This paper attempts to provide a unified account of the acceptability of the three seemingly distinct phenomena in English: passivization, tough-movement and quantifier float. I argue that the acceptability of passivization and tough-movement is subject to the functional requirement that a predication relation be established between the subject and the rest of the sentence. It is further shown that the acceptability of quantifier float is dependent on the constraint that a predication relation be also established between floated quantifiers, which serve as (secondary) subjects, and the elements that follow them.

1. Introduction

This paper discusses three phenomena that look at first sight to be independent of one another: passivization, tough-movement and quantifier float. Observe the following pairs of sentences:

(1) a. Mary was persuaded to visit Sweden.
   b. *Mary was promised to visit Sweden.

(2) a. Mary was tough to persuade to leave early.
   b. *Mary was tough to promise to leave early.

(3) a. John persuaded the women all to visit Sweden.
   b. *John promised the women all to visit Sweden.

It has long been noted in the literature (e.g. Visser (1973), Bach (1979)) that object control verbs such as persuade can be passivized, as shown in (1a), whereas subject control verbs such as promise cannot, as

* I am deeply indebted to Karen Courtenay, Hiroshi Hasegawa, Keizo Mizuno and two anonymous reviewers for English Linguistics for invaluable comments and suggestions that I have received from them on earlier versions of this paper. I am also grateful to Bruce Davison, Karen Courtenay and Nan Decker, among others, for their long and patient discussion with me about many crucial sentences in the paper.
shown in (1b). It has also been noted in the literature (e.g. Stowell (1981), Larson (1991)) that while object control verbs allow the tough-construction, as exemplified in (2a), subject control verbs do not, as exemplified in (2b). As further shown by the difference in acceptability between (3a) and (3b) (noted by Maling (1976)), the object control verb persuade allows the quantifier all to be floated from the matrix object the women, whereas the subject control verb promise does not.1

One might conjecture here that although the three constructions demonstrated in (1)–(3) are different from one another, their contrasting acceptability can be reduced to the distinction between the subject and object control verbs. However, compare (1)–(3) with the following:

(4) a. The boys were made good students by Aunt Mary.
   (cf. Aunt Mary made the boys good students.)
   b. *The boys were made a good mother by Aunt Mary.
   ((4b) is from Maling (1976: 717))
   (cf. Aunt Mary made the boys a good mother.)

(5) a. This violin is easy to play the sonata on.
   b. *Winter is impossible to climb Mt. Fuji in.

(6) a. John called the two men both liars.
   b. *John left the two rooms both angry.

The sentences in (4)–(6), unlike those in (1)–(3), do not involve control verbs, and yet there is a clear difference in acceptability between the (a) and (b) examples. The passive and the tough-movement sentences in (4a) and (5a) are acceptable, whereas those in (4b) and (5b) are not. Further, while in (6a) the quantifier both can be floated from the object the two men, in (6b) it cannot be floated from the object the two rooms.

The examples given in (1)–(6) would then suggest that the acceptability and unacceptability of the constructions should be attributed not to the idiosyncratic lexical properties of verbs such as persuade and promise, but to some constraint imposed on each construction itself. It would be even more desirable (and theoretically more interesting) if

---

1 For present purposes it does not matter whether it is assumed that quantifiers are actually floated from the underlying constituent structures such as \([\text{NP all } \text{PP of } \text{NP the women}]\) (e.g. Postal (1974), Maling (1976), Baltin (1978)), or whether it is assumed that they are simply base-generated in place (e.g. O'Grady (1982), Bowers (1993), Baltin (1995), Nakamura (1996)).
the three constructions in question were shown to be closely inter-
related and if their acceptability could be accounted for on the basis of
a single notion, be it syntactic or functional. I will demonstrate in this
paper that this is indeed the case, and propose a functional account of
the three constructions in terms of a predication relation. That is, the
subject must be followed by elements that are predicated of it.

This paper is organized as follows: Sections 2 and 3 briefly discuss
passivization and tough-movement, respectively, and offer a functional
account based on predication relation. Section 4 examines in detail
the phenomenon of quantifier float, and I argue that floated quantifiers
serve as (secondary) subjects, and that they must be followed by their
predicates. Further, section 5 examines Bowers's (1993) and Baltin's
(1995) syntactic analyses of quantifier float, both of which incorporate
the notion of predication, just as my analysis does, and shows that the
present analysis is more comprehensive than theirs.

2. Control and Passivization

Observe the following pairs of sentences:

(7) a. John persuaded Mary to visit Sweden.
    b. Mary was persuaded (by John) to visit Sweden. (cf. (1a))

(8) a. John promised Mary to visit Sweden.
    b. *Mary was promised (by John) to visit Sweden. (cf. (1b))

As is well known, while persuade is an object control verb, promise is a
subject control verb, and therefore (7a) and (8a) can be represented as
[John persuaded Maryi [PROi to visit Sweden]] and [Johni promised
Mary [PROi to visit Sweden]], respectively. Interestingly, object con-
trol verbs can be easily passivized, as shown in (7b), whereas subject
control verbs cannot, as shown in (8b). This phenomenon has gener-
ally been known as Visser's Generalization ever since Bresnan (1978)
named it so. Visser (1973, part III: 2118), commenting on similar ex-
amples given by Chomsky (1965: 229, fn. 13), states that “a passive
transform is only possible when the complement relates to the im-
mmediately preceding (pro)noun.” In (7a), the complement (PRO) to
visit Sweden relates to the immediately preceding NP Mary, with PRO
being controlled by the object Mary, not by the subject John; hence
the passive transform (7b) is possible. In (8a), on the other hand, the
complement (PRO) to visit Sweden does not relate to the immediately
preceding object *Mary*, but to the subject *John*, with PRO being controlled by the latter; hence the passive transform (8b) is not possible.

But why is it the case that a passive sentence is only possible when the complement relates to the immediately preceding NP? Does this derive from a deeper principle of grammar? I will show below that it does, but before doing so, let us further observe the following contrasting pairs of examples:

(9) a. Mary was considered intelligent (by John).
    b. *Mary was impressed as intelligent (by John).

(10) a. The idea was regarded (by John) as nonsense.
    b. *John was struck (by the idea) as nonsense.

(11) a. The boys were made good students by Aunt Mary.
    (=4a))
    b. *The boys were made a good mother by Aunt Mary. (=4b))

(12) a. The room was found empty (by John).
    b. *The room was left angry (by John).

