Focus Intervention Effects Revisited: A Semantics-Pragmatics Approach

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1   Introduction

This paper aims to provide a new account for **focus intervention effects** in *wh*-in-situ languages like Korean and Chinese (see e.g., Kim 2002; Beck 2006; Li and Law 2016). In these languages, *wh*-questions usually do not involve the fronting of *wh*-items (see *mwusun* in (1) and *shén-me* in (2)).

(1)   Mary-nun   <u>mwusun</u> chayk-ul   ilk-ess-ni?
       Mary-TOPIC <u>what</u>   book-ACC read-PAST-Q
       'What book(s) did Mary read?'   Korean (SOV): *wh*-in-situ

(2)   Mary dú-le   <u>shén-me</u> shū?
       Mary read-PFV <u>what</u>   book
       'What book(s) did Mary read?'   Chinese (SVO): *wh*-in-situ

   When there is a focus item in a *wh*-question (see *-man* in (3) and *zhǐ-yǒu* in (4)), the *wh*-in-situ version with the pattern '*only ... wh*' is degraded, while the *wh*-movement version with the pattern '*wh ... only*' sounds natural.

(3)   a.   * [Mary]$_F$-<u>man</u> <u>mwusun</u> chayk-ul   ilk-ess-ni?
               Mary-<u>ONLY</u>   <u>what</u>   book-ACC read-PAST-Q
               Intended: 'What is the book-sum x s.t. only Mary read x?'

    b.   <u>mwusun</u> chayk-ul   [Mary]$_F$-<u>man</u> ilk-ess-ni?
         <u>what</u>   book-ACC Mary-ONLY read-PAST-Q
         'What book(s) did Mary read?'   Korean

(4)   a.   * <u>zhǐ-yǒu</u> [Mary]$_F$ dú-le   <u>shén-me</u> shū?
          <u>only</u>   Mary   read-PFV <u>what</u>   book
          Intended: 'What is the book-sum x s.t. only Mary read x?'
    b.   <u>shén-me</u> shū   <u>zhǐ-yǒu</u> [Mary]$_F$ dú-le?
         <u>what</u>   book <u>only</u>   Mary   read-PFV
         'What book(s) did Mary read?'   Chinese

(5)   Generalizations on focus intervention effects:
    a.   Degraded pattern: *only ... wh*   **wh-in-situ + focus ✗**
    b.   Acceptable pattern: *wh ... only*   **wh-movement + focus ✓**

In the existing literature on intervention effects, the degraded pattern (5a) has often been attributed to derivational failure (see e.g., Beck 2006; Li and Law 2016). However, it has also been pointed out that there is variation among native speakers' judgments (see Tomioka 2007).

Inspired by works on *post-suppositions* (see e.g., Brasoveanu 2013; Bumford 2017), I propose a new semantics-pragmatics account for intervention effects data. Both focus items like *only* and *wh*-items bring relativized maximality/definiteness requirements that need to be checked at a global, sentential level, as post-suppositions. When *only* and *wh*-items appear together, their relativized maximality/definiteness requirements cannot be met, leading to meaning triviality in using *only*. Thus the degraded pattern (5a) is not due to derivational crash, but rather meaning triviality. I also propose that the acceptable pattern (5b) has a covert distributivity operator associated with the fronted *wh*-item, helping (5b) avoid triviality/uninterpretability.

The rest of the paper is organized as follows. Section 2 presents new empirical observations on how sentences with *only* are interpreted, showing a crucial contrast between declarative sentences and *wh*-questions. Based on these observations, Section 3 explains why a relativized reading for *only* is never available in *wh*-questions and accounts for the generalizations in (5). Section 4 compares the current proposal with existing studies on intervention effects and addresses advantages of the current proposal. Section 5 concludes.

2   New Empirical Observations

Here I show that when a focus item like *only* appears in a declarative sentence vs. a *wh*-question, the interpretations of *only* are not exactly the same.

2.1 The Interpretation of Declarative Sentences with *Only*

Cross-linguistically, declarative sentences with *only* have two readings. The availability of these two readings is evidenced by our truth-value judgments of sentences in (6) under different scenarios (see (7) and (8)).

(6)   Declarative sentences with *only*
    a.   English: <u>Only</u> [Mary]$_F$ read *Batman* and *Sandman*.
    b.   Korean: (= (6a))

    [Mary]$_F$-<u>man</u> Batman-kwa Sandman-ul   ilk-ess-ta
    Mary-ONLY   Batman-and Sandman-ACC read-PAST-DECL
    c.   Chinese: (= (6a))

    <u>zhǐ-yǒu</u> [Mary]$_F$ dú-le   *Batman* hé *Sandman*
    <u>only</u>   Mary   read-PFV Batman and Sandman

Declarative sentences in (6) are true under the scenario in (7). Under this scenario, *Batman* and *Sandman* are books that have the property of having a unique reader, Mary. In this case, what is under consideration is each atomic book x and whether the property $\lambda x.[\text{only Mary read } x]$ holds true for x.

