

The role of intonation in floating quantifiers

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This paper will examine the role of focus structure and prosody in the determination of so-called floating quantifiers' (FQ) placement. Prosody will be shown to be the determining factor in the final position that the FQ occupies in the linear string. It will also be shown that focus structure plays a crucial role in determining whether or not a quantifier can float and in determining which position the FQ will occupy. It will be shown that the existing theories do not take these factors into account and subsequently fail to provide an adequate explanation for FQ placement.

1. Introduction

What determines the position floating quantifiers occupy in a sentence? The two mainstream approaches to this phenomenon can explain FQ placement to a relative extent, but do not provide a concise explanation for which of the several possibilities will be realized in a given sentence. In this paper I will account for the specific distinctions in FQ placement. Furthermore I will show that focus structure plays a role in the determination of an element's ability to be modified by a floating quantifier. In this paper I will persist in the nomenclature FQ simply for convenience sake, but I show that the categorization of which elements fall under this guise needs to be expanded.¹

¹ In this paper the term floating quantifier is used for quantifiers that are not adjacent to the constituent they are modifying as well as to quantifiers that could be moved to non-adjacent positions. Therefore sentence initial quantifiers that could be floated will also be considered in this paper.

2. Floating quantifiers

Floating quantifiers are elements that can have several possible locations in a sentence.

- (1) a. The carpets have been cleaned
 b. The carpets have been all cleaned.
 c. The carpets have all been cleaned
 d. The carpets all have been cleaned
 e. All the carpets have been cleaned.

All theories regard (1c, d) as floating quantifiers. There is no apparent difference in meaning or scope in these sentences and the FQ can felicitously appear in either position.² Sentences (1a, b) are often given different interpretations. (1b) is frequently treated as different from FQ sentences. Sometimes it is treated as a completive adverb (Bobaljik 1995) while in other theories it is treated as an FQ (Sportiche 1988). The most controversial sentence is (1d), as we will see later it is this type of sentence that creates the greatest chasm in the two different approaches. Some theories consider (1d) to be the non-floated version of (1a-c) but essentially the same type of element, while other theories treat DP initial *all* as a different element completely. These theories consider DP initial *all* to be determiner quantifier (D-quantifier), and the floated *all* to be an adverb.

At this point it is crucial to point out that judgments of FQs vary widely. Except for sentences like (1c), there is seldom any consensus on the acceptability of a sentence. I return to this issue later as its significance of is one of the major effects that phonology has on FQ placement. In short, there is no one clear delineation of what an FQ is, nor in what position an FQ can appear in; minimally, it is a quantifier-like element (although even this point is contested) that seems to be modifying the DP, yet is located structurally below the subject.

It is important to understand that the addition of *all* has a significant effect on the sentence. (1a) can felicitously be uttered in a situation where there are 100 carpets and 95 of the carpets have been cleaned. Given the same scenario informants take (1b-e) to be infelicitous; as long as there is even one carpet that that has not been cleaned (1b-e) will be perceived as infelicitous. *All* has a maximizing effect. It maximizes the constituent it is attached to.

3. Previous approaches

There are two predominant approaches to quantifier float (q-float); the stranding approach and the adverb approach. In this section I will briefly sketch out the main aspects as well as the strengths and weaknesses of both of these approaches.

3.1 DP- trace approach

What has become the textbook approach to FQ placement was put forth by Sportiche (1988). Proponents of this approach take the DP and its modifier to form a single constituent giving the structure [Q NP] (Sportiche; Shlonsky 1991; Merchant 1996; McCloskey 2000).³

² See Tsoulas (2002) for a counter approach to this claim which takes FQ to be overt scope markers. Furthermore, scope differences do arise when there is another operator in the sentence.

³ There have been several variations on the implementation of this idea and what exact position the Q is in and whether the Q is a head taking and NP as a complement or whether the Q is in a specifier position.

Sportiche, as a proponent of the VP internal subject hypothesis, takes this unit, the FQ+DP (then NP) to be base generated in Spec, VP. When the subject moves cyclically to Spec, TP the FQ can remain in the base or any intermediate positions while the rest of the DP continues to rise.

- (2) All the boys should have eaten.
 [[All [the boys t]] [should [t have [t eaten]]]]
 (All) the boys (all) should (all) have (all) eaten.

FQs mark the position of DP traces. This theory takes FQs and their DP initial counterpart to be the same element stranded in the former case and non-stranded in the latter.

Since Sportiche put forth his theory in 1988, modified versions of this approach have been used to account for FQ placement cross-linguistically to relative degrees of success. One such example is Hebrew. Shlonsky expands on Sportiche's ideas and applies them to q-float in Hebrew. He proposes that quantifiers head their own projections (QP) and the head Q takes a DP as its complement. When the DP raises to SpecQP, on its way out of the QP en route to Spec TP, we get agreement.⁴

- (3) Kol ha-yeladim ?ohavim le-saxek
 all the children like to play
 'All the children like to play.'
- (4) Ha-Yeladim kul-am ?ohavim le-saxek
 the children all-[3MPL] like to play
 'All the children like to play' (Shlonsky 1991)

While the stranding approach is successful in many accounts there are several crucial issues that it cannot adequately account for. Represented in (5) through (8) are a few of the obstacles that dissuade acceptance of the stranding approach. In (5) the FQ is unacceptable in the theorized base position of the subject, contrary to what is expected.⁵ In (6) the FQ is occurring in a position that the subject could not theoretically have occupied.⁶ In (7) the FQ and the DP could not logically have formed a single constituent. And finally in (8) *all* in the base position of the subject leads to a different interpretation of *all* (I will return to this in the coming section).

