CHAPTER 1

THE ROLE OF FOCUS IN SLUICING

1.1 Introduction

Sluicing is the ellipsis of a whole embedded question except for the wh-phrase. Let us look at the examples under (1)-(2), where the (b)-examples are the sluiced versions of the (a)-examples.

(1) a. Somebody just left --guess who just left.
   b. Somebody just left --guess who. Ross (1969:252)

(2) a. He is writing, but you can't imagine what / where / why he is writing.
   b. He is writing, but you can't imagine what / where / why. Ross (1969:252)

The clause containing the sluiced interrogative is preceded (or, sometimes, followed) by another clause from which the elided material can be (syntactically or semantically) recovered, namely Somebody just left in (1b) and He is writing in (2b). I will call these clauses ANT(ecedent)-clauses. Also, in the full-fledged version of the sluicing example (1b), the interrogative clause differs from the ANT-phrase in just one phrase: we find the wh-phrase who instead of the overt Determiner Phrase (DP) somebody. The phrase in the ANT-clause that corresponds to the sluiced wh-phrase will be called ANT(ecedent)-phrase or correlate.

Two main lines have been pursued to interpret sluiced --and, in general, elided-- material. The first strategy is to consider that the missing linguistic material is never present in the syntactic derivation of the sentence. Under this analysis, the interpretation of the sluices in (1) and (2) as full questions is made possible either by pragmatics --in the same way that pragmatics allows for a full question interpretation of the bare wh-phrase in (3) (Ginzburg 1992)--, or by considering that the silent Inflectional Phrase (IP) consists of a silent proform anaphorically related to a previous IP (Hardt (1993) for VP-Ellipsis).

(3) Coffee sounds good. When? (="When shall we have coffee?")

Ross (1969:253) provides an argument that undermines this type of analysis for Sluicing: sluiced wh-phrases in German are assigned the case that they would have in the corresponding full-fledged question, as shown in (4). As Chung-Ladusaw-McCloskey (1995:§6.2) point out, it is not clear how a purely pragmatic/semantic resolution of Sluicing would derive this lexical idiosyncrasy if the responsible lexical item is never present in the structure.

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1 This is to account for the possibility of backwards Sluicing. See footnote 15 in this chapter.
2 Ross (1969:253-261) and Levin (1982:594-603) argue extensively against a particular version of this "bare wh-phrase" strategy. Their criticism targets an analysis where the sluiced wh-phrase is not embedded under an interrogative CP but is directly subcategorized for by the matrix verb. Their arguments do not extend to the version of this theory sketched above. As for examples like (3), Chung-Ladusaw-McCloskey...
(4) a. Sie wissen nicht, wem / *wen er schmeicheln will.
   They know not whom-Dat / *whom-Acc he flatter want
   "They don't know who he wants to flatter"
   
   b. Er will jemandem schmeicheln, aber sie wissen nicht wem / *wen.
   He wants somebody-Dat flatter, but they know not whom-Dat / *whom-Acc.
   "He wants to flatter someone, but they don't know who."

The second line proposes that the elided material is syntactically present at the level of representation where interpretation applies. As in other types of ellipsis, two alternative implementations of this view have been pursued in Sluicing too: the deletion approach and the copy or reconstruction approach.

Under the deletion approach (Ross 1969, Rosen 1976), the linguistic material is present in the underlying representation; a rule deletes it at surface representation (S-Str in Ross and Rosen; Phonetic Form in the current minimalist syntactic framework). This approach is attractive because it allows for a (partially) unified account of Phonological Reduction phenomena: ellipsis is taken as an extreme case of deaccenting, where the targeted segments are not just destressed but completely deleted at surface level. The VP-Reductions in (5) illustrate the two phenomena:

(5) a. VP-Ellipsis:
   Ariadna came to the party, and Monica did, too.
   
   b. VP-Deaccenting:
   Ariadna came to the party, and Monica came to the party, too.

In the copy or reconstruction approach (Williams 1977, Levin 1982, Chung-Ladusaw-McCloskey 1995), instead, the IP node corresponding to the elided material is generated empty. It is later "filled" with linguistic material, before interpretation applies. One such approach is Chung-Ladusaw-McCloskey's (CLM, henceforth), which contributes very important data and yields wider empirical coverage than any of its competitors in the "bare wh-phrase" line, in the deletion approach or in the copy approach.

CLM collect or discover some peculiar characteristics of Sluicing. In this chapter, I will concerned with the following:

(i) Restriction on possible antecedent phrases. CLM note that, in contrast to the grammatical example (1) with an indefinite antecedent, the examples (6) and (7), which display a name and a Quantificational DP as antecedent phrases respectively, are ungrammatical.

(6) *? I know that Meg's attracted to Harry, but they don't know (to) who(m).
   (CLM 1995:(28a))

3 Deaccented material is written in italics.
(7) * Each of the performers came in. We were sitting so far back that we couldn't see who {came in}.  

(CLM 1995:(30b))

(ii) Inheritance of content. The sluiced \textit{wh}-phrase seems to "inherit" the restriction imposed by the N’ of the ANT-phrase. For example, as Ginzburg (1992) notes, the sluiced interrogative clause in (8) finds a better paraphrase in (8a) than in (8b). The same judgment holds for (9):

(8) John likes some students, but I don't know who.  

a. I don't know who of the students / which students John likes. 

b. I don't know who / which person John likes. 

(9) We should put them (somewhere) in the dinning room but it's not clear where. 

a. It's not clear where in the dinning room we should put them. 

b. It's not clear where / in which place we should put them.

(iii) Sensitivity to strong islands. Sluicing with an overt indefinite antecedent and Sluicing with an implicit indefinite antecedent behave differently with respect to islands. On the one hand, as Ross notices, sluiced interrogative clauses with overt antecedents are immune to islands (and ECP), contrary to their full-fledged versions:

(10) a. Sandy was trying to work out which students would be able to solve a certain problem, but she wouldn’t tell us which one. 

b. ?* Sandy was trying to work out which students would be able to solve a certain problem, but she wouldn’t tell us which one she was trying to work out which students would be able to solve. 

(CLM 1995:(79a)-(80a))

On the other hand, CLM present the following observation, which they attribute to Chris Albert: sluices with implicit indefinite antecedents are sensitive to islands (and ECP), as their full-fledged versions are.

(11) a. * Sandy was trying to work out which students would speak, but she refused to say who to / to who(m). 

b. * Sandy was trying to work out which students would speak, but she refused to say who she was trying to work out which students would speak to. 

(CLM 1995:(102a))

CLM propose an LF algorithm specific to Sluicing and to no other kind of ellipsis to derive these facts. In their account, three LF operations are in charge of copying a syntactic structure into the empty slot and making the resulting LF representation interpretable. From the design of each of these LF operations, the peculiarities described above follow. CLM's Sluicing operations are the following:

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4 Ross does not say that sluiced \textit{wh}-phrases are immune to islands, but rather that island violations in sluiced material result in a milder ungrammaticality than island violations in overt material (p. 276ff). Levin (1982:603ff) and CLM, though, provide impeccable examples of Sluicing across islands.
(12) **IP-Recycling**: Copy the ANT-IP into the empty IP at LF.

(13) **Merger**: merge the ANT-phrase and the \(wh\)-phrase so that the semantic restriction on the domain of quantification of the Q-operator is determined both by the content of the ANT-phrase and the content of the \(wh\)-phrase.

(14) **Sprouting**: "sprout" or realize a trace in order to complete a \(wh\)-chain (i.e., when there was no overt ANT-phrase).

The aim of this chapter is to derive those three peculiarities of Sluicing from independent factors, without having to postulate a special LF mechanism for Sluicing different from the analysis of other types of ellipsis. I will pursue a deletion approach that allows us to maintain the same Recoverability Conditions for Sluicing (and IP-deaccenting) as for VP-Reduction and that derives the characteristics (i)-(iii) from independently motivated factors.

The key point of the analysis will be the presence of a Focus feature in the sluiced \(wh\)-word. I claim that, in the same way as, in VP-ellipsis, part of the explicit material in the ellipsis clause is highlighted with contrastive focal intonation, the left-over \(wh\)-word in Sluicing usually receives focal intonation too, though a special pronunciation, involving deaccenting of (at least) the whole \(wh\)-phrase, is also possible. I will show that judgments about ANT-phrases are determined by whether or not the \(wh\)-word receives focus stress, and, more concretely, that the ANT-phrase restrictions that CLM (partially) describe occur only in Sluicing with Focus and turn out to be opposite as soon as the sluiced \(wh\)-phrase is deaccented. Inheritance of content will be also shown to follow from the semantics of Focus/Background and the notion of partial answer. Finally, several factors will be argued to play a role in the (in)sensitivity of Sluicing to strong islands: besides the felicity conditions imposed by the Focus/Background structure, the necessarily narrowest scope of implicit indefinite NPs and the availability of E-type pronouns determines the puzzling facts about islands.

This chapter is organized as follows. In section 2, I present the analysis of VP-Reduction that I adopt here (Rooth 1992, 1997; Fiengo-May 1994; Tomioka (in prep.)) and that I will extend to Sluicing. We will see that Focus --as treated in Rooth (1985, 1992, 1995) or in Schwarzschild (1996, 1997a,b)-- plays a central role in this approach to Phonological Reduction. Then, I will devote sections 3, 4 and 5 to each of the aforementioned peculiarities of Sluicing, namely, to the restriction on possible ANT-phrases, to the inheritance of content effects and to the island (in)sensitivity, respectively. Section 6 summarizes the conclusions.

1.2 The Role of Focus in VP-Reduction

There is a link between Phonological Reduction and Focus, insofar as, when reduction occurs, part of the remnant material is most naturally uttered with focal
In this section, we will see that two characteristics of Ellipsis and Deaccenting follow from the presence of Focus: first, the focused remnant and its antecedent need to have parallel scope in their respective clauses; second, the focused remnant needs to contrast in semantic content with its antecedent.

1.2.1 Scope Parallelism between Antecedent and Remnant

Let us examine the scope parallelism relation first.

As proposed in Fiengo-May (1994), the recoverability condition governing VP-Ellipsis is double. First of all, the elided VP has to be syntactically identical to the antecedent VP at LF, as (15) dictates:

(15) LF-condition on VP-Ellipsis:
A VP may be elided only if it is LF-equivalent to another VP in the discourse, up to different indices.

A second condition is needed in order to account for a well-known observation: if the two VPs do not contain exactly the same indices (e.g. because they contain sloppy pronouns or different traces of movement), the binders of those indices must have parallel scope. The example (16) illustrates this parallelism requirement for binders of sloppy pronouns (Sag 1976), and the example (20) illustrates it for QR-movement of Quantificational NPs (Hirschbühler 1982, Fox 1995, Tomioka 1995):

(16) Norma told Beth’s boyfriend to give her a dime, and Judy told Lois's boyfriend to.
   a. √ Strict reading: {to give Beth a dime}. (Sag 1976)
   b. √ Sloppy reading with respect to to Lois: {to give Lois a dime}.
   c. * Sloppy reading with respect to Judy: {to give Judy a dime}.

(20) Exactly three boys admire every professor, and exactly three girls do, too.
   a. "There are exactly three boys that admire every professor, and there are exactly girls that admire every professor too."
   b. "For every professor, there are exactly three boys that admire him/her, and, for every professor, there are exactly three girls that admire him/her too."
   c. * "There are exactly three boys that admire every professor and, for every professor, there are exactly three girls that admire him/her."

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5 See Rooth (1992b:14) for a brief discussion of this issue. One could go further, like Schwarzschild (1997a), and suggest that focus stress vs. lack of focus stress is determined by the information flow of the discourse: novel material is focused, whereas known, given material is not focused. From this, the correlation between reduced constituents and focused remnants follows as an epiphenomenon: provided that a sentence adds some new information, some element in it will carry focus intonation; since only constituents providing given information can be phonologically reduced, focus stress will appear in (part of) the remnant material.

6 Besides variability in indices, Fiengo-May allow for some variability in the shape of coindexed expressions: a coindexed pronoun can take the place of a name or a trace in the elided VP. This license is known as vehicle change (see their chapter 6). A semantic alternative to this first condition is explored in Rooth (1997).
d. * "For every professor, there are exactly three boys that admire him/her, and there are exactly three girls that admire every professor."

In Fiengo-May, this parallelism condition is implemented in purely structural, syntactic terms: the pattern of indices in the ANT-clause and in the ellipsis clause has to be isomorphic. However, Rooth (1992b) argues against this approach in view of examples like (21), where the sloppy reading is available even though the sloppy Subjects Mary and Sue are not in isomorphic syntactic positions:

(21) First John told Mary I was bad-mouthing her, and then Sue heard I was.

(Rooth 1992b:30)

a. Sloppy reading: "John told Mary I was bad-mouthing Mary and then Sue heard I was bad-mouthing Sue".

Rooth proposes that the required parallelism is semantic and that it is related to the felicity conditions of Focus. He implements this idea within the focus theory developed in Rooth (1985, 1992a, 1995): a set of focus alternatives --the Focus semantic value of of β, [[β]]f-- is defined, and one of these alternatives is required to be expressed or implied in the previous discourse. Rooth's recursive definition of Focus semantic value is given under (22), and his Focus semantic condition for VP-Reduction is provided under (23):

(23) Definition of Focus semantic value:
(i) If α is a non-focused lexical item, then [[α]]f = { [[α]] }.
(ii) If α is a focused lexical item, then [[α]]f = Δσ, where σ is the type of [[α]].
(iii) If the node α has the daughters β and γ (order irrelevant), and there are types σ and τ such that <σ, τ> is the type of [[β]] and σ is the type of [[γ]], then [[α]]f = {x ∈ Δτ: ∃y, z [ y ∈ [[β]]f & z ∈ [[γ]]f & x=y(z) ]}

(24) Focus semantic condition:
There must be LF-constituents α and β dominating the ANT-VP and the reduced VP respectively such that the ordinary semantic value of α belongs to (or implies a member of) the focus semantic value of β.