Although the above passive sentences do not contain infinitival clauses, it is intuitively felt that their acceptability and unacceptability are related to those of (7b) and (8b). Hence it seems that the acceptability of passive sentences involving control verbs such as persuade and promise should (and can) be accounted for in a way parallel to that of passive sentences such as (9)–(12).

I propose that the acceptability and unacceptability of the passive sentences observed so far can be reduced to a single constraint to the effect that a predication relation must be established between the passive subject and the rest of the sentence; in other words, the passive sentence must be a statement about the subject. This constraint seems quite natural considering the fact that a nonsubject element in the corresponding active sentence is placed in the topic or theme position (= subject position) via passivization, and that, accordingly, the rest of the sentence is interpreted as a comment on (i.e. a statement about) the new subject. Of course, this constraint is not limited to passive sentences alone, but must be observed in every sentence involving the subject-predicate pattern, since the subject is generally interpreted as the topic, and its predicate as a comment about it.\(^2\)\(^3\)

\(^2\) Williams (1980) conceives of the rules of predication as rules which index NPs
With this in mind, observe (9)-(12) once again:

(9)  
  a. Mary was considered intelligent (by John).
  b. *Mary was impressed as intelligent (by John).

(10)  
  a. The idea was regarded (by John) as nonsense.
  b. *John was struck (by the idea) as nonsense.

(11)  
  a. The boys were made good students by Aunt Mary.
  b. *The boys were made a good mother by Aunt Mary.

(12)  
  a. The room was found empty (by John).

and the Xs that modify them in surface structure, and defines predication syntactically on the basis of c-command:

(i) The C-command Condition on Predication: If NP and X are coindexed, NP must c-command X or a variable bound to X.

In Rothstein (1983, 1995), a predicate is a syntactic primitive, defined in terms of syntactic projections of heads. A syntactic predicate is an open maximal projection that needs to be saturated by being linked to a syntactic argument, its subject. On the other hand, my definition of predication is semantic, close to that assumed in Kuno (1976) and Kuno and Takami (1993); namely, if given elements are interpreted as a statement about the referent of a particular NP, a predication relation is assumed to be established between them (see notes 3 and 5).

3 This argument is reminiscent of Kuno’s (1976) Thematic Constraint on Relative Clauses, given below:

(i) The Thematic Constraint on Relative Clauses: A relative clause must be a statement about its head noun.

This constraint can account for the following contrast, for example:

(ii)  
  a. *The nurse [who polished her trombone and the plumber computed my tax] was a blonde.
  b. This is the whisky [which I went to the liquor store and bought].

Though (iia, b) both violate Ross’s Coordinate Structure Constraint, (iia) is unacceptable, but (iib) is acceptable to most speakers. This is because (iiia) below (corresponding to (iia)) is a statement about the nurse and the plumber, and not a statement about the nurse alone, while (iib) (corresponding to (iib)) can be regarded as a statement about whisky because the first conjunct I went to the liquor store can be interpreted very easily as an action taken for the purpose of buying whisky.

(iii)  
  a. The nurse polished her trombone and the plumber computed my tax.
  b. I went to the liquor store and bought some whisky.
b. *The room was left angry (by John).

In (9a), as a result of John's considering Mary as intelligent, intelligent is predicated of the subject Mary. In (9b), on the other hand, as a result of John's impressing Mary as intelligent, intelligent is predicated of the oblique complement John, and not the subject Mary. Similarly, in (10a) as a result of John's regarding the idea as nonsense, it is the passive subject the idea that was regarded as nonsense. But in (10b), as a result of the idea's striking John as nonsense, it is the oblique complement the idea, and not the passive subject John, that was seen as nonsense. Hence, nonsense is predicated of the subject the idea in (10a), while it is not predicated of the subject John in (10b). Likewise, (11a) says that Aunt Mary made the boys good students, and therefore, good students is predicated of the subject the boys. On the other hand, (11b) says that Aunt Mary became a good mother for the boys, and therefore, a good mother is predicated of Aunt Mary, and not the passive subject the boys. Hence the difference in acceptability. Furthermore, (12a) is interpreted as a statement about the passive subject the room, since it was found empty. But (12b) is not interpreted as a statement about the passive subject the room, because angry is predicated of John, and not of the room.

The contrast between (7b) and (8b), repeated here, is now easily accounted for:

(7) b. Mary was persuaded (by John) to visit Sweden.

(8) b. *Mary was promised (by John) to visit Sweden.

In (7b), as a result of John's persuasion of Mary to visit Sweden, it is Mary who visited Sweden. Therefore, to visit Sweden, coupled with was persuaded (by John), is predicated of the subject Mary. In contrast, in (8b) as a result of John's promise to Mary to visit Sweden, it is John who was to visit Sweden. Therefore, to visit Sweden is predicated of the oblique complement John, and not of the passive subject Mary.

Let us now formalize the above discussion as the following general constraint:

(13) The Predication Constraint on Sentences: A passive (as well as an active) sentence must be a predication (statement) about its subject.
We have shown above that the Predication Constraint on Sentences (henceforth, the Predication Constraint) can straightforwardly account for the acceptability and unacceptability of passive sentences observed so far.\(^4\)\(^5\)

If the Predication Constraint is claimed to be applicable to active sentences, as well, one might wonder why the active sentence (7a) (repeated below), for instance, is acceptable, in spite of the fact that the complement clause is predicated of the matrix object, and not of the matrix subject:

\[(14) \text{John persuaded Mary to visit Sweden. (\(=\text{(7a)}\))}\]

This question is natural and is easily expected if we focus only on the control relation in (14). But note here that the sentence can be divided between the matrix subject John and the matrix VP persuaded Mary to visit Sweden with respect to a more global predication relation, and the matrix VP is predicated of its subject John, as shown below:

\(^4\) Sentences involving the expletive subjects \text{it} and \text{there} (which are not assigned any \(\theta\)-roles), as in (ia, b), are exempted from the Predication Constraint:

\[(i) \begin{array}{l}
a. \text{It was believed that the man was a spy.} \\
b. \text{There came to his mind her beautiful and intelligent face.}
\end{array}\]

