

A Syntactic Analysis of Floating Quantifiers in English

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1. Introduction

In English, a quantifier can appear in various positions separate from the DP it quantifies over. This phenomenon has been investigated in the literature since the early stages of generative grammar. For example, the quantifier *all* in (1a) modifies the subject DP *the students* in prenominal position. In contrast, *all* in (1b) is separated from the subject DP and appears to its right. Quantifiers like *all* in (1b) are called “floating quantifiers” (FQs).

- (1) a. **All** *the students* have finished the assignment.
- b. *The students* have **all** finished the assignment. (Bobaljik (2003: 1))
- (2) a. * John saw *the men* **all**.
- b. * They read *the papers* **both** yesterday.

(Fiengo and Lasnik (1976: 188))

On the other hand, FQs normally cannot be associated with direct objects of transitive verbs in English, as shown in (2).¹ The distribution of subject-oriented FQs has been widely discussed (e.g. Kayne (1975), Sportiche (1988), Baltin (1995), Bobaljik (2003) and Bošković (2004), among others), but the distributional asymmetry between subject-oriented FQs and object-oriented FQs has received little attention. The purpose of this paper is to provide a unified account for subject-oriented FQs and

object-oriented FQs by assuming a simple licensing condition under the minimalist framework (Chomsky (2000, 2001, 2008)). Specifically, it is argued that an FQ serving as a matching goal enters into a Multiple Agree relation with a functional head as a probe and its host DP as another matching goal within the same phase domain.

This paper is organized as follows. Section 2 overviews previous analyses of FQs and points out their problems. Section 3 proposes a licensing condition on FQs based on Multiple Agree under the minimalist framework. Section 4 shows that the distribution of subject-oriented FQs and object-oriented FQs is successfully account for under the proposed analysis. Section 5 is the conclusion of this paper.

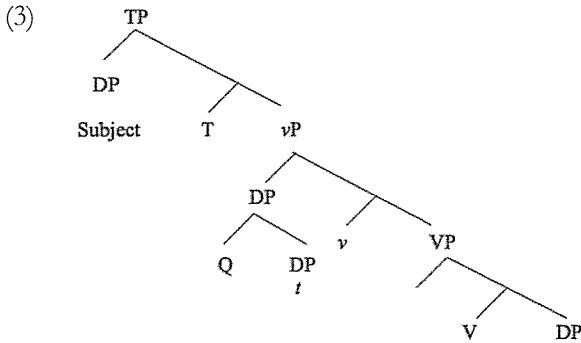
2. Previous Studies

There are mainly three analyses of the distribution of FQs proposed in the literature, i.e. stranding analysis (Sportiche (1988) and Shlonsky (1991)), adverbial analysis (Bobaljik (1995) and Baltin (1995)) and anaphoric analysis (O’Grady (1982) and Kayne (1984)). This section overviews these analyses and points out problems with the stranding analysis, while the basic ideas of the adverbial analysis and the anaphoric analysis are adopted in this paper.

2.1. The Stranding Analysis

As for subject-oriented FQs, Sportiche (1988) argues that the pair of sentences like (1) are semantically identical (see also Giusti (1990), Shlonsky (1991) and Merchant (1996) for the same observation), and this is due to the syntactic identity of the two sentences at some stage in the derivation. He therefore assumes that a quantifier enters into the derivation adjoined to the subject DP in Spec-*v*P, and it may be either pied-piped with the subject DP to Spec-TP or stranded in the base-generated position, deriving sentences like (1a, b), respectively. Therefore, the

phenomenon of FQs has been considered to provide empirical evidence for the ν P-internal subject hypothesis. The syntactic structure of a sentence with an FQ is represented in (3) under the stranding analysis.



However, there are serious problems with the stranding analysis and hence it cannot be maintained. Firstly, it fails to capture the fact that FQs cannot appear in the base-generated position of the surface subject of unaccusative/passive verbs.

(4) a. * *The students* have arrived **all**.

b. * *The students* were seen **all**.

(Bobaljik (2003: 13))

Secondly, the stranding analysis crucially relies on the assumption that the pair of sentences like (1) are semantically identical. However, Junker (1990) provides arguments against this assumption. She defines the quantifiers *all* and *each* as operators of distributivity, the effect of which varies depending on their positions at S-structure. Namely, the positions of quantifiers constrain their interpretations. The asymmetry of interpretation between non-floating quantifiers and FQs is illustrated in the following examples.

(5) a. **All** *the students* have **not** finished the assignment.

[not > ∀, ∀ > not]

b. *The students*_i have **not all** *t_i* finished the assignment.

[not > ∀, *∀ > not]

In (5a), *all* takes either wide or narrow scope over the negation, while only the negation can take wide scope over *all* in (5b). These data demonstrate that different structures must be assigned to non-floating and floating constructions, contrary to the stranding analysis.