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7 For a technical formulation of Fiengo-May's indexical dependency condition, see their pp. 52ff and 95ff.
8 Fiengo-May (p. 100, fn 6) present a potential counterexample to Rooth's Focus semantic condition, given in (i). This example is reminiscent of other potential counterexamples --like (ii), mentioned in Rooth--,

(i) First John told Mary I was bad-mouthing her. Then Sue behaved as though I was {bad-mouthing Sue}.
(ii) He1 bit her2, and then she2 punched him1. (attributed to Bierwisch)
I give the Focus semantic value of the second conjunct of the examples (20) and (21) below. Note how the Focus semantic condition proposed by Rooth is met in each of these examples. In the case of (20), the proposition denoted by the ANT-clause belongs to the set of alternatives generated by the Focus only if the Quantificational NPs have parallel scope. In the example (21), the Focus condition is satisfied via implicational bridging: the ANT-proposition implies a proposition in the set of alternatives of the ellipsis clause.

(20) Exactly three boys admire every professor, and exactly three GIRLS do, too.

(25) Set of Focus alternatives for the $\exists >> \forall$ reading of second conjunct of (20):

\[
[[ \{ \text{exactly three GIRLS}_1 [ \text{every professor}_2 [t_1 \text{adlime} t_2]] \}]^f
\]

\[
= \{ p : \exists Q_{<e,st>} [ \text{p} = \lambda w. \exists x (Q(x)(w) \land \forall y (\text{professor}(y)(w) \rightarrow \text{admire}(y)(x)(w))) \} \}
\]

\[
= \{ \text{that there are exactly three women that admire every professor, that there exactly three boys that admire every professor, that there are exactly three men that admire every professor, ...} \}
\]

(26) Checking Focus Condition for (20):

a. The proposition "that there are exactly three boys that admire every professor" $\in$ $[[ \{ \text{exactly three GIRLS}_1 [ \text{every professor}_2 [t_1 \text{admire} t_2]] \}]^f$.

b. The proposition "that, for every professor, there are exactly three boys that admire him/her" $\notin$ $[[ \{ \text{exactly three GIRLS}_1 [ \text{every professor}_2 [t_1 \text{admire} t_2]] \}]^f$.

(21) First John told Mary I was bad-mouthing her, and then SUE heard I was.

(27) Set of Focus alternatives for the sloppy reading of the second conjunct of (21):

\[
[[ \text{SUE}_2 \text{heard} \ I \text{was bad-mouthing her}_2] ]^f
\]

\[
= \{ p : \exists x [ \text{p} = \lambda w. x \text{heard in w} (\lambda w'. \text{bad-mouth}(x)(I)(w')) \} \}
\]

\[
= \{ \text{that Sue heard I was bad-mouthing Sue, that Mary heard I was bad-mouthing Mary, that Peter thought I was bab-mouthing Peter, ...} \}
\]

(28) Checking Focus Condition for (21):

The proposition "that John told Mary I was bad-mouthing Mary" implies the proposition "that Mary heard I was bad-mouthing Mary", which is a member of $[[ \text{SUE}_2 \text{heard} \ I \text{was bad-mouthing her}_2] ]^f$.

The same results are achieved if we use Schwarzschild's (1997a,b) Focus/ Background theory to account for this scope parallelism. Schwarzschild proposes that non-focused material needs to be given in the previous discourse, as stated in (29). (30) spells out the conditions that make an utterance "given".

(29) **Givenness Condition:**

9 From this point on, focused material will be written in capitals.
If a syntactic node is not Focus marked, it has to be given in the discourse.\(^{10}\)

(30) An utterance U counts as given iff it has a salient antecedent A and (modulo \(\exists\)-type shifting) A entails [or implies] the result of replacing Focus marked parts of U with existentially bound variables of the same semantic type.\(^{11}\)

In (31) and (32), I illustrate how this Givenness condition applies to the examples (20) and (21) respectively. In the first example, the focused Noun \textit{girls} is replaced with a variable Q of the same semantic type \(<\text{e, st}>\), which is then bound by \(\exists\)-closure. The proposition denoted by the second clause in (20) after this substitution has to be "given" (entailed or implied) in the previous discourse. This requirement enforces the desired scope parallelism between the Quantificational NPs of the antecedent and ellipsis clause, as shown in (31). In the second example, the focused name \textit{Sue} is of type e and, thus, the existentially closed variable that replaces it is, too. The resulting proposition is implied by the previous clause. Hence, the semantic scope parallelism between the binders of the sloppy pronouns is derived, too.

(20) Exactly three boys admire every professor, and exactly three GIRLS do, too.

(31) Checking Givenness for the \(\exists\gg\forall\) reading of second conjunct of (20):
   a. The antecedent proposition "that there are exactly three boys that admire every professor" entails \(\lambda w. \exists Q_{<\text{e, st}>} \exists x[Q(x)(w) \& \forall y (\text{professor}(y)(w) \rightarrow \text{admire}(y)(x)(w))]\)
   b. The antecedent proposition "that, for every professor, there are exactly three boys that admire him/her" does not entail or imply \(\lambda w. \exists Q_{<\text{e, st}>} \exists x[Q(x)(w) \& \forall y (\text{professor}(y)(w) \rightarrow \text{admire}(y)(x)(w))]\)

(21) First John told Mary I was bad-mouthing her, and then SUE heard I was.

(32) Checking Givenness for the sloppy reading of the second conjunct of (21):
   The antecedent proposition "that John told Mary I was bad-mouthing Mary" implies \(\lambda w. \exists x_{\text{e}}[\text{heard}(\lambda w'. \text{bad-mouth}(x)(I)(w'))(x)(w)]\)

1.2.2 Contrast between Antecedent and Remnant
   A second characteristic of elliptical constructions that follows from the semantics of Focus is the following: focused material in remnants has to contrast semantically with the

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\(^{10}\) A whole constituent may be Focus marked even if only part of it receives focal stress. See Selkirk (1995), Truckenbrodt (1995) and Wold (1995) for Focus Projection (i.e., for the relation between focal stress and semantic Focus marking). For the purposes of this chapter, though, we can equate stressed material with Focus marked material.

\(^{11}\) Since entailment is only defined for propositions, \(\exists\)-type shifting is needed when givenness is checked for non-clausal nodes. The addition "or implies" is mine and is aimed to account for Rooth's implicational bridging examples.
corresponding portion of the antecedent phrase. This is shown by the contrast in the VP-ellipsis example (33) and, independently of ellipsis, in (34):

(33) a. Rosa₁ wanted to come to the U.S., but she₁ \text{WON'T}_{F-marked}.
    b. # Rosa₁ wanted to come to the U.S., but SHE₁ \text{F-marked} \text{WON'T}_{F-marked}.

(34) a. Rosa likes chocolate, and JOSE_{F-marked} likes chocolate, too.
    b. * Rosa likes chocolate, and JOSE_{F-marked} likes CHOCOLATE_{F-marked}, too.

In Schwarzschild's terminology, non-focused material has to be new, not given in the previous discourse. The utterances (33b) and (34b) are odd because they have focal stress on material whose denotation is already given in the previous sentence, namely on she₁ (=Rosa) and on chocolate.

To account for this fact, Schwarzschild proposes the contraint in (35), which he views as an instance of Grice's Maxim of Quantity (limit the felicity conditions of your utterance as much as possible) (1996a:26).

(35) **Avoid Focus Constraint**: (Avoid F)

Focus-mark as little as possible, without violating Givenness (or Rooth's Focus condition).

Let us see this constraint at work with the example (34). First, we see that Avoid F is satisfied in (34a), since sparing the Focus marking of Peter would make the fulfillment of Rooth's Focus condition --as shown in (36)-- and of Schwarzschild's Givenness requirement --as in (37)-- impossible:

(34) a. Rosa likes chocolate, and JOSE likes chocolate, too.

(36) Checking felicity of Focus in Rooth:

\[ (√ \text{Focus Condition:} \quad [[\text{Mary likes chocolate}]] \in [[\text{PETER likes chocolate}]]^f) \]

\[ (√ \text{Avoid Focus Principle:} \quad [[\text{Mary likes chocolate}]] \not\in [[\text{Peter likes chocolate}]]^f) \]

(37) Checking felicity of Focus in Schwarzschild:

\[ (√ \text{Givenness Condition:} \quad [[\text{Mary likes chocolate}]] \text{ entails } \lambda w. \exists x . [\text{like(chocolate)(x)(w)}] \]

\[ (√ \text{Avoid Focus Principle:} \quad [[\text{Mary likes chocolate}]] \text{ does not entail } \lambda w. \text{like(chocolate)(j)(w)}] \]

If we turn now to (34b), we can see that the utterance is unfelicitous precisely because the focal stress (or Focus marking) on chocolate is not necessary for the Focus condition and the Givenness condition to be met. That is, even if we do not focus this constituent, those two conditions are satisfied, as (38) and (39) show:
(34) b. * Rosa likes chocolate, and JOSE likes CHOCOLATE, too.

(38) Checking felicity of Focus in Rooth:
   √ Focus Condition:
   
   $[[\text{Mary likes chocolate}]] \in [[\text{PETER likes CHOCOLATE}]]^f$

   * Avoid Focus Principle:
   
   $[[\text{Mary likes chocolate}]] \in [[\text{PETER likes chocolate}]]^f$

(39) Checking felicity of Focus in Schwarzschild:
   √ Givenness Condition:
   
   $[[\text{Mary likes chocolate}]]$ entails $\lambda w. \exists x \forall y [\text{like}(y)(x)(w)]$

   * Avoid Focus Principle:
   
   $[[\text{Mary likes chocolate}]]$ entails $\lambda w. \exists x [\text{like(chocolate)}(x)(w)]$

   In sum, Avoid F dictates that unnecessary Focus stress (or Focus marking) has to be avoided. Hence, focal stress in a constituent yields an utterance felicitous only if that constituent provides new information, that is, only if it contrasts in meaning with its antecedent in the ANT-clause.

   To summarize this section 2, we have seen that part of the remnant material in VP-Ellipsis (and, in general, in other elliptical constructions) usually receives focal intonation. Structures containing focused constituents are subject to two types of requirements: first, a background condition requires the non-focused material to be entailed or implied by the previous discourse (Rooth's Focus condition or Schwarzschild's Givenness condition); second, a novelty condition requires the focused portion to be novel (Avoid F). These are all felicity conditions for Focus, no matter whether the focused constituent is a remnant in an ellipsis construction or not. From them, two characteristics of focused (remnant) constituents follow:

   (40) a. The focused remnant and its antecedent must have parallel scope in their respective clauses.
   
   b. The focused remnant must contrast in meaning with its antecedent.

   In the next sections, I will make crucial use of these two characteristics of focused remnants in order to explain the observed peculiarities of Sluicing.

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12 Rooth builds this contrastiveness requirement directly into the semantic of Focus (namely, into the semantics of the squiggle operator). I choose Schwarzschild's Avoid F Constraint over Rooth's strategy since it yields a more elegant account of the minimality of Focus, both with multiple foci --as noted by Schwarzschild-- and with the choice of the smallest possible focused constituent --as shown by Truckenbrodt (1995).
1.3 Restriction on Possible Antecedent Phrases

1.3.1 Chung-Ladusaw-McCloskey's (1995) Data and Analysis

As I mentioned above, CLM observe that not all kinds of DPs are licit ANT-phrase
for a sluice. They note that there exists an asymmetry between weak indefinite DPs and
\(wh\)-phrases, on the one hand, and names and quantificational DPs, on the other: weak
indefinite DPs and \(wh\)-phrases are licit ANT-phrases for a sluice, whereas names and
quantificational DPs are not. The relevant data from which this generalization is drawn
are given in (41) through (44); the generalization itself is sketched in (45).

(41) Indefinite DP as ANT-phrase:
   Joan ate dinner with someone, but I don't know with who.

(42) \(Wh\)-phrase as ANT-phrase:
   We know how many papers this reviewer has read, but we don't know which ones.

(43) Name as ANT-phrase:
   *? I know that Meg's attracted to Harry, but they don't know to who.

(44) Quantificational NP as ANT-phrase:
   a. * Each of the performers came in. We were sitting so far back that we couldn't see
   who.
   b. * She has read most books, but we don't know which ones.

(45) CLM's empirical generalization on ANT-phrases:

<table>
<thead>
<tr>
<th>Good ANT-phrases</th>
<th>Bad ANT-phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>weak indefinites: (41)</td>
<td>names: (43)</td>
</tr>
<tr>
<td>(wh)-phrases: (42)</td>
<td>quantificational NPs: (44)</td>
</tr>
</tbody>
</table>

As we saw, CLM propose a purely syntactic algorithm to build interpretable LFs for
sluiced interrogatives. One of their LF-operations is \textbf{IP-Recycling}, repeated in (46) and
illustrated in (47):

(46) \textbf{IP-Recycling}: Copy the ANT-IP into the empty IP at LF.
(47) Joan ate dinner with someone, but I don't know with whom.

From this operation plus the (standard) ban against vacuous quantification, the facts about ANT-phrases are derived. Let us see how. As in any interrogative clause, the Q-operator in C⁰ has to bind a variable in order to avoid vacuous quantification. Since, instead of the t_w_h, we have the antecedent phrase copied along within the recycled IP, the antecedent phrase needs to provide this free variable. CLM assume that only weak indefinites and wh-phrases are interpreted as open formulae providing a free variable at LF --following Kamp(84)/Heim(82) framework--, whereas names and Quantificational NPs do not introduce a free variable. This assumption renders the desired empirical coverage: Q-binding succeeds when the antecedent phrase is an indefinite or a wh-phrase; it results in vacuous quantification otherwise.