Note, however, that the following sentences corresponding to (ia, b), in which the subjects have \(\theta\)-roles, are subject to the constraint:

\[(ii) \begin{array}{l}
a. \text{The man was believed to be a spy.} \\
b. \text{Her beautiful and intelligent face came to his mind.}
\end{array}\]

\(^5\) Note that a topicalized element, though not placed in subject position, must be described in some way or other by the rest of the sentence. We can see this embodied by the following constraint given by Kuno and Takami (1993: 42):

\[(i) \text{Functional Constraint on Fronting: In a sentence that has a fronted element, the rest of the sentence must be a predication about the fronted element.}\]

This constraint can account for the following contrast, for example:

\[(ii) \begin{array}{l}
a. \text{Mary, Bill regrets that everyone dislikes.} \\
b. ???\text{With Mary, Bill regrets that John committed the crime.}
\end{array}\]

In sentences whose main verbs are "non-assertive verbs" such as regret in the sense of Hooper and Thompson (1973) and Hooper (1975) (in contrast to those whose main verbs are assertive verbs such as think), the main clause represents the main proposition of the sentences. Therefore, in (iii), the proposition that Bill regrets that everyone dislikes Mary is a predication about Mary. But in (iib), the proposition that Bill regrets that John committed the crime with Mary is not a predication about "with Mary" (i.e. Mary as co-agent). Hence the marginality or unacceptability of the sentence. For further details, see Kuno and Takami (1993: 41–45).
That John persuaded Mary to visit Sweden is clearly interpreted as a statement about John, since he performed an action of persuading Mary to visit Sweden. Thus, the sentence is acceptable, in keeping with the Predication Constraint.

It has been shown in this section that the acceptability of passive (and active) sentences involving control verbs and of some other types of passive sentences such as (9)–(12) can be uniformly accounted for by the Predication Constraint.

3. The Tough-Construction and Predication

It has been noted in the literature (e.g. Stowell (1981), Larson (1991)) that while sentence (16a) below with the object control verb persuade allows the tough-construction, as shown in (16b), sentence (17a) with the subject control verb promise does not, as shown in (17b):

(16)  a. It was tough to persuade Maryi [PROi to leave early].
     b. Maryi was tough to persuade [PROi to leave early].

     (=2a))

(17)  a. It was tough to promise Maryi [PROj to leave early].
     b. *Maryi was tough to promise [PROj to leave early].

     (=2b))

Observe that PRO in (16a) is controlled by the object of persuade, Mary, which can take the subject position of the tough-construction in (16b). On the other hand, PRO in (17a) is not controlled by Mary, but is arbitrary, and the corresponding tough-construction (17b) is unacceptable.

The contrast between (16b) and (17b) can also be accounted for by the Predication Constraint (or a constraint to the same effect). While the complement clause [PRO to leave early] in (16b) is a predication about the subject Mary, that in (17b) is not, as shown below:

(18)  a. Maryi was tough to persuade [PROi to leave early].

          (=16b))

     b. *Maryi was tough to promise [PROj to leave early].

          *(=17b))
In (18a), it is Mary herself who was to leave early, but in (18b) it is someone else who was to leave early. Moreover, in (18a) the whole matrix VP was tough to persuade to leave early is a predication about the subject Mary, because the latter is described by the former as a person who was unwilling to accept the proposal that she leave early. In (18b), on the other hand, the whole matrix VP was tough to promise to leave early is not a predication about the subject Mary, because even if someone had difficulty in promising Mary to leave early (because of, say, not seeing her very often), this does not state anything about her; hence unacceptability, resulting from a violation of the Predication Constraint.

Observe further the following contrasting pairs of sentences:

(5) a. This violin is easy to play the sonata on.
   b. *Winter is impossible to climb Mt. Fuji in.

(19) a. This bed is comfortable to sleep in.
   b. *This bed is comfortable to sleep near/beside.

In (5a), the fact that one can easily play the sonata on this violin is interpreted as offering a predication (statement) about the violin (e.g., the violin is described as a good one to play the sonata on). In (5b), on the other hand, the fact that one cannot climb Mt. Fuji in winter can only be interpreted as offering a predication about Mt. Fuji (hence, Mt. Fuji is impossible to climb in winter is acceptable), but not about winter. Such a fact is not a statement about winter. Hence, the difference in acceptability between (5a) and (5b) is accounted for by the Predication Constraint. Similarly, in (19a) the fact that one can comfortably sleep in this bed is certainly interpreted as offering a predication about the bed, hence acceptability. But in (19b) the fact that one can comfortably sleep near/beside this bed has no direct bearing on the bed itself, and the bed is not involved in the action of sleeping at all. Therefore the sentence is not a predication about the subject this bed, and the unacceptability results (for further relevant data and discussion, see Takami (1992: Ch. 5)).

One might wonder here why the acceptability of passivization and tough-movement, seemingly distinct phenomena, can be accounted for by a single constraint, the Predication Constraint. Note, however, that they have one thing in common; namely, nonsubject elements in the underlying structures are placed in the subject position in these two constructions. The subject, as mentioned in section 2, generally serves as the topic of the sentence, and the rest of the sentence serves as a
comment on the topic. Hence, it seems reasonable to attribute the acceptability of the two phenomena under discussion to a single constraint (for relevant discussion, see Takami (1992: 166-167)).

4. Quantifier Float and Predication

Maling (1976: 716) has observed that Visser's Generalization on the passivization of an object NP correlates with a constraint on the so-called quantifier float. Consider the following contrasting pairs:

(20) a. John persuaded the women all to visit Sweden. $(=3a)$
   b. *John promised the women all to visit Sweden. $(=3b)$

(21) a. John considered his friends all as selfish.
   b. *John impressed his friends all as selfish.

(22) a. John found the two rooms both empty.
   b. *John left the two rooms both angry. $(=6b)$

In the above examples, the quantifiers all and both are floated from the object NPs, but the (a) examples are acceptable, while the (b) examples are not.

Maling argues, in conjunction with Visser's Generalization, that quantifier float does not apply to the object NP if the following phrase is a complement predicated of the subject NP. In (20a), the complement (PRO) to visit Sweden is predicated of the object NP the women, whereas in (20b), it is predicated of the subject NP John. Similarly, selfish in (21a) is predicated of the object NP his friends, but in (21b) it is predicated of the subject NP John. The same applies to (22a, b).