A similar argument is presented by Bobaljik (2003), who also pays attention to the asymmetry of interpretation between non-floating quantifiers and FQs. For example, (6a) has the most prominent reading in which every member of lions, tigers and bears is scary. On the other hand, the sentence involving the FQ in (6b) has an additional reading that lions, tigers and bears are generally scary in the world. In other words, (6b) is ambiguous with the individual plural nouns construed as generics, which is a reading unavailable in (6a).

- (6) a. **All** *lions, tigers and bears* are scary.
 b. *Lions, tigers and bears* are **all** scary. (Bobaljik (2003: 29))

2.2. Similarities of FQs to Adverbs and Anaphors

This section outlines the other two analyses of FQs: the adverbial analysis and the anaphoric analysis, highlighting the properties of FQs similar to adverbs and anaphors.

2.2.1. The Adverbial Analysis

It has been claimed in the literature that FQs are neither moved rightward nor stranded by DP-movement, but they are adverbial elements that are base-generated in a ν P/VP-adjoined position (Dowty and Brodie (1984), Doetjes (1992), Baltin (1995), Torrego (1996), Bobaljik (1995) and Brisson (1998), among others). Under the adverbial analysis, the structure of (1b) (repeated as (7)) is not the stranding structure in (7a) but rather the adjunction structure in (7b).

- (7) *The students* have **all** finished the assignment.
 a. *The students*_i have [_{NP} [_{DP} **all** *t*_i] [_{VP} finished the assignment]]
 b. *The students*_i have [_{NP} [_{QP} **all**] [_{VP} *t*_i [_{VP} ν [_{VP} finished the assignment]]]]]

The structure in (7b) captures the parallel distribution between FQs and certain adverbs (Bobaljik (1995) and Brisson (1998)). Following Sag (1978), Bobaljik (2003) observes that both FQs and adverbs show the same pattern under ν P/VP-ellipsis, as shown in (8).

(8) a. Otto has read this book, and my brothers have (**all/certainly**) read it, too.

b. Otto has read this book, and my brothers have (***all**/
***certainly**) ____, too. (Bobaljik (2003: 5))

In (8a), both the FQ *all* and the adverb *certainly* can appear in a position between the auxiliary and the main verb. On the other hand, the example in (8b) shows that neither of them can escape from ν P/VP-ellipsis.

Furthermore, Tescari Neto (2013) proposes to account for the distribution of FQs within Cinque's (1999) hierarchy of adverbial projections by assuming that FQs occur in a position between mood adverbs, as shown in (9).

(9) Mood_{Speech/Act}P > Mood_{Mirative}P > **FQ_{all}** > Mood_{Evaluative}P > Mod_{Epistemic}P
> ... > V (Tescari Neto (2013: 317))

The ban on subject-orient FQs following unaccusative/passive verbs as in (4) would reflect the hierarchy in (9). FQs must adjoin to a position higher than ν , the landing site of unaccusative/passive verbs. The sentences in (4) are correctly ruled out, since there are no suitable positions for FQs to adjoin to.

Although the adverbial analysis works better to account for the distribution of FQs than the stranding analysis, there remains one problem. If we assume that FQs are adverbial, then a question will arise which class of adverbs they exactly belong to. The argument that the distribution of FQs is restricted in the same way as mood adverbs only suggests that this type of distribution applies not only to adverbs, but also to other adjuncts such as FQs. Brisson (2000) presents a detailed discussion of distributional similarities and differences between adverbs and FQs, and concludes that FQs do not belong to any of the standard

adverb classes. I agree with his suggestion that FQs should be considered as a special class of adverb, differing from any other types of adverb standardly assumed. Moreover, there are further properties of FQs that are not found in other types of adverb, i.e. anaphoric distribution and agreement, which will be discussed in the next section.

2.2.2. The Anaphoric Analysis

As pointed out by a number of linguists, FQs show similar behavior to anaphors (O'Grady (1982), Jaeggli (1982) and Kayne (1984)). As shown in (10), a pronominal quantifier can serve as an anaphoric expression: *all* and *each* refer to and are conindexed with *the students* and *the men*, respectively. In addition, the examples in (11) show that the antecedent of a pronominal quantifier must be plural.

- (10) a. *The students_i* came to the party and **all_i** danced together.
 b. After *the men_i* had read the book, **each_i** agreed that it should be banned. (O'Grady (1982: 527))
- (11) a. * *The student_i* came to the party and **all_i** danced together.
 b. * After *the man_i* had read the book, **each_i** agreed that it should be banned. (O'Grady (1982: 527))

The same property holds for FQs, which must also be associated with the plural host DP, as shown in (12).

- (12) a. *The men* have {**all/both/each**} left.
 b. * *The man* has {**all/both/each**} left. (O'Grady (1982: 535))

Furthermore, the following examples indicate that the relation between FQs and their host DPs is parallel to that between anaphors and their antecedents.