- (5) *The votes have been counted all. (Bobaljik 1995)

⁴ An anonymous review pointed out that German has the exact opposite situation with *ganz* 'whole'. When it is not stranded it has agreement and when it is stranded there is no agreement.

⁵ See Erteschik-Shir and Rapaport (2000) for theoretical approach to passives and unaccusatives that does not base generate them in object position.

⁶ This has lead researchers to propose that in these situations there is not an FQ but a full DP. They claim this is supported by the fact that full DP can be substituted in these positions while in other floated positions this is not possible (see Doetjes 1992).

- i. Ben, Mike and Sara arrived all at the same time.
- ii. Ben, Mike and Sara arrived, Ben and Mike at the same time.
- iii. *The children have Ben Sara and Mike seen the movie

- (6) The magicians disappeared all at the same time.⁷ (Bobaljik 1995)
- (7) a. Seth, Pilar and Diana have all left in one car.
 b. *All (of) Seth, Pilar and Diana have left in one car. (Bobaljik 1995)
- (8) The carpets (all) have (all) been (all) cleaned.

There are also sentences where if the FQ and the subject formed a constituent the result would be semantically impossible.

- (9) a. The boys were_[cumulative numerous] and _[distributive all eager to talk]
 b. *All the boys were numerous and eager to talk. (Zamparelli 2000)

If the FQ in (9) is at any point construed with the subject, Zamparelli claims this leads us to assume the possibility of sentences like (9b) which are completely ungrammatical.

The beauty of the stranding analysis lies in its convenience and unified approach. The fact that FQs appear in positions the DP passes through delivers a nice picture, but, unfortunately the data cannot support it.

3.2 Adverb Approach

The second major approach to FQs takes them to be adverbs/adjuncts. The FQ is adjoined to the left edge of the predicate whose subject they modify, and the FQ stands in an interpretive relationship to the DP (cf. Dowty and Brodie 1984; Bowers 1993; Baltin 1995; Bobaljik 1995). It was observed that FQs pattern with and behave like adverbs; both are subject to ordering restrictions, trigger semantic/syntactic effects and need interpretive rules.⁸ Bobaljik takes the FQ to maximize the predicate to which the FQ is attached in relationship to the subject. The FQ and the DP do not form a constituent at any stage of the derivation. Pre-DP quantifiers are of a different sort, generally considered to be determiner quantifiers, than their 'floated' adverb counterpart.

The adverb approach is able to explain many of the cases that the stranding approach is unable to. For example, the stranding approach is unable to account for (7) where the DP and the FQ could not logically have formed one constituent; this sentence naturally falls in line with the adverbial approach.

- (10) The children greeted the teacher all at the same time.⁹

PPs are predicates and the FQ can attach to the left edge of predicates. Additionally, this removes the problem of accounting for passives, unaccusatives and cases where the DP and the FQ could not logically have formed one constituent as was shown in examples (6) and (7). The problem posed by (5) for the stranding approach poses no problem for the adverb

⁷ There is evidence that it is not the case that the FQ is marking the position where the subject originated although initially it may appear to be. Note that topicalization of the adverbial does not permit *all* to be left behind.

i. *At the same time, the magicians disappeared all.
 ii. All at the same time, the magicians disappeared all. (Bobaljik 1995)

⁸ See Dowty and Brody (1984) and Bobaljik (1995) for the specifics on these construals.

⁹ This example was given to me by an anonymous reviewer.

approach. Sentence finally there is no XP for the adverb to adjoin to, therefore the unacceptability is expected.

While the adverb approach can successfully account for several issues that plague the stranding approach, it too has several major drawbacks. One of the strongest arguments against it is that in many languages FQ behave like DP-internal modifiers in that they agree with the head of DP in phi-features and case.

- (11) **Strákunum** leiddist **ollum** í skóla. (Icelandic)
 The.boys. DAT.PL bored all.DAT.PL in school
 ‘The boys were all bored in school.’ (Boeckx, 2001)
- (12) **Diessen** studenten habe ich gestern **allen** geschmeichelt. (German)
 These-DAT-PL students have I yesterday all-DAT-PL flattered.
 ‘I flattered all of these students yesterday.’ (Merchant 1996)

In (11) the DP *strákunum* agrees with the FQ *ollum* and in (12) the FQ bears case and phi-features that agree with the DP subject. If the FQ is an adverb, there is no obvious explanation for the nominal agreement, especially since other adverbs do not exhibit this type of agreement.

