

# Resolving Multiple *Wh*-Fragments in English: A Syntax-Pragmatics Approach

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Park, Sang-Hee. 2009. Resolving Multiple *wh*-fragments in English: A Syntax-Pragmatics Approach. *SNU Working Papers in English Linguistics and Language* 8, 16-27. This study attempts to provide a new analysis of multiple *wh*-fragments, the so-called 'multiple sluicing', in English. Against previous approaches which resort to a reconstruction-based resolution or gapping, the proposed analysis captures multiple *wh*-fragments without positing a copy-deletion mechanism. In fact, multiple *wh*-fragments are viewed as a root clause whose interpretation can be determined by previous discourse context. This is achieved by suggesting a new type constraint for multiple *wh*-fragments, based on the analysis of fragment by Bertomeu and Kordoni (2005). (Seoul National University)

**Keywords:** multiple *wh*-fragments, sluicing, context, resolution, HPSG

## 1. Introduction

Sluicing is a phenomenon that involves a stand alone *wh*-phrase whose content is partially determined by context.

- (1) a. A: Many dissidents have been released.  
    B: Do you know who?  
    b. A: Is there anyone who could possibly unscrew the hatch?  
    B: Gee, I wish I knew who.  
    c. A: Did anyone show up for class today?  
    B: Yup.  
    A: Really?  
    B: Yeah.  
    A: Who? (Ginzburg and Sag 2000: 321-323)

In these examples, each of the reduced questions contains a single

*wh*-phrase. However, similar examples with more than one *wh*-remnants are also possible.

- (2) a. A: Some student is reported to have quarreled with a famous professor.  
 B: [Which student] [with which professor]?  
 (Ginzburg and Sag 2000: 301)
- b. Everyone bought something, but I can't tell you [who] [what].

The aim of this paper is to clarify the properties of sentences such as in (2), the so-called 'Multiple Sluicing'. It also attempts to provide an analysis in terms of pragmatic resolution (Bertomeu and Kordoni 2005).

## 2. Background on multiple *wh*-fragments

Sluicing is generally assumed to involve an ellipsis of an IP-constituent of a clause, leaving a CP-projection containing a *wh*-remnant. Sentences such as (3) are analyzed as involving movement of *who*<sub>i</sub> into Spec of CP and subsequent deletion of the IP.

- (3) Arabelle is marrying someone you know. Guess [CP *who*<sub>i</sub> [~~IP is marrying t<sub>i</sub>]]!~~

This analysis cannot simply be extended to constructions such as (2), because it would then give rise to a problem of having ungrammatical source.

- (4) \*Everyone bought something, but I can't tell you [who]<sub>i</sub> [what]<sub>j</sub> t<sub>i</sub> bought t<sub>j</sub>.

Not surprisingly, this kind of approach is pursued by Park and Kang (2007). They argue that the ungrammaticality of (4) is due to the ill-formed application of the copy-deletion operation. To be specific, it is assumed that the first *wh*-remnant is associated with

the strong EPP feature, which determines which copy undergoes deletion. According to the movement theory of Richard (2001) they assume, then, the tail of this element must be deleted and the head, i.e., the first *wh*-remnant itself should remain at overt syntax. On the other hand, in the case of the second *wh*-remnant, it is the tail that is associated with the strong EPP feature. Thus, what should remain after all are the head of the first chain and the tail of the second chain, as in (4'). This is the case we obtain the undeleted counterpart of (2b), *who bought what*.

(4') ..., but I can't tell you [who]<sub>i</sub> [what]<sub>j</sub>-t<sub>i</sub> bought t<sub>j</sub>

In short, examples like (4) are simply nonexistent under Park and Kang's analysis; either the string in (2b) or (4') is possible. However, it is suspicious that the operation behind examples such as (2) is really a copy-deletion mechanism. Though the authors do not discuss how to mark the antecedent of deletion, examples of multiple *wh*-fragments parallel to (1c) would certainly cause a problem.