1.3.2 Revision of the Data

1.3.2.1 Further Data on Good and Bad ANT-Phrases

A broader set of data will show that the facts about ANT-phrases are not as captured by the generalization in (45). In the examples (48) and (49), we have a weak indefinite and a wh-phrase as ANT-phrases respectively; yet, sluicing is ungrammatical. On the

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13 CLM use Karttunen’s denotations for interrogatives clauses, that is, sets of propositions. I understand that the semantic contribution of the Q-operator they present is double. On the one hand, it turns proposition denoting expressions into question denoting expressions, much like Karttunen’s (1977) Proto-Question Rule (p. 13). On the other hand, it is in charge of binding the free variable (the trace) left by wh-movement within the IP, which was done by a separate rule --Wh-Quantification Rule, p. 19-- in Karttunen. This second aspect of the Q-operator’s semantics is the crucial one for their argumentation on good and bad ANT-phrases.

14 Although they do not say explicitly so, CLM probably assume that strong indefinite DPs are interpreted as open formulae too, since those are perfect ANT-phrases for Sluicing:

(i) She’s read one of these books, but I don’t know which one.
other hand, names and quantificational DPs functioning as ANT-phrases do not result in ungrammaticality in (50)-(51), unexpectedly too.

(48) Indefinite NP as ANT-phrase:
   * I know that four students came to the party, but they don't know HOW MANY.

(49) Wh-phrase as ANT-phrase:
   a. * We know how many papers this reviewer has read, but they don't know HOW MANY.
   b. * We know which papers this reviewer has read, but they don't know WHICH ones.

(50) Name as ANT-phrase:
   I know that Joan, Pat, Sam and Paul danced the first tango, but I don't know WHO with WHO.15

(51) Quantificational NP as ANT-phrase:
   a. She has read most books, but we don't know EXACTLY which ones.16
   b. I know everybody danced with somebody, but I don't know WHO with WHO.

Contrary to what CLM had concluded from their data, the examples (48)-(49) show that the variable provided by the ANT-phrase is not sufficient to yield a grammatical sluice, and the examples (50)-(51) show that it is not necessary either. The generalization resulting from the previous and new data is given under (52).

(52) New empirical generalization on ANT-phrases:

<table>
<thead>
<tr>
<th>Good ANT-phrases</th>
<th>Bad ANT-phrases</th>
</tr>
</thead>
<tbody>
<tr>
<td>indefinites: (41)</td>
<td>indefinites: (48)</td>
</tr>
<tr>
<td>wh-phrases: (42)</td>
<td>wh-phrases: (49)</td>
</tr>
</tbody>
</table>

15 Examples (50) and (51b) are not cases of gapping for two reasons. First, VP-ellipsis and Sluicing can occur in embedded clauses, as Reinhart-Rooth (1986:4) point out, but gapping can happen only in matrix clauses (Hankamer 1971:19, Johnson 1996:21):
   (i) Alfonse stole the emeralds and Muggsy the pearls.
   (ii) * (I think) Alfonse stole the emeralds, and I / Harvey think(s) Muggsy the pearls. (Hankamer 1971:19)
   Second, Tomioka (p.c.) pointed out to me that backward Sluicing is possible, as in (iii). Again, multiple wh-remnants pattern like Sluicing (ex. (iv)) rather than like gapping (ex.(v)) in this respect:
   (iii) I don't know WHO, but I'm sure she's dating somebody.
   (iv) I don't know WHO with WHO, but I'm sure everybody will dance with somebody.
   (v) * Alfonse the emeralds and Muggsy stole the pearls.
   It is not clear, though, how to treat (50) and (51b) as ellipsis of a whole IP. Maybe the (usually LF)movement of the in-situ wh-phrase of a multiple question is done by Spell-Out in Sluicing. Note, in any case, that a similar problem arises with stranded prepositions, which in full interrogatives clauses appear in base generated position but in Sluicing may follow immediately the wh-phrase, as in (vi). Again, this is not a case of gapping since the ellipsis is embedded. (On deleted and stranded prepositions in Sluicing, see Ross (1969:265-6), Rosen (1976), Levin (1982:606ff) and CLM (1995:fn1))
   (vi) She went out for dinner, but I don't know WHO with.

16 The example (51a) is CLM's. They leave its explanation for further research.
From this generalization, we conclude that the kind of DP that constitutes the ANT-phrase does not determine by itself the (un)acceptability of the ANT-phrase in a sluice.

But we can still go further. So far, the examples we have seen --i.e., CLM’s examples and the new examples in (48)-(51)-- involve focus stress on the $wh$-word. What would happen if we enforce a special intonation of Sluicing, removing the focus pitch and deaccenting the whole $wh$-phrase (and maybe some more material)? It turns out that, in this case, the ungrammatical examples (48), (49) and (43) become grammatical, as (48’), (49’) and (43’) show:

(48’) I know that four students came to the party; THEY don’t know how many.

(49’) a. We know how many papers this reviewer has read, but THEY don’t know how many.
   b. We know which papers this reviewer has read, but THEY don’t know which ones.

(43’) I know that Meg’s married to Harry; THEY don’t know to who.

---

17 In these deaccented examples, I change the stress pattern of the second conjunct in order to make it possible for the reader to deaccent the $wh$-Determiner. It seems that phonologically reducing some syntactic material --because it is redundant-- involves stressing some other constituent that brings new information --in this case, the main Subject THEY.

Notice, however, that placing focus stress on the subject they is not directly responsible for the improvement of the sluicing, since the example with stress on they but also on the $wh$-word is still bad:

(i) * We know how many papers this reviewer has read; (but) THEY don’t know HOW MANY.

18 Some speakers do not get a contrast between the focused version and the deaccented version of example (43) in English, thus ruling out both. In Catalan and Spanish, instead, there is a clear cut contrast: (i) is a perfect sluice without Focus on the $wh$-word (the two main subjects sound as contrastive Topics), whereas the focused version (ii) is odd, only salvagable if the previous context is independently motivating the Focus in the $wh$-word:

(i) Nosaltres sabem que la Nuria esta interessada en el Pere, pero ells no sabem en qui. (Catalan)
   Nosotros sabemos que Nuria esta interesada en Pedro, pero ellos no saben en quien. (Spanish)
   We know that (the) Nuria is interested in (the) Peter, but they not know in who.

(ii) # Nosaltres sabem que la Nuria esta interessada en el Pere, pero ells no sabem en QUI. (Catalan)
    # Nosotros sabemos que Nuria esta interesada en Pedro, pero ellos no saben en QUIEN. (Spanish)

At this point, I do not have any explanation for this disagreement. The analysis that I will propose rules in (43’) as well as (i). Further research needs to be done on the nature of which-phrases in those languages.

Also, examples like (44a), with a QuNP as ANT-phrase, do not turn grammatical when the $wh$-word is deaccented, as (iii) shows, not even in Catalan/Spanish. Note, though, that its full-fledged, non-deaccented version in (iv) is not perfect either. The status of this type of examples may depend on the relation between questions and total and partial answers, a factor that will be shown to play a crucial role in other examples of Quantificational ANT-NPs, like (44b)-(51a) (=v). See subsection 3.5 on this issue.

(iii) * Tobi knows that each of the performers came in; SIMONE doesn’t know who.

(iv) ?? Tobi knows that each of the performers came in, but SIMONE doesn’t know who came in.

(v) She has read most books, but we don’t know *(EXACTLY) which ones.
By contrast, the grammatical examples (41), (42), (50) and (51b) deteriorate up to ungrammaticality if the sluiced \textit{wh}-phrase is deaccented:

$$\text{(41')} * \text{I know that Joan ate dinner with someone, but THEY } \text{don't know with who.}$$

$$\text{(42')} * \text{We know how many papers this reviewer has read, but THEY } \text{don't know which ones.}$$

$$\text{(50')} * \text{I know that Joan, Pat, Sam and Paul danced the first tango, but THEY } \text{don't know who with who.}$$

$$\text{(51')} \text{b. * I know everybody danced with somebody, but THEY } \text{don't know who with who.}$$

If we take a close look at the good and bad examples, the following generalization arises. When the sluiced \textit{wh}-word bears \textit{focus} stress, any kind of DP will be an acceptable ANT-phrase if and only if it \textit{contrasts} with the information asked by the \textit{wh}-phrase; that is, iff the question denoted by the ANT-clause is not the same as the question denoted by the sluiced clause (e.g., if the ANT-clause inquires about the quantity or existence of students and the sluiced interrogative asks for their identity). If there is \textit{no focus} on the \textit{wh}-phrase, instead, a DP will be a good ANT-phrase if and only if the denotaton of the ANT-clause and the denotation of the sluiced interrogative are the same.

\subsection*{1.3.2.2 IP-Deaccenting vs. IP-Ellipsis (or Sluicing)}

IP-Deaccenting patterns like Sluicing, even though no IP-Recycling or binding of a free variable is involved. This is shown by the oddness of both (53) and its deaccented version (54), which differ only in terms of the syntactic presence or absence of the IP, keeping the focus stress equal:

$$\text{(53) *? I know that Meg's attracted to Harry, but they don't know to WHO.}$$

$$\text{(54) ?? I know that Meg's attracted to Harry, but they don't know to WHO \textit{Meg's attracted}.}$$

If the oddness of (53) and (54) is to be accounted for in a unified fashion, it cannot be due to any syntactic operation to recover elided material, since there is no elision in the deaccenting case.

In conclusion, the new data on good and bad ANT-phrases and on IP-deaccenting presented in this subsection have shown that the acceptability of an ANT-phrase does not depend on the kind of DP by itself. Instead, the acceptability of an ANT-phrase is the result of the interaction of two factors: the presence/absence of focus on the \textit{wh}-word and the contrast/similarity between an ANT-denotation and the denotation of the sluiced interrogative clause (or higher constituent). This contrast/similarity hinges on the
semantic contribution of both the ANT-phrase and the \textit{wh}-word, not just on the shape of the ANT-phrase by itself.

1.3.3 Proposal

In this section, I will derive the data above from the focus stress on the sluiced \textit{wh}-word and not from LF-operations specific to Sluicing. I will show that VP-Reduction and Sluicing can receive a unified analysis --namely, the one described in section 2-- and that the facts about ANT-phrases follow from the felicity conditions of Focus. The crucial condition will be Avoid F, which --as we saw-- is directly responsible for the characteristic in (55) (=40b) that focused material displays:

(55) The focused remnant must constrast in meaning with its antecedent.

Let me first recapitulate the Recoverability Conditions for VP-Ellipsis, which I slightly modify to cover IP-Ellipsis (i.e., Sluicing), too. The LF-Condition in (56) is only operative for ellipsis; the Background condition (in either Rooth's version or Schwarzschild's version) and Avoid F describe the felicity conditions of Focus/Background and, hence, apply to both ellipsis and deaccenting of constituents.

(56) \textbf{LF-condition:}
A constituent may be elided only if it is LF-equivalent to another constituent in the discourse, up to different indices.

(57) \textbf{Background condition:}
a. Rooth's Focus condition:
There must be LF-constituents \(\alpha\) and \(\beta\) dominating the ANT-constituent and the phonologically reduced constituent respectively such that the ordinary semantic value of \(\alpha\) belongs to (or implies a member of) the focus semantic value of \(\beta\).
b. Schwarzschild's Givenness condition:
If a syntactic node \(\beta\) is not Focus marked, there has to be a salient antecedent \(\alpha\) such that (modulo \(\exists\)-type shifting) \(\alpha\) entails or implies the result of replacing the Focus marked parts of \(\beta\) with existentially bound variables of the same type.

(58) \textbf{Avoid Focus Constraint:}
Avoid Focus, unless needed to fulfill the background condition (57).

In order to apply this framework to Sluicing, I need to define a class of alternative denotations of the same semantic type for the focused portion of the \textit{wh}-phrase, so that either version of the background condition can apply. We have seen that several kinds of NPs may contrasts with a focused \textit{how many} phrase or with a focused \textit{which} phrase, in the appropriate circumstances: contrasting ANT-phrases may be indefinites, names, quantificational NPs and, also, \textit{wh}-phrases themselves. I will take the examples with antecedent \textit{wh}-phrases as the core cases to define the desired set of alternatives. I will then propose that ANT-clauses containing other kinds of ANT-phrases satisfy the
background conditions not by direct membership to the set of Focus alternatives, but by implicational bridging (or logical entailment).

In all the examples that we have seen, the Focus of the *wh*-phrase was placed on the *wh*-Determiner. Hence, our task is to define the set of alternatives of a focused *wh*-Determiner. The denotations of *which* and *how many* are obvious alternatives to each other, and they behave as such in Sluicing examples, e.g., in (58a). We still need, though, a third alternative in view of the examples (58b)-(58c): the interrogative Complementizer *whether*, together with the Determiner *any*, seems to build a question denotation that functions as an alternative to the corresponding *how many*-question and *which*-question. That is, each of the questions denoted by the embedded interrogative clauses in (59) are Focus alternatives of each other (or entail the Focus-∃-closure version of each other).

(58) a. They usually ask *how many* papers the candidate reviewed for the journal, but they never ask *WHICH* ones.
   b. They usually ask *whether* the candidate reviewed *any* papers for the journal, but they never ask *HOW MANY*.
   c. They usually ask *whether* the candidate reviewed *any* papers for the journal, but they never ask *WHICH* ones.

(59) a. They ask which papers the candidate reviewed for the journal.
   b. They ask how many papers the candidate reviewed for the journal.
   c. They ask whether the candidate reviewed any papers for the journal.

A sample LF for these three kinds of alternative interrogatives clauses is given under (60). Note that the *wh*-phrase is split in two parts: the *wh*-morpheme that moves to Spec-CP and the rest of the *wh*-phrase, that is, the left-over *wh*-Determiner t2-*which/many* plus the NP *students*. The *wh*-morpheme is identical for all three alternative questions; the Focus feature is placed on the left-over Determiner, excluding the trace of *wh*-movement.19

(60) (I know) which / how many / whether some students came.