The adverb approach has another problem. As pointed out by Bošković (2004), Bobaljik’s approach predicts parallel distribution for FQs and modal adverbs. This parallelism is not found. Frequently constituents can extrapose around adverbs as in (13) and the resulting structure while frequently slightly degraded is acceptable. This is not available when the adverb is an FQ as evidenced by (14). If FQs are adjoined to XP the same way as adverbs (left adjunction), then (14) should be an available option.¹⁰

- (13) a. The men forgot their keys ?surely/accidentally/surprisingly.
 b. The men surely/accidentally/surprisingly forgot their keys.
- (14) a. The men all forgot their keys.
 b. *The men forgot their keys all.

The adverb approach needs to be able to account for why (13a) is acceptable but (14b) is not. Furthermore, as pointed out by Bošković, FQs can attach to PP but sentential/modal adverbs (which are the type FQs are theorized to pattern like) cannot attach to PP. So if FQ are true adverbs then they should pattern like them.¹¹

The adverb approach deals with FQ placement much more successfully than the stranding approach but still leaves many gaps.

¹⁰ An alternative analysis, pointed out by an anonymous reviewer, for this construction could be that *all* is not allowed to right-adjoin while the adverbs in (13) can. This analysis though does not help to explain why the FQ, which is proposed to be a modal adverb, does not behave as other modal adverbs. In section 4.3 I will discuss a prosodic constraint that could account for why the FQ cannot occur finally.

¹¹ See Bošković (2004) for a more in depth critique on Bobaljik’s parallelism between FQs and sentential adverbs.

4. *A prosodic and f-structure approach*

4.1 *Overview*

Existing approaches to floating quantifiers are unable to account for the specific position that FQs occupy. When there is a string of possible locations, these theories have neither prediction power nor explanation for why the FQ occurs in one position as opposed to another. Whether one follows the stranding approach or the adverb approach, one still must grapple with the lack of specification in these theories. In this section, I will show that the decision on which position the FQ will occupy is based on prosodic constraints and focus structure requirements. This prosodic data could feasibly be adapted into either of the mainstream approaches and lead to a more comprehensive account of FQ placement.

4.2 *Data compilation methods and sources*

The focus of this research is to explain what determines which position the FQ will occupy when there are several possibilities. As I am interested in the actual usage of the language, nearly all data was obtained from spoken sources. Since the different types of sources are important, I will briefly discuss them.

The initial source of data came from informants who memorized a sentence and were recorded reciting it. This data was intended to capture the overall prosody of sentences with FQs. The second source of data came from recordings of native informants who were given contextualizing information and then questions regarding the context; the informants had to choose the answer that they felt best suited the question. The answer choices consisted of the different possible word orders for FQs. A recording was made of the informants reading the question and the chosen answer. This data was used to see what position was preferred depending on the focus structure and to see what pitch accents were associated with which f-structure roles and to see if there was any difference in the prosodic boundaries.

The third source was corpora, more specifically, The Santa Barbara Corpus (SBC) (Dubois et al. 2000) and the Variations in Conversation (VIC) corpus (Pitt et al. 2003). These two corpora provided the substance of the data. Corpora provide examples of freely generated contextualized speech, which were subsequently analyzed for f-structure, pitch, and boundaries. All sounds were analyzed using PRAAT speech analysis system (Boersma and Weenik, 1992)

In addition to the recorded data, 8 native speaking informants were surveyed in order to accumulate data on FQ placement in differing f-structures.

4.2.1 *Focus structure*

Focus structure affects word order. In free word order languages it has been shown that the information structure role of a constituent affects its position. Many languages are theorized to have structural focus positions (for Hungarian see Kiss 1998, for Hebrew see Belletti & Shlonsky 1995, for an overview on focus positions in Spanish, Italian and German see Büring 2003). While English is not a free word order language there are elements that exhibit relative freedom in their placement and it has been shown that in some cases focus structure affects the placement of these constituents (Dehé 2001 for verb particle structure, Büring 2003 and references therein). A one-to-one correlation between focus structure role and FQ placement

is not expected except in the case of contrast because while FQs can be contrastive they cannot be topics or foci; they can only be associated with a topic or a focus.¹²

4.2.2 Contrast

When the FQ is contrastive and modifying the subject, it is highly favored to appear left adjacent to the DP, in sentence initial position.¹³ This result, while surprising for English, is well-attested cross-linguistically. Numerous languages posit a contrastive position in the left periphery (Rizzi 1997, Dominguez in press). Speakers' preference for placing contrastive FQs in this position is unanimous in my experiments. The survey results showed unanimously that given (15a) or (16a) the preferred response was (b):

- (15) a. Did any of the children see the movie?
b. All the children have seen the movie.
- (16) a. Did all the children go or only some of the children?
b. All the children went.

In (15) there is contrast between the alternatives for *all* and in (16) there is overt contrast between *all* and *some*. Following the theory of focus structure put forth by Erteschik-Shir (1997) the fact that sentence initial *all* is contrastive is not surprising, since contrast is created by a focal element inside a topic.