From this type of contrast, Maling states that “while it is not obvious how to state the semantic restrictions precisely, it appears that Q-Float- ing can apply only if the following phrase can reasonably be associated (semantically) with the NP that the quantifier binds” (p. 716).7

But why is it the case that quantifier float can apply only if the following phrase can reasonably be associated with the NP that the quantifier binds? Does this derive from a deeper principle of grammar?

---

6 This section is a revised and extended version of the argument given in Kamio and Takami (1998: 175-180).

7 An observation similar to Maling's is also found in Ike-uchi (1985: 238-240) and Iwasawa (1988: 86).
What is the function of floated quantifiers? Why do passivization and quantifier float correlate? Unless these problems are resolved, it seems that Maling's above statement will remain a mere description. Below, I will attempt to answer these questions. More specifically, I will examine the function of floated quantifiers in section 4.1 and argue that they serve as (secondary) subjects. In section 4.2, further, I will demonstrate that sentences with floated quantifiers are acceptable to the extent that the quantifiers are followed by their appropriate predicates, since they are (secondary) subjects that necessitate predicates.

4.1. Floated QPs as Secondary Subjects

First, observe the following pair of sentences:

(23) a. [NP All [PP of [NP the students]]] came to the party.
   b. The students all came to the party.

The (a) example in (23), with the quantifier all not floated, and the (b) example, with the quantifier floated, convey the same logical meaning, but they are slightly different in information status. When the speaker uses the latter sentence pattern, it seems that he/she emphasizes the number (or quantity) that the quantifier represents. Therefore, while (23a) is roughly equivalent to 'All the students came to the party,' (23b) can roughly be paraphrased as 'There was no student who didn't come to the party' or as 'Contrary to our expectations, it was all the students that came to the party.'

This semantic difference, though slight, may be reflected in the structures of both sentence patterns. The structure of (23a) can be represented as in (24a), and that of (23b), as in (24b):

(24) a. IP
   NP I' VP NP I' VP
    all of the students I came to the party
   VP came to the party

b. IP
   NP I' VP NP I' VP
    all VP VP
   VP came to the party

In (24a), all is an element of the larger NP all of the students, embedded within it, whereas in (24b) the floated all no longer forms a
constituent with the students, but generates as the specifier of VP₁, serving as a modifier of VP₂. This structure can be borne out, for example, by the following test of VP-preposing:

(25) The students said they would all come to the party, and [VP all come to the party] they did.

The acceptability of (25) shows that all come to the party forms a single constituent, VP, as shown in (24b). Further, the following examples, taken from McCawley (1988: 89–90), also show that a floated quantifier and a following VP is a syntactic constituent, itself a VP:

(26) a. The neighbors either [all like punk rock] or [all want to annoy me].

b. What the children did was [all make obscene gestures].

c. I want your friends to [all/each/both apologize to me].

For other syntactic tests showing that floated quantifiers are specifiers of VP, see McCawley (1988), Iwasawa (1988) and Nakamura (1996).

The structure (24b) is reminiscent of Sportiche’s (1988) claim that all of the students in (23a) originally takes the specifier position of VP and that (23b) derives from movement of only the students to the specifier position of IP, leaving the quantifier all in situ. The resulting structure is exactly the same as (24b), but I do not assume here this sort of transformational derivation, and simply assume that the subject the students and the quantifier all are base-generated in place. (For problems with Sportiche’s analysis, see Baltin (1995) and Nakamura (1996).)

What matters in the structure (24b) with respect to predication relation is the fact that there is a double predication relation, as represented below:

(27) The students all [came to the party].

In (27), in addition to the primary predication relation between the subject the students and the predicate VP came to the party, there exists also a (so-called) secondary predication relation between the quantifier all, serving as what can be termed here a secondary subject, and the VP came to the party. To put it differently, the structure (24b) can be taken to mean that there are two subjects, the specifier of IP, the students, and the specifier of VP₁, the quantifier all, which can be regarded as the so-called VP-internal subject, both sharing the common predicate came to the party. Note here that, as O’Grady (1982: 527–529) points out, adverbial quantifiers have an anaphoric potential, and
that therefore all in (27) and (24b) serves as a sort of pronoun whose antecedent is the students. Therefore, they can be placed in separate clauses, as in the following:

(28)  
   a. The students came to the party and all danced together. 
   b. After the women had read the book, each agreed that it should be banned. 

In (28a, b) all and each refer to the students and the women, respectively, and hence they are coindexed. Therefore in (27) as well, the students and all can be coindexed.8

A somewhat similar double predication relation may be observed in an expletive there-construction, as in (29a), whose structure can be represented as in (29b) (for relevant discussion, see Radford (1997: 317) and Rothstein (1995)):

(29)  
   a. There is someone knocking at the door. 
   b. [IP There [I' is [VP someone [V' knocking at the door]]]] 

In (29b), there takes the specifier position of IP, and someone, which is the associate of there, takes the specifier position of VP and is the subject of the V' knocking at the door. The V' is predicated of the subject someone, and is not specifically predicated of there, which is a non-argument lacking any θ-role (see note 4). But since someone is referred to as the associate of there, it would not be entirely beside the point to claim that there are two subjects (i.e. there, someone) that share the common predicate knocking at the door.

Another similar double predicate relation can also be found in the much-discussed Japanese multiple subject construction, exemplified below:

---

8 As the structure (24b) shows, floated quantifiers perform the function of VP-adverbs, as well (see O'Grady (1982) and McCawley (1988)). This is demonstrated in the distributional behavior of floated quantifiers, given below, which is essentially similar to the distribution of VP-adverbs (Kamio and Takami (1998: 182)):

(i)  
   a. His parents both admire John F. Kennedy. 
   b. His parents deeply admire John F. Kennedy. 

(ii) 
   a. His parents admire both John F. Kennedy. 
   b. His parents admire deeply John F. Kennedy. 

(iii)  
   a. I consider the boys each intelligent. 
   b. I consider the boys quite intelligent. 

(iv)  
   a. I consider the boys intelligent each. 
   b. I consider the boys intelligent quite.
In (30), there are two subjects marked with *ga*, taking only one predicate. The second subject, *atama-ga* ‘head,’ serves to specify which part of the first subject *Taro* is good. Similarly, in the following sentence with a floated quantifier, the quantifier functions to specify how many of the students danced:

(31) Gakusei-ga zen-in odotta.
    students-Nom all danced
    ‘The students all danced.’

