

Chapter 4

Isomorphism Principle

4.1 Introduction

In Chapter 3, I have established the thesis that there are two sources for the scope interaction among *quantificational noun phrases* (= QPs): (i) LF compositional computation and (ii) MINOR, an extra-grammatical operation. In the course of the establishment, I have examined the scope interaction in the configuration in (1), where QP_{Sub} stands for a subject QP and QP_{Obj} an object QP, and concluded that the wide scope reading of the QP_{Sub} over the QP_{Obj} may be based on the *LF representation* (= LF) in (2a), but that of the QP_{Obj} over the QP_{Sub} is not based on the LF in (2b); hence, the former may emerge through LF compositional computation, but the latter does not.

- (1) [... QP_{Sub} [... QP_{Obj} ...]], where the QP_{Sub} and the QP_{Obj} are clause-mates
- (2) (Ψ stands for an element that denotes a one-place predicate)
- a. LF: [Ψ QP_{Sub} [Ψ QP_{Obj} [Ψ ... t_{Sub} [... t_{Obj} ...]]]]
 - b. LF: [Ψ QP_{Obj} [Ψ QP_{Sub} [Ψ ... t_{Sub} [... t_{Obj} ...]]]]

Given that covert movement is a syntactic operation that can apply freely, it is reasonable to interpret the conclusion (that the wide scope reading of the QP_{Sub} over the QP_{Obj} may be based on (2a), but that of the QP_{Obj} over the QP_{Sub} is not based on (2b)) as indicating that there is some independent principle that rules in (2a), but rules out (2b). And the isomorphism principle in (3) is one good candidate for such a principle, which

is originally argued in Huang 1982 on the basis of the scope interaction among QPs in Chinese, and in effect, in Hoji 1985 using similar phenomena in Japanese.¹

(3) Isomorphism Principle

When two noun phrases undergo covert movement, their c-command relation prior to the movement cannot be altered.

The aim of this chapter is to motivate the isomorphism principle in (3) on independent grounds, thereby further confirming the thesis that there are two sources of the scope interactions among QPs.

The following sections are organized as follows. In Sections 4.2 and 4.3, I will demonstrate that the isomorphism principle holds (i) between a QP and a referential expression and (ii) between a QP and an NP plus an adnominal 'focus-sensitive' particle such as *only* and *even*. Each section consists of (i) an experimental design where I spell out how we can make sure the elements under examination undergo covert movement and how we can identify their c-command relation after the movement and (ii) a demonstration of the isomorphism principle. Both sections are based on Japanese empirical materials. In Section 4.4, I will conclude with a summary and a small remark on the nature of the isomorphism principle.

¹ The original intuition of the isomorphism principle is found in Reinhart 1976, who puts forth (i).

(i) (= Reinhart 1976 (39), p.191)
A logical structure in which a quantifier binding a variable x has wide scope over a quantifier binding a (distinct) variable y is a possible interpretation for a given structure S just in case in the surface structure of S the quantified expression corresponding to y is in the (c-command) domain of the quantified expression corresponding to x .

4.2. Between a QP and a referential expression²

In this section, I demonstrate that the isomorphism principle holds between a QP and a referential expression.

4.2.1. Experimental design

To demonstrate that the isomorphism principle holds between a QP and a referential expression, we need an environment where both of the elements undergo covert movement and their c-command relation after the movement can be examined, provided that their c-command relation prior to the movement is identified on an independent ground. I claim that *CM-comparatives*, exemplified in (4), which we have discussed in Chapter 3:Section 3.2.1, serve as such an environment.³

(4) (= Chapter 3 (7))

[_{IP} [_{AdvP} [_{CP} John-ni yorimo] sakini] [_{IP} Kimura kyoozyu-ga Bill-ni
John-DAT than early Kimura professor-NOM Bill-DAT

Mary-o syookaisita]] (to siyoo).
Mary-ACC introduced that suppose

'(Suppose that) [_{IP} [_{IP} Prof Kimura introduced Mary to Bill] [_{AdvP} earlier [_{CP} than to John]]].'

² This section is mostly based on Hayashishita 2003.

³ As mentioned in Chapter 3, FN 8, the NPs that serve the locus of comparison in a CM-comparative must be dative-marked (or marginally accusative-marked). For this reason, we will only consider CM-comparatives in which the locus NPs are dative-marked.

First of all, as in Chapter 3:Section 3.2.1, I adopt for CM-comparatives the LF copying analysis put forth by Hoji (1998b), and assume that (4), for example, is analyzed as (5).^{4,5}

(5) (= Chapter 3 (8))

- a. Before *to Bill* (the ^LNP of the antecedent clause) raises

[_{IP} [_{AdvP} [_{CP} *to John* [_{C'} [_{IP} ec] *than*]] *early*] [_{IP} *Prof. Kimura introduced Mary to Bill*]]

- b. After *to Bill* (the ^LNP of the antecedent clause) raises

[_{IP} [_{AdvP} [_{CP} *to John* [_{C'} [_{IP} ec] *than*]] *early*] [_{IP} *to Bill*₁ [_{IP} *Prof. Kimura introduced Mary t₁*]]]

- c. After LF copying takes place (= LF)

[_{IP} [_{AdvP} [_{CP} *to John*₁ [_{C'} [_{IP} *Prof. Kimura introduced Mary t₁*] *than*]] *early*] [_{IP} *to Bill*₁ [_{IP} *Prof. Kimura introduced Mary t₁*]]]

Under this analysis, the NP that serves as the locus of comparison in the antecedent clause must move out of the IP in which it originates (i.e., must undergo *constituent raising* in the sense of Reinhart 1991), so as to avoid non-constituent copying. We can therefore ensure that a referential expression undergoes covert movement when it serves as the locus of comparison in the antecedent clause. For convenience, as in Chapter 3, I

⁴ The choice between LF copying and PF deletion does not affect any of the ensuing discussions. See also FN 11 and FN 12 in Chapter 3.

⁵ As mentioned in Chapter 3:Section 3.2.1, Hoji claims this analysis based on the assumption that the comparative clause of a CM-comparative is identical to its antecedent clause at LF, except the NPs that serve as the locus of comparison, which he independently substantiates on the basis of various kinds of bound variable anaphora (cf. Hoji 1998b:Section 3.3, and Hoji 2002:Sections 3.4, 4.2, and 5.2), see Chapter 3, FN 9. See also the quantifier scope based argument for this analysis I put forth in Chapter 3:Section 3.2.1.

will refer to the NPs that serve as the locus of comparison as *locus NPs* or simply *L*NPs, e.g., *John and Bill* in (4).

Let us now consider how we can make sure that a QP undergoes covert movement in a CM-comparative. Suppose that the antecedent clause of a CM-comparative contains a QP as one of its major constituents but not as the locus NP. In this situation, we can reasonably assume that the QP moves whenever it bears clausal scope. Let me explain why such is the case. It is argued in Chapter 3 that there are two ways for a QP to bear clausal scope: through LF compositional computation (i.e., through covert movement) and due to MINOR, an extra-grammatical operation. (Let us assume that the two ways are the only ways.) But for a QP to take clausal scope by means of MINOR, all of the clause-mates of the QP must be in an A-position (the conclusion drawn from the discussions in Chapter 3:Sections 3.3 and 3.5.2).⁶ Given that for a CM-comparative the locus NP of the antecedent clause, which is a clause-mate of the QP, cannot stay in an A-position, the option of the scope taking due to MINOR is excluded. Hence, we can ensure that when the QP bears clausal scope, it undergoes covert movement.