- (17) [[{All}]_{foc}[the children]]_{top} [have [seen the movie]]_{foc}.
 {most}
 {some}
 {none}

It is well known and accepted that *all*, along with most quantifiers, is usually prosodically highlighted; this is a type of focalization and subjects are default topics. In (17) the speaker is asserting that it is *all* and not an alternative to *all*. Obviously, context can change the reading, change the f-structure, but the default reading seems to be contrastive in these cases unless the speaker refrains from accenting *all*. Survey results were not the only confirmation for contrastive FQ being favored initially. Analysis of two corpora, Santa Barbara Corpus (SBC) and Variations in Conversations (VIC) and recordings of elicited speech show that frequently when *all* occurs DP initially it is marked by the L+H* pitch accent. Experimental work in English has associated contrast with the pitch accent L+H* (Pierrehumbert 1980; Hedberg 2002).

¹² See Belletti (2003) for a quantifier stranding approach that incorporates information structure.

¹³ When the FQ itself is contrastive, not the whole DP.

Figure 1

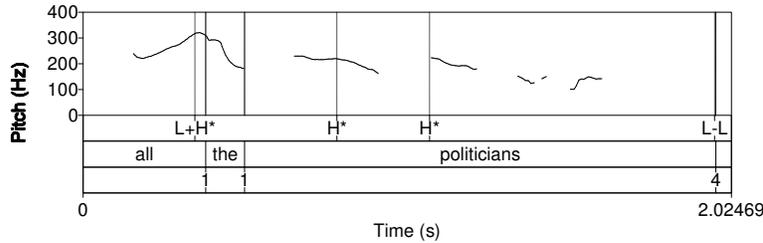
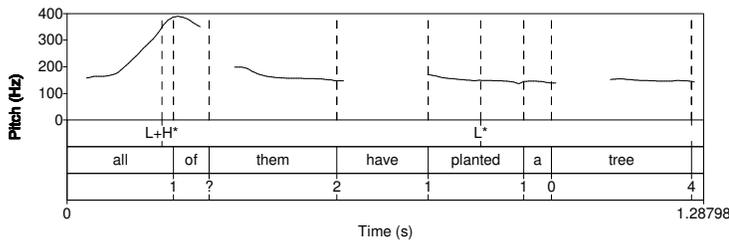


Figure 1 shows the contrastive pitch accent on *all*.¹⁴ The context of the discourse illustrated that this was indeed a case of contrast.¹⁵

Figure 2



In figures 1 and 2, the L+H* pitch accent indicates that the FQ is contrastive. It should be pointed out that *all* can be contrastively pitch accented in the floated position and in such cases it will be interpreted contrastively. Therefore I propose that initial placement of the FQ is an optional way of marking contrast on FQs.

4.2.3 Topic/focus associations

FQs themselves are not the topic or focus of a sentence; they are associated with a topic or focus.¹⁶ FQs related to topics clearly prefer non-initial position. While it has been claimed that topics are usually not pitch accented in English my research has found that frequently non-pronominal subject topics are pitch accented as well as the FQ associated with topics.¹⁷ Generally the pitch accent marking subject topic and the associated FQ pitch accent is H*. The relevance of this will be seen in section 4.3.2, where I discuss the role of prosodic incorporation.

¹⁴ Following the ToBI guidelines utterance initial pitch accents should be marked L+H* only in cases of an unambiguous pitch accent type, in cases where the pitch accent type is not clear between H* and L+H* transcribers should choose the former (Beckman and Elam 1994). Therefore several initial FQ were transcribed as H*. In some cases duration was also taken into account as frequently the L+H* has a longer duration than H*.

¹⁵ There were a few cases where the initial FQ was clearly not pitch accented contrastively. These cases require more analysis before any conclusions can be drawn.

¹⁶ The exception to this is when the FQ replaces the subject of the sentence: 'All came.'

¹⁷ This finding is limited to sentences which contain an FQ as that was what was under investigation. Further research should be done to see if this finding is consistent in non-quantified sentences.