(7)   Senario 1 ('distributive' scenario): Mary read all the three books, while Lucy and Nancy only read one book, *Watchmen*.
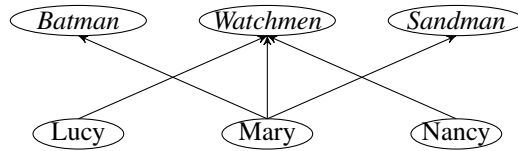
Declarative sentences in (6) are also true under the scenario in (8). Under this scenario, no book has a unique reader. Sentences in (6) are true because Mary is unique in reading the combination of books '*Batman* and *Sandman*'. Here the uniqueness of Mary is based on the entire rest of the sentence, i.e., *read Batman and Sandman*. *Only Mary* is interpreted at the sentential level.

(8)   Scenario 2 ('collective' scenario): Lucy, Mary, and Nancy each read two books. Only Mary read the combination '*Batman* and *Sandman*'.
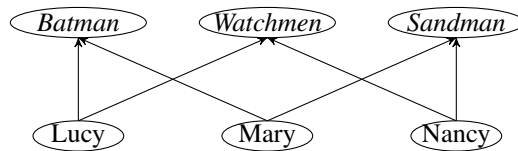
Therefore, each of the sentences in (6) has two readings.

In one reading, as interpreted under Scenario 1 in (7), *only Mary* (*read*) is interpreted in an **absolute** sense. The meaning of *only Mary* (*read*) is computed **locally** (i.e., the property $\lambda x.$[only Mary read x] is first derived), independent of the part *Batman and Sandman*.

In the other reading, as interpreted under Scenario 2 in (8), *only Mary* is interpreted in a **relative** sense. The meaning of *only Mary* cannot be fully computed until at the sentential level. The uniqueness of Mary is checked in a delayed manner, involving the information '*Batman and Sandman*'.

Thus sentences in (6) are reminiscent of **superlatives**, which can be interpreted in an **absolute** way vs. a **relative** way (see (9)). According to Bumford (2017), the absolute reading of *the tallest mountain* (see (9a)) is based on a local, DP-level interpretation of this superlative: the maximality/definiteness requirement is applied at the DP level and picks out the tallest mountain in the domain (e.g., in our actual world, the Everest). In contrast, the relative reading of *the tallest mountain* (see (9b)) is based on a more global interpretation of this superlative: the maximality/definiteness requirement is applied at a higher level and picks out the tallest mountain climbed by some girl.

(9)   The girl who climbed the tallest mountain   (see e.g., Bumford 2017)

     a.   The absolute reading of *the tallest mountain*:
        $\rightsquigarrow$ the tallest mountain in the world, i.e., the Everest
     b.   The relative reading of *the tallest mountain*:
        $\rightsquigarrow$ the tallest mountain climbed by some girl

In Section 3, I will present Bumford (2017)'s analysis of superlatives and propose to analyze focus expressions like *only Mary* in the same way.[1]

2.2   The Interpretation of *Wh*-questions with *Only*

In *wh*-questions, if *only Mary* is interpreted in exactly the same way as in declarative sentences, we would expect that there are also two interpretations: a DP-level, absolute interpretation of *only Mary*, as well as a sentence-level, relative interpretation of *only Mary*. The prediction is that for *wh*-questions in (10), *Batman and Sandman* would be a true and felicitous answer under both Scenarios 1 and 2 (see (7) and (8)). However, this prediction is not borne out.

(10)   Acceptable *wh*-questions with the pattern '*wh . . . only*'

     a.   What books did only [Mary]$_F$ read?   English
     b.   mwusun chayk-ul [Mary]$_F$-man ilk-ess-ni?   Korean (= (3b))
     c.   shén-me shū zhǐ-yǒu [Mary]$_F$ dú-le?   Chinese (= (4b))

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[1] The absolute vs. relative readings of superlatives and *only Mary* seem also reminiscent of scope taking. I follow Bumford (2017) and do not pursue a scope-taking-based account for them.

As summarized in (11), we intuitively feel that under Scenario 1 (see (7)), *Batman and Sandman* is a true and felicitous answer, while under Scenario 2 (see (8)), this is not a true answer. Actually, our intuition is that for Scenario 2, *wh*-questions in (10) can only be answered with *none*, because none of the books have a unique reader.

(11)   Answers to the questions in (10)
      a.   *Batman* and *Sandman*.   ✓under Scenario 1 (see (7))
      b.   *Batman* and *Sandman*.   ✗under Scenario 2 (see (8))

The contrast in (11) indicates that *wh*-questions in (10) can only be interpreted as addressing 'which books have the property of having a unique reader, Mary', never interpreted as addressing 'Mary is unique in reading a certain combination of books, and what this book-combination is'. In other words, in these *wh*-questions, *only Mary* can only be interpreted in an absolute sense, but never in a relative sense.

2.3 Generalizations

When combined together, Sections 2.1 and 2.2 show that the interpretation(s) of *wh*-questions with *only* does not match exactly with the interpretation(s) of corresponding declarative sentences with *only*. As shown in (12), a sentence-level, relativized interpretation for *only Mary*, which is available for declarative sentences, is never attested for *wh*-questions. *Wh*-questions containing *only Mary* can only have a DP-level, absolute interpretation for *only Mary*.