- (13) a. * The mother of [*my friends*]_i likes **each other_i**.
 b. * *My friends_i* think that I like **each other_i**. (Kayne (1984: 91))
- (14) a. * The mother of *my friends* has **all** left.
 b. * *My friends* think that I have **all** left. (Kayne (1984: 91))

It is well known that anaphors must be c-commanded by their antecedents

in the same local domain, which is formulated as the Binding Condition A (Chomsky (1981)). The sentences with an anaphor in (13) are ruled out due to the violation of the Binding Condition A. It seems that the sentences involving an FQ in (14) show a similar pattern and hence are amenable to the same analysis as (13). In (14a), the host DP *my friends* is not in a position c-commanding the FQ *all*, while the two elements are separated by the embedded clause boundary in (14b). Thus, it can be concluded that FQs are subject to the Binding Condition A, which suggests that they are a kind of anaphor.

Given these facts, it would be plausible to assume that FQs are adverbial elements with an anaphoric property and must be associated with their host DPs in the same local domain.

3. An Alternative Analysis

In this section, I will propose a new analysis of FQs within the minimalist framework to accommodate their properties discussed so far, especially anaphoric behavior and agreement.

3.1. The Binding Condition A and Multiple Agree

Given that FQs have the same distributional restrictions as anaphors, FQs should be subject to some condition with the same effect as the Binding Condition A. In recent work, Chomsky (2008: 141) suggests that “whether c-command plays a role within the computation to the C-I interface is an open question.” In fact, he claims that c-command is not required in the binding theory. He adopts Reuland’s (2001) proposal that a binding relation holds between the antecedent XP and the reflexive R in the structure of the form {H ... XP ... R}, where XP does not c-command R, but both are c-commanded by the head H that agrees with XP. Empirical evidence for this proposal comes from Norwegian and Icelandic, as shown in (15).

(15) a. Norwegian:

Det ble introdusert en mann_i for seg_i selv / *ham_i selv
 it became introduced a man to SE SELF / *him SELF

b. Icelandic:

Thad kom maður_i með börnin sín_i / *hans_i
 There came a. man with children SE / *him

(Reuland (2005: 512))

In (15), the antecedent DP does not c-command the reflexive, but both of them are goals of the probe that heads the construction. Chomsky then argues that binding relations can be reformulated as probe-goal relations. This is a case of probe-goal relation with H as a probe, which is not c-commanded by XP, and R is in the minimal search domain of H. In other words, the head H mediates between R and XP. Chomsky (2008: 142) mentions that “the reflexive must have the bare form R, meaning it is in an agreement (probe-goal) relation with H, though not c-commanded by its antecedent XP.” Then, he suggests that “the core case of Condition A does not involve c-command, but rather Agree.”

Chomsky adopts Hiraiwa’s (2001) theory of Multiple Agree (MA) rather than a c-command relation for the Binding Condition A.² The definition of MA is as follows.

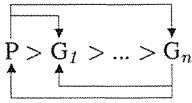
(16) MULTIPLE AGREE

MULTIPLE AGREE (multiple feature checking) with a single probe is a single simultaneous syntactic operation; AGREE applies to all the matched goals at the same derivational point derivationally simultaneously. (cf. Hiraiwa (2001: 69))

Furthermore, Hiraiwa (2005) constrains the operation of MA to a phase domain by adopting the phase theory (Chomsky (2000, 2001, 2004)). The operation of MA is schematized in (17).

(17) MULTIPLE AGREE (P, \vee G)

Agree is a derivationally simultaneous operation AGREE (P, \vee G).



(Hiraiwa (2005: 38))

Agree ($P, G_1 \dots G_n$) is a *Centrosymmetry* operation, where P is a probe and all instances of G are matching goals, with “ $>$ ” standing for a c-command relation. As shown by the arrows in (17), [μ Case] (uninterpretable Case feature) of all goals is valued by P and the last goal G_n values [$\mu\varphi$] (uninterpretable φ -feature) of P and the other goals. Moreover, MA must take place within a phase domain, along the lines of the phase theory. Thus, a probe-goal relation under MA is subject to the Phase Impenetrability Condition (PIC).

(18) Phase-Impenetrability Condition (PIC):

In phase α with head H , the domain of H is not accessible to operations outside α , only H and its edge are accessible to such operations.

(Chomsky (2000: 108))

Under these assumptions, the Binding Condition A is reformulated based on the phase theory, by replacing a binding domain with a phase domain, as shown in (19).

(19) Binding Condition A (reformulated):

An anaphor serving as a matching goal enters into an MA relation with a functional head as a probe and its antecedent DP as another matching goal within the same phase domain.

As for probing by functional heads, this paper assumes with Chomsky (2008) that T and V inherit [$\mu\varphi$] and [EPP] from the phase heads C and v^* , respectively, and they serve as probes which attract matching goals to their specifiers to satisfy [EPP].

