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Floating Quantifiers in English and Their Semantic Composition

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1. Introduction

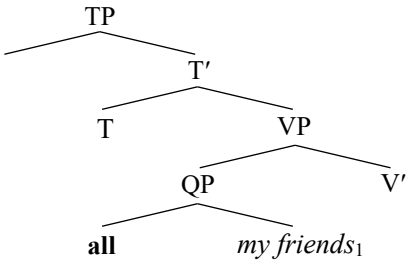
This paper investigates the nature of *floating quantifiers* (FQ) in English. Descriptively, FQs are not prenominal. For example, the quantifier *all* in (1a) is not overtly attached to the subject *my friends*, but they are semantically linked and derive the same propositional meaning as the prenominal version in (1b).

(1) a. *My friends* may **all** like the same girl.
b. **All** *my friends* may like the same girl.

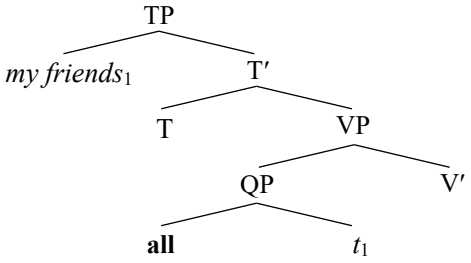
Referring to this type of non-prenominal Qs as FQs, I address how they are obtained. This question has been a hot issue in the history of generative grammar, and there are several approaches to the distribution of FQs. In this section, I will introduce two influential ones and describe their empirical challenges.

The first analysis to review is a *stranding analysis*, which is proposed by Sportiche (1988) and developed by Bošković (2004), among others. In this analysis, FQs are created transformationally. Specifically, they are underlyingly prenominal and left behind in A-movement, such as movement to TP.

(2) a. Base-generation as prenominal *all*



b. A-movement of the sister DP



In (2), the subject QP is base-generated within VP, but only the sister DP of the Q head undergoes subject movement, stranding the latter in its base position. Accordingly, this analysis makes it look like the prenominal Q is floated at surface. In addition, it can also capture the semantic similarity between a FQ and its prenominal twin, because they are originally the same element.

As Bobaljik (1996) points out, however, the stranding analysis is faced with a couple of problems. For instance, it predicts that no Q should be floatable if it cannot occur as a part of its host DP, since all FQs are analyzed as underlyingly prenominal; if the base positions for FQs are ruled out for some reason, they should not be generable from the beginning. The fact contrary to this prediction is given below.

(3) a. * **All** *some of my friends* may like the same girl.
b. *Some of my friends* may **all** like the same girl.

In (3a), *all* is attached to an existential QP and results in unacceptability, which shows that the prenominal

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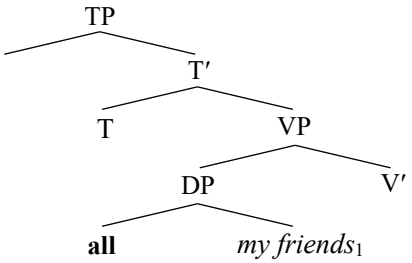
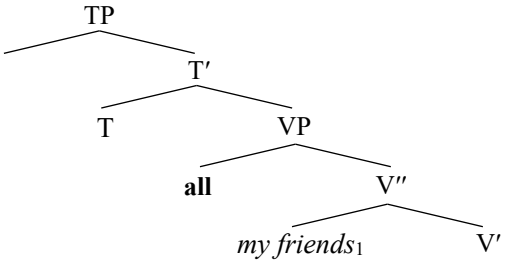
position of the QP is unavailable to *all*. Then, this would entail that we cannot obtain a FQ from (3a), but we actually can; the floated *all* in (3b) is perfectly acceptable. It is thus clear that the contrast in (3) stands out as a problematic fact for the stranding analysis.

Based on this and other facts, Bobaljik (1996) and Brisson (1998) develop another analysis, which I call a *modifier analysis*. These researchers claim that FQs are adverbs such as *probably*, assuming that *all* (as well as *both*) is a crosscategorial modifier, like *even* and *only*. In other words, *all* can be base-generated in a variety of syntactic positions, including adnominal and adverbial ones, as shown below.

(4) a. Base-generation as adnominal *all*



b. Base-generation as adverbial *all*



This analysis can capture the contrast in (3), since it base-generates the prenominal *all* and the floated *all* in different positions, and there is no need to assume that one of them cannot be used in a sentence where the other cannot. In light of (3), therefore, the modifier view goes better than the stranding one.

Still, the modifier analysis must answer how to ensure the semantic similarity between a FQ and its prenominal twin, because verbal and nominal modifiers normally have different semantics. For this issue, Brisson (1998) first claims that *all* is actually not a quantifier. This claim is based on the inability of *all* to induce "inverse scope." For example, (5) shows that *every* allows a wide-scope reading, but not *all*.