We have so far concluded that the locus NP of the antecedent clause in a CM-comparative, even if it is a referential expression, undergoes covert movement, and so as a QP that is a clause-mate of the locus NP if it bears clausal scope. Now the question is how we can examine the c-command relation between the locus NP (when it is a referen-

⁶ As in Chapter 3:Section 3.2.1, I adopt the definition of A-position in (i). See also FN 6 in Chapter 3.

(i) (= Chapter 3 (6))
A position α is an A-position if, and only if α is a theta position of a verb or a case position.

tial expression), and the QP under discussion, after they undergo covert movement. I claim that we can identify the c-command relation under discussion through the scope interaction between the QP and the AdvP containing the comparative clause.⁷

First, when a QP that is a major constituent of the antecedent clause takes scope above the AdvP, it is reasonable to assume that the QP c-commands the AdvP at LF (because the QP cannot bear clausal scope due to MINOR). In this situation, the QP must also c-command its clause-mate locus NP at LF, whether or not the isomorphism principle holds between the two, as illustrated in (6), where the copied IP is underlined.

- (6) a. [IP QP_j [IP [AdvP [CP ^LNP_k [C' [IP ... t_j ... t_k ...] than]] early] [IP ^LNP_k [IP ... t_j ... t_k ...]]]]
- b. [IP QP_j [IP [AdvP [CP ^LNP_k [C' [IP ... t_k ... t_j ...] than]] early] [IP ^LNP_k [IP ... t_k ... t_j ...]]]]

Second, when a QP that is a major constituent of the antecedent clause takes scope below the AdvP (i.e., when we can safely assume that the QP is c-commanded by the AdvP at LF), the QP must be c-commanded by its clause-mate locus NP at LF, irrespective of the isomorphism principle, as schematized in (7). Otherwise, the QP-trace in the comparative clause (i.e., *t_j*) could not be bound, as illustrated in (8).

- (7) a. [IP [AdvP [CP ^LNP_k [C' [IP QP_j [IP ... t_j ... t_k ...] than]] early] [IP ^LNP_k [IP QP_j [IP ... t_j ... t_k ...]]]]
- b. [IP [AdvP [CP ^LNP_k [C' [IP QP_j [IP ... t_k ... t_j ...] than]] early] [IP ^LNP_k [IP QP_j [IP ... t_k ... t_j ...]]]]

⁷ As in Chapter 3, I assume that the AdvP in a CM-comparative is an existential quantifier over a degree variable plus its restrictor, cf. Larson 1988.

- (8) a. * $[_{IP} [_{AdvP} [_{CP} ^LNP_k [C' [_{IP} \dots \boxed{t_j} \dots t_k \dots] \text{than}]]] \text{early}] [_{IP} QP_j [_{IP} ^LNP_k [_{IP} \dots t_j \dots t_k \dots]]]]$
- b. * $[_{IP} [_{AdvP} [_{CP} ^LNP_k [C' [_{IP} \dots t_k \dots \boxed{t_j} \dots] \text{than}]]] \text{early}] [_{IP} QP_j [_{IP} ^LNP_k [_{IP} \dots t_k \dots t_j \dots]]]]$

In summary, the generalizations in (9) hold for CM-comparatives. Hence, we can identify the post-movement c-command relation between the locus NP of antecedent clause, which is a referential expression, and a QP that is a clause-mate of the locus NP through the scope interaction between the QP and the AdvP.

(9) Generalizations for CM-comparatives

Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.

- a. α can take scope above the AdvP iff α c-commands β at LF.
- b. α can take scope below the AdvP iff α is c-commanded by β at LF.

4.2.2. Evidence for isomorphism principle

We can now demonstrate that the isomorphism principle holds between a referential expression and a QP, using CM-comparatives. If the movement of the locus NP of the antecedent clause and that of its clause-mate QP are subject to the isomorphism principle, we obtain (10). From (9) and (10), the generalizations in (11) are derived.

- (10) Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.
- a. α can c-commands β at LF iff α c-commands β prior to covert movement.
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- b. α can be c-commanded by β at LF iff α is c-commanded by β prior to covert movement.

(11) Generalizations for CM-comparatives with Isomorphism Principle

Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.

- a. α can take scope above the AdvP iff α c-commands β prior to covert movement.
- b. α can take scope below the AdvP iff α is c-commanded by β prior to covert movement.

If the isomorphism principle is irrelevant for the two elements under discussion, on the other hand, the generalizations in (12) should hold.

(12) Generalizations for CM-comparatives without Isomorphism Principle

Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.

- a. α may take scope above the AdvP, whether or not α c-commands β prior to covert movement.
- b. α may take scope below the AdvP, whether or not α is c-commanded by β prior to covert movement.

The following empirical materials, however, indicate that the generalizations in (11) can be maintained, while those in (12) cannot. First, consider the example in (13), which is a CM-comparative whose antecedent clause has the configuration of [QP-*ga* [^LNP-*ni* Verb]].

- (13) [IP [AdvP [CP John-ni yorimo] sakini] [IP sanninizyoo-no sensei-ga
 John-DAT than early three:more-GEN teacher-NOM
 Mary-ni tikazuita]] koto
 Mary-DAT approached that
 'That [IP [IP three or more teachers approached Mary] [AdvP earlier [CP than
 John]]]'

Given that the NP₁ c-commands the NP₂ in the configuration of [NP₁-ga NP₂-ni/o Verb] prior to covert movement (cf. Kuroda 1969/70, Hoji 1985, Hayashishita 2000b), we expect from the generalizations in (11) that (13) can give rise to the interpretation in (14a) but not that in (14b). Under the generalizations in (12), on the other hand, we expect that (13) may give rise to both of the interpretations. Our intuition confirms that (13) is taken to mean (14a) but not (14b), indicating the generalizations in (11) must be adopted over those in (12); in particular, (11b) can be maintained while (12b) cannot.

- (14) a. The QP>AdvP reading

There are three or more *x*s, *x* is a teacher such that the time at which *x* approached Mary precedes the time at which *x* approached John.

- b. The AdvP>QP reading

The time (span) at which there are three or more *x*s, *x* is a teacher such that *x* approached Mary precedes the time (span) at which there are three or more *y*s, *y* is a teacher such that *y* approached John.

To truth-conditionally substantiate the intuition under discussion, we may consider the following situations.

- (15) There are six and only six teachers, A, B, C, D, E, and F.
 a. Situation 1

A and B approached Mary at the time (span) Δ_1 and John at the time Δ_2 .

C and D approached Mary at the time (span) Δ_3 and John at the time Δ_4 .

E and F did not approach Mary or John.

$\Delta_1 \neq \Delta_3$, $\Delta_2 \neq \Delta_4$, and Δ_1 and Δ_3 precedes Δ_2 and Δ_4 respectively.

b. Situation 2

A, B, C, and D approached Mary at the time (span) Δ_1 , but did not approach John.

C, D, E, and F approached John at the time (span) Δ_2 , but did not approach Mary.

Δ_1 precedes Δ_2 .

If (13) is taken to mean (14a), we should be able to truthfully utter it in (15a), but not in (15b). If the meaning of (13) is (14b), on the other hand, (13) is true in (15b), but not in (15a). The fact seems to be that (13) can be truthfully uttered only in (15a), substantiating the intuition that (13) can give rise to (14a), but not (14b), and indicating that the generalization in (11b) must be adopted over that in (12b).⁸

The examples in (16), which are with other types of QPs, further indicate that the generalizations in (11) must be adopted over those in (12). Their configurations are

⁸ Incidentally, (i) gives rise to both (14a) and (14b), despite the fact that it minimally differs from (13) in regard to the absence of the case-marker attached to the NP in the comparative clause.