- (5) A: Did anyone show up with any girl for the party  
yesterday?  
B: Yup.  
A: Really?  
B: Yeah.  
A: (Do you know) [Who] [with who]?

Given (5), any approach that posits resolution at syntax-semantics interface such as LF would be problematic.

There is another way to explain multiple *wh*-fragments. Nishigauchi (1998) and Lasnik (2007) argue that examples like (2) are special cases of gapping, with the initial *wh*-phrase in Spec of CP and the other in some other specifier position. However, multiple *wh*-fragments exhibit properties that can never be explained under this approach, which I will show in the next section.

### 3. Properties of multiple *wh*-fragments

As with sluicing, multiple *wh*-fragments can appear as matrix elements, as we observed from (2a) and (5). (2b) shows that this construction can also appear in embedded environments. More examples are provided below.

- (6) a. I know that in each instance one of the girls got something for one of the boys.  
But [which] [for which]? (Bolinger 1978: 109)
- b. In French, we have noticed that some intransitive V permit Extraposition of Indefinite, while others permit Impersonal Passive. [Which] [Which]?  
(Merchant 2001:113)
- (7) a. Everyone brought something (different) to the potluck, but I couldn't tell you [who] [what].  
(Merchant 2001:112)
- b. ?Some linguist criticized (yesterday) some paper about sluicing, but I don't know [which linguist] [which paper about sluicing].  
(Park and Kang: 2007: 422)

Note that gapping is not possible in embedded context (Also noted by Takahashi 1994, Nishigauchi 1998, Park and Kang 2007).

- (8) \*John saw Bill, and Tom said that Mary saw Susan.

Another fact that distinguishes the two constructions is the type of constituents involved. Multiple *wh*-fragments, as the term suggests, always contain two *wh*-phrases. Though this is required for this case, gapping can appear with both *wh*- and non-*wh* remnants.

- (9) a. I know who Mary talked to yesterday about phonology, ?\*but I don't know [who] [about semantics].  
(Lasnik 2007)
- b. Which boy read Hamlet, and which girl read Macbeth?  
(Park and Kang 2007)

It seems that multiple *wh*-fragments do not involve long distance dependency relations. One piece of evidence comes from the fact that such fragments resist modifications by phrases such as the hell and the heck, which can only modify extracted *wh*-phrases.<sup>1)</sup>

- (10) a. A: Some student is reported to have quarreled with a famous professor.  
 B: [Who](#the hell/#the heck) [with who](#the hell/#the heck)?
- b. Everyone bought something, but I can't tell you [who] (#the hell/#the heck) [what] (#the hell/#the heck).

Generally, the antecedent of the first *wh*-fragment has been considered to be a universal quantifier (Nishigauchi 1998, Park and Kang 2007, among others). However, it is doubtful whether this generalization is correct given that examples such as (2a), (6ab), and (7b) are also possible. I assume that the acceptability of multiple *wh*-fragments is basically not dependent on the nature of the quantification within the antecedent.

Many accounts on multiple *wh*-fragments exploit syntactic reconstruction mechanism in order to capture certain parallelism between the remnants and their antecedents. This is because the majority of studies on multiple *wh*-fragments have focused on embedded uses such as (2b) and (7ab). However, matrix multiple *wh*-fragments such as (2a), (5) and (6ab) can be better explained if they are resolved at the level of discourse contexts, whose interpretation can be determined by previous utterances. Under the reconstruction-based approach, it is difficult to identify the antecedent which does not immediately precede the reconstruction sites. Moreover, as examples in (11) show, possible antecedents for multiple *wh*-fragments can sometimes be provided by subsequent discourse context.<sup>2)3)</sup>

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1) See Ginzburg and Sag (2000: 229) for more about these modifiers.

2) The so-called 'N-gapping' also shows this property. (Chaves 2005: 4)

(i) Tim only gulped one \_\_\_ early in the morning, but his sister managed to eat three chocolate bars before lunch.