Given this theoretical background, an alternative analysis of FQs will be proposed in the following section.

3.2. A Phase-Based Analysis of FQs

Given that FQs have the same distributional restrictions as anaphors, as

(20) Licensing Condition on FQs

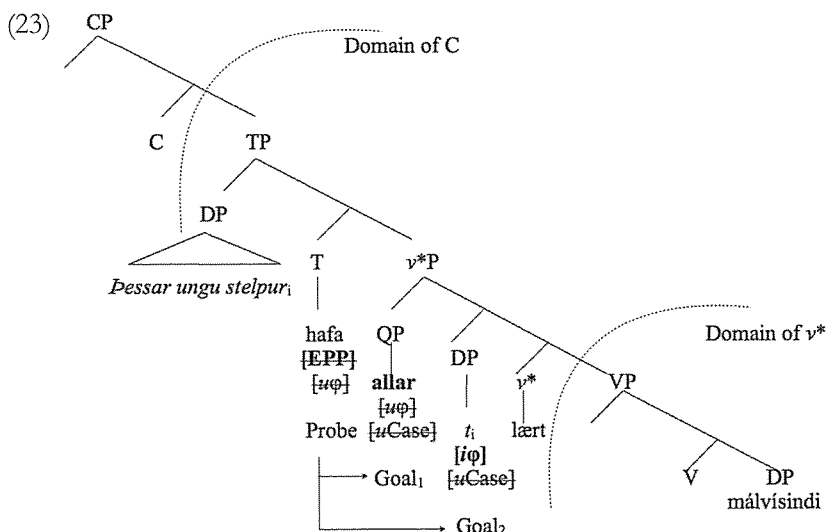


(22) a. *Þessar ungu stelpur* hafa ***allar***
these young girls: NOM; F; PL have all: NOM; F; PL
lært málvísindi.
studied linguistics
'These young girls have all studied linguistics.'
(Icelandic (cf. Thráinsson (2007: 124)))

- b. Ði we sceolon **ealle** beon
 therefore we: NOM; M; PL should all: NOM; M; PL be
 on gode gebroþru.
 on God brothers
 ‘Therefore should we all be brothers on God.’

(Old English (ÆCHom I 327.47))

If this is correct, the derivation of the Icelandic sentence in (22a) will be as in (23), where the auxiliary *hafa* ‘have’ occupies the head position of TP (cf. Thránsón (2007)), the FQ *allar* ‘all’ is adjoined to v^*P and the past participle *lært* ‘studied’ has moved to v^* .



In (23), T, which has $[u\varphi]$ and [EPP] inherited from C, acts as a probe and enters into an MA relation with the FQ *allar* ‘all’ bearing $[u\varphi]$ and $[uCase]$, as well as the subject DP *Þessar ungu stelpur* ‘these young girls’ bearing $[i\varphi]$ (interpretable φ -feature) and $[uCase]$. This MA relation is established at the CP phase, thereby satisfying the condition in (20). Under MA, T assigns nominative Case to the FQ and the subject DP; at the same time, $[i\varphi]$ of the subject DP values $[u\varphi]$ of T and the FQ. Then, the subject DP

moves to Spec-TP to satisfy [EPP] on T. This leads to the convergent derivation, with all the uninterpretable features deleted in (23).

The next section shows how the proposed analysis accounts for the distribution of subject- oriented FQs and object-oriented FQs.

4. Explaining the Distribution of FQs

4.1. Subject-oriented FQs

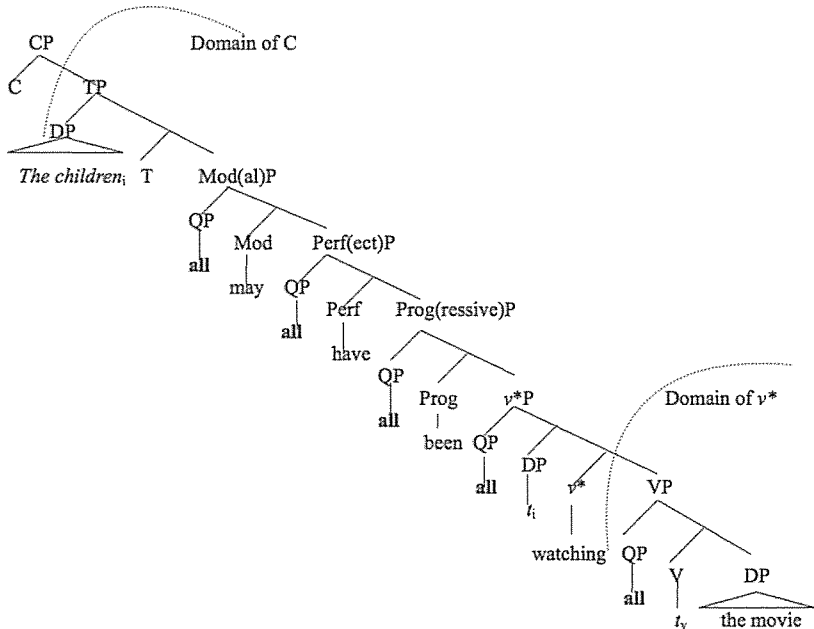
Firstly, let us look at the following sentences with FQs occurring in various positions of transitive constructions, as shown in (24).