Figure 3

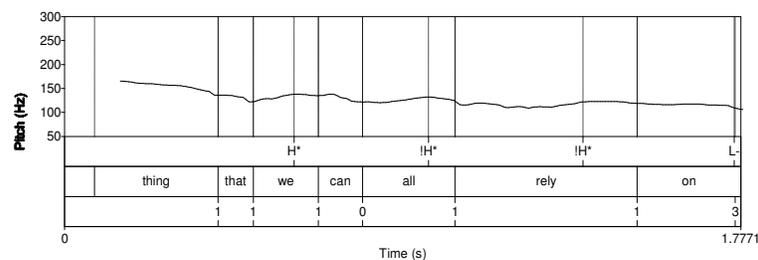


Figure 4

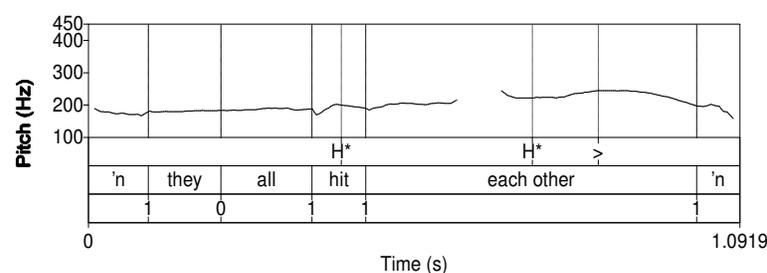
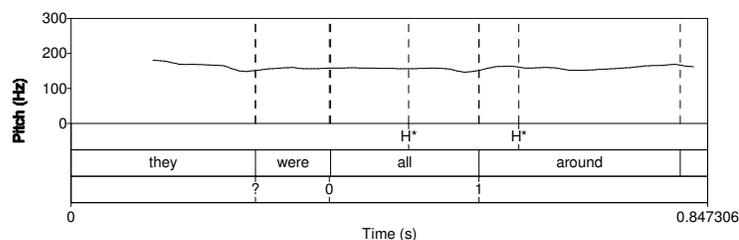


Figure 5



Figures 3-5 show that topic-associated *all* occurs to the right of the DP it modifies and can either be pitch accented or not. Initially, there appears to be no structural position that *all* favors: any position adjacent to a weak pronoun, auxiliary, or modal is fine, although in section 4.3.2 we will see that phonology determines which of these positions will be preferred.

FQs associated with foci do not seem to have a direct correlation to a specific position. There are prosodic events that indicate that an element might be focused. One indicator that appeared in several recordings with focus on the DP was a phrase boundary after the FQ, which corresponded to 3 on the ToBI break indices. This boundary following the FQ is not consistently present in cases where the DP is focused and there are very limited occurrences of full DP foci floating quantifiers. The case of full DPs floating quantifiers usually came from recited speech, therefore spontaneous speech with foci floating quantifiers is needed before any conclusions can be drawn. Further research is needed to see if this boundary is an indicator of focus. There also seems to be some tendency for floating FQ from topics as opposed to foci. I will return to this in section 4.2.4.

Evidently, there is a favored position for contrastive FQs. I certainly do not intend to claim that the FQ will obligatorily occur left adjacent to the DP whenever there is contrast. I do

claim that the analysis of freely generated speech does show that speakers prefer this position for contrastive FQs. While an analysis of why initial position in many languages is favored for contrast is a theoretical question well beyond the scope of this paper I will though put forth two possibilities. Firstly, it could be a way to link the contrast back to prior discourse as seen in topicalization, which moves topics to SpecCP, and provides a link back to the prior discourse. The contrast is with a prior aspect of the discourse; by placing it initially it is easier to process the contrast. When *all* is related to a topic there is no need to refer back to anything outside the sentence because DP-modifying FQs are anaphoric to the DP they are associated with. There may be further phonological reasons, though: contrast is usually distinctly pitch accented, this high peak maybe be easier to produce sentence initially before the declination of the F0 begins.¹⁸

4.2.4 Further topic/focus associations

Information structure also seems to influence whether or not a DP can be modified by a floating quantifier. There seems to be a preference for topics to have floating quantifiers as opposed to foci. This preference may shed some light on other aspects of q-float including so called q-pro-flip and other cases of FQs associated with objects.

Pronouns with FQ in complement position can occur in either DP_{PRONOUN}+FQ or FQ+DP_{PRONOUN} order. This variable order has been termed q-pro-flip, and it is a phenomenon unrelated to q-float.¹⁹ This separation is justified on the grounds that q-float from complement position with a full DP is quite rare. If though this is looked at in terms of q-float we will see a pattern emerges. In (18) *all* can occur on either side of the object DP.

- (18) a. The boss told all of them.
b. The boss told them all.

Example (19) illustrates that full DPs cannot float quantifiers when the DP is complement of a transitive verb.

- (19) a. *John greeted the teachers all.
b. John greeted all the teachers.

Determination of which *pronoun/all* order will occur is quite problematic. Initially, there does not seem to be a connection between the order and f-structure. One may be inclined to claim the choice depends on whether the context requires a strong partitive as in (18a), or not as in (18b). When these data are looked at in the light of data from the double object construction and dative constructions, there seems to be more going on than just a partitive difference.

In order to understand object q-float we need to look at other cases of object q-float. Some full DP direct objects do allow quantifiers to float.

- (20) a. John sold the books all to Mary.
b. John sold all (of) the books to Mary.

¹⁸ Although a counterclaim to this might be that the high peak is easier to perceive once the F0 has declined significantly, since the contrast between the peak and the baseline will be more significant.

¹⁹ Maling (1976) described this phenomenon as pronouns obligatorily undergoing short movement to SpecQP, and termed it q-pro-flip.

It is well known that these constructions have different interpretations depending on whether the direct or indirect object comes first. Following Erteschik-Shir (1997), when the direct object occurs initially, the direct object will be the topic in the unmarked case. In the reverse order (indirect object preceding direct object), there is no such condition on the unmarked f-structure. So, in (21a) *the books* is the topic, while not necessarily in (21b).

- (21) a. Mary sent (all) the books (all) to Peter.
 b. Mary sent Peter (all) the books (*all).

(21b) has the implication that Peter received the books while (21a) has no such implication associated with it. In (21a) the FQ can float, while in (21b) floating is impossible unless additional material is added after the direct object.