(i) $[_{IP} [_{AdvP} [_{CP} \text{John yorimo}] \text{sakini}] [_{IP} \text{sanninizyoo-no sensei-ga Mary-ni tikazuita}]] \text{ koto}$
 John than early three:more-GEN teacher-NOM Mary-DAT approached that
 'That $[_{IP} [_{IP} \text{three or more teachers approached Mary}] [_{AdvP} \text{earlier} [_{CP} \text{than John}]]]$ '

This seems consistent with Hoji's (2002) analysis that the construction exemplified by (i) does not involve LF copying (or PF deletion) and the comparative clause contains a (covert) deep anaphor. If the deep anaphor in (i) is understood to be *the same set of three or more teachers approached x*, then the reading that emerges is analogous to (14a). On the other hand, if the deep anaphor is understood to be *three or more y, y is a teacher such that y approached x*, what emerges is analogous to (14b).

identical to that of (13), and they can give rise to the QP>AdvP reading, but not the AdvP>QP reading.

- (16) a. [IP [AdvP [CP Kimura sensei-ni yorimo] sakini] [IP oozei-no gakusei-ga
Kimura teacher-DAT than early many-GEN student-NOM
Tanaka sensei-ni aisatusita]] to siyoo.
Tanaka teacher-DAT greeted that suppose
'Suppose that [IP [IP many students greeted Prof. Tanaka] [AdvP earlier [CP than
Prof. Kimura]]].'
- b. [IP [AdvP [CP Toyota-ni yorimo] sakini] [IP 15%izyoo-no kyoozyu-ga
Toyota-DAT than early 15%:more-GEN professor-NOM
Nissan-ni gakusei-o syookaisita]] to siyoo.
Nissan-DAT student-ACC introduced that suppose
'Suppose that [IP [IP 15% or more of the professors introduced students to
Nissan] [AdvP earlier [CP than to Toyota]]].'

Comparing (13) with (17), we receive further support for the generalization in

(11b).

- (17) [IP [AdvP [CP John-ni yorimo] sakini] [IP Mary-ni sanninizyoo-no sensei-ga
John-DAT than early Mary-DAT three:more-GEN teacher-NOM
tikazuita]] koto
approached that
'(Lit.) That [IP [IP Mary, three or more teachers approached] [AdvP earlier [CP than
John]]]'

(17) minimally differs from (13) such that the word order between the subject QP and the locus NP is 'scrambled' in the antecedent clause. Nevertheless, (17) can give rise to the AdvP>QP reading in (14b), which (13) lacks, in addition to the QP>AdvP reading in (14b). Given the assumption that the NP₂ can c-command, or be c-commanded by, the NP₁ in the configuration [NP₂-ni/o NP₁-ga Verb], prior to covert movement (cf., Hoji 1985, Saito 1992, and Ueyama 2002, among others), the contrast between (13) and (17)

with regard to the availability of the AdvP>QP reading in (14b) is fully consistent with (11b), but not with (12b).

We now turn to a demonstration that the generalization in (11a) must be adopted over that in (11b). Consider the example in (18), which is a CM-comparative whose antecedent clause has the configuration of [NP-*ga* [^LNP-*ni* [QP-*o* Verb]]].

- (18) [IP [AdvP [CP John-*ni* *yorimo*] sakini] [IP Kimura *kyoozyu-ga* Mary-*ni*
John-DAT than early Kimura professor-NOM Mary-DAT

mittuizyoo-no kaisya-o syookaisita] koto
three:more-GEN company-ACC introduced that

'(Lit.) That [IP [IP Prof. Kimura introduced to Mary three or more companies]
[AdvP earlier [CP than to John]]]'

Under the assumption that the NP₂ c-commands the NP₃ in the configuration [NP₁-*ga* NP₂-*ni* NP₃-*o* Verb], prior to covert movement (cf. Hoji 1985 and Hayashishita 2000b), the generalizations in (11) leads us to expect that (18) can give rise to the AdvP>QP reading in (19b), but not the QP>AdvP reading in (19a). Under the generalizations in (12), on the other hand, we expect that (18) may give rise to both readings. The fact seems to be that (18) can be taken to mean (19b), but not (19a), indicating that (11) can be maintained but not (12), in particular, (11a) must be adopted over (12a).

- (19) a. The QP>AdvP reading

There are three or more *x*s, *x* is a company such that the time at which Prof. Kimura introduced *x* to Mary precedes the time at which Prof. Kimura introduced *x* to John.

- b. The AdvP>QP reading

The time (span) at which there are three or more x s, x is a company such that Prof. Kimura introduced x to Mary precedes the time (span) at which there are three or more y s, y is a company such that Prof. Kimura introduced y to John.

The intuition under discussion is, for example, substantiated by the fact that (18) can be truthfully uttered in (20b), but not in (20a) (since (19a) is true in (20a), but false in (20b) while the converse holds for (19b)).⁹

(20) There are six and only six companies, A, B, C, D, E, and F.

a. Situation 1

Prof. Kimura introduced A and B to Mary at the time (span) Δ_1 , and to John at the time Δ_2 , and C and D to Mary at the time (span) Δ_3 , to John at the time Δ_4 , but did not introduce E and F to Mary or John.

$\Delta_1 \neq \Delta_3$, $\Delta_2 \neq \Delta_4$ and Δ_1 and Δ_3 precede Δ_2 and Δ_4 respectively.

b. Situation 2

Prof. Kimura introduced A, B, C, and D to Mary at the time (span) Δ_1 but did not introduce them to John, and introduced D, E, and F to John at the time (span) Δ_2 but did not introduce them to Mary.

⁹ (i) contrasts with (18) in giving rise to both (19a) and (19b), and this is not surprising for the reason mentioned in FN 8.

(i) [IP [AdvP [CP John yorimo] sakini] [IP Kimura kyoozyu-ga Mary-ni mittuizyoo-no
John than early Kimura professor-NOM Mary-DAT three:more-GEN
kaisya-o syookaisita]] koto
company-ACC introduced that
'(Lit.) That [IP [IP Prof. Kimura introduced to Mary three or more companies] [AdvP earlier [CP
than John]]]'

Δ_1 precedes Δ_2 .

We can also provide support for the generalization in (11a), using other types of QPs. For instance, the sentences in (21), which have the same configuration as that in (18), can give rise to the AdvP>QP reading, but not the QP>AdvP reading.

- (21) a. [IP [AdvP [CP Toyota-ni yorimo] sakini] [IP Kimura sensei-ga Nissan-ni
Toyota-DAT than early Kimura teacher-NOM Nissan-DAT

oozei-no gakusei-o suisensita]] koto
many-GEN student-ACC recommended that

'(Lit.) That [IP [IP Prof. Kimura recommended to Nissan many students] [AdvP earlier [CP than to Toyota]]]'

- b. [IP [AdvP [CP John-ni yorimo] sakini] [IP Kimura sensei-ga Mary-ni
John-DAT than early Kimura teacher-NOM Mary-DAT

10-satu-no hon-o kasiataeta]] koto
10-CL-GEN book-ACC lent that

'(Lit.) That [IP [IP Prof. Kimura lent to Mary 10 books] [AdvP earlier [CP than to John]]]'

Furthermore, note that (18) contrasts with (22) in which the order of the QP and the locus NP in the antecedent clause is 'scrambled'; the latter can give rise to the QP>AdvP reading in (19a), as well as the AdvP>QP reading in (19b).