19 Alternatively, we could consider that *wh*-phrases introduce a free variable and that the Q-operator in C0 (un)selectively binds this variable (the free variable would take the place of the trace t2), as in Baker (1970). Also, in the chapter on *which* phrases, I conclude that the index (free variable or trace) that a *which* phrase introduces ranges over intensional choice functions rather than over individuals. To make the denotation of *how many* phrases parallel, I would have to say that *how many* ranges not over individuals (numbers), but over intensional choice functions that yield "numerical" concepts as values. Note that this sophistication may turn out to be empirically motivated in view of examples like (i) and (ii), which have a reading where the particular number varies from bouletic world to bouletic world (intensional reading in (i)) and for world-player pairs (intensional functional reading in (ii)). For perspicuity, I will present my analysis of Sluicing as though *wh*-phrases ranged over individuals.

(i) Q: How many papers do you want me to read per week?
   A: As many as your T.A. considers appropriate.
(ii) Q: How many friends of his1 does the coach want every player1 to bring along to the game?
   A: As many as he1 brought to the winter final.
The intended semantic values of the relevant lexical entries in (60) are given in (61) through (64). First, under (61), I present the denotation of the wh-morpheme, common in all three alternative trees.

(61) \[ [[\text{wh-}]] = f \in D_{\langle e, s, st, t, o, w, o \rangle} \text{ such that, for every } P \in D_{\langle e, s, st, t, o, w, o \rangle}, \]
\[ \text{every } w \in D_s, \text{ and } p \in D_{st}, \]
\[ f(P)(w)(p) = 1 \quad \text{iff} \quad \exists x [P(x)(w)(p)] \]

(62) and (63) introduce the semantic value of the left-over wh-Determiners many and (wh)ich. Note that, once their denotations are combined with the value of \( t_2 \), their semantic types are the standard one for Determiners (\( \langle e, st, o, w, o \rangle, \text{ abbreviated as } \delta \)).

(62) \[ [[\text{many}]] = f \in D_{\langle e, \delta \rangle} \text{ such that for every } n \in D_e, \text{ every } P, Q \in D_{\langle e, st \rangle} \text{ and } \]
\[ \text{every } w \in D_s, \]
\[ f(n)(P)(Q)(w) = 1 \quad \text{iff} \quad \exists x [P(x)(w) & Q(x)(w)] \]

(63) \[ [[(\text{wh})ich]] = f \in D_{\langle e, \delta \rangle} \text{ such that for every } x \in D_e, \text{ every } P, Q \in D_{\langle e, st \rangle} \text{ and } \]
\[ \text{every } w \in D_s, \]
\[ f(x)(P)(Q)(w) = 1 \quad \text{iff} \quad P(x)(w) & Q(x)(w) \]

Finally, under (64), a function \( j \) is defined with the same semantic type as many and (wh)ich to yield the third alternative, namely the propositional concept "whether some students came". This function \( j \) does not correspond to any syntactic constituent; it is just a semantic object of the same type as the semantic objects referred to by many and (wh)ich.

\[ 20 \text{ The reader should take this particular implementation of the whether alternative as tentative and rough. I have to leave for further research many issues concerning the semantics of whether that may prove relevant to our discussion. Among others, let me mention that, even though the function } j \text{ does not correspond to one single lexical item, it may turn out to be the denotation of a discontinuous syntactic constituent, namely the } \]

23
Function \( j \in D_{e,<,\delta} \) such that for every \( n \in D_e \), every \( P, Q \in D_{e,st} \) and every \( w \in D_s \),

\[
j(n)(P)(Q)(w) = 1 \iff \exists x [P(x)(w) \& Q(x)(w)]
\]

The result of the semantic computation yields Hamblin-type denotations for questions, that is, a function from worlds to sets of propositions (to each world \( w \), this function assigns the set of possible answers to that question in \( w \)). The reader can follow the details of the computation in (65)-(67).{\textsuperscript{21}}

---

**denotation of crosscategorial whether** associated with any. That whether may associate with any to form a unit is suggested by two types of data.

The first set of data involves displacement of pitch accent onto the associated element. The crosscategorial disjunction burried in whether can conjoin not only clauses but also smaller constituents, as in (i.a) and (ii.a). Larson (1985) proposes that, in either case, whether originates next to the disjunction and forms a constituent with it (the constituent (whether IP or IP in (i.a), and (whether John or Mary in (ii.a)). Note that, if we want to make the questions in (i.a) and (ii.a) contrastive, the Focus pitch accent falls on the disjunct constituent (if present), not on whether, as (i-ii,b,c,d) show. Crucially, as A. Kratzer (p.c.) pointed out to me, the same displacement can be executed for whether...any, as (iii) shows.

**Example:**

(i) a. I'll tell you whether she came (or not).
   b. I'll tell you WHETHER she came (... but not WHY).
   c. # I'll tell you WHETHER she came or not (... but not WHY).
   d. I'll tell you whether she came or NOT (... but not WHY).

(ii) a. I'll tell you whether she visited John or Mary.
   b. # I'll tell you WHETHER she visited John or Mary (... but not WHY).
      (It can only mean "whether she visited J or M or she didn't").
   c. I'll tell you whether she visited JOHN or MARY (... but not WHY).

(iii) a. They ask WHETHER the candidate reviewed papers for the journal.
   b. They ask whether the candidate reviewed ANY papers for the journal.
      The second piece of data concerns examples like (iv), also brought to my attention by A. Kratzer. For many speakers, the examples in (iv) are good sluices under the readings "how many books", "how many paintings", "which guy", which are different from "how many good books", "how many famous paintings" and "which American guy". Here again, whether and the focused adjective seem to form a syntactic/semantic unit that contrasts with the interrogative Determiner how many or which.

(iv) a. I want to know whether you've read GOOD books this summer (or NOT). I don't want to kow HOW MANY.
   b. This guidebook doesn't tell you whether a museum has FAMOUS paintings (or NOT). It only tells you HOW MANY.
   c. The immigration officers will ask you whether you are dating an AMERICAN guy (or NOT). They definitely won't ask you WHO.

---

\[d(\text{whether any student came})\]

\[= 1 \iff \forall p [Q(w)(p) & p(w)] \rightarrow x \text{ believes } p \text{ in } w\ , \text{ and}
\]

\[b. \text{ if } \neg \exists p [Q(w)(p) & p(w)], \text{ then } x \text{ believes in } w (\lambda w'. \neg \exists p [Q(w')(p) & p(w')]).\]

---

\[d(\text{whether any student came})\]

21 In Hamblin (1973), as in Karttunen (1977), the proposition "no student came" does not belong to the denotation of which student came (=66). To account for the meaning of know which students came when no student actually came, I adopt Karttunen's (1977:in11) denotation of know (or Heim's (1994) elaboration on it), modified as in (i) to match Hamblin's denotations. The same strategy can be used to derive this case from the denotation that I propose for whether any student came (=67), which differs from Karttunen's (and may be different from what Hamblin had envisaged, too --see Hamblin p. 50).

(i) \[[\text{know}]](Q)(x)(w)=1 \iff
\]

\[a. \ \forall p [Q(w)(p) & p(w)] \rightarrow x \text{ believes } p \text{ in } w\ , \text{ and}
\]

\[b. \text{ if } \neg \exists p [Q(w)(p) & p(w)], \text{ then } x \text{ believes in } w (\lambda w'. \neg \exists p [Q(w')(p) & p(w')]).\]
(65) (I know) how many students came.

\[
\begin{array}{c}
\text{CP} \quad \lambda w \lambda p. \exists n \left[ p = \lambda w'. \exists x \left[ \text{student}(x)(w') \land \text{came}(x)(w') \right] \right] \\
\quad q \quad p \\
\text{wh}_2 \quad C' \quad \lambda n \lambda w \lambda p. p = \lambda w'. \exists x \left[ \text{student}(x)(w') \land \text{came}(x)(w') \right] \\
\lambda P \lambda w \lambda p. \exists n[P(n)(w)(p)] Q p \\
\quad O \quad \text{IP} \quad \lambda w'. \exists x \left[ \text{student}(x)(w') \land \text{came}(x)(w') \right] \\
\lambda q \lambda w \lambda p. p = q \\
\quad \text{WhP}_1 \quad \text{IP} \quad \lambda x \lambda w'. \text{came}(x)(w') \\
\quad w \quad o \quad 6 \\
\quad \text{Wh}^0 \quad \text{NP} \quad t_1 \text{ came} \\
\quad 6 \\
\text{wh}_2 - \text{MANY students} \\
\lambda Q \lambda w'. \exists x \left[ \text{student}(x)(w') \land Q(x)(w') \right] 
\end{array}
\]

(66) (I know) which students came.

\[
\begin{array}{c}
\text{CP} \quad \lambda w \lambda p. \exists x \left[ p = \lambda w'. \text{student}(x)(w') \land \text{came}(x)(w') \right] \\
\quad q \quad p \\
\text{wh}_2 \quad C' \quad \lambda x \lambda w \lambda p. p = \lambda w'. \text{student}(x)(w') \land \text{came}(x)(w') \\
\lambda P \lambda w \lambda p. \exists x[P(x)(w)(p)] Q p \\
\quad O \quad \text{IP} \quad \lambda w'. \text{student}(x)(w') \land \text{came}(x)(w') \\
\lambda q \lambda w \lambda p. p = q \\
\quad \text{WhP}_1 \quad \text{IP} \quad \lambda x \lambda w'. \text{came}(x)(w') \\
\quad w \quad o \quad 6 \\
\quad \text{Wh}^0 \quad \text{NP} \quad t_1 \text{ came} \\
\quad 6 \\
\text{wh}_2 - (WH)ICH students \\
\lambda Q \lambda w'. \text{student}(x)(w') \land Q(x)(w') 
\end{array}
\]
(67) (I know) whether any students came.

\[
\text{CP } \lambda w \lambda p. \exists n \left[ p = \lambda w'. \exists x \left[ \text{student}(x)(w') \land \text{came}(x)(w') \right] \right]
\]

\[
\lambda P \lambda w \lambda p. \exists \left[ P(n)(w)(p) \right] q \rightarrow P
\]

\[
\lambda \exists x \left[ \text{student}(x)(w') \land \text{came}(x)(w') \right]
\]

In sum, a formalization has been proposed that yields, for any interrogative clause of the shape WHICH P are Q and HOW MANY P are Q, the following alternative question denotations: "which P are Q", "how many P are Q" and "whether some P are Q".22 23

---

22 This same set of alternatives may be used to derive the existence presupposition that arises in full-fledged interrogative clauses with a focused wh-word, as discussed in Hajicová (1983): (i) does not presuppose (ic), but (ib) does:

(i) a. Who arrived late?
   b. WHO arrived late?
   c. Somebody arrived late.

The rough idea is the following: the focus stress on the wh-word presupposes the existence of an alternative to who arrived late. If no such alternative is provided in the discourse, it is accommodated, as any other presupposition. Now, asking who arrived late while presupposing that how many people arrived late and did anybody arrive late have already been asked, is a coherent discourse only if the speaker assumes that somebody indeed arrived late, since otherwise who arrived late would have been already answered.

23 The Sluicing examples that we have examined involved focus stress on the wh-Determiner. Evidence from particles associated with Focus shows that a wider Focus is possible too, namely, a Focus on the whole wh-phrase. In (i), for example, the stressed when can be understood as contrasting with "where", "why", "with whom", etc. That is, besides the Determiner alternatives (yielding "how many times" and "whether... at any time"), we need a set of alternatives for the whole constituent. The same happens in (ii), where the patient-argument what constrasts with the manner-adjunct how.

(i) I only know WHEN she left (i.e., I don't know where to, or why, or with who...).
   (ii) I liked not only WHAT she ordered, but also HOW she ordered it.

Note that this phrasal (maybe thematic-role) Focus also occurs with non-wh-phrases, as (iii) and (iv) show. I leave for further research the implementation of this type of Focus.

(iii) I only knew that she left [at 3pm]F-marked. I didn't know that she left [with PAT]F-marked.
   (iv) Not only did she order [WINE]F-marked. She also ordered it [with a Catalan ACCENT]F-marked.
1.3.4 Deriving the Contrast Cases

In this subsection, we will derive the (un)grammaticality of all the above examples -- with indefinite DPs, *wh*-phrases, names and QuNPs as ANT-phrases -- by using the Recoverability Conditions in (56)-(58) and the set of alternatives of a *wh*-Determiner that I just proposed.

Let us examine, first, the examples with *wh*-phrases as ANT-phrases. I will illustrate how the Generalized Recoverability Conditions work with a grammatical example and with an ungrammatical one. The example (68) (= (42)) is grammatical because the LF-condition, the Background conditions and the Avoid Focus Constraint are all met. The LF-representation of the ANT-IP and of the elided IP are identical up to indices, as (68a) shows. Also, the denotation of the ANT-clause belongs to the focus semantic value of the sluiced interrogative --as shown in (68b)-- and entails the Focus-∃-closure of the ellipsis clause --as in (68b'). And, finally, the Avoid Focus Constraint is not violated because the focus on the sluiced *wh*-Determiner is not superfluous but necessary to fulfill either version of the Background condition, as sketched in (68c).

