**ONLY: An NPI-licenser and NPI-unlicenser**

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**Abstract** This paper looks at the distributional pattern of NPIs under the exclusive focus particle *only*. Despite the commonly accepted view that *only* can license an NPI that appears within the unfocused part of its immediate scope, Wagner (2006) observes evidence contra this view from both DP-*only* and VP-*only*: (i) DP-*only* does not license an NPI that appears within the unfocused part of its left argument; (ii) VP-*only* does not license an NPI if this NPI and the focused item appear within the same island.

I adopt the operation of F-movement from Wagner (2006) and the basic idea of the grammatical view (Chierchia 2006, 2013) that an NPI is licensed iff assessing its [D] feature does not yield a G-triviality. Moreover, to capture the generalizations (i)-(ii), I argue that *only* is not just an NPI-licenser but also an “NPI-unlicenser”: when *only* operates on the D-alternatives of an NPI, it returns an inference that contradicts the prejacent presupposition, making the NPI unlicensed.

1. **Introduction**

Negative polarity items (henceforth NPIs), such as the emphatic expression *any*, are known to be licensed in downward-entailing (henceforth DE) environments (Fauconnier 1975, 1979; Ladusaw 1979). Prototypical DE environments are list in the following.

1. **Under negation**
   a. John didn’t read any papers.
   b. * John read any papers.

2. **Under negative quantifiers**
   a. Few/no/at most 3 students read any papers.
   b. *Many/most students read any papers.

3. **Left argument of universal quantifiers**
   a. Every student who has read any papers passed the exam.
   b. *Every student who has read some papers passed any exams.
   c. *Some student who has read any papers passed the exam.

4. **Antecedent of conditionals**

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1[Acknowledgement to be added.]
a. If John knows any big names, he will be invited.
b. *If John is invited, he will know any big names.

An environment is DE iff it supports downward inferences. For instance, observe the contrast between (5a) and (5b) that a downward inference holds from a set student to its subset smart student in the left argument of every, but not in the left argument of some.

(5) a. Every student passed the exam. → Every smart student passed the exam.
b. Some students passed the exam. ∉ Some smart students passed the exam.

Following von Fintel (1999) and Gajewski (2007), we can schematize the DE analysis as in (6).²

(6) **DE analysis of NPI-licensing**

a. An NPI is grammatical iff it appears in a constituent that is DE w.r.t. to this NPI.
b. A constituent A is DE w.r.t. α of type δ iff the function λx.[A[α/v]]_δ^Δv→x is DE.

[A[α/v] is the result of replacing α with v in A.]
c. A function f of type < σ, τ > is DE iff for all x, y of type σ s.t. x ⊆ y: f(y) ⊆ f(x).

Nevertheless, the NPI-licensing effect of the exclusive focus particle only, first observed by Klima (1964), casts doubt on the DE analysis of NPI-licensing: while the NPI any is licensed in (7a) and (8a), these contexts do not support downward inferences (Atlas 1993, 1996), as shown in (9a) and (9b), respectively.³

(7) **Right argument of DP-only**

a. Only JOHN_F read any papers.
b. *JOHN_F read any papers.

(8) **Unfocused part under VP-only**

a. Mary only gave any books to JOHN_F.
b. *Mary gave any books to JOHN_F.

(9) a. Only JOHN_F ate vegetables for breakfast. ∉ Only JOHN_F ate kale for breakfast.
b. Mary only gave fruits to JOHN_F. ∉ Mary only gave apples to JOHN_F.

²Here and throughout the paper, ‘⊆’ stands for cross-categorical entailment (von Fintel 1999).

(1) a. For p, q of type t: p ⊆ q iff p is false or q is true.
b. For f, g of type < σ, τ >: f ⊆ g iff for all x of type σ: f(x) ⊆ g(x).

In particular, for a, d of type e: a ⊆ d iff for all P of type < e, t >: λP.P(a) ⊆ λP.P(d').

³Here and throughout the paper, I use CAPITAL letters to mark stressed items, and a subscript ‘F’ to mark the semantic focus.
In responding to the NPI-licensing effect of *only*, many different positions have been defended in the literature, each of which weakens the strict DE condition to some extent: the Strawson-DE analysis grants the presuppositions of the consequence when a downward-inference is assessed (von Fintel 1999; Wagner 2006; Hsieh 2012); the grammatical view of NPI-licensing ignores presuppositions and implicatures when the meaning of a weak NPI is evaluated (Gajewski 2012; Chiari 2013); the pseudo-anti-additivity (Atlas 1996) and the non-veridicality analyses (Gian-nakidou 2006) each uses a weaker condition for the licensing of weak NPIs; and so on.

Moreover, numerous works on the NPI-licensing effect of *only* have pointed out that *only* does not license NPIs in its associated part. For instance, compared with the cases in (7a) and (8a), the NPI *any* is not licensed in the left argument of DP-*only* or the focused part under VP-*only*, as exemplified in (10). For simplicity, I call this fact “Licensing Asymmetry”.

(10)  
  b. *Mary only gave [any books]$_F$ to John.

Further, Drubig (1994) and Wagner (2006) observe that Licensing Asymmetry is not merely determined by F-association. In both of the following examples, *only* does not license the NPI *any* although it is associated only with the NP complement of *any*.

(11)  
  b. *John only read [any PAPERS$_F$], (he didn’t read any books).

Examples in (11) suggest two generalizations: (i) DP-*only* does not license an NPI that appears within the unfocused part of its left argument; (ii) VP-*only* does not license an NPI if this NPI and the focused item appear within the same island. For simplicity, I describe these facts uniformly as “Licensing-*F Mismatch”, namely that the environment where an NPI is licensed does not fully match the focused part of the sentence.

In sum, to capture the NPI-licensing effect of *only*, we need to answer at least three questions:

(A)  *Only* is not a prototypical DE-operator, why does it license NPIs?

(B)  Why is that the NPI-licensing effect of *only* is subject to Licensing Asymmetry?

(C)  Why is that Licensing Asymmetry is subject to Licensing-*F Mismatch?

The remainder of this paper is organized as follows. Section 2 and section 3 will review two representative theories on the NPI-licensing effect of *only*. One is the focus (F)-movement theory by Wagner (2006), and the other is the grammatical (G)-view of NPI-licensing by Chierchia (2006, 2013). I will show that both analyses have clear advantages but neither of them properly predicts

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4 The *any* P counts as an island to the extent that the NP complement cannot be moved out alone: according to Abels (2003), the complement of a phasal head – such as the D$^0$ *any* – cannot be moved by itself and strand its embedding phasal head, but must pied-pipe that phasal head.
the distributional pattern of NPIs under *only*. In section 4, I will propose an integrated analysis that incorporates features of both theories. The main ingredients of the new analysis are the following:

(A) Following the G-view of NPI-licensing, I assume that an NPI is licensed iff assessing its domain feature [D] does not yield a G-triviality.

(B) I argue that *only* is not only an NPI-licenser, but also an “NPI-unlicenser”: when an NPI is interpreted under the immediate syntactic complement of *only*, using *only* to assess the [D] feature of this NPI returns an inference contradicting the prejacent presupposition of *only*.

(C) In the case of VP-*only* association, the requirement of avoiding G-trivialities motivates F-movement. The contradiction in (ii) can be avoided iff the NPI is interpreted in the remnant VP.

2. The theory of F-movement and its shortcomings

2.1. The SDE-condition

To capture the NPI-licensing effect of *only*, von Fintel (1999) proposes a S(strawson)-DE analysis of NPI-licensing, as schematized in (12). Unlike the strict DE condition, the SDE condition grants all presuppositions of the consequence when the validity of a downward inference is assessed.

(12) **SDE analysis of NPI-licensing**

a. An NPI is only grammatical if it is in the scope of a function \( f \) s.t. \( f \) is SDE.

b. A function \( f \) of type \(< \sigma, \tau >\) is SDE iff 

   for all \( x \) and \( y \) of type \( \sigma \) s.t. \( x \subseteq y \) and \( f(x) \) is defined: \( f(y) \subseteq f(x) \).

Further, von Fintel (1999) argues that *only*-NP is an SDE function: the scope of *only*-NP is DE when the prejacent presupposition of *only* is satisfied, as shown in (13).