- (22) [IP [AdvP [CP John-ni yorimo] sakini] [IP Kimura kyoozyu-ga mittuizyoo-no
John-DAT than early Kimura professor-NOM three:more-GEN

kaisyaa-o Mary-ni syookaisita]] koto
company-ACC Mary-DAT introduced that

'That [IP [IP Prof. Kimura introduced three or more companies to Mary] [AdvP earlier [CP than to John]]]'

Under the assumption that the NP₃ can c-command, or be c-commanded by, the NP₂ in the configuration of [NP₁-ga NP₃-o NP₂-ni Verb], prior to covert movement (cf. Hoji

1985 and Kitagawa 1994), this contrast can be nicely accounted for under the generalization in (11a), but not under that in (12a).¹⁰

We have thus demonstrated that the generalizations in (11), repeated here, hold for CM-comparatives.

(11) Generalizations for CM-comparatives with Isomorphism Principle

Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.

¹⁰ To argue for the generalization in (11a) over that in (12a), I have utilized CM-comparatives whose antecedent clause has the configuration of [NP-*ga* [^LNP-*ni* [QP-*o* Verb]]], adopting Hoji's (1985) generalization that the NP₂ c-commands the NP₃ in the configuration of [NP₁-*ga* NP₂-*ni* NP₃-*o* Verb], prior to covert movement. Although the Hoji generalization is challenged by Kitagawa (1994) and Miyagawa (1997), Hayashishita (2000b) demonstrates that (i) the generalizations they put forth, which are based on quantifier scope and binding, emerge due to the failure to differentiate the two sources of scope interaction argued in Chapter 3, i.e. LF compositional computation and MINOR, and (ii) once we confine our attention to the LF-based scope interaction, the Hoji generalization is proven to be correct.

We can also argue for (11a) over (12a), using CM-comparatives of different configurations. For example, consider (i).

- (i) [IP [AdvP [CP Kimura kyoozyu-ni yorimo] sakini] [IP sootyoo-ga Tanaka kyoozyu-ni
Kimura professor-DAT than early dean-NOM Tanaka professor-DAT
sanninizyoo-no gakusei-o suisensaseta]] koto
three:more-GEN student-ACC made:recommend that
'That [IP [IP the dean made Prof. Tanaka recommend three or more students] [AdvP earlier [CP
than Prof. Kimura]]]'

The antecedent clause of (i) has the configuration of [NP-*ga* [^LNP-*ni* [QP-*o* Verb]] CAUSE]. Since the locus NP and the QP are the subject and the object in the inner clause, we can safely assume that the former asymmetrically c-commands the latter. As expected from the generalization in (11a), but not from that in (12a), (i) can give rise to the Adv>QP reading, but not the QP>Adv reading.

Furthermore, the CM-comparative in (ii), a scrambled counterpart of (i), contrasts with (i), in allowing the QP>Adv reading, in addition to the AdvP>QP reading. This contrast is once again nicely accounted for by the generalization in (11a), but not by that in (12a).

- (ii) [IP [AdvP [CP Kimura kyoozyu-ni yorimo] sakini] [IP sootyoo-ga sanninizyoo-no gakusei-o
Kimura professor-DAT than early dean-NOM three:more-GEN student-
ACC
Tanaka kyoozyu-ni suisensaseta]] koto
Tanaka professor-DAT made:recommend that
'That [IP [IP the dean made Prof. Tanaka recommend three or more students] [AdvP earlier [CP
than Prof. Kimura]]]'

- a. α can take scope above the AdvP, iff α c-commands β prior to covert movement.
- b. α can take scope below the AdvP, iff α is c-commanded by β prior to covert movement.

Since (11) is derived straightforwardly from the inherent properties of CM-comparatives (i.e., (9)) and the assumption that the isomorphism principle holds between a QP and a referential expression, the above empirical materials are considered as a demonstration of the isomorphism principle between the two elements.¹¹

4.3. Between a QP and an adnominal 'focus-sensitive' particle¹²

In this subsection, I demonstrate that the isomorphism principle holds also between a QP and an NP plus an *adnominal 'focus-sensitive' particle* (= FP), such as *only* and *even*.

4.3.1. Experimental design

As we did for the previous demonstration in Section 4.2, to demonstrate that the isomorphism principle holds between a QP and an NP plus an FP, we must first identify an environment where both of the elements undergo covert movement and their c-

¹¹ One may wonder if the generalizations in (11) can be replaced with those in (i). But such is not the case, given the facts mentioned above in passing that (17) gives rise to the QP>AdvP reading, and (22) and (ii) in FN 10 allow the AdvP>QP reading.

(i) Generalizations for CM-comparatives with Linear Principle
 Let α be a QP that is a major constituent of the antecedent clause, and β its clause-mate locus NP.

- a. α can take scope above the AdvP, iff α precedes β prior to covert movement.
- b. α can take scope below the AdvP, iff α is preceded by β prior to covert movement.

¹² Some of the empirical materials in this section are also found in Hayashishita to appear.

command relation after the movement can be examined, provided that the c-command relation prior to the movement can be identified on an independent ground. To this end, I must make some preparatory remarks on 'focus-sensitive' particles before the introduction of an experimental design, using the next two subsections, i.e., Sections 4.3.1.1 and 4.3.1.2.

4.3.1.1. Two types of adnominal 'focus-sensitive' particles

In the generative tradition, 'focus-sensitive' particles in their adnominal uses (and adverbial uses) are uniformly treated as having the property of being a scope-bearing element, i.e. taking sentential scope, (henceforth scope properties), cf. Kuroda 1965, Peters & Karttunen 1979, Hoji 1985, Rooth 1985, and Büring & Hartmann 2001, among others. For example, the meaning of (23a) is assumed to be (23b).

- (23) a. John greeted only Mary.
 b. There is no one other than Mary such that John greeted him or her.

I claim, however, that some instances of FPs cannot be considered as having scope properties; therefore, there are (at least) two distinguished types of FPs. My arguments are based on empirical materials in Japanese (although the claim should hold also in languages other than Japanese) for the reason that the language distinguishes the two types of FPs morphologically.

In Japanese, adnominal 'focus-sensitive' particles can precede or follow a *case-marker or postposition* (henceforth simply *CM*), as illustrated in (24)-(25).¹³

¹³ The nominative-marker *ga* and the accusative-marker *o*, in contrast with the dative-marker *ni* and postpositions, can follow, but not precede, an FP, as illustrated in (i)-(ii).

(i) a. *?Kimura sensei-ga John-o-dake/sae suisensita (to siyoo).
 Kimura teacher-NOM John-ACC-only/even recommended that suppose

- (24) a. John-wa Kimura sensei-ni-dake/sae aisatusita.
John-TOP Kimura teacher-DAT-only/even greeted
'John greeted only/even Prof. Kimura.'
- b. John-wa Kimura sensei-dake/sae-ni aisatusita.
'John greeted only/even Prof. Kimura.'
- (25) a. John-wa Kyoto daigaku-de-dake/sae enzetusita.
John-TOP Kyoto university-at-only/even spoke
'John spoke only/even at Kyoto University.'
- b. John-wa Kyoto daigaku-dake/sae-de enzetusita.
'(Lit.) John spoke at only/even Kyoto University.'