(68) We know how many papers this reviewer has read, but we don't know WHICH ones.

a. √ LF-Condition: \[ \text{this reviewer has read } t_1 \] is LF-identical to \[ \text{this reviewer has read } t_2 \], up to different indices.

b. √ Rooth's Focus condition, since:

\[ [\text{how many papers this reviewer has read}] \in [\text{WHICH papers this reviewer has read}] \], which equals

"which papers this reviewer has read", "how many papers this reviewer has read", "whether this reviewer has read some papers"

b'. √ Schwarzschild's Givenness condition, since:

\[ \lambda w. \exists x \in \mathcal{P} \left[ \lambda w'. \exists x \left[ w = \lambda w''. \left[ \lambda p. \exists x \left[ p = \lambda w'. \left[ \text{papers this reviewer has read} \right] \right] \right] \right] \right] \left[ \text{papers this reviewer has read} \right] \left( x \right) \left( w \right) \]

c. √ Avoid Focus Constraint, since:

\[ [\text{how many papers this reviewer has read}] \notin [\text{which papers this reviewer has read}] \]

\[ [\text{which papers this reviewer has read}] \], which equals

"which papers this reviewer has read"; and

\[ \lambda w. \exists x \in \mathcal{P} \left[ \lambda w'. \exists x \left[ w = \lambda w''. \left[ \lambda p. \exists x \left[ p = \lambda w'. \left[ \text{papers this reviewer has read} \right] \right] \right] \right] \right] \left[ \text{papers this reviewer has read} \right] \left( x \right) \left( w \right) \]

does not entail

\[ \lambda w. \exists x \in \mathcal{P} \left[ \lambda w'. \exists x \left[ w = \lambda w''. \left[ \lambda p. \exists x \left[ p = \lambda w'. \left[ \text{papers this reviewer has read} \right] \right] \right] \right] \right] \left[ \text{papers this reviewer has read} \right] \left( x \right) \left( w \right) \]

24 The example (51a), involving the adverb *exactly*, will be explained in the next subsection (3.5).

25 I use a hybrid object-language/metalanguage notation in this and the next (b')-formulations. This more perspicuous notation should be taken as a short-cut to convey the corresponding accurate formulations, which I exemplify for (68b') under (i):

(i) \[ \lambda w. \exists x \in \mathcal{P} \left[ \lambda w'. \lambda p. \exists x \left[ w = \lambda w''. \left[ \lambda p. \exists x \left[ p = \lambda w'. \left[ \text{papers this reviewer has read} \right] \right] \right] \right] \right] \left[ \text{papers this reviewer has read} \right] \left( x \right) \left( w \right) \]

entails

\[ \lambda w. \exists x \in \mathcal{P} \left[ \lambda w'. \lambda p. \exists x \left[ w = \lambda w''. \left[ \lambda p. \exists x \left[ p = \lambda w'. \left[ \text{papers this reviewer has read} \right] \right] \right] \right] \right] \left[ \text{papers this reviewer has read} \right] \left( x \right) \left( w \right) \]
Example (69) (=49a)), instead, is ungrammatical. The LF and Background conditions are met exactly as in (68), but the focus feature on the *wh*-Determiner is superfluous and, hence, should not be there.

(69) * We know how many papers this reviewer has read, but they don't know HOW MANY.
   c. * Avoid Focus Constraint, since:
      
      $[[\text{how many papers this reviewer has read}]] \in 
      [[\text{how many papers this reviewer has read}]]^f; \text{ and}$
      
      $\lambda w. \exists x \exists P \left[ P \left( [[\text{how many papers this reviewer has read}]] \right) \left( x \right) \left( w \right) \right]$
      
      entails
      
      $\lambda w. \exists x \exists P \left[ P \left( [[\text{how many papers this reviewer has read}]] \right) \left( x \right) \left( w \right) \right]$

Let us, now, turn to names. For the grammatical example (70) (=50)), all three conditions are met. After QRing the names to IP-adjunct position, we have an IP lower than the adjunction site that is LF-identical to the sluiced IP. This is captured in (60a).\(^\text{26}\) Next, the Background conditions are fulfilled as well, this time through implicational bridging, as (60b-b’) show. Finally, the focus feature is not superfluous, which can be seen in (60c).

(60) I know that Joan, Pat, Sam and Paul danced the first tango, but I don’t know WHO with WHO.
   a. √ LF-Condition: $\left[ t_1 \text{ danced the first tango} \right]$ is LF-identical
      to $\left[ t_3 \text{ danced the first tango with } t_4 \right]$, up to different indices.
   b. √ Focus condition, since:
      
      $[[\text{know that Joan, Pat, Sam and Paul danced the first tango}]]$ implies "to
      know whether somebody danced the first tango with someone", which $\in$
      $[[\text{know WHO danced the first tango with WHOM}]]^f$
   b’. √ Givenness condition, since:
      
      $\lambda w. \exists x \exists P_0 <<s,t>_{<e,s,t>>} \left[ P \left( \left[ \text{that Joan, Pat, Sam and Paul danced the first tango} \right] \right) \left( x \right) \left( w \right) \right]$ implies
      
      $\lambda w. \exists x \exists P_0' <<s,t>_{<e,s,t>>} \left[ P_0' \left( \left[ \text{whether any person danced the first tango with any person} \right] \right) \left( x \right) \left( w \right) \right]$,
      which in turn entails
      
      $\lambda w. \exists x \exists P_0 \exists D, D'_{<e,s,t>} \left[ P_0' \left( \left[ \text{D person danced the first tango with D' person} \right] \right) \left( x \right) \left( w \right) \right]$

---

\(^{26}\) In order for the two IPs to be really identical at LF, we would have to "sprout" an indefinite NP in the ANT-IP and then QR it outside the IP. However, besides the variability in indices and vehicle change that Fiengo-May allow for (see footnote 6 of this chapter), there is further evidence that the LF-identity condition has to be weakened in various ways. In section 5 in this chapter, we will see that a Quantificational NP and an E-type pronoun count as identical for ellipsis purposes, too. The case that we are looking at now may be another instance of permitted syntactic mismatch. I leave open the question whether the identity of the two IPs should be syntactic (with the above provisions) or semantic (as Rooth (1997) entertains).
c. √ Avoid Focus Principle, since:  

\[
\lambda w. \exists x \exists P \left< s,s,t > \left< e,s,t > \right> \left[ P \left( \left[ \text{[that Joan, Pat, Sam and Paul danced the first tango]} \right] (x) (w) \right) \right. 
\] 

implies

\[
\lambda w. \exists x \exists P' \left< s,s,t > \left< e,s,t > \right> \left[ P' \left( \left[ \text{[whether any person danced the first tango with any person]} \right] (x) (w) \right) \right. 
\]

which does not entail

\[
\lambda w. \exists x \exists P' \left[ P' \left( \left[ \text{[which person danced the first tango with which person]} \right] (x) (w) \right) \right. 
\]

The ungrammatical example (61) (both in its sluiced version (=43) and its deaccented version (=54)) is ruled out on the basis of the Avoid Focus constraint, like in the ungrammatical example with indefinite ANT-phrase:

(61) *? I know that Meg’s attracted to Harry, but they don’t know to WHO (Meg’s attracted).

27 Actually, the focus feature is necessary in the second WHO, but superfluous in the first WHO, as (ib) shows:

(i) √ I know that Pat, Joan, Sam and Paul danced the first tango, but I don’t know WHO with WHO.

b. Background condition:

\[
\lambda w. \exists x \exists P \left< s,s,t > \left< e,s,t > \right> \left[ P \left( \left[ \text{[that Joan, Pat, Sam and Paul danced the first tango]} \right] (x) (w) \right) \right. 
\]

implies

\[
\lambda w. \exists x \exists P' \left< s,s,t > \left< e,s,t > \right> \left[ P' \left( \left[ \text{[whether any person danced the first tango with any person]} \right] (x) (w) \right) \right. 
\]

which entails

\[
\lambda w. \exists x \exists P' \left[ P' \left( \left[ \text{[which person danced the first tango with which person]} \right] (x) (w) \right) \right. 
\]

28 According to the definition of know given in footnote 21, [[know that Meg’s attracted to Harry]] implies the property "to know to whom Meg is attracted" only in case [[Meg’s attracted to Harry]] is understood as the exhaustive true answer to the question [[who is Meg attracted to]] in the evaluation world w. This exhaustivity can be gained if the assertive clause is uttered with focus stress --free focus-- on the name Harry.

Processing studies on Sluicing by Frazier-Clifton (1995) show that there is a tendency to focus ANT-phrases on Sluicing: given two indefinite DPs in the ANT-clause, informants prefer to interpret the focused DP as ANT-phrase rather than the unfocused DP.
Finally, the examples involving good and bad indefinite and quantificational ANT-phrases, which we recapitulate under (62) and (63) respectively, are exactly parallel to names: basically, if the ANT-clause (or any higher constituent, e.g. the matrix VP) is or implies (knowing) the answer to the question asked in the sluice, the focus feature is superfluous and the sluicing is ungrammatical.

(62) a. Joan ate dinner with someone, but I don't know with WHO.
    b. * I know that four students came to the party, but they don't know HOW MANY.

(63) a. I know everybody danced with somebody, but I don't know WHO with WHO.
    b. * We saw that each of the performers came in, but they didn't see WHO.

All the ungrammatical examples so far have been ruled out because of the Avoid Focus Constraint; that is, they have been excluded because the sluiced wh-phrase was uttered with a focus stress whose semantic consequences were not needed. At this point, some predictions clearly arise. On the one hand, all the examples that have been ruled out because of unnecessary focus stress are predicted to become grammatical as soon as we remove the focal stress and enforce a deaccented pronunciation of the sluiced wh-phrase. This prediction is borne out, as we saw in examples (48'), (49') and (43')(4c'). On the other hand, the grammatical examples of Sluicing with Focus --including the ones from CLM-- needed the focus feature on the wh-word in order to fulfill the Background condition. Hence, if that focal intonation is removed, our analysis predicts them to become ungrammatical, as it actually happens (examples (41'), (42'), (50') and (51')).

We have seen that the acceptability of indefinite DPs, wh-phrases and names as ANT-phrases for a sluice is a matter of contrast between the denotation of some higher ANT-constituent and the denotation of some constituent higher than the sluiced IP. This result is derived from the interaction of two conditions: the Background condition requires for there to be an equivalence or implication relation between the denotation of the ANT-constituent and one of the alternatives generated by the sluice; and Avoid F forces this equivalence or implication relation to hold with an alternative different from the denotation of the sluice itself.
In sum, the same algorithm as for VP-ellipsis has been successfully applied to derive the above cases of Sluicing, after defining an appropriate set of alternatives for a wh-Determiner.29

1.3.5 The Role of Exactly with Interrogative Clauses

A different case is the one involving the adverb exactly. Recall that, unexpectedly under CLM's analysis, inserting exactly in front of the sluice could make a Quantificational NP a good ANT-phrase:

(64) a. * I know that Sue has read most books, but I don't know HOW MANY.
   b. I know that Sue has read most books, but I don't know EXACTLY how many.

We would like to point out that the markedness of (64a) --and the improvement we get by inserting exactly-- is independent of focusing and/or sluicing the wh-Determiner, as (65) shows:

(65) a. * I know that Sue has read most books, but I don't know how many books she has read.
   b. I know that Sue has read most books, but I don't know EXACTLY how many books she has read.

It seems that the effect is due to the semantics of negation, know and questions, since (64a-65a) simply sound contradictory, rather than ungrammatical. Let us explore this idea.

According to many analyses of questions (Karttunen (1977), Groenendijk-Stokhof (1984), Heim (1994), Rullmann (1995), Beck-Rullmann (1996)), to know a question means to know the exhaustive true answer to that question.30 To know a partial answer to a question, hence, does not entail to know the question. It does not imply it either, at least

29 K. von Fintel (p.c.) pointed out to me a potential problem for my analysis of Sluicing. The first conjunct in (i) implies --more concretely, it presupposes, according to some analyses-- that Jordi saw a (non-hazel eyed) student. However, this implication does not suffice to make the Focus on the sluiced wh-phrase felicitous:
(i) * It isn't true that Jordi saw a student with HAZEL eyes, but I don't know WHO / WHICH student. I would like to point out that this is a general problem concerning the relation between background information (and, probably, saliency) and implicational bridging, not just for the analysis of Sluicing that I am defending. Note that the same problem arises in VP-Ellipsis too; the presupposition "that a student with non-hazel eyes came" does not license the Focus in the second conjunct (though explicitly asserting such a proposition would, as (iii) shows).
(ii) # It's not the case that a student with HAZEL eyes came. And Prof. KINGSTON did, too.
(iii) A student with non-hazel eyes came. And Prof. KINGSTON did, too.
30 These analyses differ in whether to know a question means to know the weakly exhaustive answer or the strongly exhaustive answer to that question, or whether know is ambiguous between both. The analysis of know that I am assuming --detailed in footnote 21-- is an adaptation of Karttunen's original, but the choice of his approach over the others is irrelevant for the purposes of my analysis.
not under any notion of implicational bridging related to the semantics of Focus. This is attested by the oddness of (66):

(66) # I only know that most students will come. THEY know how many students will come, too.
   b. * Rooth's Focus condition, since:
      \([I \text{ know that most students will come}]\) does not belong to nor implies a
      member of \([THEY \text{ know how many students will come}]\)\(^f\);
   b'. * Schwarzschild's Givenness condition, since:
      \([I \text{ know that most students will come}]\) does entail or imply
      \(\exists x \ [ x \text{ knows how many students will come}]\).

However, example (65a) suggests that not to know a question means something
stronger than not to know its complete exhaustive answer; it means **not to know any partial answer** to it.\(^3\) That is, to know only a partial answer to a given question does not entail or imply --it even contradicts-- not to know the question. The inappropriateness of (67) points in that direction, too:

(67) # I only know that most students will come. THEY don't know how many students will come, either.
   b. * Rooth's Focus condition, since:
      \([I \text{ only know that most students will come}]\) does not belong to nor
      implies a member of \([THEY \text{ don't know how many students will come}]\)\(^f\);
   b'. * Schwarzschild's Givenness condition, since:
      \([I \text{ only know that most students will come}]\) does not entail or imply
      \(\lambda w.\exists x \ [ x \text{ doesn't know in } w \text{ how many students will come }\).

We have seen that "to know a partial answer to a question" does neither imply "to know the question" nor "not to know the question", at least as far as the semantics and pragmatics of Focus are concerned. Thus, the only way to relate knowledge of partial answers to knowledge of questions is by making the knowledge of the question partial too: "to only know a partial answer to a question" implies "not to know exactly the question". That is, by sticking **not exactly** (or **partially**) in front of the interrogative clause, the knowledge of partial answers and the partial knowledge of questions are compatible, as (68) shows, and comparable in terms of alternatives, as can be seen in (69)-(70).