(13) Kale is a vegetable. 
   John ate kale for breakfast. 
   Only JOHN\(_F\) ate vegetables for breakfast.
   \[ x \Rightarrow y \]
   \[ f(x) \text{ is defined} \]
   \[ f(y) \]
   \[ \therefore \text{Only JOHN}\(_F\) ate kale for breakfast } \]
   \[ \therefore f(x) \]

2.2. The theory of F-movement

The SDE condition, however, still cannot explain why VP-*only* association is subject to Licensing Asymmetry and why Licensing Asymmetry in general exhibits Licensing-*F* Mismatch. In responding to these questions, Wagner (2006) proposes a theory of F-movement. This theory has assumptions in both syntax and semantics, as outlined in the following.
2.2.1. The syntax of only

First, both DP-only and VP-only have two syntactic arguments, a restrictor and a scope. In the case of DP-only, the restrictor and the scope correspond to its left argument and right argument, respectively. In the case of VP-only, F-association always invokes a covert phrasal movement of the focused expression to the syntactic restrictor of only; thus the restrictor and the scope correspond to the F-moved phrase and the remnant VP, respectively.

\[(14)\]

a. DP-only:

Only JOHN\textsubscript{F} came.

\[
\text{only}\quad \text{JOHN}_{F}\quad \text{came} \\
\text{(restrictor)}\quad \text{(scope)}
\]

b. VP-only:

Mary only invited JOHN\textsubscript{F}.

\[
\text{only}\quad \text{JOHN}_{F}\quad \lambda x\quad \text{VP} \\
\text{(restrictor)}\quad \text{\quad (scope)}
\]

Second, F-movement is island-sensitive (cf. Anderson 1972; Jackendoff 1972; Rooth 1985); therefore, when only is associated into an island, it is the minimal F-contained island that undertakes F-movement (same as in Drubig 1994). For instance, the F-moved phrases in (15a) and (15b) would be the complex DP and the when-clause, respectively.

\[(15)\]

a. Dr. Smith only rejected [the proposal that JOHN\textsubscript{F} submitted].

b. Dr. Smith only complains [when BILL\textsubscript{F} leaves the lights on].

2.2.2. The semantics of only

Only presupposes an existential premise, rather than the truth of its prejacent. The lexical entry of only is schematized as in (16). The arguments \(f\) and \(P\) correspond to its syntactic restrictor and scope, respectively; the variable \(C\) stands for the exhaustification domain. Crucially, the existential presupposition is generated by abstracting over the entire restrictor, not just the focused part (cf. Horn 1996).

\[(16)\]

a. \([\text{only]}(f)(P) = \forall a \in C[P(a) \rightarrow P(f) \subseteq P(a)]\]

b. Presupposition: \(\exists x. P(x)\)

The presupposition of only is defined in this way so as to predict the phenomenon of Licensing-*F Mismatch: regardless of which part is focused, any part of the restrictor is non-SDE and therefore cannot license NPIs. Consider, following the traditional view that only presupposes the truth of its prejacent (Horn 1969), we would predict that the unfocused part of the restrictor is SDE:
compare, when the prejacent presupposition of only is granted, a downward inference does not hold in (17) but still holds in (18). Thus, if adopting the prejacent presupposition, the SDE analysis of NPI-licensing would make a wrong prediction that the unfocused part of the restrictor can license NPIs.

(17) Junior students are students. \( x \Rightarrow y \)
    Some junior students met Particle Man. \( f(x) \) is defined
    Only [some students]_F met Particle Man. \( f(y) \)
    \( \not\rightarrow \) Only [some junior students]_F met Particle Man. \( \not\rightarrow f(x) \)

(18) A female inhabitant is an inhabitant. \( x \Rightarrow y \)
    Someone met Particle Man. \( f(x) \) is defined
    Only an inhabitant of [Twin Earth]_F met Particle Man. \( f(y) \)
    \( \therefore \) Only a female inhabitant of [Twin Earth]_F met Particle Man \( \therefore f(x) \)

Alternatively, adopting the existential presupposition (16b), we would avoid overly predicting SDE environments within the restrictor of only: the Strawson-downward inference does not hold in (19).

(19) A female inhabitant is an inhabitant. \( x \Rightarrow y \)
    Someone met Particle Man. \( f(x) \) is defined
    Only an inhabitant of [Twin Earth]_F met Particle Man. \( f(y) \)
    \( \not\rightarrow \) Only a female inhabitant of [Twin Earth]_F met Particle Man \( \not\rightarrow f(x) \)

2.2.3. Consequences

Wagner (2006) claims that the F-movement theory is followed by two general restrictions on the NPI-licensing effect of VP-only, namely the Island Restriction and the Head Restriction.

(20) **Head Restriction:**
    If only is associated with the head of a constituent, it does not license an NPI in the complement of the head.

(21) **Island Restriction:**
    Association with a constituent within an island cannot license an NPI in the same island.

The Head Restriction comes from the rule that F-movement is phrasal movement: a head cannot take phrasal movement; therefore, when only is associated with a head, the F-moved item has to be the entire projection of this head. For instance in (22), the F-moved element has to be the entire VP, including the anyP; therefore the NPI any is interpreted within the syntactic restrictor of only and is not licensed.

(22) *John only [CUT_F any vegetables]. \( \) (Wagner 2006: 310)
The Island Restriction comes from the assumption that F-movement is island-sensitive. For instance in (23a), only is associated into the because-clause, which is an island; therefore, the F-moved item must be the entire because-clause, including the NPI any. In (23b), on the contrary, the NPI anyone is outside the because-clause and therefore is not involved in F-movement.\(^5\)

\[(23)\]
\[\begin{align*}
a. & \quad \#\text{Mary only gave a book to John [because BILL}_F \text{ gave any book to him].} \\
  b. & \quad \text{She only gave anything to anyone [because YOU}_F \text{ did].}
\end{align*}\]

(Wagner 2006: 313)

2.3. Problems with Wagner (2006)

Wagner (2006) has convincingly argued that F-movement is needed for predicting the NPI-licensing effect of only, especially for unifying the Licensing-*F Mismatch behaviors of DP-only and VP-only: DP-only does not license an NPI that appears in its left argument, even if this NPI is not focused; VP-only does not license an NPI if this NPI and the focused item appear within the same island, even if this NPI itself is not focused. By virtue of the F-movement assumption, whatever explanation works for the former fact would also work for the latter.

Nevertheless, the explanation provided by Wagner (2006), that the existential presupposition of only does not render SDE in the restrictor of only, is problematic for at least two reasons. First, the existential presupposition of only is too weak to render SDE even in the scope of only; in other words, using this presupposition, we would predict that only cannot license NPIs at all. Second, the operation of F-movement is not well-motivated or properly controlled.

2.3.1. Problems with the semantics of only

Recall that Wagner (2006) defines an existential presupposition to avoid predicting SDE environments in the unfocused part of the DP-only restrictor. To reach this goal, the existential presupposition has to be very weak. On the one hand, the existential import has to be generated by abstracting over the entire syntactic restrictor of only, rather than the semantic focus. For instance in (24), if the existential import abstracts over the semantic focus, a Strawson-downward inference would hold from the unfocused item inhabitant to its subset female inhabitant.

\(^5\)The island effect of Licensing Asymmetry under VP-only might not be the real reason (or at least not the only reason) why the NPI any is not licensed in (23a). Chierchia (2013) indicates that because has an intervening effect on the licensing of NPIs. In (1b), even the clause-mate negation cannot license the NPI anybody across because.

\[(1)\]
\[\begin{align*}
a. & \quad \text{Mary doesn’t believe that John criticized anybody.} \\
  b. & \quad \#\text{Mary doesn’t believe that John was arrested because he criticized anybody.}
\end{align*}\]
A female inhabitant is an inhabitant. \( x \Rightarrow y \)

A female inhabitant from somewhere met Particle Man. \( f(x) \) is defined

Only an inhabitant of [Twin Earth] met Particle Man. \( f(y) \)

\[ \therefore \text{Only a female inhabitant of [Twin Earth] met Particle Man} \]

\( f(x) \)

On the other hand, the domain of the existential presupposition cannot be restricted by the exhaustification domain \( C \). For instance in (25), if someone quantifies over \( C \), the Strawson-downward inference from inhabitant to female inhabitant would be licensed.

\[ \begin{align*}
\text{(25) A female inhabitant is an inhabitant.} & \quad x \Rightarrow y \\
\text{Someone (in } C \text{) met Particle Man.} & \quad f(x) \text{ is defined} \\
\text{Only an inhabitant of [Twin Earth] met Particle Man.} & \quad f(y) \\
\therefore \text{Only a female inhabitant of [Twin Earth] met Particle Man} & \quad f(x)
\end{align*} \]

where \( C = \{ \text{a female inhabitant of Twin Earth, a female inhabitant of Earth, a female inhabitant of Mars, ...} \} \)

Hence, Wagner (2006) defines a rather weak existential presupposition for only, repeated below.

\[ \begin{align*}
\text{(26) a.} & \quad \lbrack \text{only}\rbrack(f)(P) = \forall a \in C[P(a) \Rightarrow P(f) \subseteq P(a)] \\
\text{b. Presupposition: } & \quad \exists x.P(x)
\end{align*} \]

Nevertheless, this definition leads to a serious problem: the existential presupposition is too weak to render SDE even in the scope of only. As shown below, the right argument of DP-only cannot support a Strawson-downward inference if someone refers to an individual outside the exhaustification domain \( C \).

\[ \begin{align*}
\text{(27) Someone, either in } C \text{ or not in } C, \text{ ate kale.} & \quad f(x) \text{ is defined} \\
\text{Among individuals in } C, \text{ only JOHN met vegetables.} & \quad f(y) \\
\text{ } & \quad \not\Rightarrow \text{Among individuals in } C, \text{ only JOHN met kale.} & \quad \not\Rightarrow f(x)
\end{align*} \]

\[ \begin{align*}
\text{(28) Someone in } C \text{ ate kale.} & \quad f(x) \text{ is defined} \\
\text{Among individuals in } C, \text{ only JOHN met vegetables.} & \quad f(y) \\
\therefore \text{Among individuals in } C, \text{ only JOHN met kale.} & \quad \therefore f(x)
\end{align*} \]

\[ \text{2.3.2. Problems with “why move?”} \]

Wagner (2006: 314) assumes that F-movement is motivated to strengthen the existential presupposition, in spirit of the Maximize Presupposition (MP) Principle (Heim 1991):

“F-movement minimizes the size the of the syntactic restrictor, which may have an effect on the strength of the statement that is grammatically encoded by the sentence.”
For instance, (29) and (30) have the same semantic focus but different existential presuppositions: the existential import abstracts over the semantic focus “BASKETBALL\textsubscript{F}” in (29) but over the entire VP “played BASKETBALL\textsubscript{F}” in (30). Since the existential presupposition in (29) is stronger than the one in (30), the F-moved form is more preferable in spirit of the MP Principle.\(^6\)

(29) With F-movement:
   a. John only \(\overset{\gamma}{\text{played BASKETBALL}}\)\textsubscript{F}.
   b. Presupposition: \(\exists x.\) John played \(x\).