(12)   a. **Declarative sentences with *only***:
          (i)   ✓a DP-level, absolute interpretation for *only Mary*
          (ii)   ✓a sentence-level, relative interpretation for *only Mary*
      b. ***Wh*-questions with the acceptable pattern '*wh . . . only*'**:
          (i)   ✓a DP-level, absolute interpretation for *only Mary*
          (ii)   ✗a sentence-level, relative interpretation for *only Mary*

3 Proposal

I follow Brasoveanu (2013) and Bumford (2017)'s studies on post-suppositions and propose a post-suppositional perspective in analyzing focus items and *wh*-items (Section 3.1). Then, in Section 3.2, I explain why a sentence-level, relativized interpretation of focus items is never possible in *wh*-questions. Finally, in Section 3.3, I account for the judgment contrast between '*only . . . wh*' and '*wh . . . only*' (see (5)), proposing that the availability of the DP-level, absolute interpretation of focus items hinges on *wh*-movement and the use of a covert distributivity operator. After all, the pattern '*only . . . wh*' is degraded because it has no felicitous interpretation.

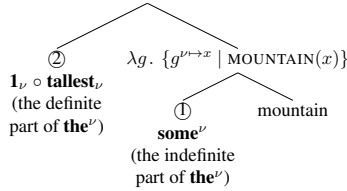### 3.1 A Post-suppositional View on *Wh*-items and Focus

Bumford (2017) adopts dynamic semantics to analyze the absolute and relative readings of superlatives. Within dynamic semantics, meaning derivation is considered a series of updates from an information state to another. Here an information state m (of type $g \to \{g\}$) is represented as a function from an input assignment function to an output set of assignment functions.

(13) The^u girl who climbed <u>the$^\nu$ tallest mountain</u>   (= (9))

    a. The absolute reading of *the$^\nu$ tallest mountain*

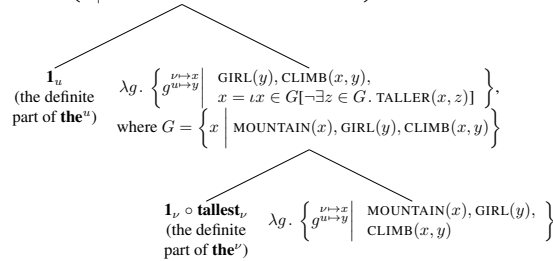$$\lambda g. \{g^{\nu \mapsto x} \mid x = \iota x \in G[\neg \exists z \in G. \text{TALLER}(x,z)]\},$$
$$\text{where } G = \{x \mid \text{MOUNTAIN}(x)\}$$

       ② $\quad \lambda g. \{g^{\nu \mapsto x} \mid \text{MOUNTAIN}(x)\}$

      $\mathbf{1}_\nu \circ \mathbf{tallest}_\nu$
      (the definite
      part of **the$^\nu$**) ① $\quad$ mountain

      some$^\nu$
      (the indefinite
      part of **the$^\nu$**)

    b. The relative reading of *the$^\nu$ tallest mountain*

$$\lambda g. \left\{ \begin{matrix} {}^{\nu \mapsto x} \\ g^{u \mapsto y} \end{matrix} \middle| \begin{matrix} x = \iota x \in G[\neg \exists z \in G. \text{TALLER}(x,z)], \\ y = \iota y [\text{GIRL}(y) \wedge \text{CLIMB}(x,y)] \end{matrix} \right\},$$
$$\text{where } G = \left\{ x \middle| \text{MOUNTAIN}(x), \text{GIRL}(y), \text{CLIMB}(x,y) \right\}$$

    $\mathbf{1}_u$
    (the definite $\lambda g. \left\{ \begin{matrix} {}^{\nu \mapsto x} \\ g^{u \mapsto y} \end{matrix} \middle| \begin{matrix} \text{GIRL}(y), \text{CLIMB}(x,y), \\ x = \iota x \in G[\neg \exists z \in G. \text{TALLER}(x,z)] \end{matrix} \right\},$
    part of **the^u**) $\text{where } G = \left\{ x \middle| \text{MOUNTAIN}(x), \text{GIRL}(y), \text{CLIMB}(x,y) \right\}$

        $\mathbf{1}_\nu \circ \mathbf{tallest}_\nu$
        (the definite $\lambda g. \left\{ \begin{matrix} {}^{\nu \mapsto x} \\ g^{u \mapsto y} \end{matrix} \middle| \begin{matrix} \text{MOUNTAIN}(x), \text{GIRL}(y), \\ \text{CLIMB}(x,y) \end{matrix} \right\}$
        part of **the$^\nu$**)

As illustrated in (13), Bumford (2017) splits the semantic contribution of definite determiner *the* into two parts. In (13a), in ①, the **indefinite** part of **the$^\nu$** first introduces a discourse referent (dref) in a non-deterministic way. After relevant restrictions are added (here MOUNTAIN(x))), in ②, the **definite** part of **the$^\nu$** contributes definiteness, picking out the unique mountain that is taller than all other mountains in the domain. The absolute reading of this superlative, *the tallest mountain*, is thus derived.
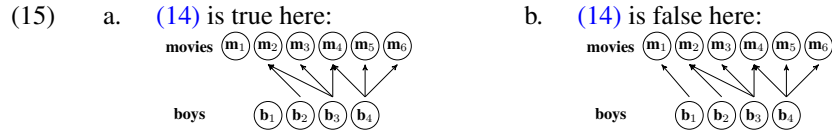
In (13b), after the indefinite part of **the$^\nu$** introduces a dref in a non-deterministic way (this part is omitted in the tree), definiteness contributed by **the$^\nu$** is not at work immediately. It is after another dref is introduced and more restrictions are added (here GIRL(y) and CLIMB(x, y) – see the bottom right part of the tree) that definiteness tests eventually come to work. In (13b),

these delayed, post-suppositional tests pick out (i) the unique mountain that is taller than all other mountains climbed by some girl in the domain and (ii) the unique girl who climbed this unique mountain. The relative reading of this superlative, *the tallest mountain*, is thus derived.