(5) a. A policeman stood on **every** *corner*.
b. * A policeman stood on **all** *the corners*. (Brisson 1998: 125)

Given this, Brisson suggests that *all* is a non-quantificational modifier which has only a "domain-adjustment" meaning, and that *all* can enjoy a few special compositional rules to semantically combine with its sister. In short, this semantic system allows the single item *all* to act as an adnominal or adverbial modifier, and maintains that a FQ and its prenominal twin are lexically the same element.

Although Brisson's entire discussion is very insightful, I do not agree with its conclusion, however. In particular, the modifier view of FQs itself is not empirically perfect. Suppose that FQs occur in adverbial positions. Then, FQs and adverbs should show similar distribution, and *all* should be unable to occur where no adverbs can. Still, this is a wrong prediction. For example, consider the following paradigm.

(6) a. Nancy gave *the kids* **all** a teddy bear yesterday. (FQ)
b. * Nancy gave *the kids* **secretly** a teddy bear yesterday. (manner adverb)
c. * Nancy gave *the kids* **probably** a teddy bear yesterday. (modal adverb)

Here, *all* can appear between the indirect object (IO) and direct object (DO) in the double object construction, but this position is not available to any adverbs, as noted by Stowell (1981). Although (6a) is slightly degraded for some speakers, it is fine for others, and crucially it is better than (6b) and (6c). This contrast therefore indicates that FQs are not adverbial modifiers.

In this way, neither the stranding nor modifier analyses are well supported. Given this, I will provide a new analysis of FQs, which I call a *crossing analysis*. I call it so, because it is a formal implementation of Fitzpatrick's (2006) idea that the licensing of FQs needs their associate DPs to move over them. Importantly, my analysis is strictly compositional semantic, like Brisson's (1998), but I keep assuming that *all* (as well as *both*) is a quantifier, and avoid positing any special compositional rules for FQs. Instead, I implement the compositional semantics of FQs by making only a minor revision to *Predicate Abstraction*, a rule proposed in Heim and Ktatzer's (1998) general framework. I will show that the crossing analysis overcomes the above empirical challenges to the stranding and modifier analyses.

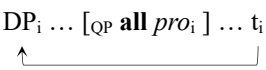
The roadmap of this paper is as follows: Proposal, Support, Extension, and Conclusion.

2. Proposal

I will begin by making a couple of assumptions on which my analysis is built. First of all, I assume with Doetjes (1997) and Fitzpatrick (2006) that the FQ is structurally a full QP and contains a null pronoun *pro* as the sister of the Q head, like [$_{QP}$ **all** *pro*$_i$], where *pro*$_i$ is interpreted as a free or bound variable of type *e*. That is, the FQ is an ordinary quantifier and is very much like [$_{QP}$ **all** *of them*] in its semantic type. Under an event semantics (e.g., Kratzer 1996), where the basic semantic types include *e* (individual), *v* (event), and *t* (truth value), this means that [$_{QP}$ **all** *pro*$_i$] is of type $\langle\langle e, \langle v, t\rangle\rangle, \langle v, t\rangle\rangle$, which is a function that takes a *thematic relation* $\langle e, \langle v, t\rangle\rangle$ and gives an *event predicate* $\langle v, t\rangle$. This is the most important basis for the compositional semantics of FQs in my analysis.

Then, the leading idea for my proposal is given below, which I will develop in this section.

(7) For a FQ to be compositionally interpretable, its *pro*$_i$ must be moved over by a co-indexed DP.



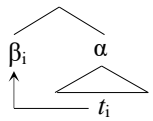
Here, the FQ is not an adverbial modifier, but a full QP base-generated between the base and landing sites of the moved DP. In other words, all that the FQ needs to be licensed is crossing by its associate DP. This simple idea correctly predicts that FQs can only occur above the position where subject movement starts.

(8) a. *The boys* (✓**all**) may like Mary.[1]
b. *The boys* may (✓**all**) like Mary.
c. *The boys* may like (***all**) Mary.
d. *The boys* may like Mary (***all**).

Note that (7) is not my own new idea but comes from Fitzpatrick (2006). Thus, my analysis should be regarded as an extension of Fitzpatrick's approach. Still, it only makes a sketch of how the configuration in (7) is compositionally interpreted, leaving it open what formal semantic device is needed. Moreover, it is in fact an advocate of the modifier analysis (Bobaljik 1996; Brisson 1998) and assumes that the English FQ is an adverbial.[2] This assumption must be abandoned, since the FQ can occur between IO and DO, which is an option not available to adverbs. In the following, I suggest that such an extra assumption is unnecessary if we adopt a version of Heim and Kratzer's (1998) *Predicate Abstraction* (PA).

Here is my proposal. First, I impose the following condition on the application of PA.

(9) PA may apply to any node α iff
α is c-commanded by a moved node β_i, and
α dominates a trace t_i of the moved node β_i.



Then, I propose to revise PA as a type-shifting rule employed in the syntax-semantics mapping.