(30) Without F-movement:
   a. John only \(\overset{\gamma}{\text{played BASKETBALL}}\)\textsubscript{F}.
   b. Presupposition: \(\exists x.\) John \(x\)-ed.

Nevertheless, using the MP Principle to motivate F-movement faces at least two problems. First, it cannot capture the Head Restriction. Consider the sentence (22) again, repeated below. The F-moved item (if exists) has to be the entire VP; therefore regardless of whether F-movement takes place, the syntactic complement of \textit{only} would be the entire VP, and the existential presupposition would be like (31b).\(^7\) Hence, if F-movement were used only to strengthen the existential presupposition, it would NOT be motivated in (31).

(31) *John only \(\overset{\gamma}{\text{CUT}}\)\textsubscript{F} any vegetables\textsuperscript{7}.
   a. Assertion: If John did any action to any vegetables, that action is no more than cutting.
   b. Presupposition: \(\exists x.\) John \(x\)-ed.

Moreover, defining \textit{only} as in (26), Wagner would predict that a sentence of the form “John only \(\overset{\gamma}{\text{CUT}}\)\textsubscript{F} \(x\)” is not only SDE but also strictly DE with respect to \(x\): it is SDE because the downward inference holds in the asserted component (namely, (32a-i) asymmetrically entails (32b-i)); it is also strictly DE because (32a-b) have the same presupposition. Therefore, Wagner cannot predict the Head Restriction, no matter whether he adopts the SDE condition or the strict DE condition.

(32) a. John only \(\overset{\gamma}{\text{CUT}}\)\textsubscript{F} vegetables\textsuperscript{7}.
   i. Assertion: If John did any action to vegetables, that action is no more than cutting.
   ii. Presupposition: John did something.
   b. John only \(\overset{\gamma}{\text{CUT}}\)\textsubscript{F} kale\textsuperscript{7}.
   i. Assertion: If John did any action to kale, that action is no more than cutting.
   ii. Presupposition: John did something.

\(^6\)Underlining marks the syntactic complement or restrictor of \textit{only}, and “corner symbols” marks the scope of \textit{only}.

\(^7\)Wagner (2006: 310) himself writes the presupposition of (32b) as “John did something with kale”, which however conflicts with his main assumption that the existential import abstracts over the entire complement of \textit{only}.
Second, because of the prejacent inference from *only*, the MP Principle cannot really motivate F-movement. An existential presupposition – regardless of its strength – is always entailed by and thus collapses under the prejacent inference. Therefore, if the prejacent inference is involved in the assessment of the MP Principle, an F-moved form cannot be more preferable over a un-F-moved form. The only way to defend for the MP-based analysis, probably, would be to stipulate that the MP Principle is evaluated at a level of representation that ignores the prejacent inference. In the following, I will evaluate this stipulation and explain its infeasibility.

Wagner (2006: 307) has noticed that the definition of *only* in (26) is insufficient for accounting for sentences like (33), where *only* is associated with a coordination. By intuition, the sentence (33) cannot be uttered if Sue invited only John, although the asserted exhaustivity inference and the existential presupposition are both satisfied in this context. To predict this infelicity without treating the prejacent inference as a presupposition, Wagner adopts McCawley’s (1993: 311) idea and proposes that the sentence (33) *conversationally implies* the prejacent inference (33c). If this idea were tenable, the MP analysis of F-movement could be salvaged by stipulating that implicatures are ignored in the assessment of the MP Principle.\(^8\)

\(^8\)Nevertheless, even if the prejacent inference were indeed an independent implicature, it is still implausible to assume that the assessment of the MP Principle ignores implicatures, because this principle is generally considered as a pragmatic and global condition.

I have to admit that it is difficult to come up with a straightforward counter-example against this stipulation. But assuming that implicatures are involved in the assessment of the MP Principle would make it much easier to explain why the verb in a disjunctive sentence like (1) mandatorily carries a singular morpheme -s: the plain meaning of “John or Mary” does not grant the presupposition of a singular-mark, which I will show in the following, while the enriched meaning *John or Mary but not both* does.

(1) John or Mary smokes/*smoke.

Let us see why the plain meaning of a disjunction that coordinates atomic terms is undefined for singulars. First, Spector (2007) points out that a disjunctive answer like (2b) is ambiguous in answering a universally modalized question like (2a). In particular, (2b) completely answers (2a) when taking the local disjunctive reading (namely *required > or*), which says that *John is free to choose MP or HK to read and he has to read one of them*. To capture this reading, Spector proposes that a wh-item also ranges over the domain consisting of generalized quantifiers like (3). Furthermore, as observed by Fox (2013), the local disjunctive reading becomes unavailable when (2b) is used to answer a singular-marked question like (4a). Therefore, we can conclude that the plain meaning of a disjunction that coordinates atomic elements is undefined for singulars.

(2) a. Which books is John required to read?
   b. He is required to read *MP or HK*. \((\text{OK*required > or}; \text{OK*or > required})\)

(3) \([MP \text{ or } HK] = \lambda P_{ext}. \lambda w. P_w(m) \lor P_w(h)\)

(4) a. Which book is John required to read?
   b. He is required to read *MP or HK*. \((\#\text{required > or}; \text{OK*or > required})\)
(33) Sue only invited [John and Mary]_F.
   a. Presupposition: Sue invited someone.
   b. Assertion: Anyone invited by Sue is a part of John+Mary.
   c. Conversational implicature: Sue invited both John and Mary.

As argued by Ippolito (2008: 59), however, the implicature analysis of the prejacent inference has at least two problems. First, it cannot explain why a negative-only sentence (e.g., Sue not only invited JOHN_F) also introduces a prejacent inference. Second, it cannot explain why the prejacent inference cannot be cancelled without an epistemic operator (e.g., maybe), as shown in (34).

(34) a. # Only Mary can speak French – in fact, not even she can.
   b. Only Mary can speak French, and maybe not even she can.

Related to the second problem pointed out by Ippolito, the contrast between the following two conversations also suggests that the prejacent inference from only is more robust than an implicature from the weak scalar item some: unlike the scalar implicature from some, the prejacent inference affects the truth conditions of the only-clause and is much more difficult to cancel.

(35) Did John invite some of the speakers to the dinner?
   a. Yes. Actually he invited all of them.
   b. # No. He invited all of them.

(36) Did John only invite Mary?
   a. # Yes. Actually he didn’t invite anybody.
   b. No. He didn’t invite anybody.

So far we have seen that the prejacent inference should not be treated as an independent implicature. Instead, we can analyze it as a presupposition (Horn 1969; Rooth 1985, 1992) or adopt Ippolito’s (2008) analysis that the prejacent inference is a logical consequence of the scalar implicature (37a) together with a conditional presupposition (37b).

(37) Only A is B.
   a. Implicature: Someone is B.
      (Derived by negating the stronger alternative No one is B.)
   b. Presupposition: If someone is B, A is B.
   c. ⇒ A is B.

Under the presupposition analysis, the existential presupposition collapses under the prejacent presupposition, and thus the MP Principle cannot motivate F-movement. With Ippolito’s (2008) conditional presupposition, the MP Principle would predict that the un-F-moved form is more preferable over the F-moved form: the existential inference is the antecedent of the conditional presupposition; therefore strengthening the existential inference would weaken the presupposition.
2.3.3. Problems with “when move?”

Wagner (2006) claims that F-movement is mandatory for VP-only association. I argue that this strong claim leads to two undesired consequences.

First, it incorrectly predicts that an NPI associated with only is always not licensed, even if this NPI appears under some other licenser. Recall that Wagner’s assumptions yield the prediction that only does not license an NPI appearing inside the F-moved constituent. This prediction, together with the claim that F-movement is mandatory for VP-only association, implies a stricter constraint as follows: “VP-only cannot be associated with any NPIs or with/into any NPI-contained islands within which the NPIs are not licensed.” This constraint, however, is too strong for cases like (38), where only is associated with an anyP across another NPI-licenser (i.e., clause-mate negation).

(38) Mary only didn’t give [any books]F to John. (She did her best to help him.)