3) A further subtype under *sem(antic)-con(ceptual)-res(olution)-frag(ment)-cl(ause)* which Bertomeu and Kordoni (2005) propose for semantic-conceptual resolution must be added

- (11) a. I don't know [who] [with who], but I am sure everyone  
will get hooked up with someone.  
(Merchant 2006: 286)
- b. I don't know [who] [with who], but I'm sure everybody  
will dance with somebody. (Romero 1997:197)

Note also that gapping is possible only when it follows its antecedent.<sup>1)</sup>

As noted by Nishigauchi (1998), the distribution of embedded examples such as (2b), repeated here as (12a), is restricted to cases where they appear as a complement of factive or resolute predicates such as *know*, *discover*, *forget*, *tell*, *guess*, *predict*. Multiple *wh*-fragments strongly resist appearing as a complement of Question Embedding (QE) predicates such as *ask*, *wonder*, *investigate*, and *discuss*.

- (12) a. Everyone bought something, but I can't tell you [who]  
[what].
- b. Everyone bought something. \*?I wonder [who] [what].  
(Nishigauchi 1998: 146)

#### 4. A new analysis

In this section, I present an alternative account for multiple *wh*-fragments in English within the framework of Head-Driven Phrase Structure Grammar (HPSG). The analysis I will propose is based on Bertomeu and Kordoni's (2005) analysis of intersentential elliptical constructions.

##### 4.1 Background: "discourse record" and ellipsis

In Bertomeu and Kordoni (2005), two general ways to resolve

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to explain examples such as these. However, the analysis I present in this paper do not deal with this issue. For the moment, I reserve this as a future study.

1) Another property of gapping which is not shared with multiple *wh*-fragments is that it can appear in comparative constructions.

(i) Paula kissed more boys than Sue kissed girls. (Chaves 2005: 3)

various types of fragments are proposed: resolution via-identity, which takes place at the semantic-structural level and resolution via-inference, which takes place at the semantic-conceptual level. The first type finds its source in the previous source, as in (13a) and the second type finds two sources of context anchoring: the previous discourse (13b) and the surrounding physical environment (13c).

- (13) a. > When did 2-Pac release "All eyes on me"?  
           > And Michael Jackson "Thriller"?  
       b. > Has Anastacia released any CDs in the last year?  
           - Yes, "Left outside alone".  
           > Any prizes?  
       c. > Flights to Paris. (Uttered by a customer at the travel agency) (Bertomeu and Kordoni: 2005)

According to the authors, in the case of (13a), the structural information of the source sentence of the gapped clause is still in the 'discourse-record', which registers representations of the utterances in an order preserving way. Thus, the first utterance of (13a) is available as the antecedent of the second utterance. However, there is no such direct linguistic source in (13b) and (13c). Yet, resolution is still available in the first case (13b) since there are representations of objects which are still under 'focus of attention'. Thus, even if the speaker chooses to utter fragments, the focus of attention of the hearer and of himself can be placed in the same mental representation, and thus the hearer can still appreciate the meaning carried by fragments. In the last case (13c) ellipsis resolution depends on situational environments which trigger the activation of some script in the knowledge-base of the hearer.

One thing that is worth noting here is that fragments are treated as non-head daughters in a general head-complement structure. The head-daughter is assumed as a phonetically empty element, which contributes its semantics to the mother. Thus, this analysis can account for fragments involving more than one constituent, such as constructions involving multiple *wh*-fragments.

The following are constraints on fragments (among others)

proposed by Bertomeu and Kordoni. The Attribute-Value Matrix (AVM) in (15) describes constraints imposed on the type *semantic-structural-resolution-fragment-clause* (*sem-struct-res-frag-cl*), which inherits from a more general constraint in (14), *fragment-clause* (*frag-cl*).