(10) Let α be a node that PA may apply to.
Then, for any assignment g, PA($[\![\alpha]\!]^g$) = $\lambda x.[\![\alpha]\!]^{g(x/i)}$,
where g(x/i) is the g modified so as to assign x to i.

The version of PA resulting from (9) and (10) differs from Heim and Kratzer's (1998: 186) original idea, since they allow PA to only apply to the sister of the moved element β_i, but in my system, PA may target any node α that β_i c-commands, as long as α dominates a trace of β_i. In short, my revised PA ensures that other nodes than the sister of a moved element β_i can also be turned into a predicate that takes an argument of type *e*, if they contain a trace or pronoun co-indexed with β_i.

I will use this revised PA under Kratzer's (1996) VoiceP structure. In her theory, the external argument of type *e* is introduced at the edge of a Voice head, which takes VP as its sister, as shown below.

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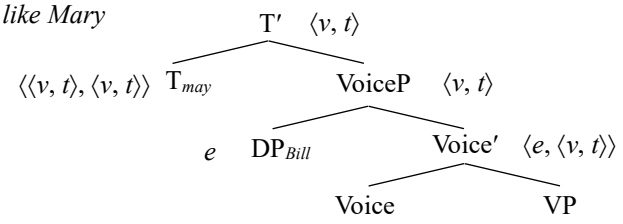
[1] (8a) is slightly degraded, but much better than (8c) and (8d), which are hopeless. Note that the acceptability of each original example was judged by 10–20 speakers of U.S. English, who I recruited via Amazon Mechanical Turk.
[2] More precisely, Fitzpatrick (2006) claims that the stranding and modifier analyses are both needed, and provides some empirical criteria to show that different FQs across languages should be treated differently. However, Fitzpatrick considers the FQs in Standard English as adverbials, in which respect I do not agree.

(11) The structure of *Bill may like Mary*



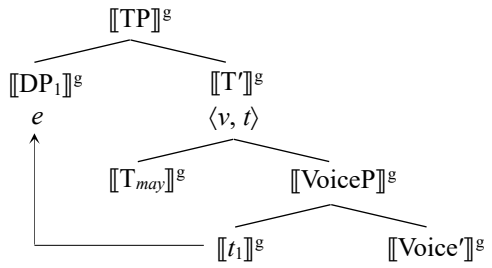
Here, I analyze the elements of the category T as a function of type $\langle\langle v, t\rangle, \langle v, t\rangle\rangle$, including the modal operator *may* (cf. Kratzer 1996), so the T head requires its sister and mother to be of type $\langle v, t\rangle$. Also, I assume that the T head includes Krifka's (1989) *temporal trace function* τ in its denotation and uses the symbol $\tau(e)$ to refer to the run time of an event e. However, the denotations of those nodes in (11) are not so important for my analysis of FQs. Thus, I simplify them as follows, for the sake of readability.

(12) $[\![\text{Voice}']\!]^g = \lambda x.\lambda e.[x \text{ like } \textbf{Mary} \text{ in } e]$ (type $\langle e, \langle v, t\rangle\rangle$)
$[\![\text{VoiceP}]\!]^g = \lambda e.[\textbf{Bill} \text{ like } \textbf{Mary} \text{ in } e]$ (type $\langle v, t\rangle$)
$[\![\text{T}_{may}]\!]^g = \lambda P.\lambda e'.\Diamond\exists e.[\tau(e) = \tau(e') \wedge P(e)]$ (type $\langle\langle v, t\rangle, \langle v, t\rangle\rangle$)
$[\![\text{T}']\!]^g = \lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge \textbf{Bill} \text{ like } \textbf{Mary} \text{ in } e]$ (type $\langle v, t\rangle$)

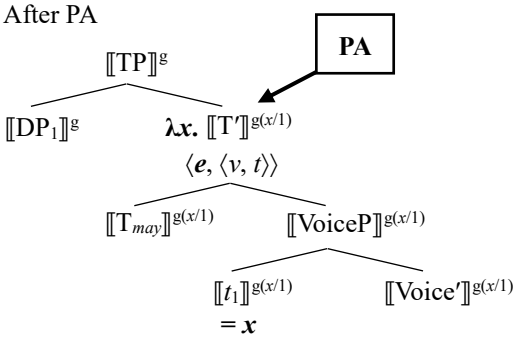
Suppose that the event e' in $[\![\text{T}']\!]^g$ is specified by the C head as the utterance event e^* of the speaker (cf. Enç 1987). Then, the meaning of the entire sentence looks like $\Diamond\exists e.[\tau(e) \circ \tau(e^*) \wedge \textbf{Bill}$ like **Mary** in $e]$, which means "It is possible that there is an event e such that its run time overlaps with that of the utterance event e^* and it is an eventuality of Bill liking Mary." In this way, the semantics of TP is somewhat simplified, but it suffices for my purposes. What is more relevant here is the semantic type of each node.