The stricter constraint predicts (38) to take the LF (1), under which the NPI any cannot be licensed: the anyP, as the minimal F-contained island, is moved to the syntactic restrictor of only, a context that is non-SDE and cannot license NPIs.\(^9\)\(^10\)

\(^9\)Note that the NPI any is not licensed if only merely associates with any, as exemplified below. This is so because (1) doesn’t have any excludable alternatives, failing to satisfy the additive presupposition of only.

\(^10\)An anonymous reviewer of JoS points out the possibility of moving the entire negative VP complement to the restrictor of only. This movement is in general possible, but not allowed under Wagner’s framework: to enable this movement, we need to stipulate that the grammaticality of an NPI is prior to the satisfaction of the MP Principle; but Wagner assumes that the ungrammaticality of an NPI is due to F-movement, an operation motivated by the MP Principle.
Second, as Daniel Büring and Yael Sharvit pointed to Wagner (2006: fn 20), assuming F-movement to be mandatory overly rules out possible interpretations for sentences like (40), where *only* is associated with a scopal element *at most 3 students* across another scopal element *want*. If F-movement were mandatory, the focused item would have to take only a wide scope reading.

(40) She only wanted to kiss [at most 3 students]$_F$.

To account for the correct scope readings, Wagner (2006: fn 20) proposes that the F-moved item undergoes obligatory semantic or syntactic reconstruction. Nevertheless, if reconstruction were always feasible, the focused *any* in (41) should also be reconstructed to and licensed within the scope of VP-*only*.

(41) *Mary only wanted to read [any books]$_F$.

A defender of the reconstruction analysis might object that *only* must be reconstructed in company with the F-moved element. Under this analysis, (41) would be interpreted as *Mary wanted to read only [any books]$_F$*. Nevertheless, this analysis is untenable because VP-*only* takes a rigid scope reading (Taglicht and Randolph 1984; Rooth 1985; Bayer 1996), as exemplified in (42).

(42) John is only required to meet MARY$_F$. (OK$_{only > required}$; # required > only)

3. The G-view of exhaustifications

3.1. The G-view of scalar implicatures

The G-view (Chierchia 2004; Fox 2007; Chierchia et al. 2013; among the others) is firstly introduced to analyze scalar implicatures. This view argues that the phenomenon of scalar implicature is not purely pragmatic (cf. Grice 1975), given the fact that scalar implicatures can be generated in embedding contexts.

The main ingredients of the G-view are as follows. First, propositions containing scalar items are associated with sets of alternative, which are computed in the same way as the answer sets of questions (Hamblin 1973) and the alternative sets of focus (Rooth 1985, 1992, 1996). A recursive definition of alternative sets is schematized as below, adopted from Chierchia (2013: 138).
(43) Basic Clause: For any lexical entry $\alpha$, $\text{ALT}(\alpha) =$

a. $\{[\alpha]\}$ if $\alpha$ is lexical and does not belong to a scale;

b. $\{[\alpha_1], ..., [\alpha_n]\}$ if $\alpha$ is lexical and part of a scale $\langle [\alpha_1], ..., [\alpha_n]\rangle$.

Where $\text{ALT}$ is a function from expressions to a set of interpretations.

(44) Recursive Clause: $\text{ALT}(\beta(\alpha)) = \{b(a) : b \in \text{ALT}(\beta), a \in \text{ALT}(\alpha)\}$

Next, alternatives keep growing until factored into meaning via a covert exhaustivity operator $O$ (also notated as “EXH” in the literature). This $O$-operator affirms the prejacent and negates all the alternatives that are not entailed by the prejacent, as schematized in (45).\(^{11}\) The non-entailed alternatives are also called excludable alternatives.

(45) $O(p) = \lambda w. p(w) \land \forall q \in \text{ALT}(p)[p \not\subseteq q \rightarrow \neg q(w)]$

Accordingly, a scalar implicature is derived as a logic consequence of applying an $O$-operator over a sentence containing a scalar item. For instance in (46), applying an $O$-operator over the some-sentence (notation: $\phi_{\text{SOME}}$) affirms the prejacent $\phi_{\text{SOME}}$ and negates the stronger alternative $\phi_{\text{ALL}}$, yielding the scalar implicature $\neg \phi_{\text{ALL}}$.

(46) a. Some of the students came. $\Rightarrow$ Not all of the students came.

b. $\text{ALT}(\phi_{\text{SOME}}) = \{\phi_{\text{SOME}}, \phi_{\text{ALL}}\}$

c. $O(\phi_{\text{SOME}}) = \phi_{\text{SOME}} \land \neg \phi_{\text{ALL}}$

3.2. The G-view of NPI-licensing

Chierchia (2006, 2013) extends the G-view to NPI-licensing with assumptions compatible with the strict DE condition. He proposes that the NPI any is an indefinite existential item like some but lexically encoded with a grammatical feature [D]. This feature obligatorily activates a set of domain (D)-alternatives and must be checked off by a c-commanding $O_D$-operator.

Exercising an $O_D$-operator over a sentence containing an occurrence of any has consequences in both syntax and semantics: in syntax, it checks off the [D] feature in the lexicon of any, just like a regular feature-checking operation; in semantics, it affirms the assertion and negates D-alternatives that are not entailed by the assertion.

A schematic example for the total domain $D$ and its corresponding D-alternative sets is given in (47). The D-alternative set includes the prejacent, while the proper D-alternative set does not.

(47) a. Total-D: $\{a, b\}$

Assertion = $\exists x \in \{a, b\} f(x)$

\(^{11}\)Note to distinguish this $O$-operator from the one used by Fox (2007), which negates only alternatives that can be negated consistently (viz. the so-called “innocently excludable alternatives”).
b. Sub-D: \( \{a, b\}, \{a\}, \{b\} \)
\[
D-\text{ALT} = \{ \exists x \in \{a, b\} f(x), \exists x \in \{a\} f(x), \exists x \in \{b\} f(x) \}
\]
c. Proper sub-D: \( \{a\}, \{b\} \)
\[
\text{Proper D-ALT} = \{ \exists x \in \{a\} f(x), \exists x \in \{b\} f(x) \}
\]

Consider the basic positive sentence (48) to see how the G-view captures the DE condition of NPI-licensing. With an indefinite existential expression *any*, the sentence (48) asserts the existential inference (48b). Moreover, the [D] feature of *any* activates a set of D-alternatives, generated by substituting the total domain \( D \) with a subdomain \( D' \), as schematized in (48c). Crucially, the monotonicity pattern of the entire clause with respect to the NPI *any* is upward-entailing (henceforth UE), and hence the proper D-alternatives are not entailed by the assertion. Next, applying \( O_D \) negates all the proper D-alternatives, yielding the exhaustivity inference (48d), which however contradicts the asserted existential inference (48b), as shown in (48e). This contradiction makes the sentence ungrammatical and the NPI *any* unlicensed.12

\[(48) \quad *\text{John read any papers.}\]

\[
\begin{align*}
\text{a. } & O_D \ [\text{John read any} D \text{ papers}] \\
\text{b. } & \text{Assertion: } \exists x \in D [P(x) \land R(j, x)] \\
& \quad \text{(John read some papers in the total domain } D) \\
\text{c. } & D-\text{ALT} = \{ \exists x \in D' [P(x) \land R(j, x)] \mid D' \subseteq D \} \\
\text{d. } & \forall D' [D' \subset D \rightarrow \neg \exists x \in D' [P(x) \land R(j, x)]] \\
& \quad \text{(for any proper subdomain } D', \text{ John read no paper in } D') \\
\text{e. } & \llbracket (48a) \rrbracket = \llbracket (48b) \rrbracket \land \llbracket (48d) \rrbracket = \bot \\
& \quad \text{(# John read some papers in } D, \text{ but he read no paper in any proper sub-domain } D')
\end{align*}
\]

The contradiction in (48e) essentially differs from the one in (49). The former makes the utterance ungrammatical, while the latter makes the utterance infelicitous but not ungrammatical.

\[(49) \quad # \text{ It is raining and it isn’t raining.}\]

To distinguish these two types of contradictions, Chierchia (2006, 2013) adopts the notions from Gajewski (2002) and describes the one in (48e) as “G(rammatical)-triviality”, a special sub-type of

---

12Consider the mini model in (1) for a simpler illustration of this idea. Assume that the total domain \( D \) contains exactly two items, paper \( p1 \) and paper \( p2 \). The D-alternative set is thus schematized as in (1b), consisting of three elements: the asserted proposition \( \text{John read a paper in } \{p1, p2\} \) and two proper D-alternatives including \( \text{John read a paper in } \{p1\} \) and \( \text{John read a paper in } \{p2\} \). The proper D-alternatives are not entailed by the assertion. Therefore, applying an \( O_D \)-operator affirms the assertion and negates both proper D-alternatives, as schematized in (1c), yielding the contradictory inference \( \text{John read } p1 \text{ or } p2, \text{ and he did not read } p1, \text{ and he did not read } p2. \)

\[(1) \quad \begin{align*}
\text{a. } & D = \{p1, p2\} \\
\text{b. } & D-\text{ALT} = \{R(j, p1) \lor R(j, p2), R(j, p1), R(j, p2)\} \\
\text{c. } & R(j, p1) \lor R(j, p2) \land \neg R(j, p1) \land \neg R(j, p2) = \bot
\end{align*}\]
L(ogical)-triviality. L-trivialities are tautologies or contradictions in the traditional sense. While G-triviality means that a sentence receives the same truth value regardless of how the lexical terminals in the structure are replaced. Compare the sentences in (50) for instance. Expressions like John, smokes, and student are lexical terminals, and the rest are functional terminals. The contradiction in (50a) can be avoided by substituting the two occurrences of smoke with distinct lexical items (e.g., John smokes and doesn’t dance). In contrast, the meaning of (50b) is always contradictory no matter which lexical items are used. Therefore, we identify (50a) as L-trivial, while (50b) as both L-trivial and G-trivial.