I have argued in this subsection that floated quantifiers function as (secondary) subjects, which would lead to the requirement that they be followed by appropriate predicates. This argument will be further elaborated on in the following subsection.

4.2. Secondary Predication Relation

It is significant to note that once a subject is present, it necessitates a predicate. On the assumption that a floated quantifier is a (secondary) subject, it needs a predicate that describes something about it. Otherwise, it is left stranded, and unacceptability should result because of the absence of a predicate. This is confirmed by the following contrasting pairs of examples:

(32) a. The guests have all arrived.
    b. *The guests have arrived all.

(33) a. His parents were both invited to the party.
    b. *His parents were invited to the party both.

In (32a), the quantifier *all*, floated from the subject *the guests*, is followed by the predicate *arrived*, whereas in (32b) it is stranded at the end of the sentence and is not followed by any predicate. Hence the difference in acceptability between (32a) and (32b). The same account

---

9 As an anonymous reviewer points out, however, (30) and (31) are different in that in (30) ii ‘good’ is not specifically predicated of the first subject *Taro*, while in (31) *odotta* ‘danced’ is also predicated of the first subject *gakusei* ‘students.’ In the former, the whole *atama-ga ii* ‘smart’ is predicated of *Taro*. 
applies to the contrast between (33a) and (33b).

The unacceptability of (32b) and (33b) reminds us of the fact, noted by Sag (1978), that floated quantifiers cannot immediately precede a deletion/extraction site. Observe the following examples:

(34) John has lived in Boston, and his brothers \{a. *have all \} 
\{b. \sqrt{all} have \}

\text{too.}

(35) None of them were Communists, but Socialists, they \{a. *were all \}
\{b. \sqrt{all} were. \}

In (34a) and (35a), \textit{all}, floated from the subject, is stranded and nothing is predicated of it; hence unacceptability. In (34b) and (35b), on the other hand, the floated \textit{all} is followed by the auxiliary verbs \textit{have} and \textit{were}, which serve to recover the deleted and extracted elements. Thus, it would be reasonable to consider that \textit{all} has a predicate that follows it, though part of it is deleted or extracted. Concerning this phenomenon, Sag (1978) only states that a floated quantifier cannot be followed by an extraction/deletion site, but it is clear that this is merely a description of a fact. I attribute the phenomenon to the lack of a predicate for a floated quantifier that functions as a subject.

We have so far observed quantifiers floated from subjects only. Let us now turn to instances of quantifiers floated from NPs other than subjects, and observe first the following examples:

(36) a. *The teacher scolded the students all.
\hspace{1cm} b. *Mike discussed the problem with his employees all.

In (36a, b), the quantifiers are floated from an object or an oblique complement, and are stranded in sentence-final position, unaccompanied by any predicates. Hence the unacceptability results.

Compare (36) with the following examples, in which floated quantifiers are followed by adverbial expressions:

(37) a. *Ann met the boys all in the library.

\hspace{1cm} b. *The teacher scolded them all.

\hspace{1cm} As Maling (1976) and McCawley (1988) point out, however, this is not an instance of quantifier float, but an instance of what is called "Q(uantifier)-Pro Flip."

\hspace{1cm} When the NP associated with a quantifier is a pronoun, sentence (36a), for instance, turns out to be acceptable:

( i ) The teacher scolded them all.

\hspace{1cm} As Maling (1976) and McCawley (1988) point out, however, this is not an instance of quantifier float, but an instance of what is called "Q(uantifier)-Pro Flip."
b. *John ran after the thieves both by bicycle.

It is important to note here that the elements that follow the floated quantifiers in (37a, b) are not predicated of the quantifiers (or the NPs that they are associated with). In (37a), the sentence-final PP in the library only specifies the place where Ann met the boys, and is hardly predicated of all (or the boys). Thus, all is not followed by a predicate and the unacceptability results. In (37b), likewise, by bicycle represents the means by which John ran after the thieves, as shown in the example, and is not semantically connected with both (or the thieves); hence unacceptability.

Now, compare (37) with the following sentences:

(38) a. John called the two men both liars. (=(6a))

b. Mary put his letters all on her desk.

In contrast to (37), a predication relation is established between the floated quantifier and the sentence-final NP or PP in (38a, b). In (38a), besides the primary predication relation between the subject John and the rest of the sentence, the NP liars is secondarily predicated of both (and the two men that it is associated with). Thus, the floated both is followed by its predicate, and the acceptability results. In (38b), similarly, as a result of Mary’s putting all of his letters on her desk, all the letters were eventually (placed) on the desk. In other words, the so-called small clause relationship is established between all and on her desk, as in All [of his letters] (were) on her desk. Thus, a predication relation is established between all and on her desk, as shown in the example; hence acceptability.

Observe further the following contrasting pairs of examples:

(39) a. *John found the books all quickly.

b. John found the books all interesting.

(40) a. *John argued with the men all about linguistics.

b. John looked at the men all lying on the grass.

As shown in (39a) and (40a), quickly and about linguistics are semantically associated with found the books and argued with the men, respec-
tively, and not with *all (or its associated NP). In contrast, as shown in (39b) and (40b), interesting and lying on the grass are semantically associated with the floated *all (and its associated NPs the books and the men). Therefore, in the former examples the floated quantifiers are not followed by their predicates, whereas in the latter they are, and the difference in acceptability results from this.

From the above discussion, we can hypothesize the following constraint on floated quantifiers:

(41) The Predication Constraint on Floated Quantifiers: Since floated quantifiers function as (secondary) subjects, they must be followed by their (semantically appropriate) predicates.

It is clear that all the examples taken up in this and the preceding subsections can be accounted for by the Predication Constraint on Floated Quantifiers.

It is now time to observe the following contrasting pairs, given at the beginning of this section:

(20) a. John persuaded the women all to visit Sweden.

b. *John promised the women all to visit Sweden.

(21) a. John considered his friends all as selfish.

b. *John impressed his friends all as selfish.

(22) a. John found the two rooms both empty.

b. *John left the two rooms both angry.

As demonstrated in the above examples by the lines showing the secondary predication relations, while the quantifiers floated from the objects in the (a) examples are followed by their appropriate predicates, those in the (b) examples are not. In the latter examples, the sentence-final predicates are associated with and predicated of only the subjects. Therefore, the floated quantifiers are left stranded without being followed by any elements that are predicated of them, and the unacceptability results from the violation of the Predication Constraint on Floated Quantifiers.