Given this, I now demonstrate how the revised PA works. First, let us consider an example with no FQ, such as *The boys may like Mary*. Its semantic composition goes as follows.

(13) a. Before PA



b. After PA



In (13a), the subject DP_1 moves to the edge of TP, leaving a trace t_1 in its base site. The problem is that there is a type mismatch between DP_1 (e) and T′ ($\langle v, t\rangle$). Still, T′ is c-commanded by the moved DP_1 and dominates its trace t_1, so it can undergo PA, as in (13b). The output of this PA is given below.

(14) $\text{PA}([\![\text{T}']\!]^g) = \boldsymbol{\lambda x}.[\![\text{T}']\!]^{g(x/1)} = \boldsymbol{\lambda x}.\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![t_1]\!]^{g(x/1)} \text{ like } \textbf{Mary} \text{ in } e]$
$= \boldsymbol{\lambda x}.\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge \boldsymbol{x} \text{ like } \textbf{Mary} \text{ in } e]$

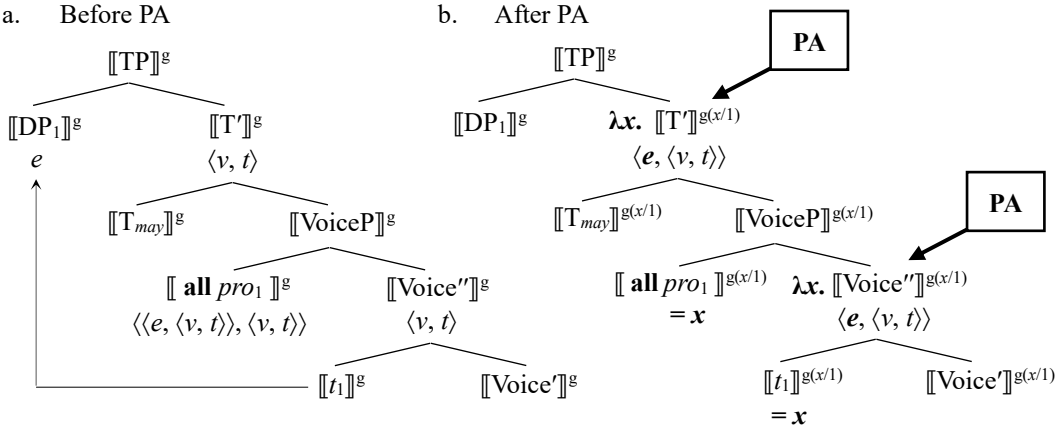
Here, the trace t_1 is interpreted as the variable x under the modified assignment $g(x/1)$, so T′ now denotes a predicate that takes an argument of type e as the value of x, and can combine with DP_1, as shown below.

(15) $\boldsymbol{\lambda x}.[\![\text{T}']\!]^{g(x/1)}([\![\text{DP}_1]\!]^g) = \boldsymbol{\lambda x}.\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge \boldsymbol{x} \text{ like } \textbf{Mary} \text{ in } e]([\![\text{DP}_1]\!]^g)$
$= \lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![\text{DP}_1]\!]^g \text{ like } \textbf{Mary} \text{ in } e]$

In this way, the type mismatch in (13a) goes away. Of course, the same result can be given by Heim and Kratzer's (1998) original PA, but the point here is that the revised PA can do what the original PA can.

I will then examine an FQ example like *The boys may **all** like Mary*, and show what the revised PA can do further. Suppose that the QP [$_{QP}$ **all** pro_1] is base-generated at the highest edge of VoiceP. Then, since the subject DP *the boys* undergoes A-movement to TP, it crosses over the QP, as in (16a).

(16) a. Before PA b. After PA



In this case, we find two type mismatches; one is between DP_1 (e) and T′ ($\langle v, t\rangle$), and the other is between [**all** pro_1] ($\langle\langle e, \langle v, t\rangle\rangle, \langle v, t\rangle\rangle$) and Voice″ ($\langle v, t\rangle$). However, T′ and Voice″ can both be targeted by PA, as in (16b), because they are c-commanded by the moved DP_1 and dominate its trace t_1. First, PA applies to Voice″, interpreting the trace t_1 as the variable x, and turns it into a predicate of type $\langle e, \langle v, t\rangle\rangle$.

(17) $\text{PA}([\![\text{Voice}'']\!]^g) = \boldsymbol{\lambda x.}[\![\text{Voice}'']\!]^{g(x/1)} = \boldsymbol{\lambda x.}\lambda e.[[\![t_1]\!]^{g(x/1)}$ like **Mary** in e]
$= \boldsymbol{\lambda x.}\lambda e.[\ \ \boldsymbol{x}\ \ $ like **Mary** in e]

Accordingly, the type mismatch between [**all** pro_1] and Voice″ disappears, and the former can take the latter as its semantic argument, like $[\![$ **all** $pro_1]\!]^g(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])$. This is the denotation of VoiceP, with which the head T_{may} is then combined, producing the denotation of T′ as shown below.