- (22) ?Mary sent Peter the books all at the same time.

At first it may seem that the problem is that *all* cannot occur sentence finally for prosodic reasons. While there is some truth to that claim (which I will discuss later), there are two indicators that this is not the sole explanation. First, *all* is prosodically phrased with the PP and not with the DP and the PP. This indicates that, structurally, the FQ is contained in the PP and not in the DP.

- (23) a. ... (the books)_{IP} (all at the same time)_{IP}
 b. * ... (the books all)_{IP} (at the same time)_{IP}

If the FQ was a constituent of the DP this phrasing is unexpected. If one does not follow the stranding approach which takes the FQ and DP to be base generated as a single constituent, there is no reason that the FQ cannot attach to PP the same as it attaches to other XPs. Furthermore, informants only judged (22) as acceptable with focal stress on the PP. Focusing the PP renders *the books* a topic.²⁰

Secondly, when informants were presented with the following questions, different answer choices were permitted.

- (24) a. What did Mary send to Peter?
 b. Who did Mary send the books to?

(24a) requires a direct object focus, while (24b) requires an indirect object focus. Informants chose non-floated *all* as the response in both (24a,b) but allowed floated *all* only in response to (24b). So when the direct object is a topic the floated order is possible while with focal direct objects the floating option is unavailable. There is an interesting parallel here. Recall that only pronouns allow FQ to float in simple transitive sentences.

- (25) The man hates (all) them (all).

- (26) The man hates (all) the pictures (*all).

²⁰ Unless there is more than one focus as in the answer to multiple wh-questions.

Pronouns represent familiar referents. Pronouns are anaphoric on something already in the discourse and therefore cannot be new information.²¹ (Erteschik-Shir 1997) The unmarked/default case is one in which the subject is the topic and the object is the focus. There seems to be a parallel here between transitive cases and the double objects. This parallel can be further exemplified by the overwhelming informant intuition that (27), with the floated quantifier, can only be uttered felicitously with stress on the indirect object.

(27) Mary sent the books all to Peter.

Stress on the indirect object will focus the indirect object and the direct object will be the topic.²² Erteschik-Shir (1979) proposed that the default f-structure for the word order (without the *all*) in (27) would have the direct object be the topic and the indirect object be the focus. Evidently, the FQ can occur within the focused constituent, but with direct objects it seems to be preferred only to modify topics.²³ More research is required in order to confirm or disprove this hypothesis, but given the data presented here I feel this is an approach that warrants looking further into it.²⁴

F-structure has been shown in this section to play an important role in q-float. FQs that bear the f-structure role of contrast are favored initially. On the other hand, FQs associated with foci or topics are favored in non-initial position, with a preference for FQs to float from topics as opposed to foci.

4.3 *The role of phonology*

This section will explore the precise details of what determines the position of FQs within the maze of auxiliaries/modals. In (28), what determines which position *all* will occupy?

(28) The children (all) might (all) have (all) been (all) causing problems at the movies.

I claim that the position is determined by where the FQ can prosodically incorporate (PI) with another element without disrupting the prosody of the utterance. The idea that FQ need to prosodically incorporate is not new. McCloskey (2000) proposes that wh-quantifier float in West Ulster English (WUE), beyond the syntactic constraints, is further constrained by the requirement that the FQ prosodically combine with the verb. Sentences become progressively more degraded as more intervening material occurs between the verb and the FQ. McCloskey's data provides, as of yet, unrefuted evidence for the role of prosody in FQ placement.²⁵ Interestingly, my data shows that FQs PI with intrinsically weak elements, while PI in WUE takes place with lexical verbs. This provides further confirmation for the crucial role of language specific, perhaps more correctly dialect specific, phonology and prosody.

²¹ I am ignoring the deictic use of pronouns. Also, first and second person (speaker and listener) are naturally in the discourse they are obligatorily topics even if not directly stated previously in the discourse.

²² Unless the sentence is an all focus sentence.

²³ I am using the term modify for convenience sake

²⁴ A connection between focus structure and q-float has been established in both Japanese and Korean, see Han 1999 and references therein.

²⁵ McCloskey followed a stranding approach and claimed the FQ could remain in any position the wh-phrase passed through as it cyclically moved to Spec, CP. If the FQ was in a position that was not prosodically optimal, the sentence would be drastically reduced in acceptability, but if the FQ occurred in a position that the wh-phrase had not passed through then the sentence would be completely unacceptable for the informants.

4.3.1 Prosodic incorporation

Prosodic incorporation is used more or less as a catch-all for cliticization, lack of disjuncture, fast/slurred speech etc... A precise classification of PI is needed before any claims can be made for its role in word order. The following definition of PI is based on an analysis of 20 utterances from the SBC and the VIC at different junctures.

(29) Prosodic incorporation in English

Two words highly co-articulated without final lengthening of the first constituent, no initial glottalization of the second constituent, possibility of a reduced vowel in either of the two constituents, one constituent of the newly formed prosodic unit can be pitch accented and the two words are auditorially perceived as one word (corresponding to a break index of zero within the ToBI framework).²⁶ (Cho 1999, 2001; Turk and White 1999; Beckman and Ayers)

Actually classification of instances of PI is quite difficult because frequently not all five criteria are detectable. In this research, I attempted to adhere to the definition in (29) as closely as possible. Having established what PI is we now need to see what it does.