As stated at the beginning of this section, contrasts such as those
given in (20)–(22) have already been noted by Maling (1976), but she has merely stated that quantifier float does not apply to the object NP if the following phrase is a complement predicated of the subject NP. This phenomenon has now been given an explanation, and it has been attributed to the semantic character of floated quantifiers as (secondary) subjects, which must necessarily take predicates.11

The acceptability of the following examples also seems to be accounted for by the Predication Constraint on Floated Quantifiers:

(42) a. I gave the girls both handkerchiefs.
   b. John promised the girls each a diamond ring.

In (42a), as a result of the speaker’s giving handkerchiefs to both girls, they are construed as the possessors or recipients of the handkerchiefs. In other words, the handkerchiefs play an integral part in the speaker’s process of acting on the girls. Therefore, it can be reasonably assumed that there is some sort of predication relation between the floated both and handkerchiefs; hence acceptability. The same is the case with (42b).12

11 As pointed out in note 8, floated quantifiers can also function as adverbs. Therefore, one might argue that the acceptability of the sentences given in section 4.2 can also be accounted for by assuming that floated quantifiers are adverbs modifying predicates. However, this assumption (i) encounters problematic sentences such as (38a) (repeated below), because the predicate in question (i.e. liars) is an NP, and (ii) fails to differentiate acceptable sentences from unacceptable ones, as given in (22a, b) (also repeated below):

(38) a. John called the two men both liars.
(22) a. John found the two rooms both empty.
   b. *John left the two rooms both angry.

Hence, it can be concluded that the Predication Constraint on Floated Quantifiers, in which a floated quantifier is assumed to function as a (secondary) subject, can capture a wider range of examples than can the assumption that they are adverbs modifying predicates.

12 One might argue here that the predication relation established between the girls (or both) and handkerchiefs in (42a) or between the girls (or each) and a diamond ring in (42b) is somewhat different (and extended) from the one generally established between a subject and its predicate, because in (42a), for example, handkerchiefs does not specifically serve as a statement about the girls.

However, Imai et al. (1995: 208) argue that the double object construction can be analyzed as containing a small clause, as shown below (see also Kayne (1983) and Larson (1988)):
It is interesting to compare here the following pair of sentences:

(43) a. I gave the two girls each a handkerchief. (cf. (42a))
    
    floating  predication
    
    b. *The two men gave Mary each a handkerchief.
    
    floating

In (43a), as observed in (42a), there exists a (secondary) predication relation between the sentence-final a handkerchief and each, floated from and thus semantically associated with the two girls. Therefore, each is followed by an appropriate predicate, a handkerchief, in keeping with the Predication Constraint on Floated Quantifiers. In (43b), on the other hand, the secondary predication relation exists only between a handkerchief and Mary, and each is floated from and thus associated with the subject the two men. Therefore, the floated each is not followed by its predicate, and the sentence is unacceptable.

Before leaving this section, it would be instructive to further observe that although the acceptability of quantifier float is primarily controlled by the Predication Constraint on Floated Quantifiers, it is also somewhat affected by the distance between the floated quantifier and the NP that it quantifies. Observe the following examples:

(44) a. ?The men promised Frank all to leave.
    
    (Bowers (1993: 629, fn. 24))
    
    b. Frank persuaded the men all to leave. (cf. (3a))

(45) a. ?His proposals struck me all as nonsense.
    
(46) a. John gave Mary a diamond ring.
    
    b. Mary had a diamond ring.

The small clause analysis given in (ia) (i.e., Mary is the subject and a diamond ring is its predicate) can be viewed as containing a covert verb have, since (ia) implies the corresponding (ib). Further, Bowers (1993) extends this small clause analysis and proposes what he calls a double predication structure, in which a double object sentence such as John gave Mary a book is the lexicalized causative form of a sentence such as Mary has/owns the book (pp. 641–644). Thus, it does not seem to be entirely off the point to recognize in (42a, b) a predication relation between the (expected) possessor (recipient) and what he/she eventually receives.
b. I regarded his proposals all as nonsense.

As shown in the (a) examples of (44) and (45), the floated quantifier all is followed by its predicate, in keeping with the Predication Constraint on Floated Quantifiers. But many people find the sentences somewhat awkward. In light of the perfect acceptability of the (b) examples, it must be due to the fact that all, floated from the subject, is placed to the right of the object, and that, as a result of it, the separation of the quantifier from the NP that it quantifies would make it somewhat difficult to interpret their semantic association. This conjecture is supported by the acceptability of the following sentences, in which the floated quantifier all is placed immediately after the subject:

(46) a. The men all promised Frank to leave. (cf. (44a))
    b. His proposals all struck me as nonsense. (cf. (45a))

In connection with the above discussion, Radford (1997: 335) provides an informative set of examples:

(47) a. The men do all seem to understand the situation.
    b. ?The men do seem all to understand the situation.
    c. ??The men do seem to all understand the situation.

Concerning (47a–c), Radford (1997: 337) states that “floating quantifiers become more awkward the further away they are from the expression they quantify.”

5. Bowers’s (1993) and Baltin’s (1995) Analyses

In this section I will briefly observe Bowers’s (1993) and Baltin’s (1995) analyses of quantifier float, both of which incorporate the notion of predication, just as my analysis does. However, their analyses are essentially syntactic in nature, in the sense that Bowers introduces the functional category PrP (Predication Phrase) into syntactic structure, and Baltin makes the syntactic assumption that a certain projection becomes a predicate when it is c-commanded by a subject. I will demonstrate below that their analyses, though ingenious, encounter serious problems, and that the functional analysis proposed in the previous section is more comprehensive than theirs.