(50)  a. # John smokes and doesn’t smoke. [ x P and not P ]
    b. * Some student but John smokes. [ some P but x Q ]

Under the G-view, the type of contradiction in (48e) can be avoided if the constituent that the $O_D$-operator attaches to is DE with respect to the $D$ variable of any$_D$. Consider the basic negative sentence in (51) for instance. By virtue of negation, all the D-alternatives are entailed by the assertion and therefore not excludable. The $O_D$-operator, although is mandatorily present for the sake of feature checking, is vacuous in semantics.

(51)  John didn’t read any papers.

a. $O_D \not\sim [\text{John read any}_D \text{ papers}]$

b. Assertion: $\neg\exists x \in D[\text{P}(x) \land R(j,x)]$
    (John read no paper in the total domain $D$.)

c. D-ALT = $\{\neg\exists x \in D'[\text{P}(x) \land R(j,x)] \mid D' \subseteq D\}$

d. [[(51a)]] = [[(51b)]] = $\neg\exists x \in D[\text{P}(x) \land R(j,x)]$
    (John read no paper in the total domain $D$.)

3.3. Extending the G-view of NPI-licensing to only

Inspired by Krifka (1995) and Lahiri (1998), Chierchia (2006, 2013) extends the G-view of NPI-licensing to the licenser only. This line of approaches adopts the lexical entry of only from Horn (1969), namely that only asserts an exhaustivity inference and presupposes the truth of its prejacent. The heart of this view is the following: the unfocused part of the asserted exhaustivity inference is DE and hence forms an NPI-licensing environment.

Using the schematic notations by Chierchia (2013), we can structure the LF of (52) as in (52a). This LF contains two exhaustification operators, $O_D$ and only, checking off the [D] feature of the
NPI \(\text{any}_D\) and the [F] feature of the semantic focus \(\text{JOHN}_F\), respectively. The prejacent presupposition and the asserted exhaustivity inference are schematized as in (52b) and (52c), respectively. The D-alternatives are generated from the assertion by replacing the total domain \(D\) with a subdomain \(D'\), as schematized in (52d).

(52) Only \(\text{JOHN}_F\) read any papers.
   a. \(O_D\) [only \([\text{JOHN}_F\ \text{read any}_D\ \text{papers} ]\)]
   b. Presupposition: \(\exists x \in D[P(x) \land R(j,x)]\)
      (John read a paper in the total domain \(D\).)
   c. Assertion: \(\lambda w. \forall y \in D_e [\exists x \in D'[P_w(x) \land R_w(y,x)] \rightarrow j \subseteq y]\)
      (For any individual \(y\), if \(y\) read a paper in the total domain \(D\), then \(y\) is John.)
   d. D-AL T = \{only \([\text{JOHN}_F\ \text{read any}_D'\ \text{paper} ]\) : \(D' \subseteq D\) \}
      = \{\lambda w. \forall y \in D_e [\exists x \in D'[P_w(x) \land R_w(y,x)] \rightarrow j \subseteq y] \mid D' \subseteq D\}

The presupposed component (52b), as argued by Gajewski (2011) and extended by Chierchia (2013), is irrelevant for the assessment of the [D] feature in weak NPIs (e.g. \(\text{any}\)). The asserted component (52c) is DE with respect to the domain variable \(D\) of \(\text{any}_D\). Therefore, the NPI \(\text{any}\) is licensed in (52), as it would be in any DE environments.

It is worthy of noticing that the G-view conventionally assumes that exhaustification operators operate on propositional alternatives. Therefore for both DP-\(\text{only}\) and VP-\(\text{only}\), this convention requires the exhaustification domain to be a set of propositions, represented as “ALT\((p)\)” in (53).

(53) \([\text{only}]\)(\(p\)) = \(\lambda w. \forall q \in \text{ALT}(p)[q(w) \rightarrow p \subseteq q]\)

Therefore, strictly following this convention, the G-view of NPI-licensing should instead schematize the assertion of (52) as in (54). Here the F-alternatives are propositions of the form “y read some papers in the total domain \(D\)” where \(y\) is a contextually relevant individual.\(^{15}\)

\(^{14}\)Gajewski (2011) proposes that presuppositions and implicatures are relevant only for the assessment of the [D] feature in strong NPIs (e.g. \(\text{any}\)). This proposal captures the contrast between weak NPI-licensing and strong NPI-licensing under \(\text{only}\). For instance, \(\text{only}\) does not license the strong NPI \(\text{in years}\) in the unfocused part.

\(^{15}\)This revision does not change the polarity pattern of the assertion with respect to the \(D\) variable. It is not obvious why (54) is DE with respect to \(D\). But it is easy to prove the DE-ness of a semantically equivalent formula (1), which denotes the conjunction of negated excludable F-alternatives: an F-alternative \(q\) is UE with respect to \(D\), and thus its negation is DE with respect to \(D\), and thus the conjunction of negated F-alternatives is DE with respect to \(D\).

(1) Only \(\text{JOHN}\) came in years.

The prejacent presupposition of \(\text{only}\) is UE, and therefore the entire \(\text{only}\)-clause is non-monotonic with respect to the \(D\) variable in the strong NPI \(\text{in years}\). Then applying \(O_D\) to assess the [D] features in the prejacent and assertion yields a contradiction. See Chierchia (2013) for extensive discussions.

(1) \(\land \{\neg q : q \in \text{F-ALT}(p) \land \exists x \in D[P(x) \land R(j,x)] \not\subseteq q\}, \text{where F-ALT} = \{\exists x \in D[P(x) \land R(y,x)] \mid y \in D_e\}\)
(54) \[ \lambda w. \forall q \in \text{F-ALT}(p)[q(w) \rightarrow \exists x \in D[P(x) \land R(j,x)] \subseteq q] \]

where \( \text{F-ALT} = \{ \exists x \in D[P(x) \land R(y,x)] \mid y \in D_e \} \)

To sum up, the G-view explains the DE condition of NPI-licensing as the following: assessing the \([D]\) feature of an NPI via a covert \(O_D\)-operator yields a G-triviality if the \(O_D\)-operator is attached to a constituent that is non-DE with respect to this NPI. As for the case of \textit{only}, the G-view shows that the asserted component of an \textit{only}-clause is DE in its the unfocused part, which therefore can license NPIs.

### 3.4. Advantages of the G-view

Superior to the previous studies on NPI-licensing, the G-view provides an explicit explanation as to why NPIs cannot appear in a non-DE environment. Moreover, this view is compatible with the strict DE condition and therefore free from the problems with the SDE analysis of NPI-licensing.

As pointed out by Lahiri (1998) and Gajewski (2011), for example, the SDE condition cannot account for the distributional pattern of NPIs under a definite description of the form “\textit{the}+NP\textsubscript{\textit{singular}}” or “\textit{both}+NP”: the left argument is SDE but cannot license NPIs. Given these problematic cases, Wagner (2006) admits that other conditions, such as not being Strawson-UE (Lahiri 1998; Cable 2002; Guerzoni and Sharvit 2007), are also required for licensing NPIs.

(55) * The student who had any linguistics did well.
   a. Presupposition: \(|\text{students}_w| = 1\)
   b. Assertion: \(\text{students} \subseteq \text{did well}\)

(56) * Both students who had any linguistics did well.
   a. Presupposition: \(|\text{students}_w| = 2\)
   b. Assertion: \(\text{students} \subseteq \text{did well}\)

Following the G-view, Gajewski (2011) provides a simpler explanation to the distributional pattern of NPIs under definition descriptions. He proposes that the cardinality inferences (55a) and (56a) are not only presupposed but also asserted. Hence the overall assertions of the sentences (55-56) are non-monotonic with respect to \textit{any}, which therefore explains why the NPI \textit{any} is not licensed.

### 3.5. Problems with the G-view

Previous works on the G-view have not yet considered the phenomenon of Licensing Asymmetry. In this section, I will show that the current G-view is indeed sufficient for explaining the basic

\[ I \text{ thank an anonymous reviewer of } \text{JoS for pointing out a mistake in an older version of this paper, where I mistakenly claimed that (54) is non-DE with respect to the domain variable } D. \]
cases in (57), where only is directly associated with any or any P. But this explanation is highly restricted; it cannot extend to cases like (58), where only is associated with any across an existentially quantificational expression, nor to cases like (59) that are subject to Licensing-*F Mismatch.

(57) a. *John only read ANY F papers.

(58) a. *Mary only invited some students who read ANY F papers.
    b. *Only some students who read ANY F papers passed the test.