- (24) a. *The children* **all** may have been watching the movie.
 b. *The children* may **all** have been watching the movie.
 c. *The children* may have **all** been watching the movie.
 d. *The children* may have been **all** watching the movie.
 e. * *The children* may have been watching **all** the movie.

(Cirillo (2009: 24))

The structure of the examples in (24) is represented as a single tree diagram in (25), where the order of maximal projections follows the adverbial hierarchy in Cinque (1999). Each of the examples in (24a-d) is grammatical, because the FQ enters into an MA relation with the probe T and the host DP in Spec- ν^* P at the CP phase, satisfying the condition in (20). On the other hand, (24e) is ungrammatical due to the violation of (20), because the FQ is in the domain of ν^* , and hence it cannot establish an MA relation with T and the host DP, without violating the PIC. As a result, [$\mu\varphi$] and [μ Case] of the FQ remain unvalued, causing the derivation to crash.

(25)



Next, let us consider unaccusative/passive constructions with FQs. As mentioned above, FQs cannot appear in a position immediately after unaccusative/passive verbs, as shown in (4) repeated here as (26), which is considered to be a serious problem with the stranding analysis.

(26) a. * *The students* have arrived **all**.

b. * *The students* were seen **all**.

(= (4))

As for the status of unaccusative/passive vP , Legate (2003) claims, contra Chomsky (2000, 2001), that it constitutes a phase and provides an escape hatch for movement out of it, based on facts concerning reconstruction (see also Legate (2014)). In addition, the presence of the inflection on the passive participle in the French example (27) implies that passive v has $[\mu\varphi]$, because only a phase head bears $[\mu\varphi]$ in Chomsky's (2008) framework.

(27) Les chaises ont été repeintés.

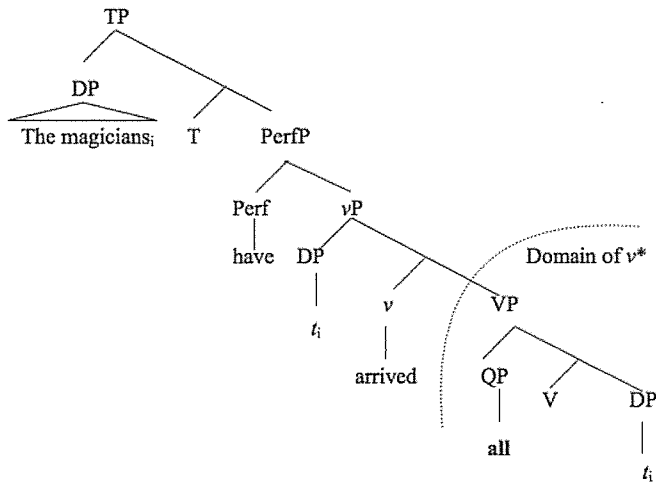
The chairs: F; PL have: PL been repainted: F; PL

‘The chairs were repainted.’ (Boeckx (2008: 33))

Thus, unaccusative/passive constructions are not different from transitive constructions on the phasehood of ν P: ν is a phase head and all elements within the complement of ν cannot be the target of agreement with T. Keeping this in mind, let us consider the following structures of the unacceptable sentences in (26), where the surface subject moves to Spec-TP via Spec- ν P to satisfy [EPP] of ν , and the FQ is adjoined to VP following the verb which has raised to ν .

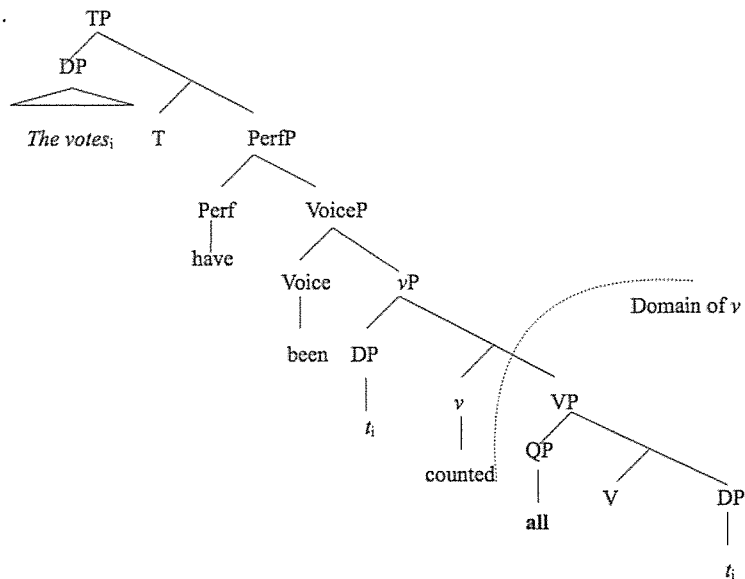
(28) a. * *The magicians have arrived all.*

b.