\(^3\) Irene Heim (p.c.) and an anonymous reviewer for Romero (1997a) pointed out to me that a parallel effect appears in the interaction of negation with plurals. The sentence under (i) is true in the situation described under (i.a), but false --or lacking a truth value, according to Loebner (1987:184-5)-- in the situation (i.b): (i) I didn't see the children.
   a. There are three (relevant) children. I did not see any of them.
   b. There are three (relevant) children. I saw one of them, but not the others.
   See Lahiri (1991) for a treatment of questions as plurals.
I know that Sue has read most books, but I don't know EXACTLY how many (books she has read).
→ No contradiction.

I just know that most students will come. Maybe THEY will know EXACTLY how many (students will come).

b. √ Rooth's Focus condition, since:
[[I just know that most students will come]] implies
"that I know partially how many students will come", which ∈
[[THEY know EXACTLY how many students will come]]f;

b'. √ Schwarzschild's Givenness condition, since:
[[I just know that most students will come]] implies
λw.∃x_e∃Z,<e,st><e,st>> [ x knows in w Z how many students will come ].

I just know that most students will come. And THEY don't know exactly how many students will come, either.

b. √ Rooth's Focus condition, since:
[[I just know that most students will come]] implies
"that I know partially how many students will come", that is,
"that I don't know exactly how many students will come", which ∈
[[THEY don't know exactly how many students will come]]f;

b'. √ Schwarzschild's Givenness condition, since:
[[I just know that most students will come]] implies
λw.∃x_e [ x does not know exactly in w how many students will come ].

In conclusion, the ungrammaticality of the Sluicing examples of Quantificational NPs with exactly is explained as an epiphenomenon arising from the interaction of questions, the semantics of know and negation. Beyond these cases, Quantificational NPs are, in principle, predicted to be acceptable ANT-phrases.

1.3.6 Conclusions

A closer look at the data on Sluicing (examples with indefinites, wh-phrases, names and Quantificational NPs as ANT-phrases and examples of IP-deaccenting) revealed that the presence of a free variable in the copied material is neither necessary nor sufficient to yield a grammatical sluice, contrary to Chung-Ladusaw-McCloskey's generalization.

A proposal has been made that (i) applies to Sluicing (IP-ellipsis) the same Recoverability Conditions as the ones proposed for VP-Reduction, and (ii) captures the good and bad examples of an ANT-phrases as well as the deaccenting case. These are explained not in terms of the kind of DP that constitutes the ANT-phrases, but in terms of the contrast between the ANT-proposition and the proposition denoted by the sluiced interrogative, which crucially carries a focus on the wh-Determiner.

In the next section, the proposed account for Sluicing will be shown to derive the inheritance of content effects, too, without the use of any special LF-operation.
1.4 Inheritance of Content

In this section, I will examine the cases of inheritance of content from the ANT-phrase to the wh-phrase. In (71a), for instance, the sluiced WHO seems to "inherit" its restrictor from its ANT-phrase, since it is understood as ranging only over students, not about people in general. In a similar fashion, the argument or restrictor of ELSE can only be understood to be [[(than) Harry]], not anybody else.

(71) a. I know she talked to some students, but I don't know WHO.
   b. She talked to Harry, but I don't know to who ELSE.

CLM posit a special LF-operation, Merger, to deal with these facts:

(72) **Merger**: merge the ANT-phrase and the wh-phrase so that the semantic restriction on the domain of quantification of the Q-operator is determined both by the content of the ANT-phrase and the content of the wh-phrase.

In the present section, I will explain these apparently "inherited" restrictions as purely contextual restrictions enforced by the felicity conditions of Focus, the semantics of know subcategorizing for a question and its relation to partial answers, much in the way we explored in the subsection 3.5. The crucial observation discussed above on which the present analysis will hinge is given under (73b):

(73) a. To know a question is to know the exhaustive true answer to that question
   b. Not to know a question entails not to know any partial answer to that question (at least as far as the semantics of Focus is concerned).

Let us first look at (71a), where the restrictor of WHO has to be the set of students. Let us see, first, why a randomly chosen set, e.g., the set of (contextually relevant) elves, would not work as its restrictor. The problem arises in applying the semantic requirements driven by the Focus on the wh-word (sluiced or not), since [[*know she talked to some students*]] neither belongs nor implies an alternative to *know WHO* (elves) *she talked to*, as the reader can see in (74):

(74) * I know she talked to some students, but I don't know WHO {(elves) she talked to}.
   b. * Focus condition:
      [[*know she talked to some students*]] implies
      "to know whether she talked to some students", but this does not belong to [[*know WHO (elves) she talked to*]]
   b'. * Givenness condition:
      )x.∃ [ [[*know she talked to some students*]](x)(w) ] neither entails nor implies )x.∃D_{e,δ} [ [[*know D (elves) she talked to*]](x)(w) ]
These conditions failed to be met even if the set of relevant elves is a subset of the set of relevant students. This is so because "to know that she talked to some students" does not imply "to know whether she talked to some students that are elves", which is an alternative that would satisfy the Background conditions.

Let us now try a superset of [[students]], e.g., the set of (contextually relevant) people. This time, the Background conditions for Focus are met, since [[to know that she talked to some students]] certainly implies "to know whether she talked to some people", which is an alternative to [[know WHICH people she talked to]]. This result is sketched in (75b-b'):

(75) * I know she talked to some students, but I don't know WHO ((people) she talked to).
   b. Focus condition:
   
   [[know she talked to some students]] implies
   "to know whether she talked to some people", which belongs to
   [[know WHO (people) she talked to]]
   
   b'. Givenness condition:
   \[\lambda w.\exists x. [[[know she talked to some students]](x)(w)]] entails/implies
   \[\lambda w.\exists x.\exists D_{e,\delta}. [[[know D (people) she talked to]](x)(w)]]

The oddity of (75) must, thus, come from somewhere else. I propose that this oddity has its source in the semantics of know plus a question and in its relation to partial answers. Let us see why. Intuitively, it seems that (76A) is a felicitous partial answer to (76Q):

(76) Q: Which people did she talk to?
   A: She talked to some students.

Hence, the first conjunct in (75) --I know she talked to some students-- implies that I know a partial answer to the question "which people she talked to". The problem is that the second conjunct in (75) is precisely denying that I know that question. That is, following the generalization in (73b), the second conjunct in (75) denies that I know any partial answer to the question "which people she talked to". Hence, taking the set of (some relevant) people as the contextual restrictor for WHO in (71a) would lead to contradiction.

Let us, finally, try the set of (relevant) students as the restrictor of the focused wh-phrase. On the one hand, the Background conditions are met, as the reader can see in (78):

(78) I know she talked to some students, but I don't know WHO ((students) she talked to).
   b. Focus condition:
   
   [[know she talked to some students]] implies
"to know whether she talked to some students", which belongs to

\[[\text{know WHO (students) she talked to}]\]

b'. Givenness condition:

\[\lambda w. \exists x \left[ \left[[\text{know she talked to some students}]\right](x)(w) \right] \text{ entails/implies} \]

\[\lambda w. \exists x \exists D_{<e,\delta} \left[ \left[[\text{know D (students) she talked to}]\right](x)(w) \right] \]

On the other hand, (79A) does not sound like a felicitous answer to (79Q):

(79) Q: Which students did she talk to?
   A: # She talked to some students.

This means that the first conjunct I know she talked to some students does not imply that I know any partial answer to the question "which students she talked to". Hence, my knowledge of that question --with the set of students as restrictor-- can be denied without contradicting the first conjunct.

In sum, the set of (relevant) students is the only felicitous restriction that results in a consistent, non-contradictory statement.

Let us turn now to the second example of inheritance of content, which I repeat under (80). The issue is why who ELSE has to be interpreted as "who else than Harry".

(80) She talked to Harry, but I don't know to who ELSE.

First of all, under (81), I sketch a possible semantic value for the expression else than:

(81) \[[\text{else than } a_c]\] = f \in D_{<e,\text{st}} \text{ such that, for all } x \in D_e, w \in D_s,
\[
f(x)(w) = 1 \iff x \not\leq a \text{ in } w
\]

If we take the contextually provided argument of else to be Peter (or any other individual or sum of individuals not including Harry), we would run into a contradiction again: knowing that she talked to Harry is knowing an (at least) partial answer to the question "to which individuals --besides Peter-- she talked". Hence, denying I know that question would be --modulo (73b)-- denying that I know any partial answer to it, which yields a contradiction with the first conjunct.

Instead, if the argument of else is taken to be Harry, the question whose knowledge is denied is "to which individuals --besides Harry-- she talked". That is felicitous, since the first conjunct in (80) does not assert that the subject knows any partial answer to that question.

Finally, if the contextually provided argument is understood as an individual sum including Harry --e.g., the sum denoted by Sally and Harry--, we could deny any knowledge of the question "to which individuals --besides Sally and Harry-- she talked".

32 In Groenendijk-Stokhof's (1984) theory of questions and of the pragmatics of answers, (79A) is a partial answer to (79Q) insofar as it wipes out of the picture one of the equivalence classes in the partition generated by the question, namely the equivalence class of the set of worlds where she didn't talk to any students. Still, (79) sounds pretty incoherent to me as a dialog.
without running into a contradiction with the first conjunct, since the first conjunct does
not assert that any partial answer to that question is known. This last case, though, is
ruled out as result of interpreting the Focus of ELSE. An appropriate alternative to else
than a is (out) of a, defined under (82):

\[(82) \; [(\text{out}) \; \text{of} \; a] = f \in D_{<e,sl>} \text{ such that, for all } x \in D_e, w \in D_s,
\]
\[f(x)(w) = 1 \text{ iff } x \leq a \text{ in } w\]

In the second conjunct in (80), negation is associated with the Focus on ELSE. Taking
(out) of as the alternative to else than, this Focus invokes the alternative proposition "I
know to which individuals out of the plural individual Sally+Harry she talked". This
proposition, however, is not entailed nor implied by the previous discourse as it stands.
The only information that the first conjunct guarantees is that the speaker knows that she
talked to Harry, but this does not imply that the speaker knows exhaustively --as (73a)
dictates-- to which individuals that are part of the plural individual Sally and Harry she
talked. Thus, the Background conditions are violated --as (83) shows-- and the sequence
is unfelicituous.

\[(83) \; \text{* She talked to Harry, but I don't know to who ELSE \{than Sally and Harry she talked\}.}\]
\[b. \; \text{Focus condition:}\]

\[\text{[(\text{know that}) she talked to Harry]} \text{ does not imply }\]
\"to know which individuals out of the plural individual Sally+Harry she talked to", which is the alternative we need for
\[\text{[(\text{know to who ELSE than Sally and Harry she talked})]}\]

\[b'. \; \text{Givenness condition:}\]
\[\lambda w. \exists x [ \text{[(\text{know that}) she talked to Harry]}(x)(w) ]\]
neither entails nor implies
\[\lambda w. \exists x \exists D_{<e,et>} [ \text{[(\text{know to who D Sally and Harry she talked})]}(x)(w) ]\]

In sum, in this section I have developed an explanation for the inheritance of content
facts in Sluicing by confronting the notion of partial answer with the notion of not-
knowledge of a question and by using Rooth's and Schwarzschild's algorithm for Focus.

1.5 Asymmetric Behavior with Respect to Islands

As we saw in the introduction to this chapter, a sluiced wh-phrase usually has an overt
correlate in the ANT-clause: its ANT-phrase. In (84), for instance, the indefinite NP
somebody is the ANT-phrase of the sluiced who. Sometimes, though, there is no overt
ANT-phrase for the wh-phrase. The examples in (85) illustrate this latter type of Sluicing.
In (85a), the sluice has no syntactic correlate; semantically, it corresponds to an implicit
indefinite argument ("something"). Similarly, the sluiced wh-phrase in (85b) has no overt
ANT-phrase and it corresponds, semantically, to an implicit adjunct ("somewhere" / "for
some reason" / "with somebody").
(84) Somebody just left. Guess who.  

(85) a. She’s eating, but I don’t know what.  
    b. She’s writing, but you can’t imagine where/why/with whom.

In this section, I will take a closer look to this latter type of Sluicing. In particular, I will investigate the different behavior that Sluicing with an overt indefinite ANT-phrase and Sluicing with an implicit indefinite ANT-phrase display with respect to strong islands. The goals of this section are the following:

First, I will show that Sluicing with implicit antecedents is far more restricted than what has been observed in the literature: it is not only blocked by strong islands, but also by the intervention of other operators.

Second, I will present an alternative account that covers the strong island cases as well as the new cases. The key point of the analysis will be, again, the Focus/Background felicity conditions that govern information flow in the discourse and Reduction phenomena as well. The characteristic of Reduction described in (86) (=40a) --which follows from these conditions-- will play a central role. Two other independently motivated factors conspire with this property to block all the ungrammatical cases: the narrowest scope of implicit indefinites and the availability of E-type pronouns.

(86) The focused remnant and its antecedent must have parallel scope in their respective clauses.

This section is organized as follows. First, in subsection 5.1, I will recall the phenomenon and present CLM’s analysis of it. In subsection 5.2, I present new data, followed by the proposed analysis in section 5.3. Subsection 5.4 brings in some interesting cases that provide further evidence for the new analysis. Finally, subsection 5.5 summarizes the conclusions.

1.5.1 Chung-Ladusaw-McCloskey’s Analysis

It is a well-known fact since Ross (1967) that overt wh-movement across strong islands results in ungrammaticality, as (87a)-(90a) show. However, Ross (1969) observes that, in Sluicing, where the offending island is elided, there is no island violation and the sentence is grammatical. CLM point out that this is the case only for Sluicing with an overt ANT-phrase. Their generalization is, hence, that Sluicing with an overt indefinite ANT-phrase is insensitive to islands. To see this, compare the grammatical sluices in (87b)-(88b) with their full-fledged (a)-versions:

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33 See footnote 4.
(87) Overt antedent and Complex NP Island: (CLM 1995)
   a. * The administration has issued a statement that it is willing to meet with one of
       the student groups, but I’m not sure which one it has issued a statement that it is
       willing to meet with.
   b. The administration has issued a statement that it is willing to meet with one of the
       student groups, but I’m not sure which one.