Bumford (2017)'s post-suppositional account for definite determiner *the* in the relative reading of superlatives is in the same spirit as Brasoveanu (2013)'s account for *modified numerals* in *cumulative-reading sentences*.

(14) is intuitively true under the scenario of (15a), but false under the scenario of (15b), indicating that the interpretation of modified numerals like *exactly 3* NP and *exactly 5* NP should be relativized. The cumulative reading of (14) counts the cardinality of all boys that saw movies and all movies seen by any boys, not the cardinality of all boys and movies in the domain.

(14) Exactly 3^u boys saw exactly 5^ν movies.   Cumulative[2]
      exactly 3: not counting all the boys, but all boys who saw movies

(15) a. (14) is true here: b. (14) is false here:

movies $(m_1)(m_2)(m_3)(m_4)(m_5)(m_6)$ movies $(m_1)(m_2)(m_3)(m_4)(m_5)(m_6)$

boys $(b_1)(b_2)(b_3)(b_4)$ boys $(b_1)(b_2)(b_3)(b_4)$

Thus modified numerals in (14) work in the same way as definite determiner *the* in (13), with a two-fold semantic contribution. As shown in (16a), modified numerals first introduce (potentially plural) drefs, x and y, in a non-deterministic way, and various restrictions are added onto these drefs. Then as shown in (16b), modified numerals contribute post-suppositions, checking definiteness and cardinality requirements (see (17) and (18)). The cumulative reading of (14) is true if u and ν are assigned to the (mereologically) maximal boy-sum and movie-sum and their cardinalities are equal to 3 and 5.

(16) A post-suppositional analysis of modified numerals for (14)

      a. Introducing drefs: $p = [\![\text{some}^u \text{ boys saw some}^\nu \text{ movies}]\!] =$
          $\lambda g. \left\{ g^{\nu \mapsto y}_{u \mapsto x} \mid \text{MOVIE}(y), \text{BOY}(x), \text{SAW}(x,y) \right\}$

      b. Checking maximality and cardinality as post-suppositions:
          $[\![(14)]\!] = [\![\text{exact } 3^u \text{ boys saw exactly } 5^\nu \text{ movies}]\!]$
          $= \mathbf{M}_{u,\nu}(p), \text{if} |x| = 3 \wedge |y| = 5$
          $= \lambda g. \left\{ g^{\nu \mapsto y}_{u \mapsto x} \mid \begin{array}{l} y = \sigma y.[\text{MV}(y) \wedge \exists x.[\text{BOY}(x) \wedge \text{SAW}(x,y)]] \\ x = \sigma x.[\text{BOY}(x) \wedge \exists y.[\text{MV}(y) \wedge \text{SAW}(x,y)]] \end{array} \right\},$
          $\text{if} |x| = 3 \wedge |y| = 5$

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[2] Sentence (14) has also a distributive reading: there are exactly 3 boys such that each of them saw exactly 5 movies. This distributive reading is not discussed in this paper.

(17) Maximality operator: (mereology-based)
$\mathbf{M}_\nu \overset{\text{def}}{=} \lambda m.\lambda g.\ \{h \in m(g) \mid \neg\exists h' \in m(g).\ h(\nu) \sqsubset h'(\nu)\}$

(18) Cardinality test: $\mathbf{5}_\nu \overset{\text{def}}{=} \lambda m.\lambda g.m(g)$, if $|g(\nu)| = 5$

Now I show that focus items (e.g., *only Mary*) and *wh*-items work just like definite determiner *the* and modified numerals, with a two-fold meaning.

As shown in (19), focus item *only Mary* first introduces a (potentially plural) dref, x (see (19a)). Then after various restrictions are added, maximality operator $\mathbf{M}_u$ and the test of $\mathbf{Mary}_u$ are applied at the sentential level, as delayed, post-suppositional tests (see (19b)).

Similar to (17), $\mathbf{M}_u$ picks out the maximal dref x such that (each atomic part of) x read *Batman* and *Sandman* (for simplicity, cumulative closure is assumed). The test $\mathbf{Mary}_u$ (see (20)) works just like a cardinality test (see (18)), checking whether the maximal x assigned to u is equivalent to Mary.

(19) A post-suppositional view on focus   The analysis of (6)

   [Mary]^u_F-<u>man</u> Batman-kwa Sandman$^\nu$-ul   ilk-ess-ta
   Mary-ONLY   Batman-and Sandman-ACC read-PAST-DECL

   Under Scenario 2 (see (8)): 'Only Mary read *Batman* and *Sandman*.'
   a. Introducing drefs:
       $p = [\![\text{some}^u \text{ people read Batman and Sandman}^\nu]\!]$
       $= \lambda g.\ \left\{ g^{\nu \mapsto y}_{u \mapsto x} \mid y = \text{BM} \oplus \text{SM}, \text{HUMAN}(x), \text{READ}(x, y) \right\}$
   b. Checking maximality and cardinality as post-suppositions:
       $[\![(6)]\!] = [\![\text{only Mary}^u \text{ read Batman and Sandman}^\nu]\!]$
       $= \mathbf{M}_u(p)$, if $x = $ Mary
       $= \lambda g.\ \left\{ g^{\nu \mapsto y}_{u \mapsto x} \middle| \begin{array}{l} y = \text{BM} \oplus \text{SM} \\ x = \sigma x.[\text{HUMAN}(x) \wedge \text{READ}(x, y)] \end{array} \right\},$
       if $x = $ Mary

(20) The test of $\mathbf{Mary}_u$: $\mathbf{Mary}_u \overset{\text{def}}{=} \lambda m.\lambda g.m(g)$, if $g(u) = \mathbf{Mary}$

Wh-expressions are similar to indefinites in introducing drefs and support cross-sentential anaphora (see (21); see also e.g., Comorovski 1996).