(18) $[\![T_{may}]\!]^g([\![\text{VoiceP}]\!]^g) = [\![T']\!]^g = \lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![$ **all** $pro_1]\!]^g(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])]$

Now, PA also applies to T′ in order to remedy the type mismatch between DP_1 and T′. Importantly, this application of PA affects, not a trace, but the null pronoun pro_1 within the FQ, changing it into the variable x. This conversion is possible, because a pronoun can act as a variable, and after the application of PA to T′, pro_1 is interpreted under the modified assignment g(x/1), as shown below.

(19) $\text{PA}([\![T']\!]^g) = \boldsymbol{\lambda x.}[\![T']\!]^{g(x/1)} = \boldsymbol{\lambda x.}\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![$ **all** $pro_1]\!]^{g(x/1)}(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])(e)]$
$= \boldsymbol{\lambda x.}\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![$ **all** $\ \boldsymbol{x}\ ]\!]^{g(x/1)}(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])(e)]$

This therefore eliminates the type mismatch between DP_1 and T′, and they are combined as follows.

(20) $\boldsymbol{\lambda x.}[\![T']\!]^{g(x/1)}([\![DP_1]\!]^g) = \boldsymbol{\lambda x.}\lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![$ **all** $\boldsymbol{x}\ ]\!]^{g(x/1)}(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])(e)]([\![DP_1]\!]^g)$
$= \lambda e'.\Diamond\exists e.[\tau(e) \circ \tau(e') \wedge [\![$ **all** $\text{DP}_1\ ]\!]^{g(x/1)}(\boldsymbol{\lambda x.}\lambda e.[\boldsymbol{x}$ like **Mary** in $e])(e)]$

It is now clear that the crossing analysis also ensures that the FQ sentence (*the boys may **all** ...*) is truth-conditionally equivalent to its prenominal version (***all** the boys may ...*), because in the former, the DP_1 *the boys* also semantically ends up in the sister position of **all**, as shown in (20). There is nothing wrong with this semantic representation, and it is derived in a strictly compositional fashion. In short, the revised PA allows A-movement of a DP over its associate FQ to give both of them a sister of type $\langle e, \langle v, t\rangle\rangle$.

Before providing further support for this analysis, I will consider a question about its syntactic side, which is raised by Mikinari Matsuoka and Hiroaki Saito (p.c.). The question is why moving the DP over the FQ into TP is possible, given that subject movement obeys a locality condition and must apply to the nominal element closest to its landing site (Chomsky 2000). This is particularly a natural question for my

analysis, since I assume that the FQ is a full QP with a nominal element *pro*$_i$. In other words, it should be asked why the QP does not count as an intervener which bars the DP from moving to TP.

This question can be answered in various ways, and here I give an account under Chomsky's (2001) theory of movement. First, suppose (i) that T has an unvalued φ-feature [*u*φ] and DP a valued φ [*v*φ] and unvalued Case [*u*Case]; (ii) that [*u*Case] must be valued, and it can be valued through φ-Agree between T and DP; and (iii) that if an element undergoes φ-Agree with T, it must move to the TP edge. Importantly, I assume with Richards (2008) that an element which lacks an unvalued feature is not visible for Agree, including probing by T, so it does not count as an intervener for movement to TP, for example.

Then, my general hypothesis is that the presence of [*u*Case] is optional on the null pronoun *pro*$_i$; it may have or lack [*u*Case]. This means that the QP is allowed to occur only with [*v*φ], as shown below.

(21) [$_{TP}$ T{*u*φ} [$_{VoiceP}$ [$_{QP}$ **all** *pro*$_i$]{*v*φ} [$_{Voice''}$ DP{*v*φ, *u*Case} […]]]]

In this option, the QP lacks [*u*Case] and is not visible for Agree, so T must undergo φ-Agree with the DP. This process values the DP's [*u*Case] as well as attracting the DP to the edge of TP, and there is nothing wrong with this derivation. On the other hand, what happens if the QP occurs with [*u*Case] as well?

(22) [$_{TP}$ T{*u*φ} [$_{VoiceP}$ [$_{QP}$ **all** *pro*$_i$]{*v*φ, *u*Case} [$_{Voice''}$ DP{*v*φ, *u*Case} […]]]]

Here, the QP is visible for Agree and closer to T, so they must undergo φ-Agree, inducing Case valuation and movement of the QP. Still, one problem with this output is that the lower DP's [*u*Case] is not valued. This means that a FQ sentence should be unacceptable if the FQ occurs as the subject, and this is correct as shown in (23). Thus, it is possible to avoid counting the FQ as an intervener, if it may lack [*u*Case].

(23) a. *The boys*$_i$ may **all** t_i like Mary.
b. * **All**$_j$ may t_j *the boys* like Mary.