(88) Overt antedent and Subject Island: (CLM 1995)
   a. * That certain countries would vote against the resolution has been widely
       reported, but I’m not sure which ones that [ t ] would vote against the resolution
       has been widely reported.
   b. That certain countries would vote against the resolution has been widely
       reported, but I’m not sure which ones.

When the indefinite antecedent of the sluiced wh-phrase is implicit, instead, Sluicing is sensitive to islands. CLM attribute this observation to Chris Albert. The examples (89)-(90) illustrate this point: the sluices in (89b) and (90b) are ungrammatical, as much as their full-fledged (a)-versions are. CLM’s example (91) shows that this ungrammaticality is the result of the island and not of long-distance wh-movement, since a sluiced wh-phrase with an implicit indefinite ANT-phrase can be extracted out of its clause.

(89) Implicit indefinite antecedent and Complex NP Island: (CLM 1995)
   a. * Tony sent Mo a picture that he painted, but it's not clear with what he sent him a
       picture that he painted.
   b. * Tony sent Mo a picture that he painted, but it's not clear with what.

(90) Implicit indefinite antecedent and Adjunct Island: (CLM 1995)
   a. * Agnes arrived after John ate, but it’s not clear what she arrived after he ate.
   b. * Agnes arrived after John ate, but it’s not clear what.

(91) I think Agnes said that Bill would speak, but I don’t remember what about. (id.)

Let us see how CLM capture these facts. Recall that their analysis of Sluicing is a copy or reconstruction analysis, not a deletion analysis. That is, in their approach to Sluicing, the sluiced IP is generated empty, and it is filled up at LF by copying the full IP from the ANT-clause into the empty slot. This is done by the LF-operation IP-Recycling, which I repeat under (92):

(92) IP-Recycling: Copy the ANT-IP into the empty IP at LF.

CLM propose that, when the indefinite ANT-phrase is overt, the indefinite NP is copied along with the rest of the antecedent IP, and its free variable --in Heim/Kamp style-- is unselectively bound by the question operator in C0. This is exemplified in (93).
Since unselective binding is not sensitive to islands, the grammaticality of (87b)-(88b) is derived.

(93) Somebody left --guess who.

Implicit indefinite arguments and adjuncts, though, are not syntactically present in the structure. Hence, the LF-representation of the ANT-IP does not contain a phrase that may serve as ANT-phrase and provide a variable for the Q-operator to bind\footnote{CLM propose that these cases are resolved in Sluicing by means of an LF-operation called "Sprouting":}. CLM propose that these cases are resolved in Sluicing by means of an LF-operation called "Sprouting":

\[
\text{(94) Sprouting: "sprout" or realize a trace in order to complete a } \text{wh-chain.}
\]

Sprouting is a A'-chain formation operation --thus, subject to islands and ECP, like any A'-chain created by overt movement-- in which the head of the chain is already present. It builds an A'-chain by "sprouting" or creating the necessary LF constituent containing an empty category (or a copy) coindexed with the sluiced wh-phrase. This is illustrated with the "sprouted" DP in bold face in (95). Since A'-chains are sensitive to islands, the ungrammaticality of (89b)-(90b) is derived.

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\footnote{See CLM's footnote 11.}
(95) He's eating, but I can't imagine what.

\[
\begin{array}{c}
\text{e} \\
\text{WhP} \\
\text{what}^x \\
\text{[+Q]} \text{NP} \\
\text{he} \\
\text{is} \\
\text{eating}
\end{array}
\]

In sum, CLM propose that what blocks antecedentless sluiced \textit{wh}-phrases across islands is the same that blocks overt \textit{wh}-movement across islands, namely, locality constraints on the links of an A'-chain $WhP_{...t_i}$.

In the next section, we will see that Sluicing with implicit antecedents is far more restricted than we thought: it is not only blocked by strong islands, but also by the intervention of other operators that do not block the A'-chain $WhP_{...t_i}$.

1.5.2 Other Intervenors that Block Sluicing with Implicit ANT-Phrase

Besides strong islands, other intervening operators --the ones yielding weak islands, as far as I found-- make Sluicing with implicit ANT-phrases ungrammatical, too. This is shown in (96)-(99):

(96) a. * Nobody went out for dinner, but I don´t remember to which restaurant \{nobody went out for dinner\}.
   b. * Paul didn´t want to read, but I don´t know which book \{he didn´t want to read\}.
   c. * Few kids ate, but I don’t know what \{few kids ate\}.
   d. * Joan rarely fed my fish, but I don´t know with which product \{Joan rarely fed my fish\}.

(97) a. ?* Susi asked whether you had eaten, but I don´t remember which meal \{she asked whether you had eaten\}.

(98)a. * Ramon is glad that Sally ate, but I don´t remember which dish \{he is glad that Sally ate\}.
   b. * She regrets that we talked about it, but I don´t know to whom \{she regrets that we talked about it\}. 
Note that this ungrammaticality cannot be due to a constraint on A'-chains, since the full-fledged questions corresponding to the sluiced interrogative clauses in (96)-(98) exhibit the same A'-chains and are grammatical.

(96′)a. I don´t remember to which restaurant nobody went out for dinner.
   b. I don´t know which book he didn´t want to read.
   c. I don't know what few kids ate.
   d. I don´t know with which product Joan rarely fed my fish.

(97´) a. I don´t remember which meal she asked whether you had eaten.

(98′)a. I don´t remember which dish he is glad that Sally ate.
   b. I don´t know to whom she regrets that we talked about it.

The contrast between the sluices (96)-(98) and the full-fledged questions in (96′)-(98′) shows that Sluicing with an implicit indefinite ANT-phrase does not behave like overt wh-A’-chains. CLM’s analysis does not explain this asymmetry, that is, it doesn't explain why the ungrammaticality of antecedentless sluices persists when no strong island intervenes.

In the next subsection, I will propose an analysis that covers the strong islands cases as well as the new cases I presented.

1.5.3 Proposal

I will propose an analysis that predicts Sluicing with an implicit indefinite ANT-phrase to be ungrammatical whenever any operator intervenes. This result will be derived not from any syntactic constraint, but from the interaction of two semantic effects: the scope parallelism between the sluiced wh-phrase and the ANT-phrase, and the scope of implicit indefinites.

The first factor is the by now familiar scope parallelism that the Background conditions impose on the sluiced wh-phrase and the ANT-phrase. Recall our example (20), repeated as (99): the scopal relation between the existential quantificational NP and the universal quantificational NP has to be the same in both conjuncts.

(99) Exactly three boys admire every professor, and exactly three GIRLS do, too.

---

35 The so-called "weak islands" do not block A’-chains WhP...ti per se. They are "islands", though, insofar as they block some interpretations of the moved wh-phrase. For instance, in (i), the how many phrase only has the wide scope reading in (i.a) and not the narrow scope reading in (i.b), as Longobardi (1987) points out. Extraction of non-D-linked wh-phrases -- e.g. example (96′c) if there is no contextual restriction on what or, better, the example (ii)-- may yield somewhat deviant results, too.

(i) How many students do you wonder whether I should talk to?
   a. Wide scope reading: "For what number n: there are n-many students x such that you wonder whether I should talk to x."
   b. Narrow scope reading: "For what number n: you wonder whether there should be n-many students that I talk to."

(ii) ?? I don't know what the hell few kids ate.
a. √ "There are exactly three boys that admire every professor, and there are exactly three girls that admire every professor too."

b. √ "For every professor, there are exactly three boys that admire him/her, and, for every professor, there are exactly three girls that admire him/her too."

c. * "There are exactly three boys that admire every professor and, for every professor, there are exactly three girls that admire him/her."

d. * "For every professor, there are exactly three boys that admire him/her, and there are exactly three girls that admire every professor."

The same holds for Sluicing. In particular, the ANT-phrase and the sluiced wh-phrase must have parallel scope, too. Since the binder of the wh-phrase is the wh-part that moved to Spec-CP (or, alternatively, the Q-operator in C0), the ∃-closure of the wh-phrase has scope over any other operator in the clause. This forces the corresponding quantificational element of the ANT-phrase to have scope over any other operator in its clause as well. The example under (100) illustrates this: since the interrogative clause presents the scopal relation which book >> always, the ANT-clause has the reading a book >> always --the one in (100a)--, but it lacks the reading always >> a book --the one in (100b).

(100) She always reads a book at dinnertime. We can't figure out WHICH one.  
   (CLM 1995)
   a. √ "There is a particular book that she always reads at dinnertime, and we can't figure out which book is such that she always reads it at dinnertime."
   b. * "It is always the case that she reads one book or other at dinner time, and we can't figure out which book is such that she always reads it at dinnertime."

The other factor that plays a role in determining the blocking effect of strong islands and other intervenors is the scope of implicit indefinites. Fodor-Fodor (1980:759-60) and Condoravdi-Gawron (1996:3) note that implicit indefinites always have narrowest scope. This is shown by the examples in (101)-(103):

36 It is not clear whether a quantificational NP within a question can QR over the wh-phrase and adjoin to CP. Universally quantified Subjects have been argued to do so when they yield pair-list readings (May 1985). However, the array of quantifiers that generate pair-list readings is small (downward monotone, most, both and many others do not (Chierchia 1993:fn20; Szabolcsi 199?:10)), and the issue of how these readings are generated is not settled. See Chierchia (1993) for an alternative to the QR view.

37 Fodor-Fodor's and Condoravdi-Gawron's work is on implicit indefinite arguments. They do not make any claim about implicit indefinite adjuncts, but the same observation seems to hold for them, too, as (i) suggests:
(i) Exactly three students bought strawberries.
   a. √ "There are exactly three students that bought strawberries in some place or other."
   b. * "There is a place where exactly three students bought strawberries."
(101) Exactly three kids ate.
   a. √ "There are exactly three kids such that there is something they ate."
   b. * "There is something that exactly three kids ate."

(102) Last year, he baked for few birthday parties.
   a. √ "There are few birthday parties for which there is something he baked."
   b. * "There is something that he baked for few birthday parties."

(103) He never goes out for dinner.
   a. √ "There is no occasion on which he goes out for dinner to one place or other."
   b. * "There is a place such that on no occasion he goes there."

Hence, on the one hand, we have that implicit indefinites have always narrower scope than any other operator in their clause; on the other, we have that the binder of a sluiced wh-phrase must have parallel scope to the existential quantification of the implicit indefinite ANT-phrase. From this, it follows that the binder of the sluiced wh-phrase should have narrowest scope in its own clause, too. But the binders of wh-phrases have scope at CP; that is, they have scope over any other operator within its clause, as we saw in the second conjunct of (100), and as (104) shows. Hence, antecedentless Sluicing succeeds only if the wh-phrase can have, at the same time, scope at CP and narrower scope than any other operator in the clause; that is, it succeeds only if there is no operator whatsoever under C^0 at LF, independently of whether that operator constitutes an island for wh-movement or not.

(104) What did few kids eat?
   a. Scope what >> few kids (single answer): "For which person x: at least seven boys danced with x."
   b. * Scope few kids >> who (pair-list answer): "For at least seven boys y, tell me who y danced with."

Let us illustrate this with an example. We just saw that, in (104), the only available reading is what >> few kids. In (105), instead, the only possible scopal relation is the inverse one, that is, few kids >> "something". Hence, when we put the two clauses together as in (106), the Background conditions cannot be met and the sentence is ungrammatical.

(105) Few kids ate.
   a. * Scope "something" >> few kids: "There is something such that few kids ate it".
   b. Scope few kids >> "something": "For few kids x, there is something that x ate".

(106) * I know that few kids ate, but I don't know WHAT {few kids ate}.
   b. * Focus condition:
      \[\{\text{know that few kids ate}\}\] does neither belong nor imply a member of \[\{\text{know WHAT (thing) few kids ate}\}\] ^\dagger, which equals
{“to know what thing is such that few kids ate it”, “to know how many things are such that few kids ate them”, “to know whether there is something such that few kids ate it”}

b’. * Givenness condition:
\[ \lambda w. \exists x \in \mathcal{D} \subset \delta \exists \mathcal{D} ("thing") \text{few kids ate} (x)(w) \]

In sum, Sluicing with an implicit indefinite ANT-phrase is ungrammatical whenever the sluiced \(wh\)-phrase takes scope over an embedded operator, no matter whether that operator constitutes a strong island or not. Ungrammaticality results from the impossibility of satisfying two contradictory requirements: the Background conditions impose a semantic scope parallelism between the ANT-phrase and the \(wh\)-phrase, but the implicit ANT-phrase can only have narrowest scope. Thus, the Background conditions cannot be satisfied.\(^{38}\)

This problem does not extend to overt indefinite ANT-phrases. Since overt indefinites may have semantic scope over other operators --even across clause boundaries and islands--\(^{39}\) the Background conditions will be met if the sluiced \(wh\)-phrase has scope over those operators or islands as well.

In conclusion, the asymmetric behavior of these two types of Sluicing with respect to islands and other operators has been explained not as an intrinsic characteristic of Sluicing itself, but as a "by-product" of the semantics of implicit indefinites and of the Focus / Background articulation of discourse.

1.5.4 Apparent Intervenors

The predictions that the new analysis makes are rather strong: if there is any operator under the scope of the \(wh\)-phrase binder at LF, Sluicing with an implicit indefinite ANT-phrase is bound to violate the Background conditions. The cases of intervening quantificational NPs that we have seen so far --repeated under (107)-- confirmed this prediction: they both led to ungrammaticality. However, the examples in (108) present quantificational NPs in the first conjunct as well and they are perfectly grammatical:

(107) a. * Nobody went out for dinner, but I don't know to which restaurant.
   b. * Few kids ate, but I don't know what.