In the following discussion, I will refer to the FP in an NP-CM-FP (e.g., (24a) and (25a)) as an *NP external FP* and to the FP in an NP-FP-CM (e.g., (24b) and (25b)) as an *NP internal FP*.

When simple cases are considered, NP internal FPs and NP external FPs appear to have scope properties on a par with each other. For example, both (26a) and (26b), for example, can be truthfully uttered in (27a), but not in (27b).

- (26) a. John-wa Kimura sensei-ni-dake soodansita.
John-TOP Kimura teacher-DAT-only consulted
'John consulted only with Prof. Kimura.'

'(Suppose that) Prof. Kimura recommended only/even John.'

- b. Kimura sensei-ga John-dake/sae-o suisensita (to siyoo).
'(Suppose that) Prof. Kimura recommended only/even John.'
- (ii) a. *Kimura sensei-ga-dake/sae John-o suisensita (to siyoo).
Kimura teacher-NOM-only/even John-ACC recommended that suppose
'(Suppose that) only/even Prof. Kimura recommended John.'
- b. Kimura sensei-dake/sae-ga John-o suisensita (to siyoo).
'(Suppose that) only/even Prof. Kimura recommended John.'

b. John-wa Kimura sensei-dake-ni soodansita.

'(Lit.) John consulted with only Prof. Kimura.'

(27) There are two and only two professors, Profs. Kimura and Yamada.

a. Situation 1

John consulted with Prof. Kimura, but not with Prof. Yamada.

b. Situation 2

John consulted both with Prof. Kimura and with Prof. Yamada.

And one may take this observation as evidence that they both can be taken to mean (28), the interpretation that is expected under the assumption that *dake* 'only' has scope properties.

(28) There is no one other than Prof. Kimura such that John consulted with him or her.

Similarly, one may assume that both (29a) and (29b) can be understood to mean (30), the interpretation expected under the assumption that *sae* 'even' has scope properties.

(29) a. John-wa Kimura sensei-ni-sae soodansita.
John-TOP Kimura teacher-DAT-even consulted

'John consulted even with Prof. Kimura.'

b. John-wa Kimura sensei-sae-ni soodansita.

'(Lit.) John consulted with even Prof. Kimura.'

(30) Each person in a given context α has the property that John consulted with him or her, and Prof. Kimura is the least likely person to have that property in α .

Once we consider more complex examples, however, the difference between NP-external FPs and NP-internal FPs emerges.¹⁴ It seems that the former can be understood as having scope properties while the latter cannot. For example, consider the examples in (31) together with the situations in (32).

- (31) a. John-wa Kimura sensei-ni-dake email-de soodansita.
John-TOP Kimura teacher-DAT-only email-with consulted

'John consulted only with Prof. Kimura through email.

- b. John-wa Kimura sensei-dake-ni email-de soodansita.

'(Lit.) John consulted with only Prof. Kimura through email.

- (32) There are two and only two professors, Profs. Kimura and Yamada.

- a. Situation 1

John consulted with Prof. Kimura through email and with Prof. Yamada through phone.

- b. Situation 2

John consulted with Prof. Kimura through email, but with no other person.

(31a) can be truthfully uttered in both of the situations. (32a) is a situation where John consulted someone other than Prof. Kimura but Prof. Kimura is the only person that he

¹⁴ Works in the functional grammar (e.g., Morita 1974 and Kuno & Monane 1979) observe that there are some semantic/functional differences between NP external FPs and NP internal FPs. Morita (1974), for example, points out that (i-a) is taken to mean that this disease can be cured by injection, but not by any other method; however, (i-b) can be used to indicate that this disease can be cured by injection alone (but something other than injection may also cure it). Sections 4.3.1.1 & 4.3.1.2 thus serve in effect as providing a theoretical characterization for the intuition reported by these works.

(i) a. Kono byooki-wa tyuusya-de-dake naoru.
this disease-TOP injection-with-only cure
'This disease is cured only with injection.'

b. Kono byooki-wa tyuusya-dake-de naoru.
'(Lit.) This disease is cured with only injection.'

consulted through email, and (32b) is a situation where John consulted no one except Prof. Kimura. By contrast, (31b) can be true in (32b), but false in (32a). In other words, (31b) cannot be true if John consulted with someone other than Prof. Kimura even with something other than email. We can thus conclude that (31a), but not (31b), can be taken to mean (33), i.e., the interpretation we expect under the assumption that *dake* has scope properties.

- (33) There is no one other than Prof. Kimura such that John consulted with him or her through email.

A similar contrast can be observed with *sae* 'even'. For example, consider (34), together with the situations in (35).

- (34) a. John-wa Kimura sensei-ni-sae email-de soodansita.
John-TOP Kimura teacher-DAT-even email-with consulted
'John consulted even with Prof. Kimura through email.

- b. John-wa Kimura sensei-sae-ni email-de soodansita.
'(Lit.) John consulted with even Prof. Kimura through email.

- (35) There are two and only two professors, Prof. Kimura and Yamada.

- a. Situation 1

John consulted with both Prof. Kimura and Prof. Yamada though email. In general, Prof. Yamada is less likely to be consulted with than Prof. Kimura. However, Prof. Kimura dislikes email to the extent that he is less likely to be consulted with through email than Prof. Yamada.

b. Situation 2

John consulted with both Prof. Kimura and Prof. Yamada through email. In general, Prof. Kimura is less likely to be consulted with than Prof. Yamada.

The situation is the same even when the consultation is through email.

(34a) can be truthfully uttered in both (35a) and (35b). (35a) is a situation where Prof. Kimura is generally more approachable to John than Prof. Yamada, but he is hard to approach through email. (35b) is a situation where it is always the case that Prof. Kimura is difficult to approach. (34b), by contrast, is true in (35b), but false in (35a). This indicates that (34a), but not (34b), can be taken to mean (36), i.e., the interpretation we expect under the assumption that *sae* 'even' has scope properties.

- (36) Each person in a given context α has the property that John consulted with him or her through email, and Prof. Kimura is the least likely person to have that property in α .

We can also demonstrate a similar contrast in the case where a given CM is a postposition. (37a), for example, can be true in both of the situations in (38); however, (37b) is true only in (38b).

- (37) a. John-wa email-de-dake Kimura sensei-ni renrakusita.
John-TOP email-with-only Kimura teacher-DAT contacted

'John contacted Prof. Kimura only through email.'

- b. John-wa email-dake-de Kimura sensei-ni renrakusita.

'(Lit.) John contacted with Prof. Kimura through only email.'

- (38) There are two and only two methods of contacting people for John, email and telephone.

a. Situation 1

John used email, telephone, and fax to contact people. To contact Prof.

Kimura, however, he used only email.

b. Situation 2

John used only email to contact people, and he contacted Prof. Kimura.

It is thus indicated that the meaning of (37a), but not that of (37b), can be (39), the interpretation expected under the assumption that *dake* has scope properties.

(39) There is no method other than email such that John contacted Prof. Kimura through it.

Based on the set of the contrasts just observed (i.e., (i) (31a), but not (31b), can be taken to mean (33), (ii) (34a), but not (34b), can be understood to mean (36), and (iii) (37a), but not (37b), can be used to indicate (39)), I conclude that NP-external FPs can have scope properties while NP-internal FPs cannot.

4.3.1.2. Theoretical assumptions

Our interest is to demonstrate that the isomorphism principle holds between a QP and an NP plus an FP. It is thus necessary to determine whether or not NP-external FPs and/or NP-internal FPs can be used for the demonstration, i.e., whether or not we can ensure that NP-external FPs and/or NP-internal FPs undergo covert movement and examine their positions after the movement. In this subsection, as a part of the determination processes, I will put forth analyses for NP-external FPs and NP-internal FPs.