(59) a. *John only read any PAPERS F.
    b. *Only any BOYS F arrived.

3.5.1. A potential solution for Licensing Asymmetry

Following the G-view of NPI-licensing strictly, we would structure the LF of (57a) as in (60a): a covert OD-operator embeds the entire only-clause; the grammatical features [F] and [D] agree with only and OD, respectively. Following Chierchia’s (2006, 2013) assumption that the polarity item any is a variant of the existential indefinite some, we conjecture that its default F-alternatives are simply the scalar alternatives, as schematized in (60b). The semantics of (60a) thus proceeds as follows: first, applying only negates the stronger scalar/focus alternative, yielding the assertion (60c), which is UE with respect to the D variable; next, exercising OD to check off the [D] feature leads to the semantic consequence of negating the proper D-alternatives, yielding the inference (60e). Crucially, (60e) contradicts the asserted scalar inference (60c), yielding a G-triviality.

(60) *John only read ANY F papers.
   a. OD [only [John read ANY D,F papers]]
   b. F-ALT = \{ \exists x \in D[P(x) \land R(j,x)] \} (John read some papers in D)
          \{ \forall x \in D[P(x) \rightarrow R(j,x)] \} (John didn’t read all the papers in D)
   c. Assertion: \(\neg\forall x \in D[P(x) \rightarrow R(j,x)]\)
          (John didn’t read all the papers in the total domain D.)
   d. D-ALT = \{ \neg\forall x \in D'[P(x) \rightarrow R(j,x)] : D' \subseteq D \}
   e. \(\forall D'[D' \subseteq D \rightarrow \forall x \in D'[P(x) \rightarrow R(j,x)]]\)
          (For each proper subdomain D', John read all the papers in D').
   f. (60e) contradicts (60c): let D = \{a, b\}, then
          D-ALT = \{ \neg[R(j,a) \land R(j,b)], \neg R(j,a), \neg R(j,b) \};
          [[(60c)]] = \neg[R(j,a) \land R(j,b)]; (John read neither a nor b)
          [[(60e)]] = R(j,a) \land R(j,b) (John read a and b)
3.5.2. Problem 1: Licensing Asymmetry with existentials

Nevertheless, the solution used above is highly restricted. If only is associated with any across an existentially quantificational phrase, the inference derived by negating the proper D-alternatives would not necessarily contradict the asserted scalar inference from any.

Consider (58a) for instance. Due to the Complex NP Constraint, the NPI any must be interpreted within the relative clause of the existentially quantificational phrase some students. The following derivation shows that the meaning of the LF (61a) is not contradictory.

(61) *Mary only invited some students who read ANY_F papers.

a. O_D [only [Mary invited some students who read ANY_F papers]]

b. F-ALT =

\[
\begin{align*}
\exists x[S(x) \land \exists y \in D[P(x) \land R(x,y)] \land I(m,x)] \\
& (Mary~invited~some~students~who~read~some~papers~in\,D) \\
\exists x[S(x) \land \forall y \in D[P(x) \rightarrow R(x,y)] \land I(m,x)] \\
& (Mary~invited~some~students~who~read~all~the~papers~in\,D)
\end{align*}
\]

c. Assertion: \(\neg \exists x[S(x) \land \forall y \in D[P(x) \rightarrow R(x,y)] \land I(m,x)]\)

(Mary didn’t invite any students who read all the papers in D)

d. D-ALT = \{\neg \exists x[S(x) \land \forall y \in D'[P(x) \rightarrow R(x,y)] \land I(m,x)] : D' \subseteq D\}

e. \forall D' \subseteq D \exists x[S(x) \land \forall y \in D'[P(x) \rightarrow R(x,y)] \land I(m,x)] : D' \subseteq D]

(For each proper subdomain D', Mary invited some students who read all the papers in D')

f. (61c) does not contradict (61e): let D = \{a,b\}, then

\((61c)\] = \(\neg \exists x[S(x) \land R(x,a+b) \land I(m,x)]\)

(Mary didn’t invite any students who read both ab)

\((61e)\] = \(\exists x[S(x) \land R(x,a) \land I(m,x)] \land \exists x[S(x) \land R(x,b) \land I(m,x)]\)

(Mary invited some students who read a and some students who read b.)

To understand this problem from a more general perspective, recall how the G-view explains the NPI-licensing effect of negation:

Claim 1: Assessing the [D] feature of any_D over negation is semantically vacuous;

Claim 2: In absence of negation, assessing the [D] feature of any_D yields a G-triviality.

Claim 1 can easily extend to other DE environments, such as only, as we have seen in section 3.3. This is so because the D-alternatives will be non-excludable as long as the [D] feature is assessed in a DE context. Nevertheless, Claim 2 does not necessarily hold in other non-DE environments, such as the one seen in (61): even though the proper D-alternatives are excludable, negating them does not necessarily yield a G-triviality.
3.5.3. Problem 2: Licensing-*F Mismatch

We have seen from section 3.3 that the asserted component of an only-sentence is DE with respect to any unfocused part. Since the G-view takes the DEness of the asserted component as the only requirement of weak NPI-licensing, it cannot capture the Licensing-*F Mismatch.

For instance, following the G-view, we would let the sentence (59a) take the LF (62a). Applying only negates all the excludable F-alternatives and returns an assertion that is DE with respect to the D variable. Next, since the D-alternatives are all entailed by the assertion, using $O_D$ to check off the [D] feature does not yield a G-triviality. Therefore, if the LF (62a) were possible, the NPI any should have been licensed in (59a).

\begin{align}
(62) & \quad \text{*John only read any PAPERS}_F. \\
& \quad \text{a. } O_D [\text{only } \exists x \in \text{D} \forall y \in \text{D}] PAPERS_F] \\
& \quad \text{b. } F-\text{ALT} = \{ \exists x \in \text{D} \forall y \in \text{D} \} \\
& \quad \text{c. } \text{Assertion: } \neg \exists x \in D \forall y \in \text{D} \\
& \quad \text{d. } D-\text{ALT} = \{ \neg \exists x \in \text{D} \forall y \in \text{D} \} \\
& \quad \text{e. } [(62a)] = \neg \exists x \in D \forall y \in \text{D} \\
& \quad \quad \quad \text{(John didn’t read any books in D)}
\end{align}

4. A new analysis

Wrapping things up, we have seen that the operation of F-movement is needed to unify the distributional patterns of NPIs under DP-only and VP-only, especially the facts related to Licensing-*F Mismatch; but so far this operation has not been well-motivated. In such a case, a natural move would be to incorporate F-movement into the G-view of NPI-licensing and motivate F-movement based on the requirement of avoiding G-trivalities.

Why is that a logical inference can motivate a syntactic operation? Chierchia (2013: 444) indicates that the structure-building apparatus (e.g., Merge, Move, Agree) and the inferential one are not radically different: “grammar only sees functional/logical material; logic sees functional/logical material and whether the lexical material is the same or different.” G-triviality, in particular, is the type of L-trivialities that takes effects in grammar.

Nevertheless, we have also seen that neither Wagner (2006) nor Chierchia (2006, 2013) properly captures the distributional pattern of NPIs under only: (i) using an existential presupposition that is too weak to render SDE, the SDE-based analysis by Wagner predicts that only cannot license NPIs at all; (ii) the G-view of NPI-licensing by Chierchia is too weak and overly generates NPI-licensing environments under only. In particular, contra the prediction of the G-view, the
phenomenon of Licensing-*F Mismatch suggests that the licensing status of an NPI in an *only*-sentence is not just determined by the polarity pattern of the environment where this NPI gets interpreted. For instance, compare the minimal pair in (63): despite that the asserted component of the entire *only*-sentence is DE and UE with respect to the NPI any in (63a) and (63b), respectively, both occurrences of any are not licensed.

(63)  
   a. *Only any BOYS$_F$ arrived.  
   b. *Only ANY$_F$ boys arrived.

I argue that *only* is not just an NPI-licenser but also an “NPI-unlicenser”: it is an NPI-licenser because it creates a DE environment in its unfocused part; it is an NPI-licenser because interpreting an NPI within its syntactic complement makes this NPI not licensed. To capture the latter role of *only*, I propose that it has the capability of assessing the grammatical feature [D]:

(64) Only mandatorily checks off any unchecked [D] features in its syntactic complement.  
   a. *Only* can check off any alternative-generating features (e.g., [F], [D]).  
   b. The [D] feature must agree with the closest probe.

Accordingly, contra the traditional G-view, the occurrence of DP-*only* in (63a) checks off not only the [F] feature of the focused item BOYS but also the [D] feature of the NPI any which appears within the restrictor, as illustrated in (65b). In particular, the feature-checking operation on [D], as we will see in section 4.1.3, gives rise to a G-triviality and “unlicenses” any: *only* negates the proper D-alternatives, returning an assertion that contradicts the prejacent presupposition of *only*.