3. Support

Now, I will give three further arguments for the crossing analysis of FQs. First, my analysis follows Doetjes (1997) and Fitzpatrick (2006) in assuming the presence of *pro*$_i$ within FQs. As Fitzpatrick notes, this assumption accounts for why A′-movement, such as *wh*-movement in (24), does not license a FQ.

(24) * *Which students*$_1$ did John [**all** *pro*$_1$] see? (Fitzpatrick 2006: 66)

Here, the FQ cannot be associated with the *wh*-phrase. According to Fitzpatrick, this fact can be reduced to so-called *cross-over effects*, which prevents A′-moved elements from creating a new binding relation. A typical case of cross-over effects is given below, where the *wh*-phrase cannot bind the pronoun *his*.

(25) * *Who*$_1$ did [*his*$_1$ mother] see? (Fitzpatrick 2006: 65)

With this kind of effects, the FQ in (24) cannot be associated with an A′-moved element, because it contains a pronoun *pro*$_i$ and A′-movement over it causes a violation of cross-over effects.

Second, I have claimed that the FQ [$_{QP}$ **all** *pro*$_i$] is a quantifier of type ⟨⟨*e*, ⟨*v*, *t*⟩⟩, ⟨*v*, *t*⟩⟩. Since *pro*$_i$ is of type *e*, my claim entails that **all** itself is of type ⟨*e*, ⟨⟨*e*, ⟨*v*, *t*⟩⟩, ⟨*v*, *t*⟩⟩⟩ and its sister must be of type *e*, as in cases like ***All*** *the boys may like Mary*, where *the boys* is of type *e*. This result is not only motivated by Matthewson's (2001) crosslinguistic study, but also explains the contrast in (3), repeated below

(26) a. * **All** *some of my friends* may like the same girl.
b. *Some of my friends* may **all** like the same girl.

Given that the sister of **all** must be of type *e*, (26a) is correctly excluded, because the sister of **all** is *some of my friends*, which is a quantifier of type ⟨⟨*e*, ⟨*v*, *t*⟩⟩, ⟨*v*, *t*⟩⟩ and type-theoretically incompatible. Meanwhile, (26b) has no problem in my analysis, under which the FQ **all** is not underlyingly attached to the subject QP, but its actual sister is *pro*$_i$, like [$_{QP}$ **all** *pro*$_i$], so there is no type mismatch in this case.

At this point, it should be asked what kind of quantifier **all** is, because Brisson (1998) suggests that it lacks quantificational force. One piece of evidence comes from its inability to cause "inverse scope."

(27) a. A policeman stood on **every** *corner*.
b. * A policeman stood on **all** *the corners*. (Brisson 1998: 125)

To capture this fact, I adopt an event-based version of Crnič's (2010) mereological semantics of **all**. This is shown in (28), where μ is a measure function and μ(x) refers to the number of the atoms composing x.

(28) $[\![\textbf{all}]\!]^g = \lambda x.\lambda R.\lambda e.\exists x'\colon x' \leq x.\ [\mu(x') = \mu(x) \wedge R(x')(e)]$ (R is a variable of type $\langle e, \langle v, t\rangle\rangle$)

This semantics requires the existence of a subpart x' of x that has a thematic relation R to an event e and whose cardinality is the same as that of x, which means that the subpart x' is itself the whole x. What is important here is that (28) does not involve universal quantification and it just says that there is some x and the whole x is a participant in e. It is now clear that ***all*** *the corners* in (27b) cannot produce a different reading even if it takes wide scope. For instance, suppose that the QP has undergone QR as shown below.

(29) [[$_{QP}$ **all** *the corners*]$_1$ [$_{TP}$ *a policeman stood on* t_1]]

Then, given that the denotation of TP is something like $\lambda x.\lambda e.\exists y.$[policeman($y$) & y stood on x in e], the QP ***all*** *the corners* takes TP as the R argument and requires some event to meet the following description.

(30) $[\![$ **all** *the corners* $]\!]^g([\![\text{TP}]\!]^{g(x/1)}) =$
$\lambda e.\exists x'\colon x' \leq$ **the corners**. [$\mu(x') = \mu($**the corners**$) \wedge \exists y.$[policeman(y) & y stood on x' in e]]

In short, if the referent of *the corners* consists of four corners, this says that one and the same policeman stood on the four corners, which is an unimaginable event. It is thus possible to derive the inability of **all** to induce "inverse scope," once we assume that it is a non-universal quantifier in the sense of (28).

Finally, I have treated the FQ as a full QP, and not an adverb. In my analysis, therefore, it is natural that FQs and adverbs differ in their distribution. Specifically, the contrasts shown in (6), partly repeated here, are not mysterious for my analysis, because the FQ and *secretly* are totally different elements.

(31) a. Nancy gave *the kids* **all** a teddy bear yesterday. (FQ)
b. * Nancy gave *the kids* **secretly** a teddy bear yesterday. (manner adverb)

Of course, for my analysis to get more support, it must address why no adverb can occur between IO and DO, though I have no simple answer now. Still, my analysis makes it possible to explain why the FQ can occur there, once we assume that IO moves, like the subject (e.g., Runner 1998; Beck and Johnson 2004).