As noted above, works in the generative grammar uniformly treat 'focus-sensitive' particles as having scope properties. Proposed analyses are thus meant to account for the scope properties, and they are roughly divided into two types. One, exemplified by Ku-

roda 1965, Peters & Karttunen 1979, and Hoji 1985, among others, in effect assumes that an NP plus an FP undergoes covert movement (henceforth the QR analysis). The other, exemplified by Rooth 1985, 1992, and Buring & Hartmann 2001, is based on the theory of association of focus developed in Rooth 1985 (henceforth the Roothian analysis). Given the conclusion above that NP-external FPs can have scope properties while NP-internal FPs cannot, we must consider which should be adopted for NP-external FPs, the QR analysis or the Roothian analysis.^{15, 16} We must, however, seek a new analysis for NP-internal FPs.

4.3.1.2.a. NP-external FPs

Let us begin with NP-external FPs. I will first briefly introduce the QR analysis and the Roothian analysis, along with their fundamental assumptions, and then argue that the QR analysis must be adopted over the Roothian analysis for NP-external FPs.

Proponents for the QR analysis adopt the assumptions in (40) or their notational variants.

(40) Assumptions adopted by the QR analysis

- a. An NP plus an FP (e.g., *only Mary*) is an instance of a generalized quantifier, i.e., of type $\langle et, t \rangle$.

¹⁵ One may wonder if the scope properties associated with NP-external FPs are due to MINOR, an extra-grammatical scope-taking strategy. I assume without further discussion that such is not the case, since (i) one of the necessary conditions for a QP α to take clausal scope due to MINOR is that the speaker refers to a specific group with α , and (ii) an NP plus an FP, both NP-external and NP-internal ones, is difficult to understand as having such a property.

¹⁶ Having excluded the possibility that the scope properties associated with NP-external FPs are due to MINOR, an extra-grammatical scope taking strategy, see FN 15, I assume without further discussion that the scope properties under discussion emerge solely based on LF compositional computation. Assuming that the QR analysis and the Roothian analysis are the only viable options, I will justify myself to chose one for NP-external FPs by rejecting the other.

- b. An NP plus an FP (e.g., *only Mary*) undergoes QR for interpretive purposes, i.e., to avoid a type mismatch problem.

Under this analysis, (41a), for example, is represented as (41b) at LF. The meaning of *only Mary* is roughly (42a), and compositionally combining *only Mary* and *John kissed t*, the scope properties of *only* is derived as in (42b).

(41) a. PF: John kissed only Mary

b. LF: $[_{IP} \text{ only Mary}_1 [_{IP} \text{ John kissed } t_1]]$

(42) a. $\llbracket [_{DP} \text{ only Mary}] \rrbracket$ = the set of all properties p which no one other than Mary has

b. $\llbracket [_{IP} \text{ only Mary}_1 [_{IP} \text{ John kissed } t_1]] \rrbracket$ = the set of worlds in which the property of John's kissing is one which no one other than Mary has

We now turn to the Roothian analysis whose crucial assumptions are summarized in (43).¹⁷

(43) Assumptions adopted by the Roothian analysis

- a. No element needs to undergo QR.
- b. *Focus* is a grammatical concept: focused elements are marked at LF with 'F', which is realized as a pitch accent on the main stress-bearing syllable.
- c. Each node is interpreted with its *ordinary semantic value* and its *focus semantic value*.

¹⁷ I acknowledge that the clear exposition by Büring & Hartmann (2001) facilitated my understanding of the Roothian analysis.

- i. The focus semantic value of any node X, $\llbracket X \rrbracket^f$, consists of a set of alternatives to its ordinary semantic value $\llbracket X \rrbracket$.
- ii. The set of alternatives is derived by substitution of the meaning of the focused constituent by alternatives.
- iii. If X contains no 'F' at all, $\llbracket X \rrbracket^f$ is the singleton set containing X's ordinary semantic value, e.g., $\llbracket \text{kissed} \rrbracket^f = \{ \llbracket \text{kissed} \rrbracket \}$

To illustrate how this analysis derives the scope properties associated with FPs, let us consider (44), where the capitalization of *Mary* indicates that it receives a pitch accent on the main stress-bearing syllable.

- (44) a. PF: John kissed only MARY.
 b. LF: $[_{IP} \text{ John kissed only Mary}_F]$

First of all, the phonetic form in (44a) corresponds to the LF in (44b), where 'F'-making is placed on *Mary*. As mentioned above, this analysis crucially assumes that each node is interpreted with its ordinary semantic value and its focus semantic value, i.e., (43c). The ordinary and focus semantic values of *Mary*, for example, are (45a) and (45b), respectively.

- (45) a. $\llbracket [_{DP} \text{ Mary}_F] \rrbracket =$ the set of all properties p which Mary has.
 b. $\llbracket [_{DP} \text{ Mary}_F] \rrbracket^f =$ the set of all sets P of properties p such that there is an alternative to Mary who has the properties p in P.

Assuming the interpretive rule for *only* in (46), which manipulates ordinary and focus semantic values, we can derive the ordinary and focus semantic values of *only Mary* as in (47a) and (47b), respectively.

(46) The interpretive rule for *only* (= Büring & Hartmann 2001 (31), p.248)

If A is of type $\langle \alpha, t \rangle$, *only A* is of type $\langle \alpha, t \rangle$, too, and $\llbracket \textit{only A} \rrbracket$ is the set of all B of type α such that B has the property $\llbracket A \rrbracket$ (i.e., $B \in \llbracket A \rrbracket$), and no other property that is an alternative to that (i.e., in $\llbracket A \rrbracket^f$); $\llbracket \textit{only A} \rrbracket^f = \{\llbracket \textit{only A} \rrbracket\}$.

(47) a. $\llbracket [\textit{DP only Mary}_F] \rrbracket$ = the set of all properties p that Mary has and that no alternative to Mary has.

b. $\llbracket [\textit{DP only Mary}_F] \rrbracket^f = \llbracket [\textit{DP only Mary}_F] \rrbracket$

And, compositionally combining the semantic values of *only Mary* and those of the rest of the sentence, the scope properties of *only* can be derived as in (48).

(48) a. $\llbracket [\textit{IP John kissed only Mary}_F] \rrbracket$ = the set of worlds in which the property of John's kissing is one that Mary has and that no alternative to Mary has.

b. $\llbracket [\textit{IP John kissed only Mary}_F] \rrbracket^f = \llbracket [\textit{IP John kissed only Mary}_F] \rrbracket$

I claim, however, that the Roothian analysis cannot be adopted for Japanese for two reasons.¹⁸ As mentioned above, the analysis under discussion manipulates ordinary and focus semantic values. Informally speaking, focus semantic values of a given proposition α is a set of alternative propositions, and it is crucially assumed that the form of alternative propositions is determined by the location of focus, i.e., 'F'-marking at LF. As I demonstrate below, this very assumption seems not to be valid in Japanese, although it appears to be correct in English.

Let us first consider the English sentence in (49a).

¹⁸ The third reason is given in Section 4.3.2, FN 23.

- (49) a. PF: Prof. Kimura introduced JOHN to Mary.
 b. LF: Prof. Kimura introduced John_F to Mary.

Under the Roothian analysis, when (49a) is uttered, its LF must be (49b), and the form of the alternative propositions must be (50). This intuition is supported by the literature such as Rooth 1985, and it is compatible with the fact that (49a) can be felicitously uttered in response to the question in (51).