(21) Who^u kissed me? I want to know her$_u$ name.

According to Dayal (1996)'s Maximal Informativity Presupposition, a *wh*-question presupposes the existence of a maximally informative true answer.[3]

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[3] Also, according to Karttunen (1977), a *wh*-question denotes the set of its true propositional answers. In Zhang (2023b), I show that the current post-suppositional perspective on *wh*-questions is also in the same spirit as Karttunen (1977).

Thus, when the above two ideas are combined, the semantic contribution of *wh*-items should also be two-fold. As shown in (22), a *wh*-item first introduces a (potentially plural) dref, y (see (22a)). Then after various restrictions are added, maximality operator $\mathbf{M}_\nu$ should be applicable (see (22b)). The maximal dref y (which is picked out via the application of $\mathbf{M}_\nu$) actually constitutes the (analytically) maximally informative true answer.[4]

(22) A post-suppositional view on *wh*-items   The analysis of (1)

     Mary^u-nun   <u>mwusun$^\nu$</u> chayk-ul   ilk-ess-ni?
     Mary-TOPIC <u>what</u>   book-ACC read-PAST-Q

     'What book(s) did Mary read?'

     a.   Introducing drefs: $p = [\![\mathrm{Mary}^u \text{ read some}^\nu \text{ books}]\!]$
        $= \lambda g\,.\,\left\{ g^{\nu\mapsto y}_{u\mapsto x}\big|\ \mathrm{BOOK}(y), x = \mathrm{MARY}, \mathrm{READ}(x,y) \right\}$

     b.   Applying $\mathbf{M}_\nu$ as a post-suppositional test:
        $[\![(1)]\!] = [\![\mathrm{Mary}^u \text{ read what}^\nu \text{ books}]\!] = \mathbf{M}_\nu(p)$
        $= \lambda g\,.\,\left\{ g^{\nu\mapsto y}_{u\mapsto x}\Big|\ \begin{array}{l} y = \sigma y.[\mathrm{BOOK}(y) \wedge \mathrm{READ}(x,y)] \\ x = \mathrm{MARY} \end{array} \right\}$

Overall, I have shown that focus items and *wh*-items (i) introduce drefs and (ii) impose definiteness at the sentential-level, in a delayed, post-suppositional way. As a consequence, their interpretation is relativized, in the sense that the introduced drefs are restricted by information from the rest of a sentence, beyond the DP-level of focus items and *wh*-items themselves.

3.2 Accounting for Focus Intervention Effects

Now I show that when both focus items and *wh*-items appear in the same sentence, their relativized interpretation is impossible.

(23) Interpreting the pattern '*only ... wh*'   The analysis of (3a)

     * [Mary]^u_F-<u>man</u> <u>mwusun$^\nu$</u> chayk-ul   ilk-ess-ni?
       Mary-<u>ONLY</u>   <u>what</u>   book-ACC read-PAST-Q

     Intended: 'What is the book-sum x s.t. only Mary read x?'

     a.   Introducing drefs: $p = [\![\text{some}^u \text{ people read some}^\nu \text{ books}]\!]$
        $= \lambda g\,.\,\left\{ g^{\nu\mapsto y}_{u\mapsto x}\big|\ \mathrm{BOOK}(y), \mathrm{HUMAN}(x), \mathrm{READ}(x,y) \right\}$

     b.   Applying post-suppositional tests:
       (i)   First $\mathbf{M}_u \circ \mathbf{Mary}_u$, then $\mathbf{M}_\nu$
          $\rightsquigarrow$ Is Mary the only reader? What does she read?

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[4] Here I still adopt the mereology-based definition of maximality operator (see (17)). See Zhang (2023b) for a more general, informativeness-based definition.

(ii) First $\mathbf{M}_\nu$, then $\mathbf{M}_u \circ \mathbf{Mary}_u$
⤳ What are all the books read by someone? Is Mary the only one who read them?

As shown in (23), focus item *only Mary* and the *wh*-item each introduce a dref, x and y, and various restrictions are added onto them (see (23a)).

Now the post-suppositional tests brought by the focus item (i.e., $\mathbf{M}_u \circ \mathbf{Mary}_u$) and the *wh*-item (i.e., $\mathbf{M}_\nu$) need to be applied.

As shown in (23b-i), suppose that $\mathbf{M}_u \circ \mathbf{Mary}_u$ is applied first, checking whether Mary is the unique reader. If the derivation passes the test $\mathbf{Mary}_u$, $\mathbf{M}_\nu$ is further applied, picking out all the books this unique reader, Mary, read.