(65) *Only any BOYS$_F$ arrived.  
   a. Traditional G-view  
   b. New analysis

In the case of VP-*only* association, F-movement is motivated so as to avoid this G-triviality.¹⁶ Compare the LFs in (66). If focus is interpreted in-situ as in (66a), the [D] feature of any would

¹⁶Since G-triviality is assessed at LF, the requirement of avoiding G-trivialities can only motivate covert movement. For instance, this requirement is not the source of overt F-movement in languages like Hungarian and Basque. (See Kiss 1995 for further instances.)
checked off by the closest probe only as in (66a), yielding a G-triviality. On the contrary, if the focused item undergoes F-movement as in (66b), only c-commands the focused item but not the NPI any; therefore the [D] feature of any is left to be checked off by a global covert $O_D$-operator. Moreover, the scope of only creates a DE environment, therefore using $O_D$ to assess the [D] feature does not yield a G-triviality, making the NPI any licensed.

(66) Mary only gave any books to JOHN.

a. Without F-movement

b. With F-movement

4.1. DP-only association

4.1.1. Semantics of DP-only

Following Rooth (1985, 1992), we can define the semantics of DP-only cross-categorically as in (67). Here $f$ and $P$ correspond to the left argument (namely the restrictor) and the right argument (namely the scope), respectively. The exhaustification domain of DP-only is the focus-and-domain value of the left argument (notation: $\llbracket f \rrbracket_{f,d}$).

(67) a. $\llbracket \text{only} \rrbracket (f_\alpha)(P_{<\alpha,\mathcal{M}>)} = \lambda w. \forall f' \in \llbracket f \rrbracket_{f,d} [P(f)(w) \rightarrow \llbracket f \rrbracket_0 \subseteq f']$

b. Presupposition: $P(f)$

$\llbracket f \rrbracket_0$ and $\llbracket f \rrbracket_{f,d}$ correspond to the ordinary value of $f$ and the focus-and-domain value of $f$, respectively. The ordinary value is simply the truth value. The focus-and-domain value is the set containing all the Falternatives ($\llbracket f \rrbracket_f$) and the D-alternatives ($\llbracket f \rrbracket_d$), composed point-wise as the following.

(68) a. $\llbracket \alpha_f \rrbracket_f = \text{Dtype}(\llbracket \alpha \rrbracket_0)$
b. $\llbracket \alpha_d \rrbracket_d = \{ \alpha_{D/D'} : D' \subseteq D \}$
c. $\llbracket \alpha \rrbracket_f = \{ \llbracket \alpha \rrbracket_0 \}$
d. $\llbracket \alpha \rrbracket_d = \{ \llbracket \alpha \rrbracket_0 \}$
e. $\llbracket \alpha \rrbracket_{f,d} = \llbracket \alpha \rrbracket_f \cup \llbracket \alpha \rrbracket_d$
f. $\llbracket \alpha(\beta) \rrbracket_{f,d} = \{ a(b) \mid a \in \llbracket \alpha \rrbracket_{f,d}, b \in \llbracket \beta \rrbracket_{f,d} \}$
In absence of NPIs, this definition of *only* has nothing different from the canonical one.

(69) Only JOHN_F’s advisors left.
   a. \[[\text{JOHN}_F’s advisors}]_0 = A(j)
   b. \[[\text{JOHN}_F]]_f = D_e
   c. \[[\text{JOHN}_F’s advisors}]_f = \{A(x) \mid x \in D_e\}
   d. Assertion: \(\lambda w. \forall y \in \{A(x) \mid x \in D_e\} [L(y)(w) \rightarrow A(j) \subseteq y]\)
      (If anyone’s advisor y came, then y is John’s advisor.)
   e. Presupposition: \(L[A(j)]\)
      (John’s advisors left.)

4.1.2. The NPI-licenser use of DP-*only*

When an NPI *any* appears within the scope of DP-*only*, its [D] feature will be assessed by a covert \(O_D\)-operator that embeds the entire *only*-clause. The asserted component of the *only*-clause is DE with respect to the scope. Therefore, assessing the [D] feature of *any* via an \(O_D\) is semantically vacuous and would not yield any G-trivialities. An example with schematized derivation is given in the following. The only difference between this analysis from the traditional G-view is that here *only* c-commands the focused item JOHN_F but not the the NPI *any*.

(70) Only JOHN_F read any papers.

\[
\begin{align*}
&2 \\
&\quad 1 \\
&\quad \text{only} \quad \text{JOHN_F} \\
&\quad \text{read any}_D \text{ papers}
\end{align*}
\]

a. \[[\text{JOHN}_F\text{]}\]_0 = j
b. \[[\text{JOHN}_F\text{]}\]_f = D_e
c. \[[1]\]_0 = \lambda w. \forall y \in D_e [\exists x \in D [P_w(x) \land R_w(y,x)] \rightarrow j \subseteq y]
   (Only John read any papers in the total domain \(D_e\))
d. \[[1]\]_d = \{\lambda w. \forall y \in D_e [\exists x \in D' [P_w(x) \land R_w(y,x)] \rightarrow j \subseteq y] : D' \subseteq D\}
e. \[[2]\] = [[1]]_0 \land \forall p \in [[1]]_d [p(w) \rightarrow [[1]]_0 \subseteq p] = [[1]]_0
   (Only John read any papers in the total domain \(D_e\))
4.1.3. The NPI-unlicenser use of DP-only

When an NPI any appears within the left argument of DP-only, only checks off both [F] and [D] features, and therefore its exhaustification domain consists of not only the focus value of its left argument but also the domain-value of its left argument. In the asserted component, applying only negates all the excludable alternatives, including the proper D-alternatives, yielding the inference in (71d). Crucially, (71d) contradicts the prejacent presupposition of only (71e). Hence, the meaning of (71) is always undefined, which therefore explains why the NPI any is not licensed in this case.

\[(71) \text{ *Only any}_D \text{ BOYS}_F \text{ arrived.}\]

\[
\begin{array}{c}
\text{only} \\
\text{DP} \\
\text{\text{any}}_D \text{ BOYS}_F \\
\end{array}
\]

\[\text{arrived}\]

a. \[\text{[any}_D \text{ BOYS}_F]_0 = \lambda f_{<e,st>} . \exists x \in D[B(x) \land f(x)]\]

b. \[\text{[any}_D \text{ BOYS}_F]_f = \{\lambda f_{<e,st>} . \exists x \in D[g(x) \land f(x)] : g \in D_{<est,f>}\}\]

c. \[\text{[any}_D \text{ BOYS}_F]_d = \{\lambda f_{<e,st>} . \exists x \in D'[B(x) \land f(x)] : D' \subseteq D\}\]

d. Assertion: \[\lambda w . \forall Q_{<est,st>} \in \text{[any}_D \text{ BOYS}_F]_{f,d}[Q(A)(w) \rightarrow \text{[any}_D \text{ BOYS}_F]_0 \subseteq Q] \]

\[\Downarrow\]

e. \[\lambda w . \forall Q_{<est,st>} \in \text{[any}_D \text{ BOYS}_F]_{d}[Q(A)(w) \rightarrow \text{[any}_D \text{ BOYS}_F]_0 \subseteq Q] = \forall D'[D' \subseteq D \rightarrow \neg \exists x \in D'[B(x) \land A(x)]]\]

(For any proper subdomain D', no boy in D' arrived.)

f. Presupposition: \[\exists x \in D[B(x) \land A(x)]\]

(Some boys in the total domain D arrived.)

g. (71e) contradicts (71f): let \(D = \{a, b\}\), then

\[\text{[(71e)]} = \neg A(a) \land \neg A(b)\] (Neither a nor b arrived.)

\[\text{[(71f)]} = A(a) \lor A(b)\] (a or b arrived.)

4.2. VP-only association

4.2.1. Semantics of VP-only

In the case of VP-only association, if focus is interpreted in-situ, the alternatives are all propositional. Following Rooth (1985, 1992), I schematize the meaning of VP-only as in (72), where \(p\) stands for the VP complement.
When F-movement takes place, VP-\textit{only} is defined cross-categorically the same as DP-\textit{only}. Now the two arguments \(f\) and \(P\) correspond to the F-moved phrase and the remnant VP.

In absence of NPIs, F-movement is not motivated and therefore the exhaustification domain of \textit{only} would be a set of propositions. A schematized example is given in the following.

**4.2.2. Case 1: F-movement is not motivated**

Assuming that F-movement is used to avoid G-trivialities, we conjecture that interpreting focus in-situ is allowed as long as it does not yield a G-triviality. For instance in (75), the NPI \textit{any} can be licensed by negation: assessing the [D] feature of \textit{any} by the overt particle \textit{only} or a covert \(O_D\)-operator that immediately c-commands negation does not yield a G-triviality; therefore F-movement is not motivated.

(75) Mary only didn’t give any\(_D\) books to JOHN\(_F\).

Only (\(O_D\)) \textbf{not} [Mary gave any\(_D\) books to JOHN\(_F\)]

Assuming the operation of F-movement to be conditional better controls the use of F-movement. For instance, contrary to Wagner’s (2006) predictions seen in section 2.3.3, the new analysis predicts that F-movement is not motivated in (76) and (77), because interpreting focus in-situ does not yield a G-triviality: (76) has no NPI; the NPI \textit{any} in (77) is licensed by negation.

(76) She only wanted to kiss [at most 3 students]\(_F\).