(32) IO is moved for Case reasons in VoiceP, and a FQ can be generated in the path of that movement.

… IO_i … [$_{QP}$ **all** *pro*$_i$] … t_i … DO …

Note that the existence of IO movement is supported by the fact that extraction out of IO is impossible.

(33) a. *Who*$_1$ did you give the child **[a picture of** t_1**]**? (extraction out of DO)
b. * *Who*$_1$ did you give **[a child of** t_1**]** the picture? (extraction out of IO)

That is, if IO moves, (33b) is ruled out by a *freezing effect* (e.g., Wexler and Culicover 1980), which bars extraction out of a moved element. The reality of this effect has been established. For example, the contrast in (34) shows the impossibility of extraction out of the passivized object, which clearly moves to the subject position. In light of the freezing effect, therefore, it is a plausible assumption that IO moves.

(34) a. *Who*$_1$ did John select **[a picture of** t_1**]**? (extraction out of the transitive object)
b. * *Who*$_1$ was **[a picture of** t_1**]** selected? (extraction out of the passivized object)

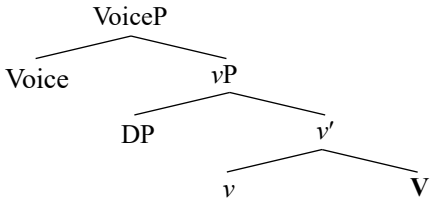
4. Extension

I will now extend my analysis to two further issues. First, why can no FQ be associated with the object of a transitive V? In (35), for example, **all** cannot be placed after the object DP *the students*.

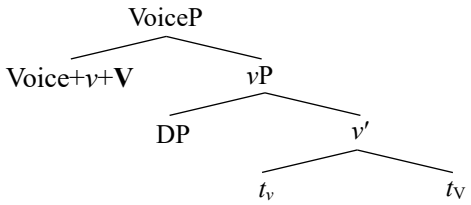
(35) a. John arrested **all** *the students*.
b. * John arrested *the students* **all**.

This fact can be explained if the object does not move at all. First, I adopt Pylkkänen's (2002) *layered V structure*, where a transitive verb consists of its root V, *verbalizer v*, and Voice, and they are combined via V-to-Voice raising (e.g., Harley 2013; Legate 2014; Alexiadou et al. 2015). Then, following Basilico (2008), I assume that the object is base-generated at the edge of *v*P and receives accusative Case there.

(36) a. Object at the edge of *v*P



b. V-raising through *v* to Voice



Note that the assumption that the object undergoes no movement is supported by the fact that extraction out of it is possible, as we have seen in (34). It therefore follows that the object within *v*P is never given an option to cross over a FQ. That is, (35b) cannot have the following FQ-licensing configuration.

(37) [$_{\text{VoiceP}}$ Voice+*v*+**V**$_{arrest}$ [$_{v\text{P}}$ DP$_1$ [$_{v'''}$ [$_{\text{QP}}$ **all** *pro*$_1$] [$_{v''}$ t_1 [$_{v'}$ t_v t_{V}]]]]]

The second issue is on a notorious pattern of FQs that has received much attention since Sportiche's (1988) stranding analysis came out. That is, why can no FQ appear after a passive V, as shown below?

(38) a. *The students* were **all** arrested.
b. * *The students* were arrested **all**.

This fact is also puzzling for my analysis, since it is possible to analyze the FQ as being moved over by the passivized object. For example, consider the following structure, where the passive V raises to Voice.

(39) … DP$_1$ … [$_{\text{VoiceP}}$ Voice+*v*+**V**$_{arrested}$ [$_{v\text{P}}$ [$_{\text{QP}}$ **all** *pro*$_1$] [$_{v''}$ t_1 [$_{v'}$ t_v t_{V}]]]]

Here, the object DP moves to TP and crosses over the FQ, so there is no problem with this structure and the word order DP–T$_{were}$–V$_{arrested}$–**all** should be available. But it is not, and the question is why.

To answer this, I first show the structure of the passive V. Based on Blight (1997), Caponigro and Schütze (2003) propose a distinction between the active and passive Vs in their height. Specifically, they suggest that the active V raises to Voice, but not the passive V. One argument for this claim comes from the distribution of *degree-of-perfection adverbs* (e.g., *poorly*, *perfectly*, *beautifully*). For instance, the following contrast indicates that the adverb *poorly* can precede the passive V, but not the active V.

(40) a. * They *poorly* **built** the house.
b. The house was *poorly* **built**. (Caponigro & Schütze 2003: 297)

This fact can be explained if the active V raises to Voice, but the passive V stays in situ, as shown below.