4.3.2 The role of Prosodic Incorporation

FQs appear in positions where PI is possible. The elements that can PI with *all* are intrinsically weak elements, which include auxiliary verbs, modal verbs, pronouns and (although not intrinsically weak), in a few cases unstressed monosyllabic NPs.

In (30), based on the role of focus structure, the expectation is that, if the FQ is not contrastive, it will occur right adjacent to the DP giving either (30a) or (30b).

- (30) a. The children **have all** seen the movie.
 b. The children **all have** seen the movie.

Intuitively speakers consistently produce (30a). *Children* is an utterance initial disyllabic content word. A prosodic analysis of this utterance indicates that the DP is pitch accented and these are not traits that lead to phonological weakening. These conditions prevent *all* from PI-ing with *the children*, therefore this word order is not favored. Additionally, PI-ing of *all have* instead of *have all* is disfavored since *all* has no onset, and will favor positions where it can acquire an onset. In my experiments where informants were given a sentence similar to (30b) and (31a-c) to memorize and recite they unknowingly and consistently produced (30a) and (31a'-c').

²⁶ Other indicators of juncture include: silent or filled pauses, breathing, F0 movements, intensity variation, and voice quality (Carlson, Granström et al. 2002). Therefore, the presence of any of these indicates that PI is not occurring. It should be noted that co-articulation and vowel quality will be affected if the syllable is stressed, bears a pitch accent and by its level of sonority- degree of coarticulatory resistance is inversely proportional to the degree of sonority of the segments (Cho 1999).

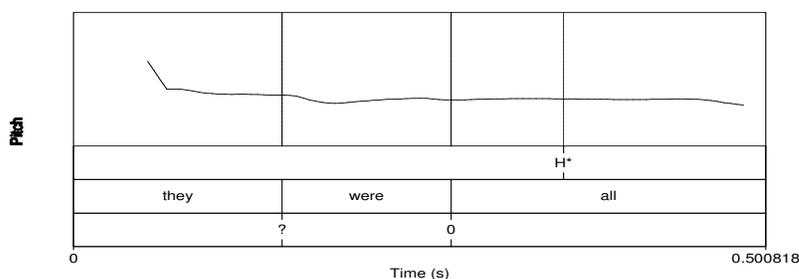
- (31) Given:
- The children all have probably seen the movie.
 - The children all should have seen the movie.
 - The children should all have seen the movie.
- Produced:
- The children have all seen the movie.
 - The children should have all seen the movie.
 - The children should have all seen the movie.

This shows that speakers naturally produce the phonologically optimal sentence and not the one they actually memorize.

FQ placement is apparently further constrained when (31c') is considered, which is favored over (31c). In (31c) the FQ occurs right adjacent to a modal and left adjacent to an auxiliary in a position that is evidently not the favored one. Furthermore the results of my survey show that the linear order of: *modal all auxiliary* was never the chosen word order. Given that in this position *all* acquires an onset and can PI the role of PI evidently needs further refinement. We need to determine what linear position *all* will occupy in a given string of possible elements that can PI with *all*.

An auditory analysis of recordings of (31b',c') clearly indicates that *should have* PIs. If *all* occurs right adjacent to the modal, it breaks up this prosodic unit, but when *all* occurs after *have*, then it can attach to the unit formed by *should have*. Survey and corpora results show that *modal+aux+all* is the preferred order for a string of modal auxiliary and FQ.²⁷ In cases without the modal and just a pronoun and an auxiliary, *all* is favored to appear where it can form a unit with the pronoun and auxiliary. In figure 6 the *pronoun+auxiliary+FQ* form a prosodic unit with *all* being pitch accented.

Figure 6



Having partially established the preferred word order given a string of auxiliaries/modals still left open is the question of why *been all* is not the preferred word order.

- (32) The dogs have been all petted.

There is no reason to suppose that *all* cannot PI with *been* in (32). The phonological criteria are met; *all* can acquire an onset here and *been* is not pitch accented. Interpretively there is a difference. This position (when the subject is plural) leads to ambiguity in interpretation or to a completely different interpretation for many speakers (when the subject is singular).

²⁷ In some cases with a pronoun, modal and auxiliary the FQ is favored between the modal and auxiliary. I assume this has to do with the phonological weakness of pronouns.

- (33) a. The dogs have been all petted.
 = the dogs have been completely petted.
 = each dog has been petted
 b. The dog has been all petted.
 = the dog has been completely petted.