- (29) a. * *The votes* have been counted **all**.

b.



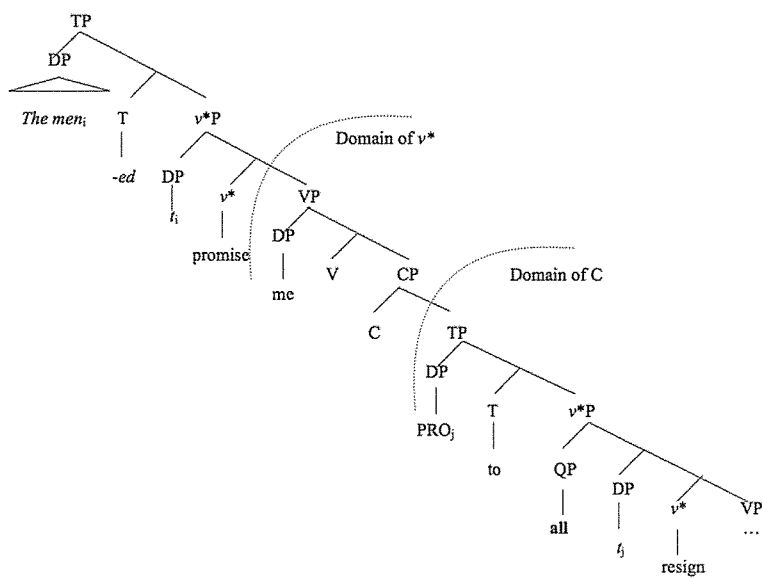
In (28) and (29), the FQ cannot enter into an MA relation with T and the host DP, because it is in the domain of v and is not accessible to operations at the CP phase due to the PIC, violating the condition in (20). This results in a nonconvergent derivation because $[\mu\varphi]$ and $[\mu\text{Case}]$ of the FQ are not valued.

Now, let us consider subject control constructions with FQs. Baltin (1995) observes that FQs cannot precede the infinitival *to*, but must follow it in subject control constructions, as shown in (30). Assuming with Chomsky and Lasnik (1993) that a control infinitive has a PRO subject bearing null Case which is checked by the infinitival T, I propose that the relevant probe is the infinitival T and the host of an FQ is PRO bearing $[\iota\varphi]$ and $[\mu\text{Case}]$. Then, the structures of (30a, b) will be in (31) and (32), respectively.

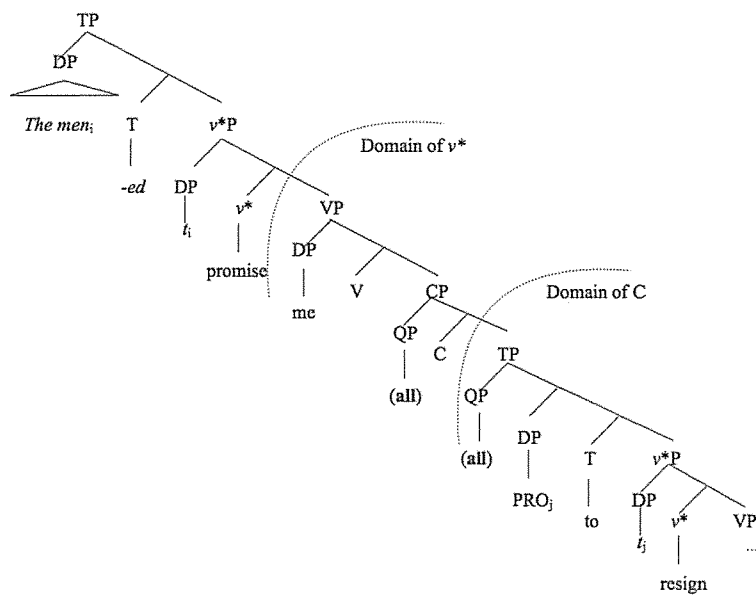
- (30) a. *The men* promised me to **all** resign.

b. * *The men* promised me **all** to resign.