Then as shown in (23b-ii), suppose that $\mathbf{M}_\nu$ is applied first, picking out all the books read by someone. Then $\mathbf{M}_u \circ \mathbf{Mary}_u$ is further applied, checking whether Mary is the unique reader that read all these books.

No matter whether the derivational order in (23b-i) or (23b-ii) was adopted, *only Mary* cannot have a relativized interpretation such that the uniqueness of Mary depends on a particular book-sum. Actually the derivations in (23b-i) and (23b-ii) would yield the same results: ν is assigned to the sum of all the books read by someone, and u is assigned to the sum of all the readers. Thus the *wh*-questions (3a)/(4a)/(23) amount to request information on 'what books are read' or 'what books the only reader, Mary, read'. No relativized interpretation of *only Mary* can be derived, and the use of *only* is trivial.

The current analysis explains the lack of relativized interpretation of *only* in a *wh*-question and captures our intuition.

Intuitively, without knowing what books Mary read, we would not use the word *only* (*Mary*) to address her uniqueness immediately. Instead, we would first raise the question 'what books did Mary read'. Then if we do know what books Mary read and are interested in whether she is unique in reading these books, we would not need to raise a *wh*-question to request information on these books, because we already know the answer.

The lack of relativized interpretation of *only* in a *wh*-question can also be considered an order conflict. Essentially, the relativized definiteness/maximality of the drefs x and y relies on adding more restrictions, i.e., applying post-suppositional tests in a delayed way, when more information about drefs are given (see also the analyses of superlatives in (13)). Therefore, without the information on x, the relativization of the definiteness of y is impossible, and vice versa. In other words, the post-suppositions with regard to drefs x and y compete to be applied as late as possible, after the information of the other is given, thus resulting in the failure of the relativization of either one.

3.3 Accounting for the Acceptable Pattern '*Wh . . . only*'

Now I come to explain why the pattern (5b), '*wh . . . only*', is acceptable.

As already shown in Section 2, the interpretation(s) of the acceptable *wh*-question '*wh . . . only*' does not fully match the intepretation(s) of the corresponding declarative sentences with *only*. The acceptable *wh*-question '*wh . . . only*' has only a DP-level, absolute interpretation for the focus item.
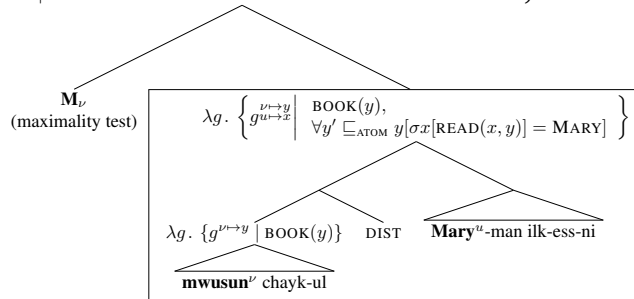
For '*wh . . . only*', to derive the reading with this absolute interpretation of the focus item, I propose that the fronted *wh*-item serves as the sorting key, and there is a **covert distributivity operator**, DIST, associated with this sorting key. As shown in (24), *only Mary* is interpreted locally, within the scope of the universal quantifier of DIST (see the highest node within the square frame). Eventually the application of $\mathbf{M}_\nu$ picks out the maximal dref y satisfying the restrictions $\text{BOOK}(y)$ and $\forall y' \sqsubseteq_{\text{ATOM}} y[\sigma x[\text{READ}(x, y)] = \text{MARY}]]$, and the *wh*-question means the sum of all the books such that Mary is the unique reader for each atomic part of these books.

(24)   Interpreting the pattern '*wh . . . only*'   The analysis of (3b)

<u>mwusun</u>$^\nu$ chayk-ul   DIST $[\text{Mary}]^u_F$-<u>man</u> ilk-ess-ni?
<u>what</u>   book-ACC DIST Mary-<u>ONLY</u>   read-PAST-Q

'What book(s) did only Mary read?'

$$\lambda g . \left\{ g^{\nu \mapsto y}_{u \mapsto x} \middle| \; y = \sigma y . [\text{BOOK}(y) \wedge \forall y' \sqsubseteq_{\text{ATOM}} y[\sigma x[\text{READ}(x, y)] = \text{MARY}]] \right\}$$

$\mathbf{M}_\nu$
(maximality test)

$\lambda g . \left\{ g^{\nu \mapsto y}_{u \mapsto x} \middle| \begin{array}{l} \text{BOOK}(y), \\ \forall y' \sqsubseteq_{\text{ATOM}} y[\sigma x[\text{READ}(x, y)] = \text{MARY}] \end{array} \right\}$

$\lambda g . \{ g^{\nu \mapsto y} \mid \text{BOOK}(y)\}$ DIST   **Mary**^{u}-man ilk-ess-ni

mwusun$^\nu$ chayk-ul

(25) $[\![\text{DIST}]\!] \stackrel{\text{def}}{=} \lambda X_e . \lambda P_{\langle et \rangle} . \forall x \sqsubseteq_{\text{ATOM}} X[P(x)]$
     (i.e., for each atomic part x in the potentially plural entity X, P holds true for x.)