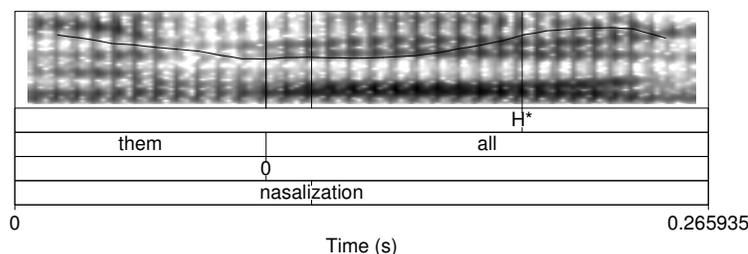
Note the singular DP in (33b), which could not possibly take *all*. This word order leads to a different interpretation. When *all* occurs following *been* before the main verb it gives a completive reading.

4.3.3 Utterance-final *all*

All cannot occur sentence finally unless it can prosodically incorporate. It has been shown that *all* prefers to PI with a weak element. This need is particularly strong sentence finally. In English in sentence final position there are two final tones, and intermediate phrase tone and a boundary tone (Beckman and Ayers 1994, Pierrehumbert 1980). These tones affect the meaning of the entire utterance as they are particularly important for the tune of the utterance. *All* seems to be unable to bear sentence final position where these tones are.²⁸

In section 4.2.3 I discussed quantifiers which float from pronominal objects. In figure 7 the PI can clearly be seen. A careful analysis of the prosody shows that this construction is not in violation of the prosodic requirements; *them* and *all* PI, which process forms a prosodically stronger unit.

Figure 7



In this utterance *all* is highly nasalized, *them* is reduced to /ɛm/, only one constituent is pitch accented (*all*), the perceived disjuncture is zero and there is no initial glottalization of *all*. Pronouns are weak and they PI with FQs and this strengthens the FQ; once the FQ has PI-ed it can occur sentence finally. Note that if the pronoun is stressed, which renders PI impossible, the sentence becomes infelicitous.

- (34) a. #Mary hates THEM all.
 b. Mary hates ALL of THEM

When there is a full DP (especially sentence finally where it is frequently pitch accented) PI will not be possible and the FQ cannot occur.

²⁸ The intermediate tone in English is linked to the last pitch accented syllable (the nuclear pitch accent) and spans until the end of the utterance, so the final element does not necessarily carry the tone. In spite of this *all* still seems unable to bear final position like other weak elements.

It has been shown that FQs position is heavily influenced by two main factors; focus structure and phonological constraints. Knowledge of the phonology at play here also helps clarify an additional factor plaguing theories on floating quantifiers; the lack of reliable judgments on the acceptability of sentences. Having fleshed out the role that phonology plays in these sentences we can see that the lack of reliability comes from whether or not the speaker/listener PIs the FQ. When the FQ is not PI-ed there will be a marked decrease in acceptability.

4.4 *Incorporation of prosodic data into other frameworks*

The phonological data discussed in this section could be cohesively incorporated to either of the two predominant FQ theories discussed in sections 3.1 and 3.2. For the stranding approach, this would entail that FQs can only be stranded in positions where PI is possible, whereas in cases of contrast FQs cannot strand. This would explain why (29a-c) are possible but not optimal. Syntactically, FQs can be stranded in any position the DP passes through but phonologically it is disfavored if they cannot PI, similar to McCloskey's proposal for WUE. In the cases of contrast one could investigate the possibility of some [+contrast] feature in English selected from the lexicon with the constituent, and the possibility of an optional XP encoding contrast. If the contrastive FQ does not check its [+contrast] feature, the sentence will be filtered out at LF.

To incorporate the phonological data into the adverb approach would mean allowing the FQ to attach as usual to any XP, but having the phonology filter out the cases where the FQ is not in a phonologically optimal location. Since FQs appearing in non-optimal positions results in degraded but generally possible sentences, I would propose an Optimality Theory style ranking of candidates. The only major obstacle to integrating these data into an adverb approach would be to account for the fact that contrastive FQs occur initially, since the adverb approach takes DP initial FQs to be of a different sort of element. This could perhaps be dealt with again through a strong [+contrast] feature. Alternatively, one could maintain that the two are different elements and the DP initial element more readily allows a contrastive interpretation.

5. *Note*

A word of caution is called for at this point. This is the start of a larger study that sets out to determine what elements like *all* are and how they get their position. Before any broad conclusions can be made or any generalizations put forth, *both* and *each* need to be analyzed from the same perspective as *all* was., since they differ from *all* phonologically. This work predicts that many of the differences in possible locations for the different FQs arise from differences in the phonology of these elements, and this claim requires investigation. Furthermore, analysis of q-float cross-linguistically needs to be carried out from a prosodic and f-structure perspective. Then and only then can we see the real picture of what these elements are.

6. Conclusion

This work sets out to fill in the gaps left by previous approaches to floating quantifiers. In doing so the role of focus structure and phonology are shown to be determining forces in q-float. This work shows that the role of prosody and f-structure cannot be sidelined. In fact phonology needs to be given a major role as it is quite evident that it is crucial to FQ placement. The broad ranges of possible FQ placements cross-linguistically indicate that each language needs to be evaluated prosodically in order to understand the FQ placement in it. The approach outlined here has the potential to not only offer an account of FQs cross linguistically but also to shed light on other phenomena such as modifier placement, adverb placement, topicalization, dislocation and extraposition that have evaded comprehensive syntactic treatments.

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