(31)



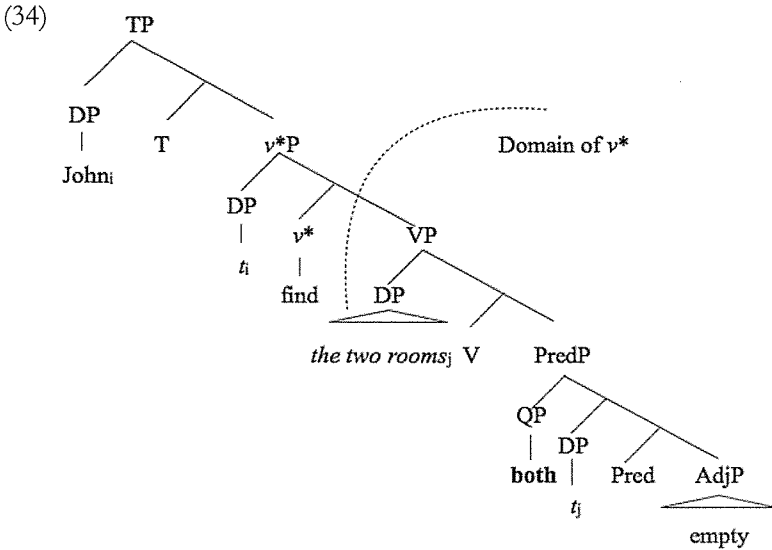
(32)



In (31), the FQ enters into an MA relation with the infinitival T and PRO in Spec- ν^* P at the infinitival CP phase, satisfying the condition in (20). On the other hand, in (32), the FQ, whether it is adjoined to the infinitival TP or CP, cannot enter into an MA relation with the infinitival T and PRO, because the FQ is not c-commanded by the infinitival T and hence is outside its search domain, violating the condition in (20). The derivation crashes with $[\mu\varphi]$ and $[\mu\text{Case}]$ of the FQ unvalued.

Lastly, let us consider the distribution of FQs in small clauses, as illustrated in (33). For the purpose of exposition, this paper follows Bowers (1993) in assuming that small clauses are headed by a functional head Pred (ication), whose function is to convert a predicate into a proposition function requiring a subject in its specifier. In this analysis, the structure of the sentence in (33) will be as in (34), where the FQ is adjoined to PredP and its host, the small clause subject is base-generated in Spec-PredP. In this structure, the FQ enters into an MA relation with V bearing $[\mu\varphi]$ and [EPP] inherited from ν^* and the host DP in Spec-PredP, satisfying the condition in (20). Then, the small clause subject moves to Spec-VP to satisfy [EPP] on V. The derivation converges, so that the distribution of FQs associated with small clause subjects are correctly accounted for.

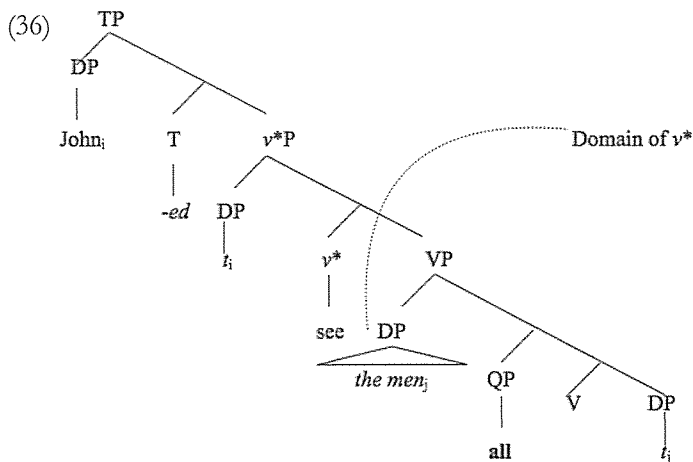
- (33) John found *the two rooms* **both** empty. (Takami (1998: 155))



4.2. Object-oriented FQs

It has been observed in the literature that the distribution of object-oriented FQs is severely restricted and they may only appear in certain constructions such as ditransitive constructions (Maling (1976), Baltin (1995), Bobaljik (2003) and Bošković (2004), among others). As we saw in section 1, object-oriented FQs are not allowed in ordinary transitive constructions, as shown in (2) repeated here as (35). The structure of (35a) is represented in (36).

- (35) a. * John saw *the men* **all**.
 b. * They read *the papers* **both** yesterday. (= (2))



In (36), the FQ cannot enter into an MA relation with V bearing $[\mu\varphi]$ and [EPP] inherited from v^* , because the FQ, which is adjoined to VP, is not in the search domain of V, violating the condition in (20). As a result, $[\mu\varphi]$ and $[\mu\text{Case}]$ on the FQ are not valued, causing the derivation to crash.

Next, let us consider ditransitive constructions with object-oriented FQs. As first observed by Maling (1976), FQs associated with an indirect object can occur between it and a direct object, as illustrated in (37).