(14) *frag-cl*:

$$\left[ \begin{array}{l} \text{frag-cl} \\ \text{SEM} \left[ \begin{array}{l} \text{dmrs} \\ \text{ID} \quad \boxed{0} \text{ event} \\ \text{RELS} \quad \boxed{A} \oplus \boxed{B} \end{array} \right] \\ \text{C-SEM} \left[ \begin{array}{l} \text{dmrs} \\ \text{RELS} \quad \boxed{A} \left\langle \text{msg}, \left[ \begin{array}{l} \text{soa} \\ \text{RELN} \text{ soa-relation} \\ \text{ARG0} \quad \boxed{0} \end{array} \right] \dots \right\rangle \end{array} \right] \\ \text{NON-HEAD-DTRS} \left\langle \left[ \begin{array}{l} \text{sign} \\ \text{SYNSEM} \text{ synsem} \\ \text{SEM|RELS} \quad \boxed{B} \end{array} \right] \right\rangle \end{array} \right]$$

(15) *sem-struct-res-frag-cl*:

$$\left[ \begin{array}{l} \text{sem-struct-res-frag-cl} \\ \text{SYNSEM|LOCAL|CONT} \left[ \begin{array}{l} \text{mrs} \\ \text{INDEX} \quad \boxed{0} \text{ event} \\ \text{GTOP} \quad \boxed{2} \text{ handle} \\ \text{LTOP} \quad \boxed{2} \\ \text{RELS} \quad \boxed{A} \oplus \boxed{B} \\ \text{H-CONS} \quad \boxed{C} \oplus \boxed{D} \end{array} \right] \\ \text{C-CONT} \left[ \begin{array}{l} \text{mrs} \\ \text{LTOP} \quad \boxed{2} \\ \text{RELS} \quad \boxed{A} \left\langle \left[ \begin{array}{l} \text{msg} \\ \text{LBL} \quad \boxed{2} \\ \text{SOA} \quad \boxed{3} \end{array} \right], \left[ \begin{array}{l} \text{soa} \\ \text{LBL} \quad \boxed{4} \text{ handle} \\ \text{RELN} \quad \boxed{5} \text{ soa-relation} \\ \text{ARG0} \quad \boxed{0} \end{array} \right] \dots \right\rangle \\ \text{H-CONS} \quad \boxed{C} \left\langle \left[ \begin{array}{l} \text{geg} \\ \text{SC-ARG} \quad \boxed{3} \\ \text{OUTSCPD} \quad \boxed{4} \end{array} \right] \right\rangle \end{array} \right] \\ \text{CTXT|DISC-REC} \left\langle \dots \left[ \begin{array}{l} \text{msg-cont-sem-obj} \\ \text{RELS} \left\langle \dots \left[ \begin{array}{l} \text{soa} \\ \text{RELN} \quad \boxed{5} \end{array} \right] \dots \right\rangle \dots \right] \dots \right\rangle \\ \text{NON-HEAD-DTRS} \left\langle \left[ \begin{array}{l} \text{sign} \\ \text{SYNSEM|LOCAL|CONT} \left[ \begin{array}{l} \text{RELS} \quad \boxed{B} \\ \text{H-CONS} \quad \boxed{D} \end{array} \right] \end{array} \right] \right\rangle \end{array} \right]$$

The type *frag-cl* contains specifications on the syntax and deep semantics—represented as *d(eep)-mrs* of fragments in general. The feature SEM stands for the semantic-conceptual representation and the feature C-SEM the relations that represent the meaning of the head-daughter. The type *sem-struct-res-frag-cl* contains further information on the semantic-structural representation. The feature DISC-REC(ORD), which is a C(ON)T(E)XT feature, has as value an semantic-structural object of type *m(e)s(sa)ge-cont(ent)-sem(antic)-obj(ect)*. The mother’s REL(ATION)S list contain the RELS of the C-CONT and that of the NON-HEAD-DRTS. This means roughly that the mother’s meaning is composed from the meaning of its head and the non-head daughters. Also, the top-level semantics is provided by the head-daughter. This is achieved by identifying the L(OCAL)TOP of the C-CONT with G(LOBAL)TOP.