Bowers (1993) introduces a new functional category named “Pr,” a mnemonic for Predication, whose maximal projection (i.e. PrP) could
occur either between I and V, or as a complement to V. Observe the following sentences and their structures:

(48) a. They will buy books.
   b. \[[\text{IP they} \ [\text{I'} \ \text{will} \ [\text{PrP} \ \text{ei} \ [\text{Pr} \ \text{buy} \ [\text{VP books} \ [\text{V'} \ \text{ej}]]]]]]\]

(49) a. They regard John as crazy.
   b. \[[\text{IP they} \ [\text{PrP} \ \text{ei} \ [\text{Pr} \ \text{regard} \ [\text{VP John} \ [\text{V'} \ \text{ej} \ [\text{PrP} \ \text{ek} \ [\text{Pr} \ \text{as} \ [\text{AP crazy}]]]]]]]]\]

In (48b) and (49b), the subject \textit{they}, base-generated at the specifier position of PrP, moves to the specifier position of IP at S-structure. In (49b), the small clause subject \textit{John}, also base-generated at the specifier position of the lower PrP, moves to the specifier position of VP. (Bowers identifies a small clause with PrP.) In (48b) and (49b), the verbs \textit{buy} and \textit{regard}, base-generated at the head position of VP, are assumed to move to the Pr position. Note that, as shown in (48b), the direct object \textit{books} is generated in the specifier position of VP, and that, as shown in (49b), \textit{as} is regarded as a direct lexical realization of Pr.

Bowers argues that floated quantifiers are base-generated as XP adjuncts that can be adjoined only to the “propositional” categories PrP and IP. Following Maling (1976) and Sportiche (1988), he further assumes the following condition on floated quantifiers:

(50) Condition on Floated Quantifiers: Floated quantifiers must be c-commanded by the NPs that they modify.

Let us now observe the following sentences with floated quantifiers and their structures, in which Bowers assumes that \textit{the men} in (52a) is a true direct object, generated in the specifier position of VP, while that in (53a) is actually a complement, rather than a direct object:

(51) a. The men will all buy books.
   b. \[[\text{IP The men} \ [\text{I'} \ \text{will} \ [\text{PrP} \ \text{all} \ [\text{Pr} \ \text{buy} \ [\text{VP books} \ [\text{V'} \ \text{ej}]]]]]]\]

(52) a. John persuaded the men all to leave.
   b. Partial Structure of (52a):
      \[[\text{PrP John} \ [\text{Pr} \ \text{persuaded} \ [\text{VP the men} \ [\text{V'} \ \text{ej} \ [\text{IP all} \ [\text{IP PRO} \ \text{to leave}]]]]]]\]

(53) a. *John promised the men all to leave.
b. Partial Structure of (53a):

\[
[\text{PrP } \text{Johni } [\text{Pr' promised} [\text{VP } [\text{V' ej } [\text{NP the men}]] [\text{IP all [IP PROi to leave]]]]]]
\]

not c-command due to V'

In (51b) all is base-generated as a PrP adjunct, and is c-commanded by the men; hence the acceptability of (51a). In (52b), all is base-generated as an IP adjunct, and the men is generated in the specifier position of VP. In this structure, all is c-commanded by the men; hence the acceptability of (52a). In (53b), on the other hand, although all is base-generated as an IP adjunct, the men is generated as a complement to the verb promised, which head-moves to the Pr position. In this structure, all is not c-commanded by the men due to the intervention of the V' node, thereby violating the Condition on Floated Quantifiers. Hence, the unacceptability of (53a) results.

Bowers's analysis outlined above raises a number of problems, however. First, his assumption that floated quantifiers are base-generated as XP adjuncts that can be adjoined only to PrP and IP is difficult to maintain because floated quantifiers can easily take the position between the subject (Spec-IP) and an auxiliary verb (I), as shown below:

(54) a. [IP The meni [? all [I' will [PrP ei [Pr' buy books]]]]]  
   (cf. (51a))

b. [IP The students [? all [I' must [have read the books]]]]

Since will and must in (54a, b) are clearly I's, the acceptability of these sentences casts serious doubt on Bowers's assumption that floated quantifiers can only be adjoined to PrP and IP.

A second problem concerns the Condition on Floated Quantifiers. Why is it that floated quantifiers must be c-commanded by the NP that they modify? No independent motivation has been provided so far, but unless an independent reason is given for this requirement, Bowers's account of quantifier float will remain a mere stipulation.

A third problem concerns the structures of (52b) and (53b). Although Bowers assumes that the men is a direct object of persuaded in (52b), but a complement to promised in (53b), here again no independent evidence is provided for the structures. Therefore, it looks as if such structures were assumed only for the presence or absence of a c-command relation between the men and all. Furthermore, Bowers is concerned here only with the c-command relation between the men and all, without paying any attention to the controller of the infinitive complement that follows them. But, as shown in the previous section, the
issue of who is the controller of the infinitive complement plays a crucial role in deciding the acceptability of quantifier float. Thus, Bowers's account of the contrast between (52a) and (53a) seems to fall short of capturing the real conditioning factor.\textsuperscript{13}

Related to the above problem, the Condition on Floated Quantifiers would necessarily predict that a sentence such as (43b), repeated below, should be acceptable:

\begin{align*}
\text{(43) b.} & \quad *\text{The two men gave Mary each a handkerchief.}
\end{align*}

\begin{center}
\begin{tabular}{c}
\text{floating} \\
\text{predication}
\end{tabular}
\end{center}

Bowers proposes what he calls a "double predication" structure for the double object (as well as the dative) construction, as in (43b), but in any case what is important here is the fact that the subject the two men necessarily c-commands the quantifier each. Hence, the unacceptability of (43b) would further show that it is necessary to consider whether a floated quantifier is followed by its predicate.


Baltin (1995) assumes the VP-internal subject hypothesis not only for lexical subjects but also for PRO. He argues that lexical subjects move out of their original VP-internal position to receive Case, while PRO remains in situ because he assumes that it is assigned Case in its original position of Spec VP.

Baltin proposes a derivational theory of predication in which a certain projection may not be a predicate inherently, but can become one when it is c-commanded by a subject which has been extracted from it. He then argues that floated quantifiers are "predicate specifiers" or "predicate introducers" so that they can be adjoined only to an $X'$ projection which is derivationally identified as a predicate.