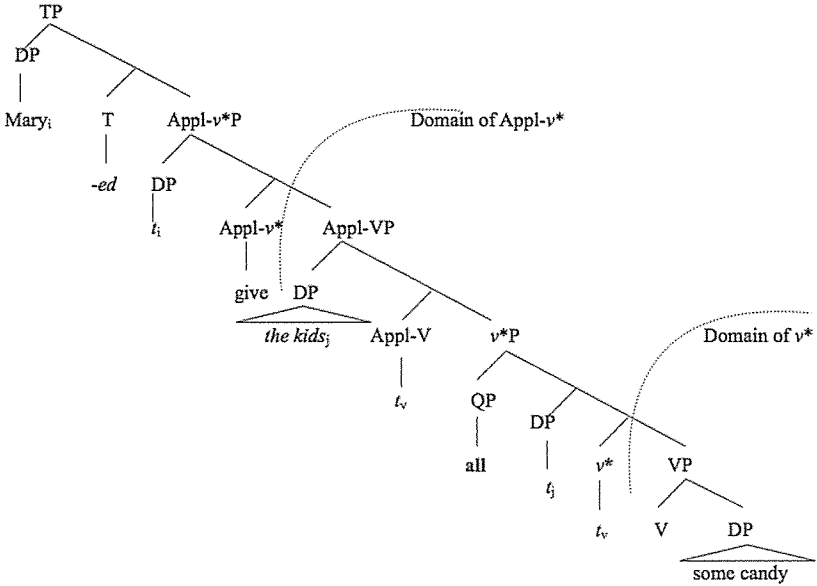
- (37) a. Mary gave *the kids* **all** some candy.
 b. The tooth fairy promised *the kids* **each** a quarter.
 c. Dad bought *the twins* **both** bicycles for Christmas.

(Maling (1976: 715))

Otsuka (2012) argues that the structure of ditransitive constructions contains two projections of v^* : Appl (icative)- v^* P and the lower v^* P. Appl- v^* P is a phase and hosts an external argument in its specifier, while an indirect object is base-generated in the specifier of the lower v^* . Adopting this analysis, together with the assumption that there is inheritance of $[\mu\varphi]$ and [EPP] from Appl- v^* to Appl-V, the structure of (37a) will be as in (38). At the Appl- v^* P phase, the FQ adjoined to the lower v^* P enters into an MA relation with Appl-V and the indirect object *the kids*, satisfying the

condition in (20). Then, the indirect object moves to Spec-Appl-V to satisfy [EPP] on Appl-V, yielding a convergent derivation.

(38)



5. Conclusion

In this paper, we have discussed the syntactic structure of FQs within the minimalist framework. Given the empirical facts, we have adopted basic ideas of the adverbial analysis and the anaphoric analysis and highlighted the properties of FQs similar to adverbs and anaphors. In these respects, we have related Chomsky's (2008) reformulation of Binding Condition A to FQs and suggested a licensing condition on FQs under MA. We have suggested that an FQ serving as a matching goal enters into an MA relation with a functional head as a probe and its host DP as another matching goal within the same phase domain. Under this

assumption, the distributional properties of both subject-oriented FQs and object-oriented FQs in variant constructions have received a unified explanation.

Notes

¹ This paper will not discuss the asymmetry between a DP object and a pronominal object concerning FQs, as illustrated in (i). The acceptable case in (ia) is called *Q-Pro-Flip* in Maling (1976), according to which the Q *all* and the pronoun *them* are simply inverted. Namely, the two elements make up a single constituent [Pro Q] in surface structure and they are part of the same DP constituent throughout the derivation. I agree with this view that cases like (ia) do not involve an FQ.

(i) a. I called *them all*.

b. * I called *the men all*. (Maling (1976: 714))

This is supported by the ungrammaticality of the following sentences.

(ii) a. * Mary hates THEM *all*.

b. * Mary hates you, him, and her *all*. (Bošković (2004: 708))

As shown in (ii), when an object is a contrastively focused pronoun or consists of coordinated pronouns, it patterns with a DP object and an FQ associated with it is not allowed.

² Multiple Agree was first suggested in Ura (1996) in the form of multiple feature checking.

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Synopsis

A Syntactic Analysis of Floating Quantifiers in English Siyang Xia

This paper aims to provide a unified account for the syntactic properties of Floating Quantifiers (FQs) in English within the minimalist framework.

In previous studies, FQs are treated as either remnant elements left behind by NP movement (the stranding analysis), or adjuncts base-generated in intermediate positions (the adverbial analysis). Crucially, the similarity of FQs to anaphors has also been observed in early studies. This paper points out problems with the stranding analysis and adopts basic ideas of the adverbial analysis and the anaphoric analysis. Furthermore, under the reformulation of the Binding Condition A in terms of the phase theory in Chomsky (2008) and Multiple Agree in Hiraiwa (2001), this paper proposes a licensing condition of FQs. In particular, it is suggested that an FQ serving as a matching goal enters into an MA relation with a functional head as a probe and its host DP as another matching goal within the same phase domain. Given this assumption, the distribution of both subject-oriented FQs and object-oriented FQs in variant constructions receive unified explanations.