- (50) $\{p \mid \exists x (\text{person}(x) \wedge p = \text{Prof. Kimura introduced } x \text{ to Mary})\}$
 I.e., {that Prof. Kimura introduced Ken to Mary,
 that Prof. Kimura introduced Jim to Mary,
 that Prof. Kimura introduced Bill to Mary, ... }

- (51) Who did Prof. Kimura introduce to Mary?

Japanese does not work in the same way, however. Under the Roothian analysis, when (52a) is uttered, its LF must be (52b) and the form of the alternative propositions must be (50).

- (52) a. PF: Kimura sensei-wa JOHN-o Mary-ni syookaisita.
 Kimura teacher-TOP John-ACC Mary-DAT introduced
 'Prof. Kimura introduced JOHN to Mary.'

- b. LF: Kimura sensei-wa John_F-o Mary-ni syookaisita.

It seems, however, that when (52a) is uttered, the alternative set cannot be (50). This intuition is confirmed by the fact that (52a) cannot be a felicitous answer to the question in (53). Intuitively, the repetition of *Mary* makes the sentence inappropriate.

- (53) Kimura sensei-wa dare-o Mary-ni syookaisita no.
 Kimura teacher-TOP who-ACC Mary-DAT introduced Q
 'Who did Prof. Kimura introduce to Mary?'

When (52a) is uttered, the possible alternative sets seem to be the ones in (54) instead.

(54) a. $\{p \mid \exists x \exists y (\text{person}(x) \wedge \text{person}(y) \wedge p = \text{Prof. Kimura introduced } x \text{ to } y)\}$

I.e., {that Prof. Kimura introduced Ken to Jane,

that Prof. Kimura introduced Jim to Susan,

that Prof. Kimura introduced Bill to Kati... }

b. $\{p \mid \exists x (\text{person}(x) \wedge p = \text{Prof. Kimura introduced } x \text{ to someone})\}$

I.e., {that Prof. Kimura introduced Ken to someone,

that Prof. Kimura introduced Jim to someone,

that Prof. Kimura introduced Bill to someone, ... }

This intuition is compatible with the fact that (52a) can be felicitously uttered in response to the questions in (55).

(55) a. Kimura sensei-wa dare-o dare-ni syookaisita no.
Kimura teacher-TOP who-ACC who-DAT introduced Q

'Who did Prof. Kimura introduce to whom?'

b. Kimura sensei-wa dare-o syookaisita no.

'Who did Prof. Kimura introduce (to someone)?'

Based on the above observations, I conclude (56), and maintain that the Roothian analysis cannot be adopted for NP-external FPs in Japanese.

(56) In Japanese, the form of the alternative set is NOT determined by focus, i.e., 'F'-marking at LF.

One may counter my conclusion, by saying that focus, 'F'-marking at LF, may not be realized as a pitch accent on the main stress-bearing syllable in Japanese.¹⁹ Admittedly, this possibility remains. But, how can we know the location of focus, 'F'-marking at LF, then? To answer the question is rather difficult, to say the least. Even if one can provide a reasonable answer to this, the Roothian analysis is yet to overcome another counterargument, to which I will come directly.

First, observe that (57a) is infelicitous while (57b) is felicitous, despite the fact that they only differ from each other with respect to the location of the FP.

- (57) a. #Boku-wa kimi-ni-dake meguriau tameni umaretekita.
 I-TOP you-DAT-only meet in:order:to was:born

'I was born in order to meet only you.'

- b. Boku-wa kimi-dake-ni meguriau tameni umaretekita.

'I was born in order to meet only you.'

I interpret this contrast as indicating (58), for the embedded scope reading is infelicitous while the matrix scope reading is felicitous, as indicated in (59).

- (58) a. The scope of NP-external FPs is clause-bounded.
 b. NP-internal FPs may appear to take scope beyond the clause they originate in.

- (59) a. The embedded scope reading

#I was born so that I meet no one other than you.

- b. The matrix scope reading

There is no one other than you that I was born to meet (i.e., my birth is for you!)

¹⁹ I thank John Whitman for making me aware of this possibility (p.c. August 2003).

We can also demonstrate a similar contrast, varying the location of an FP with respect to a postposition, as illustrated in (60), and the contrast between (60a) and (60b) confirms the generalization in (58), since the embedded scope reading is odd while the matrix reading is felicitous, as indicated in (61).

- (60) a. #John-wa Tokyo-de-dake odoru koto-o yumemiteiru.
 John-TOP Tokyo-at-only dance that-ACC is:dreaming

'John is dreaming of dancing only at Tokyo.'

- b. John-wa Tokyo-dake-de odoru koto-o yumemiteiru.

'(Lit.) John is dreaming of dancing at only Tokyo.'

- (61) a. The embedded scope reading

#John is dreaming that there is no place other than Tokyo that he dances at.

- b. The matrix scope reading

There is no place other than Tokyo that John is dreaming to dance at.

I claim that the Roothian analysis cannot account for the generalization that the scope of NP-external FPs is clause-bounded, since in order to derive the scope properties of FPs, this analysis manipulates the type-shifting operation (e.g., the ordinary semantic value of *Mary* is not of type $\langle e \rangle$, but of type $\langle et, t \rangle$, see (45) above), rather than covert movement.²⁰ One may stipulate that an NP plus an NP-external FP undergoes focus movement and such movement is clause-bounded. But such a stipulation forces us to assume that an NP plus an NP-internal FP raises for the same reason, and the generalizations in (58), the contrast between NP-external and NP-internal FPs with regard to the

²⁰ I thank John Whitman for pointing out to me (p.c. August 2003) that this generalization speaks against the Roothian analysis.

locality effects, cannot be accounted for. Hence, I reject the Roothian analysis for NP-external FPs.

The QR analysis, on the other hand, does not face the problems the Roothian analysis fails to overcome. First, it need not assume focus, 'F'-marking at LF, to be a grammatical notion. Second, it can naturally account for the generalization that the scope of NP-external FPs is clause-bounded, provided that QR is clause-bounded. I thus adopt the QR analysis for NP-external FPs. For the sake of concreteness, I provide two sets of sample derivations in (62)-(65).

(62) a. PF: John-ga Mary-ni-dake soodansita (koto).

'(That) John consulted only with Mary.'

b. LF: [_{IP} Mary-ni-dake₁ [_{IP} John-ga t₁ soodansita]]

(63) a. [[Mary-ni-dake]] = the set of all properties p which no one other than Mary has.

b. [[John-ga Mary-ni-dake soodansita]] = the set of worlds in which the property of John's consulting is one which no one other than Mary has

(64) a. PF: John-ga Mary-ni-sae soodansita (koto).

'(That) John consulted even with Mary.'

b. LF: [_{IP} Mary-ni-sae₁ [_{IP} John-ga t₁ soodansita]]

(65) a. [[John-ni-sae]] = the set of all properties p which each person in a given context

α has and John is the least likely person to have in α .

- b. $\llbracket \text{John-ga Mary-ni-dake soodansita} \rrbracket$ = the set of worlds in which the property of John's consulting is one which each person in a given context α has and John is the least likely person to have in α .

4.3.1.2.b. NP-internal FPs

Let us now turn to the analysis of NP-internal FPs. As noted above, neither the QR analysis nor the Roothian analysis can be adopted for NP-internal FPs, for both are meant to capture the scope properties of FPs, and NP-internal FPs cannot be considered as having scope properties (though they appear to have them when simple cases are considered). We thus need a new analysis for NP-internal FPs.