(77) Mary only didn’t give [any books]\(_F\) to John. She did her best to help him.
4.2.3. Case 2: F-movement is motivated

In the case of DP-only association, we have seen that interpreting an NPI within the immediate syntactic complement of only yields a G-triviality, making the NPI unlicensed. In the case of VP-only association, interpreting focus in-situ would also result in a G-triviality, but this G-triviality can be avoided by F-movement under certain configurations.

(78) Mary only gave any books to JOHN_F.

a. # Without F-movement
b. OK With F-movement

Let us first see why the un-F-moved form (78a) yields a G-triviality. Under this LF, only c-commands the entire VP and therefore checks off both [F] and [D] features. Applying only negates all the excludable alternatives, including the proper D-alternatives of any, yielding the inference (79d). Crucially, (79d) contradicts the prejacent presupposition (79e). Therefore, the meaning of the LF (79a) is always undefined.

(79) a. Exhaustification domain of only: ALT = F-ALT ∪ D-ALT
   i. F-ALT = \{∃x ∈ D[B(x) ∧ G(m, j, x)] | y ∈ D_e\}
   ii. D-ALT = \{∃x ∈ D'[B(x) ∧ G(m, j, x)] | D' ⊆ D\}
   b. Assertion: λw.∀q ∈ ALT[q(w) → ∃x ∈ D[B(x) ∧ G(m, j, x)] ⊆ q]
   ↓
   c. ∀D'[D' ⊆ D → ¬∃x ∈ D'[B(x) ∧ G(m, j, x)]]
   (Mary didn’t give John any books in any proper subdomain D')
   d. Presupposition: ∃x ∈ D[B(x) ∧ G(m, j, x)]
   (Mary gave John some papers in the total domain D)
   e. (79c) contradicts (79d): let D = \{a, b\}, then
   \[\llbracket(79c)\rrbracket = ¬G(m, j, a) ∧ ¬G(m, j, b)\] (Mary didn’t give John a or b.)
   \[\llbracket(79d)\rrbracket = G(m, j, a) ∨ G(m, j, b)\] (Mary gave John a or b.)

Alternatively, under the F-moved form (78b), the [D] feature of any is assessed by a covert OD-operator. As we have seen in section 3.3, this LF does not yield a G-triviality: only creates a DE
environment with respect to the $D$ variable in its scope; therefore assessing $[D]$ by the $O_D$-operator is semantically vacuous.

Hence, we can conclude that F-movement is motivated if only c-commands an NPI that has not been licensed within its prejacent.

4.2.4. Case 3: F-movement is unhelpful

Let us move on to Licensing Asymmetry: only cannot license an NPI when associated with this NPI or with an island containing this NPI without across another NPI-licenser. Relevant examples mentioned in the previous sections are collected in (80). I will show that NPIs are not licensed in these examples because their G-trivialities cannot be salvaged by F-movement.

(80)  
(a) *John read only ANY$_F$ papers.  
(b) *John read only [any PAPERS]$_F$, (he didn’t read every book).  
(c) *John read only any PAPERS$_F$, (he didn’t read any books).  
(d) *Mary only gave a book to John [because BILL$_F$ gave any book to him].  
(e) *Mary only invited some students who read ANY$_F$ papers.

Take (80c) for example, where only is directly associated with the NP complement of any. It is easy to see that both of the LFs, with and without F-movement, yield a G-trivial meaning, derived in the same way as we saw in (78a) (namely the unmoved form under VP-only) and (71) (namely the case where an NPI appears within the restrictor of DP-only), respectively.

(81) *John read only any PAPERS$_F$, (he didn’t read any books).

Moreover, under the new analysis, as long as the prejacent is non-DE, the contradiction between the prejacent presupposition and the inference derived from negating the proper D-alternatives holds. This generalization also applies to the case where only is associated with an NPI across an existentially quantificational phrase. For an illustration, compare the following semantic derivation with the one in (61) which follows the G-view.

(82) *Mary only invited some students who read ANY$_F$ papers.
a. only [Mary invited some students who read ANY\(_F,D\) papers]

b. Exhaustification domain of only: \(\text{ALT} = \text{F-ALT} \cup \text{D-ALT}\)

i. F-ALT = \[
\begin{align*}
\exists x[S(x) \land \exists y \in D[P(x) \land R(x, y)] \land I(m, x)] \\
(\text{Mary invited some students who read some papers in D.})
\end{align*}
\]  

ii. D-ALT = \{\exists x[S(x) \land \exists y \in D'[P(x) \land R(x, y)] \land I(m, x)] : D' \subseteq D\}

c. Assertion: \[\lambda w. \forall q \in \text{ALT}^q(w) \land \exists x[S(x) \land \exists y \in D[P(x) \land R(x, y)] \land I(m, x)] \subseteq q\]

\[\Downarrow\]

d. \[\forall D'[D' \subset D \rightarrow \neg \exists x[S(x) \land \exists y \in D'[P(x) \land R(x, y)] \land I(m, x)]\]
(For any proper subdomain \(D'\), Mary didn’t any students who read some papers in \(D'\).)

e. Prejacent presupposition: \[\exists x[S(x) \land \exists y \in D[P(x) \land R(x, y)] \land I(m, x)]\]
(Mary invited some students who read some papers in the total domain \(D\).)

f. (61d) contradicts (61e): let \(D = \{a, b\}\), then
\[
[(61d)] = \neg \exists x[S(x) \land R(x, a) \land I(m, x)] \land \neg \exists x[S(x) \land R(x, b) \land I(m, x)]
\]  
(Mary didn’t invite any students who read \(a\) or any students who read \(b\).)
\[
[(61e)] = \exists x[S(x) \land R(x, a \cup b) \land I(m, x)]
\]  
(Mary invited some students who read \(a\) or \(b\).)

In sum, if the prejacent of only is non-DE with respect to the \(D\) variable of any, then regardless of whether F-movement takes place, associating only with or into the anyP yields a contradiction between the prejacent presupposition and the negated proper D-alternatives, making the NPI any unlicensed.

4.3. Head Restriction

Unlike the cases that are subject to island effects, cases that are subject to the Head Restriction do have the option of using a covert \(O_D\)-operator to assess the [D] feature of any\(_D\). For instance in (83a), as Jon Gajewski pointed out to Wagner (2006: fn. 14), the anyP can vacate the VP, stranding the remnant VP associated with only.

\[(83)\]  
*John only CUT\(_F\) any vegetables.

\[
O_D[[DP \ \text{any}\_D \text{vegs}]; [\text{only} [VP \ \text{John CUT}_F \ t_t]]]
\]

It is obvious why here the NPI any is still not licensed: vacating the VP, the anyP can and can only be raised to the position sandwiched between \(O_D\) and only. Under this structure, the [D] feature of any is assessed under the immediate scope of \(O_D\), which yields a G-triviality.
On the other hand, if the anyP can be raised to a DE context, the NPI any would be licensed. For instance, the conditional sentence (84), which utters (83) as its antecedent, is more acceptable. This is so because: the whole conditional is DE with respect to any; applying $O_D$ over the entire conditional does not yield a G-triviality.

(84) (?) If John only CUT any vegs (and didn’t STEAM any vegs), Mary would be unhappy.

Moreover, if the quantifier raising of the anyP is blocked, the NPI any would not be licensed. For instance, the NPI any is not licensed in (85), a conditional where only is associated with the NP complement of any. First, the determiner any cannot take F-movement alone, ruling out the possibility in (85a). Second, since an only-associated focus cannot be moved from beneath only (Tancredi 1990; Beaver and Clark 2003), the F-contained anyP cannot raise over only, ruling out the possibility in (85b).

(85) *If John only invited [anyone’s ADVISORS$_F$], the students would be unhappy.

a. If John only invited [anyone’s ADVISORS$_F$, ...]

b. If John only invited [anyone’s ADVISORS$_F$, ...

5. Conclusions

The goal of this paper has been to explain the distributional pattern of NPIs under only. I reviewed two representative analyses, namely the F-movement theory by Wagner (2006) and the G-view of NPI-licensing by Chierchia (2006, 2013). I showed that both analyses have clear advantages but also make some incorrect predictions. On the one hand, using an existential presupposition that is too weak to render SDE, Wagner (2006) predicts that only cannot license NPIs at all. On the other hand, Chierchia’s (2006, 2013) analysis is too weak to capture cases where only is associated with an NPI across an existential quantifier and cases that are subject to Licensing-*F Mismatch.

Alternatively, I incorporated F-movement into the G-view of NPI-licensing with a simple assumption that the requirement of avoiding G-trivialities can motivate F-movement. Moreover, I argued that only is not just an NPI-licenser but also an “NPI-unlicenser”. To capture the latter role, I proposed that only can check off the grammatical feature [D] and operate on D-alternatives.

Compared with previous studies, this integrated analyses provides two new predictions. First, when an NPI is interpreted within the immediate complement of only, a contradiction arises be-
tween the exhaustivity assertion and the prejacent presupposition, making the NPI not licensed. Second, in the case of VP-only association, this contradiction can be avoided via F-movement if the NPI does not appear within the F-moved phrase. These predictions help to explain the phenomenon of Licensing-*F Mismatch and the motivation of F-movement under VP-only association.

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