(41) a. Active V: [$_{\text{VoiceP}}$ Voice+*v*+**V** [$_{v\text{P}}$ DP$_{\text{Obj}}$ [$_{v'}$ t_v t_{V}]]]
b. Passive V: [$_{\text{VoiceP}}$ Voice$_{\textbf{pass}}$ [$_{v\text{P}}$ DP$_{\text{Obj}}$ [$_{v'}$ *v* **V**]]]

That is, if we assume that *poorly* may only appear inside *v*P, we can derive the contrast in (40) as follows; (40a) is ruled out since *poorly* cannot be analyzed as being inside *v*P, while (40b) is accepted because it can be analyzed exactly that way. Importantly, this analysis also predicts that the passive V must follow the object DP if the latter does not undergo movement to TP. This prediction can be verified by considering the existential construction, and it is indeed a right prediction, as the following contrast shows.

(42) a. There've been *some men* **arrested**.
b. * There've been **arrested** *some men*. (Caponigro & Schütze 2003: 293)

Given this, let us adopt Caponigro and Schütze's (2003) proposal that the active V raises to Voice, but not the passive V. This assumption allows us to answer why the FQ in (38) cannot occur after the passive V. The reason is simple; it is because the passive V stays in situ and the FQ **all** must occur higher than it, as shown in (43). That is, the word order that the structure gives us is DP–T_{were}–**all**–$V_{arrested}$.

(43) … DP_1 … [$_{VoiceP}$ $Voice_{pass}$ [$_{vP}$ [$_{QP}$ **all** pro_1] [$_{v''}$ t_1 [$_{v'}$ v $\mathbf{V}_{arrested}$]]]]

5. Conclusion

In summary, I explored the distribution of English FQs and offered a new analysis as an alternative to the stranding analysis (Sportiche 1988; Bošković 2004) and modifier analysis (Bobaljik 1996; Brisson 1998). My proposal builds on Fitzpatrick's (2006) idea that a FQ is licensed by moving a co-indexed DP over that FQ. I formally implemented this crossing analysis by proposing a minor revision to Heim and Kratzer's (1998) Predicate Abstraction, under which it may apply to any node within a movement path. I showed that this semantic system solves some empirical problems with the previous approaches. Importantly, the crossing analysis makes some extra assumptions unnecessary. For example, there is no need to assume that syntactic movement must stop at every node up to its landing site (the assumption needed for the stranding analysis, without which it cannot generate FQs between auxiliaries). Also, there is no need to posit special compositional rules for FQs (which are needed for the modifier analysis).

Of course, there are also some remaining issues for my analysis. One of them is related to the fact that no FQ can occur after an unaccusative V like *bloom*, as illustrated in (44). This fact is potentially problematic for my analysis or any others, given that the unaccusative subject is underlyingly an object.

(44) a. *The plants* ***all*** bloomed.
b. * *The plants* bloomed ***all***.

One promising direction for the account is to assume that the syntax of the unaccusative V lacks the Voice head, as suggested by Alexiadou et al. (2015), so it does not move and stays in situ, like the passive V.

(45) a. Transitive V: [$_{VoiceP}$ Voice+*v*+**V** [$_{vP}$ DP_{Obj} [$_{v'}$ t_v t_V]]]
b. Unaccusative V: [$_{vP}$ DP_{Obj} [$_{v'}$ v **V**]]

This assumption allows us to explain the contrast in (44) in the same way as in the case of the passive V. Still, this account is not without a problem. For example, it predicts that the unaccusative V must follow its argument DP if the latter does not move to TP. Unfortunately, this is not born out, as shown below.

(46) a. * There have *many typhoons* **arisen** in the Pacific this year.
b. There have **arisen** *many typhoons* in the Pacific this year. (Caponigro & Schütze 2003: 293)

Although a possible way out is to assume that the existential construction is in fact *syntactically transitive* and requires the existence of Voice, the full development of this idea must await a different occasion.

Another issue comes from a crosslinguistic perspective; that is, is it possible to extend the crossing analysis to FQs in other languages? While I have argued for its validity in the case of English FQs, I will not suggest that it universally holds. In this respect, I adopt Fitzpatrick's (2006) typological approach, which uses some empirical criteria to establish that FQs are not a uniform phenomenon across languages. Specifically, it argues that in some languages, the stranding analysis holds, and in others the modifier

analysis holds, and in still others like West Ulster English (MaCloskey 2000), both analyses are needed. Though I am an advocate of the crossing analysis, I agree that each language may have different strategies to make FQs possible. From this view, the facts in Russian that a reviewer provides are worth considering; Russian FQs can occur after the passive V and unaccusative V. See also Fitzpatrick (2006) for other facts.

(47) a. **Passive V**
Studenty byli (✓***vse***) ***arestovany*** (✓***vse***).
students were all arrested all
'The students were all arrested.'

b. **Unaccusative V**
Rastenija (✓***vse***) ***zatsveli*** (✓***vse***).
plants all bloomed all
'The plants all bloomed.'

It should thus be addressed "how universal" my analysis is, and I will leave the task for the future research.

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