One more question needs to be answered: If, for the good pattern '*wh . . . only*', there can be a covert distributivity operator associated with the *wh*-item, then why cannot there be one associated with the *wh*-item for the pattern '*only . . . wh*'? Here I propose to follow an existing observation in the literature: 'plurals do not readily take "inverse distributive scope" (see Szabolcsi 2010: Section 8.2 and references therein).' The explanation of this observation is too complicated to be addressed here, and it is not directly relevant to

the current goal. As pointed out by Szabolcsi (2010), 'It should be noted immediately that there is no logical necessity in this', so it's likely due to some processing-related factors (see also Szabolcsi 2010 for more discussion).

To sum up, when a focus item and a *wh*-item appear together, as summarized in (26), a sentence-level, relative interpretation for *only* is never possible (see (26a-i) and (26b-i)), while a DP-level, absolute interpretation for *only* hinges on the availability of a covert distributivity operator and thus *wh*-movement. Therefore, the pattern '*only ... wh*' has no possible interpretation, making this pattern degraded, while the pattern '*wh ... only*' is acceptable due to the availability of one interpretation (see (26b-ii)).

(26)   Accounting for focus intervention effects (see (5))

    a.   Degraded pattern: *only ... wh*
        (i)   ✗a sentence-level, relative interpretation for *only*
        (ii)   ✗a DP-level, absolute interpretation for *only*
    b.   Acceptable pattern: *wh ... only*
        (i)   ✗a sentence-level, relative interpretation for *only*
        (ii)   ✓a DP-level, absolute interpretation for *only*

4   Discussion: Derivational Crash vs. Interpretation Difficulty

Existing studies on intervention effects do not always share the same empirical coverage, but degradedness is often attributed to derivational crash.

For example, Beck (2006)'s account for the degraded configuration (27) is based on Rooth (1985)'s focus semantics. A *wh*-item has its focus semantic value (i.e., a set of alternatives), but lacks an ordinary semantic value. Thus a Q operator is needed to take this focus semantic value and output an ordinary semantic value. However, for (27), (i) the focus-sensitive operator (e.g., *only*) blocks the association between the *wh*-item and the Q operator, and (ii) the focus-sensitive operator itself requires to be applied to an expression that has both a focus semantic value and an ordinary semantic value. For these two reasons, the derivation crashes.

(27)   Degraded configuration analyzed in Beck (2006):
    ?* $[Q...[\text{focus-sensitive operator } [_{YP}... \text{WH}...]]]$

According to Li and Law (2016), as shown in (28), both XP_F and WH introduce alternatives, thus $[\![XP_F...\text{WH}...]\!]$ is a set of sets of alternatives. As a consequence, there is type mismatch for the application of the focus-sensitive operator, and the derivation crashes.

(28)   Degraded configuration analyzed in Li and Law (2016):
    ?* $[...\text{focus-sensitive operator } [XP_F...\text{WH}...]]$

Compared with these derivation-crash-based analyses, the current account has at least three empirical advantages.

First, by attributing degradedness to interpretation difficulty or meaning triviality rather than derivational crash, the current account is better in line with the observation of Tomioka (2007): there is often variation among speakers' judgments for this kind of data. In particular, as mentioned above, the availability of a covert distributivity operator for a sentence-initial *wh*-item, but not for a sentence-middle *wh*-item, might be related to processing load.

Second, under the current account, the acceptability of the pattern '*wh* . . . *only*' is not really based on its structure, but rather the availability of an interpretation (i.e., the DP-level, absolute interpretation for *only*). More specifically, I point out that the acceptability of the pattern '*wh* . . . *only*' hinges on the sorting-key-status of the *wh*-item, which in turn hinges on *wh*-movement. Thus the current account predicts that for *wh*-items that cannot serve as a sorting key, the pattern '*wh* . . . *only*' should be degraded as well.

This prediction is borne out. As illustrated in (29), (29a) is a good declarative sentence with *only*. However, if we raise a *wh*-question about the height information of Mary, the corresponding *wh*-question is degraded (see (29b)).

(29) a. Only Mary$_F$ is above 6 feet tall.
      b. *<u>How</u>^{I} tall is <u>only</u> Mary?   *wh* . . . *only*

Given that (29b) involves *wh*-movement and has the pattern '*wh* . . . *only*', Beck (2006) and Li and Law (2016) would still predict it to be acceptable, which is contrary to native speakers' intuitive judgments.

Under the current account, since (29b) is a degree question, the *wh*-item here, *how tall*, does not introduce a dref in the domain of (potentially plural) individuals or entities, but rather in the domain of scalar values (i.e., degrees or intervals, see Zhang 2020, 2023a). As shown in the definition of DIST in (25), a scalar value cannot be the first argument of DIST, i.e., covert distributivity cannot be at play here. Thus the reading with the absolute interpretation of *only Mary* cannot be derived. As a consequence, (29b) has no reading, and its degradedness is naturally explained.

Third, the current account also predicts that as far as the issue of relativized maximality/definiteness requirements can be resolved and the use of *only* is not trivial, the pattern '*only* . . . *wh*' should be acceptable as well. This prediction is also borne out, as evidenced by the contrast in (30).

(30) '*only* . . . *wh*' in Chinese: *wh*-question vs. *wh*-conditional

      a. * <u>zhǐ-yǒu</u> Mary$_F$ dú-le   <u>shénme</u> shū?
            <u>only</u> Mary   read-PFV <u>what</u>   book
          'What is the book-sum x s.t. only Mary read x?'   (= (4a))

217

b. Context: Mary and I have special taste in books. Only Mary is interested in the books I read and follows me to read them.

wǒ dú	shénme shū,	zhǐyǒu	Mary$_F$	(yě)	gen-zhe	wǒ dú
I read	what book	only	Mary	(also)	follow	I read

shénme	shū
what	books

'Only Mary follows me to read whatever books I read.'