## 4.2 A new type

Let us assume that Bertomeu and Kordoni’s (2005) analysis can be straightforwardly extended to multiple *wh*-fragments. Then, the two *wh*-remnants in this construction will correspond to NON-HEAD-DTRS, and the *soa* of C-CONT | RELS will carry the conceptual semantics of the verbal head which selects for these *wh*-remnants. The structure-sharing of RELN value between the *soa* within DISC-REC and the *soa* within C-CONT will ensure that the relation that the head-daughter provides is the same with the relation uttered in recent discourse context. In this way, the relationship between the fragments and their antecedent can be captured as far as the core meaning of the antecedent is present within the discourse record.

Though I assume that the general approach of Bertomeu and Kordoni (2005) is on the right track, there are problems caused by unifying various elliptical constructions. As we observed in section 3, gapping and multiple *wh*-fragments exhibit a number of distinct properties. In order to correctly characterize these two constructions, constraints must be imposed independently on each case.

Below, I propose a further type for constructions involving

multiple *wh*-fragments, which is a subtype of *sem-struct-res-frag-cl*. It captures at least the following facts first, the type *multi(ple)-wh-frag(ment)-cl* must contain two *wh*-remnants. This is achieved by specifying the two members of the feature NON-H(EA)D-DTRS to contain an element of type *param*, which represents the quantificational meaning of a *wh*-expression, as the value of the feature STORE. On the other hand, the STORE value of the mother is empty, which shows that the stored meaning of *wh*-expressions is retrieved at this node. Unlike Bertomeu and Kordoni's constraint (15), the value of NON-HD-DTRS in (16) is a two-membered list because multiple *wh*-fragments always contain two *wh*-phrases. Also, this constraint requires that the non-head daughters' WH value be empty, since no extraction is involved.

(16) *multi-wh-frag-cl*:

$$\left[ \begin{array}{l} \text{multi-wh-frag-cl} \\ \text{SYNSEM | STORE } \{ \} \\ \text{NON-HD-DTRS } \left\langle \begin{array}{l} \text{sign} \\ \text{SS | LOC } \left[ \begin{array}{l} \text{WH } \{ \} \\ \text{STORE } \{ \{param\} \} \end{array} \right] \end{array} \right\rangle , \left[ \begin{array}{l} \text{sign} \\ \text{SS | LOC } \left[ \begin{array}{l} \text{WH } \{ \} \\ \text{STORE } \{ \{param\} \} \end{array} \right] \end{array} \right] \end{array} \right\rangle \end{array} \right]$$

One final note; we observed in section 3 that multiple *wh*-fragments can appear as a complement of factive or resolute predicates, i.e. *know*, *discover*, *forget*, *tell*, etc. but not as a complement of QE predicates, i.e. *ask*, *wonder*, *investigate*, etc. Assuming Ginzburg and Sag's (2000) accounts on these predicates, it seems that the preference for factive and resolute predicates comes from the fact that these predicates do not simply take questions as their argument, but rather coerce the question into a fact. At the moment, my best approximation is that the goal of speaking multiple *wh*-fragments in a conversation is not to ask the hearer about the referents of the *wh*-expressions, but to assert a fact about the previously uttered proposition e.g. that he knows/does not know who they really are. Though I do not provide a detailed analysis of this issue, the (im)possibility of embedding with certain predicates can be captured by refining the lexical entries of predicates which take a sentential complement whose content is type question.

## 5. Conclusion

In this paper, I proposed an alternative analysis of multiple *wh*-fragments. I suggested that the resolution of multiple *wh*-fragments is, to some extent, determined by discourse context. Further research is required to explain the narrower distribution of embedded cases and the fact that the source can be provided right after multiple *wh*-fragments are uttered.

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