\textsuperscript{13} Bowers attempts to account for a contrast such as the following by assuming structures similar to (52b) and (53b), respectively:

\begin{align*}
\text{(i) a.} & \quad \text{John considered his friends all impolite.} \\
\text{b.} & \quad *\text{John impressed his friends all impolite.}
\end{align*}

Here again Bowers is only concerned with whether his friends c-commands all or not. But, as argued in section 4.2, to decide the acceptability of (i, b), it is essential to take into account what impolite is predicated of.
With the above structures and assumptions in mind, let us observe the following sentences involving floated quantifiers and their structures (the recorded acceptability judgments are Baltin's):

(55) a. They seemed all to leave.
   b. \[\text{IP They, [I' Past [VP e_i^2 [V' seem [IP e_i^1 [I' all [I' to [VP e_i^0 leave]]]]]]]]\]

(56) a. *They tried all to leave.
   b. \[\text{IP They, [I' Past [VP e_i [V' try [IP [I' all [I' to [VP PRO_i leave]]]]]]}]]\]

In (55b), the floated quantifier \textit{all} is adjoined to \textit{I'}, which is c-commanded by the subject \textit{they}, having been extracted from it. Hence, the \textit{I' \{to e_i^0 leave\}} is interpreted as a predicate, and the predicate specifier \textit{all} can be licensed. Sentence (56a) (which Baltin regards as unacceptable—I will return to this later) has the structure (56b), in which \textit{all} is also adjoined to \textit{I'}. If \textit{all} were to specify the \textit{I' \{to PRO leave\}}, the latter would have to be a predicate. However, if it were a predicate, it would require a c-commanding subject. Since there is no c-commanding subject for the (lowest) \textit{I'}, the projection could not be a predicate. Hence \textit{all} is not licensed, and the sentence is unacceptable.

Let us next observe how Baltin accounts for the following contrast (Baltin (1995: 222)) (again the recorded acceptability judgments are Baltin's—I will return to the acceptability of (57b) later on):

(57) a. I persuaded the men all to resign.
   b. *The men promised me all to resign.

Baltin gives the following rough structures for (57a, b), respectively:

(58) a. Structure of (57a):
    \[\text{I, [VP e_i [V persuaded the men, [IP [I' all [I' to [VP PRO_i resign]]]]]}]\n
b. Structure of (57b):
    \[\text{The men, [VP e_i [V promised me [IP [I' all [I' to [VP PRO_i resign]]]]]}]\n
In (58a), \textit{all} is adjoined to the \textit{I' \{to PRO_i resign\}}, which is c-commanded by its subject/controller (=the matrix object) \textit{the men}. Therefore, the \textit{I'} is a predicate, and the predicate specifier \textit{all} is licensed. In (58b), on the other hand, since the controller of the infinitive [to PRO_i leave] is not the matrix object, but the matrix subject, it is not minimally c-commanded by the subject \textit{the men}. Baltin says that the NP
me, though an NP in the appropriate position to be a subject of the infinitive, is not the appropriate subject of the infinitive (since it is not the controller of the infinitive). The infinitive therefore lacks a subject in the appropriate configuration and is therefore not a predicate. Hence, all is not licensed and the unacceptability of (57b) results. Note further that this account of Baltin’s will correctly deal with the unacceptability of the following sentence in a way parallel to (57b):

(59) *I promised the men all to resign. (see also (3b), (53a))

Baltin’s analysis briefly reviewed above encounters a number of problems, as well. The first problem concerns his analytical framework, which predicts that sentence (56a), repeated below as (60a), should be unacceptable, whereas (60b) should be acceptable:

(60) a. *They tried all to leave. (=(56a))
   b. They tried to all leave.

(61) Structure of (60b):

\[
\begin{array}{c}
\text{IP They}, \text{[IP Past [VP e; [V' try [IP [V' to [VP PRO; [V' all [V'

\text{leave]]]]]]]] (cf. (56b))
\end{array}
\]

In (61), all is adjoined to V’, which is minimally c-commanded by the appropriate subject, PROi, which is coindexed with the matrix subject they. Hence, the V’ is interpreted as a predicate, and all is licensed.

It is true that there are speakers whose judgments on (60a, b) are more or less the same as Baltin’s, but most people do not find such a clear difference in acceptability between (60a) and (60b), and they find (60a) also acceptable or nearly so (in this connection, see also Tonoike (1996)). Furthermore, Baltin’s analysis that predicts (60a) to be unacceptable would run into difficulty in accounting for the acceptability of sentences such as the following, cited from McCawley (1988: 91):

(62) a. The boys intend all to return.
   b. They hope both to win prizes.

A second problem concerns Baltin’s analytical framework which predicts that the following sentences both should be unacceptable:

(63) a. *The men promised me all to resign. (=(57b))
   b. *I promised the men all to resign. (=(59))

In (63a) all is floated from the subject the men, while in (63b) it is floated from the object the men. As pointed out at the end of section 4.2, however, most people do not find (63a) as unacceptable as (63b), and judge it slightly awkward or almost acceptable (see (44a)). This judgment seems quite natural considering the fact that to resign is pre-
dicated of the men (and all) in (63a), while it is only predicated of the subject I in (63b), all being left unaccompanied by a predicate. Therefore, it must be concluded that there is something wrong with the apparatus that predicts (63a) and (63b) to be equally unacceptable.  

Although I refrain from pointing out further problems with Baltin’s analysis for space limitations (see Tonoike (1996)), the above two problems should already suffice to show that it is difficult to maintain. It can thus be concluded that the functional analysis proposed in section 4 is more comprehensive than Baltin’s (and Bowers’s) syntactic analysis.

6. Conclusion

In this paper I have discussed the phenomena of passivization, tough-movement and quantifier float, and have shown that the notion of predication relation plays a crucial role in determining the acceptability of the three phenomena. More specifically, in section 2 it was shown that the acceptability of passive sentences can be uniformly accounted for by the Predication Constraint, which requires that a passive (as well as an active) sentence be a predication (statement) about its subject. In section 3 I briefly observed that the Predication Constraint can easily be applied to an account of the acceptability of the tough-construction. In section 4 I argued that floated quantifiers function as (secondary) subjects, and that therefore they must be followed by their semantically appropriate predicates. Section 5 reviewed Bowers’s (1993) and Baltin’s (1995) syntactic analyses of quantifier float, and made it clear that they both encounter a number of problems.

14 As observed in (60a, b), Baltin’s framework predicts that if the order of all and to is permuted in (63a), the resulting sentence, given below, should turn out to be perfectly acceptable, in contrast to (63a):

(i) The men promised me to all resign. (Baltin (1995: 222))

However, most people do not find such a clear difference in acceptability between (63a) and (i), and in fact the native speakers I have consulted with have found them both equally acceptable.
REFERENCES


Department of English
Tokyo Metropolitan University
Minami Osawa, Hachioji-shi
Tokyo 192–0364
e-mail: takami-kenichi@c.metro-u.ac.jp