In (30), both the *wh*-question (30a) and the *wh*-conditional (30b) contain the pattern '*only . . . wh*'. The *wh*-question (30a) has no felicitous reading and is thus degraded. However, the *wh*-conditional (30b) is intuitively good. Those accounts that attribute the degradedness of '*only . . . wh*' to derivational crash would wrongly predict unacceptability for both (30a) and (30b).

For a *wh*-conditional like (30b), the answer to its first part ('what books I read') and the answer to its second part ('what is the book-sum X such that only Mary follows me to read X') are equivalent. Thus, the relativized definiteness of the *wh*-item in the second part can be resolved by the answer to the first part and independent of the focus item in the second part. Thus the order conflict in applying post-suppositional tests brought by the *wh*-item and the focus item can be circumvented. We first use the answer to 'what books I read' to resolve the deterministic update of the *wh*-item in the second part of the *wh*-conditional, and then the post-suppositional test of the focus item is applied as the last step, checking the relative uniqueness of Mary.

5   Conclusion

(Focus) intervention effects have been a hot topic in formal linguistics for decades. In this paper, I propose that both focus items and *wh*-items work in a way similar to definite determiner *the* and modified numerals. Specifically, all these items (i) first introduce drefs and (ii) then bring post-suppositions, i.e., relativized maximality/definiteness tests that need to be checked in a delayed way, at the sentential level. As a consequence, when focus items and *wh*-items appear together, relativized maximality/definiteness cannot be satisfied, resulting in meaning triviality for focus items. In contrast to the degraded pattern '*only . . . wh*', which has no felicitous interpretation at all, the acceptable pattern '*wh . . . only*' is still left with an absolute interpretation for the focus item, due to *wh*-movement and the sorting-key-status of the *wh*-item.

Compared to existing accounts, the current analysis is empirically more advantageous. For future research, I will extend the current account to explain (i) quantificational intervention effects (see e.g., Beck 1996) and (ii) weak island effects (see Abrusán 2014; Zhang 2023a for discussions on the potential connection between intervention effects and weak island effects).

Acknowledgments

References

Abrusán, M. 2014. *Weak Island Effects*. OUP.
https://doi.org/10.1093/acprof:oso/9780199639380.001.0001

Beck, S. 1996. Quantified Structures as Barriers for LF Movement. *Natural Language Semantics* 4: 1–56. https://doi.org/10.1007/BF00263536

Beck, S. 2006. Intervention Effects Follow from Focus Interpretation. *Natural Language Semantics* 14: 1–56. https://doi.org/10.1007/s11050-005-4532-y

Brasoveanu, A. 2013. Modified Numerals as Post-suppositions. *Journal of Semantics* 30: 155–209. https://doi.org/10.1093/jos/ffs003

Bumford, D. 2017. Split-Scope Definites: Relative Superlatives and Haddock Descriptions. *Linguistics and Philosophy* 40: 549–593. https://doi.org/10.1007/s10988-017-9210-2

Comorovski, I. 1996. *Interrogative Phrases and the Syntax-Semantics Interface*. Kluwer. https://doi.org/10.1007/978-94-015-8688-7

Dayal, V. 1996. *Locality in WH Quantification: Questions and Relative Clauses in Hindi*. Springer Science & Business Media. https://doi.org/10.1007/978-94-011-4808-5

Karttunen, L. 1977. Syntax and Semantics of Questions. *Linguistics and Philosophy* 1 (1): 3–44. https://www.jstor.org/stable/pdf/25000027.pdf

Kim, S.-S. 2002. Intervention Effects are Focus Effects. *Japanese/Korean Linguistics* 10. https://www-users.york.ac.uk/ sk899/papers/kim-JK10.pdf

Li, H., and J. H.-K. Law. 2016. Alternatives in Different Dimensions: A Case Study of Focus Intervention. *Linguistics and Philosophy* 39: 201–245.
https://doi.org/10.1007/s10988-016-9189-0

Rooth, M. 1985. *Association with Focus*. Ph.D. thesis, UMass Amherst.
https://ecommons.cornell.edu/bitstream/handle/1813/28568/Rooth-1985- PhD.pdf

Szabolcsi, A. 2010. *Quantification*. Cambridge University Press.
https://doi.org/10.1017/CBO9780511781681

Tomioka, S. 2007. Pragmatics of LF Intervention Effects: Japanese and Korean *Wh*-interrogatives. *Journal of Pragmatics* 39 (9): 1570–1590.
https://doi.org/10.1016/j.pragma.2007.03.002

Zhang, L. 2020. Split Semantics for Non-monotonic Quantifiers in *Than*-Clauses. *Syntax and Semantics* 42: 332–363. https://doi.org/10.1163/9789004431515

Zhang, L. 2023a. Post-suppositions and Uninterpretable Questions. *Dynamics in Logic and Language* (TLLM 2022, LNCS 13524). 167–187.
https://doi.org/10.1007/978-3-031-25894-7_9

Zhang, L. 2023b. Short Answers as Tests: A Post-suppositional View on *Wh*-questions and Answers. *InqBnB4*. https://ling.auf.net/lingbuzz/007300