(108) a. Just one kid was reading, but I don’t know what / which book.
   b. At least seven boys from your class danced the first waltz, but I don’t know who with.

\(^{38}\) CLM can derive the scope parallelism facts about Sluicing from their IP-Recycling rule, too. However, they do not exploit the fact that implicit indefinites have narrowest scope and, hence, do not derive the asymmetric behavior with respect to islands (and other intervenors) in the way that I propose here.

Let us take a closer look at each of these two grammatical examples. The intuitions about the meaning of the first example are listed under (109). This example does not have the reading (109a), which would result if the LF of the sluiced interrogative contained the quantificational NP *just one kid*. Instead, the example has the reading (109b), as if the pronoun *he* appeared instead of the quantificational NP at LF. That this is indeed the right LF representation is suggested by the deaccented version of (109), given under (110): the full-fledged rendering of the interrogative IP presents a pronoun instead of the quantificational NP. Note, finally, that this pronoun is an E-type pronoun (Evans 1980), since this reading is different from the impossible reading (109c), where *just one kid* scopes out of its clause and binds the pronoun *he*.

(109) Just one kid was reading, but I don’t know what.
   a. *“Just one kid was reading, but I don’t know what just one kid was reading.”*
   b. “Just one kid was reading, but I don’t know what *he* was reading.”
   c. *“There just one kids such that: I know he was reading but I don’t know what he was reading.”*

(110) Just one kid was reading, but I don’t know WHAT *he* was reading.

Hence, in this first grammatical example, we do not have a quantificational NP in the sluiced IP, but a referential expression, namely an E-type pronoun.

Let us now turn to the second example, repeated under (111). I want to call the reader's attention to the fact that this example has a reading that resembles a pair-list reading, paraphrasable as in (111a):

(111) At least seven boys from your class danced the first waltz of the night, but I don’t know who with.
   a. Pair-list-like reading: “..., but I don’t know who each of them danced with.”

This reading cannot have arisen from an LF containing the quantificational NP *at least seven boys*, since questions with *at least n N’* do not allow for pair-list answers in general (Szabolcsi 199?). This can be seen in (112), where I spell out the full-fledged quantificational version of the sluiced interrogative. (112) lacks the pair-list reading (and, furthermore, it is pragmatically odd under its other potential reading (112b) --unless one single dancer danced a part of the first waltz of the night with each boy).

(112) Who did at least seven boys from your class dance the first waltz with?
   a. *Pair-list answer: “For at least seven boys x of your choice, tell me: who did x dance the first waltz with (i.e., list me the couples).”*
   b. # Single answer: “Which person is such that at least seven boys danced the first waltz with her.”
This pair-list-like reading is easily available if the E-type pronoun they takes the place of the quantificational NP at LF. This can be seen in the deaccented version (113), which, again, is rendered preferrably with that pronoun:

(113) At least seven boys from your class danced the first waltz of the night, but I don’t know WHO they danced it WITH.
   a. Pair-list-like reading: “..., but I don’t know who each of them danced with.”
   
This type of pair-list-like readings do not arise from the interaction of any quantifier with the wh-phrase. As Krifka (1992) proposes, these pair-list-like readings arise as a special case of cumulative readings generated by two interacting plural NPs, as in (114):

(114) What did the boys rent last night?
   a. Pair-list-like reading: “For each boy x, what is the thing that x rented last night?”
   b. Single answer reading: "What is the thing such that the boys rented it last night?"

In sum, we do not have the quantificational NPs just one kid and at least seven kids denoting a generalized quantifier (type <<e, st>, <st>>) in the sluiced IP, but a referential expression denoting a plural individual of type e. Note that, independently of Sluicing, those QuNPs allow for an E-type pronoun to refer back to them, as exemplified in (115).

(115) a. Just one kid arrive late, and he (=the one kid that was late) asked for excuses.
   b. At least seven kids helped me with the cleaning. They (=the kids that helped me) did a good job.

Hence, given that we do not have an intervening operator in the sluiced IP, but a referential expression, the Background conditions can be fulfilled. This is exemplified under (116) for the sluice (108a).

(116) I know most kids talked about it, but I don't know to WHOM.
   b. Focus condition:
   \[\lambda w.\exists x_e \ [ [[know that most kids talked about it]](x)(w) \] implies
   \[\lambda w.\exists x_e \exists D_{<e,\delta>} \ [ [[know to D ("person") they (=the kids that talked about it) talked about it]](x)(w) \]
   
\[\lambda w.\exists x_e \ [ [[know that most kids talked about it]](x)(w) \]

\[\lambda w.\exists x_e \exists D_{<e,\delta>} \ [ [[know to D ("person") they (=the kids that talked about it) talked about it]](x)(w) \]

---

40 The two interacting plurals in (114) are the boys and the number-ambiguous what. These pair-list-like readings are predicted to disappear as soon as the wh-phrase is explicitly singular, e.g., which book. However, I found that, for some speakers, this reading is acceptable for (i). Those speakers also liked the pair-list-like reading of (ii):
(i) I need to know which book the kids are reading.
(ii) Most kids are reading, but I don't know which book.
Let us now go back to the ungrammatical examples, repeated in (117). From the analysis I just presented, the following prediction arises: if the type of quantificational NP does not license E-type pronouns, we cannot have such pronoun in the sluiced IP and, hence, the scope parallelism required by the Background conditions is not fulfilled. This is exactly the case for no. As Evans (1980:218) notes, a quantificational NP headed by no cannot be resumed with an E-type pronoun. Evans' example (118) illustrates this point. Hence, the example (117a) is out because its LF representation must contain a quantificational NP that disturbs the required scope parallelism.

(117) a. * Nobody went out for dinner, but I don´t remember to which restaurant {nobody went out for dinner}.
   b. * Few kids ate, but I don’t know what {few kids ate}.

(118) # No congressmen admire Kennedy, and they are very junior. (Evans 1980)

As for the example (117b), Evans observes that E-type pronouns can refer back to quantificational NPs headed by few, as illustrated in (119). However, it is often the case that this anaphora does not succeed --for reasons yet not well understood (Moxey-Sanford 1987, Kibble 1994, Corblin 1995). The examples in (120) are two such cases. In (120a), the pronoun they is preferrably understood as referring back to the total sum of students --or even to the sum of students that did not eat-- rather than to the sum of students that ate. The example (120b), which primes the sum of students that ate as the antecedent for the pronoun, is somewhat deteriorated.

(119) Few congressmen admire Kennedy, and they are very junior. (Evans 1980)

(120) a. # Few students ate. They were embarassed.
   b. ?? Few students ate, (but) they are still hungry.

Crucially, in the contexts where few N' licenses an E-type pronoun, Sluicing with an implicit indefinite ANT-phrase becomes acceptable again, as (121) shows:

(121) Scenario: An anonymous phone call warns the police that a small amount of poison --enough to kill a kid, though-- has been poured into three dishes served at a certain party. The police goes to the party and finds out that the amount of kids that has already eaten is fairly small.

(122) a. Few kids ate, but nobody recalls what they ate.
   b. Few kids ate, but I don't know what {they ate}.

Finally, let me point out that exactly the same effect and analysis extrapolates to adverbs of quantification. Kibble (1994) and Corblin (1995) note that, whereas Modal Subordination is easy with upward-monoton adverbs, downward-monoton adverbs make
it impossible or much harder. This is exemplified by the contrast within (123) and within (124). Modal subordination is possible with downward-monoton adverbials only if a Prepositional Phrase makes explicit reference to the relevant occasions, as (123c) shows.

(123)a. A player usually picks up a card. He plays it immediately.  
    b. * A player rarely picks up a card. He plays it immediately.
    c. A player rarely picks up a card. But, in that case, he plays it immediately.

(124) a. It's likely that John will cook one dish or another. He may (even) serve it on his grandma's china.
    b. * It's unlikely that John will cook anything. He may serve it on his grandma's china.

The Sluicing examples involving Modal Subordination pattern exactly the same way as the examples involving E-type pronouns: if the adverb of quantification elicits Modal Subordination, the Sluicing with an implicit ANT-phrase is possible; if we have a downward-monoton adverb that does not allow for Modal Subordination, the sluice becomes ungrammatical or deviant. This is shown in the examples (125)-(126).

(125)a. John usually cooks himself when he has guests, but I don't know what.
    b. * John never cooks himself when he has guests, but I don't know what.
    c. * John rarely cooks himself when he has guests, but I don't know what.
    c'. ?? John rarely cooks himself when he has guests, and I certainly don't know what.

(126)a. It's likely that he'll cook, but it's unclear what.
    b. * It's unlikely that he'll cook, but it's unclear what.

This result is expected under the proposed analysis of Sluicing if we assume that the phenomenon known as Modal Subordination is an instance of discourse anaphora referring to a formerly described set of situations, much in the way an E-type pronoun does in the case of quantificational NPs. Then, the sluiced IP in the grammatical (125a) would not contain the adverb of quantification usually. A referential anaphoric expression would stand in its place, and, hence, the scope parallelism between the ANT-phrase and the sluiced wh-phrase would be met. In fact, a paraphrase of the grammatical (126a) involves the use of a somewhat anaphoric expression, rather than the repetition of the modal adverb likely, as shown in (127). The other grammatical Sluicing example -- (125a)-- also allows for a paraphrase with anaphora.

41 This line has been developed in Farkas (1993), Kibble (1994a) and others as an alternative to Roberts' (1987, 1996) accommodation analysis.

42 My analysis makes the same predictions for the island-free (126a), repeated as (i), and for its Subject Island versions in (ii), since in neither of these sluices the predicate is likely is present at LF. Speakers find (iia) only mildly deviant, improved if the order of the predicates is the same, as in (iia). As for CLM's examples and judgments in (iii)-(iv) (=their (102d,c)), the speakers I consulted considered both examples odd for independent reasons, namely, because win seems to prefer a definite implicit argument rather than an indefinite one.
(127) Paraphrase for (126a):
   a. "It's likely that he'll cook, but it's unclear what he'll cook if he does / in that case."
   b. * "It's likely that he'll cook, but it's unclear what it's likely that he'll cook."

(128) Paraphrase for (125a):
   "John usually cooks himself when he is guests, but I don't know what he cooks in those occasions."

To summarize this subsection, we have seen that, when the ANT-clause contains a quantificational NP, Sluicing with an implicit indefinite ANT-phrase is grammatical only insofar as an E-type pronoun takes the place of that quantificational NP. This is predicted under the analysis of Sluicing that I have defended all through this chapter: *wh*-phrases can only have parallel scope to their implicit indefinite ANT-phrases if no operator whatsoever takes scope under the interrogative COMP.

As a corollary, Sluicing data involving adverbs of quantification suggest a close similarity between E-type pronouns and Modal Subordination.

1.5.5 Conclusions on Sluicing with an Implicit Indefinite ANT-Phrase

We have seen that Sluicing with an implicit indefinite antecedent is ungrammatical whenever an operator intervenes, no matter whether that operator blocks A'-chains or not. The reason for this is the following. Since implicit indefinites have narrowest scope and since the sluiced *wh*-phrase must have parallel scope to its antecedent, the binder of a sluiced *wh*-phrase has to meet a potentially contradictory requirement: it must have narrowest scope within the copied IP --for scope parallelism-- and it must have widest scope within the copied IP --in Spec-CP, for question interpretation. This double requirement can only be met if there is no other quantificational operator in the copied IP.

Examples with upward-entailing Quantifiers further support this generalization: this type of Sluicing only succeeds when the quantificational NP is resumed by an E-type pronoun --hence, we have a referential expression (or definite description) instead of a quantificational NP-- in the sluiced IP.

1.6 Conclusions

Three peculiarities of Sluicing have been explained as the result of the interaction of Focus with other independently motivated semantic, pragmatic and discourse principles. More concretely, we have seen that:

1. Contrary to CLM's analysis, the grammaticality of a given antecedent phrase does not hinge on the kind of DP itself, but on the contrast between the antecedent phrase and

(i) It's likely that he'll cook, but it's unclear what.
(ii) a. * That he'll cook is likely, but it's unclear what.
   b. That he'll cook is likely, but what isn't clear.
(iii) It's likely that Tom will win, but it's not clear which race.
(iv) * That Tom will win is likely, but it's not clear which race.
the sluiced *wh*-phrase, which crucially bears Focus stress on the *wh*-Determiner. The desired data are derived by defining the set of alternatives of a *wh*-Determiner and applying to it Rooth's (1985, 1992a,b, 1995) Focus Condition and Schwarzschild's (1997a,b) Givenness condition and Avoid Focus constraint.

2. *To know Q* --where *Q* is a question-- means to know the exhaustive true answer to that question *Q*, and *not to know Q* implies not to know any partial answer to that *Q*. From this generalization and from the Focus/Background conditions on discourse information, the inheritance of content effects follow automatically.

3. Sluicing with implicit indefinite antecedents is far more restricted than CLM point out: it is blocked not only when the sluiced IP contains a strong island, but also when it contains any operator whatsoever --independently of whether that operator blocks strong islands or not. This is again explained in terms of the conspiracy between different principles of the grammar: the semantics of Focus, the semantic scope of implicit indefinites and the (un)availability of E-type pronouns in certain pragmatic or discourse circumstances.

In the bigger picture, the work developed in this chapter is a step towards a unified account of VP-Ellipsis and Sluicing (and, potentially, other ellipsis phenomena). The rules that CLM propose for Sluicing --IP-Recycling, Merger and Sprouting\footnote{Some version of CLM's Sprouting operation may be needed if the ANT-IP and the sluiced IP need to be syntactically identical at LF. See, however, footnote 26 in this chapter, where I discuss other possibilities. In any case, the behaviour of sluiced *wh*-phrases with respect to islands and other intervenors is explained independently of this LF-operation.}-- are not needed, since their job is done by the interplay of independently motivated factors.