I claim that the phonetic string in (66a), for example, is represented as (66b) at LF, and interpreted as in (67). Note that we must assume that *Mary-dake-ni* 'with only Mary' stays in situ in order to account for the generalization in (58b); see also FN 21 for another piece of evidence in support of the assumption.

(66) a. PF: John-ga Mary-dake-ni soodansita (koto).

'(Lit.) (That) John consulted with only Mary.'

b. LF: $[_{IP} \text{John-ga Mary-dake-ni soodansita}]$

(67) a. $\llbracket \text{Mary-dake-ni} \rrbracket$ = Mary, who is the unique individual that satisfies the contextually most salient proposition under consideration.

b. $\llbracket \text{John-ga Mary-dake-ni soodansita} \rrbracket$ = the set of worlds in which John consulted with Mary, who is the unique individual that satisfies the contextually most salient proposition under consideration.

Similarly, I maintain that the phonetic string in (68a) is represented as (68b) at LF, and interpreted as in (69).

- (68) a. PF: John-ga Mary-sae-ni soodansita (koto).
 '(Lit.) (That) John consulted with even Mary.'
- b. LF: [_{IP} John-ga Mary-sae-ni soodansita]
- (69) a. \llbracket Mary-sae-ni \rrbracket = Mary, who is the least likely individual that satisfies the contextually most salient proposition under consideration.
- b. \llbracket John-ga Mary-sae-ni soodansita \rrbracket = the set of worlds in which John consulted with Mary, who is the least likely individual that satisfies the contextually most salient proposition under consideration.

Notice that the proposed analysis can account for the apparent scope properties of NP-internal FPs. In the cases of (66a) and (68a), assuming the contextually most salient proposition to be *John consulted with x*, the derived meanings become indistinguishable from the meanings of the NP-external FPs counterparts. Furthermore, the observations regarding (57b) and (60b) above that NP-internal FPs appear to take scope wider than the clause they originate in are consistent with the proposed analysis. In the case of (57b), for example, we may assume the contextually most salient proposition to be *I was born in order to meet x*.

One may wonder how we can account for the observations in Section 4.3.1.1 that (31b), (34b), and (37b) can be truthfully uttered in the situations, (32b), (35b), and (38b), but not in the situations, (32a), (35a), and (38a), respectively, with which I have argued that NP-internal FPs do not have scope properties.

Under the proposed analysis, (31b), which is repeated here as (70a), for example, is interpreted as (70b).

- (70) a. John-wa Kimura sensei-dake-ni email-de soodansita.
'(Lit.) John consulted with only Prof. Kimura through email.'
- b. [[John-wa Kimura sensei-dake-ni email-de soodansita]] = the set of worlds in which John consulted through email with Prof. Kimura, who is the unique individual that satisfies the contextually most salient proposition under consideration.

In order to account for the fact that (70a) can be true in (32b), but not in (32a) (both are repeated here), we must assume that the contextually most salient proposition under consideration must not be (71a); it should be (71b).

- (32) There are two and only two professors, Profs. Kimura and Yamada.
- a. Situation 1
John consulted with Prof. Kimura through email and with Prof. Yamada through phone.
- b. Situation 2
John consulted with Prof. Kimura through email, but with no other person.
- (71) a. John consulted with x through email.
b. John consulted with x.

I assume that the pragmatic principle in (72) rules out (71a), but not (71b).

- (72) Pragmatic Principle (Cf. Kuno's 1978 discourse principles.)
Do not repeat old information in the matrix clause, except a verb and a WA-marked NP.

Given the assumption that the contextually most salient proposition under consideration consists of old information, (72) disallows *email-de* 'through email' in (i) to be part of the

contextually most salient proposition; hence, (71a) is ruled out. Excluding (71a), (71b) is likely to be the proposition under consideration; hence, (70a) cannot be true in the situation, (32a).

4.3.1.3 Experimental Design

Having theoretically characterized NP-external FPs and NP-internal FPs, we are in a position to spell out an experimental design. Once again, to demonstrate that the isomorphism principle holds between a QP and an NP plus an FP, what is necessary is an environment where both of the elements undergo covert movement and their c-command relation after the movement can be examined, provided that the c-command relation prior to the movement can be identified on an independent ground.

First of all, NP-internal FPs cannot be utilized for the demonstration since nothing ensures that an NP plus an NP-internal FP can undergo covert movement. Even if it turns out that my analysis is wrong and it does undergo covert movement, we have no way to examine its position after the movement with respect to a given QP, since it does not have scope properties.

NP-external FPs, on the other hand, seem to be useful. As argued above, the scope properties of NP-external FPs are best accounted for by the QR analysis, which assumes an NP plus an NP-external FP obligatorily undergoes covert movement for interpretation purposes, i.e., to avoid the type-mismatch problem.²¹ Now suppose that a

²¹ We can independently motivate the assumption that an NP plus an NP-external FP obligatorily undergoes covert movement while an NP plus an NP-internal FP need not, using one of the conclusions in Chapter 3. In Chapter 3, we have concluded that the wide scope reading of the QP_{Obj} over the QP_{Sub} in [... QP_{Sub} [... QP_{Obj} ...]] must be due to MINOR, and one of the necessary conditions for MINOR is that all of the clause-mates of the QP_{Obj} must be in an A-position (the conclusion drawn

QP exists as a clause-mate of an NP plus an NP-external FP. In this situation, the QP must undergo covert movement in order to bear clausal scope for the reason that you are familiar with by now. As scope-taking strategies, there are two options available for a QP in general: (i) LF compositional computation (i.e., through covert movement) and (ii) MINOR, an extra-grammatical operation. (Once again, I am assuming that the two ways are the only ways.) But for a QP to take clausal scope due to MINOR, all of the clause-mates of the QP must be in an A-position (the conclusion drawn from the discussions in Chapter 3:Sections 3.3 and 3.5.2).²² Given that an NP plus an NP-external FP obligatorily undergoes covert movement, the possibility of the QP taking clausal scope due to MINOR is excluded; hence, the QP must raise in order to bear clausal scope. Provided that when a QP exists as a clause-mate of an NP plus an NP-external FP, these elements need to undergo covert movement to bear clausal scope, we can examine their c-

from the discussions in Chapter 3:Sections 3.3 and 3.5.2), see FN 6 for the definition of A-position. With the assumption under discussion, we thus predict that the generalizations in (i) emerge.

- (i) a. The wide scope reading of the QP_{Obj} over the QP_{Sub} cannot obtain in [... QP_{Sub} [... QP_{Obj} ...]], if an NP plus an NP-external FP exists as a clause-mate of the QP_{Obj} .
- b. The wide scope reading of the QP_{Obj} over the QP_{Sub} may obtain in [... QP_{Sub} [... QP_{Obj} ...]], even if an NP plus an NP-internal FP exists as a clause-mate of the QP_{Obj} .

As illustrated in (ii), the prediction seems to be borne out; (ii-a) cannot give rise to the wide scope reading of the direct object QP over the subject QP while (ii-b) can.

- (ii) a. Sanninizyoo-no sensei-ga Toyota-ni-dake rei-no hutari-no gakusei-o suisensita.
 three:more-GEN teacher-NOM Toyota-DAT-only that-GEN two-GEN student-ACC recommended
 (to siyoo)
 that suppose
 '(Suppose that) three or more professors recommended the two students only to Toyota.'
- b. Sanninizyoo-no sensei-ga Toyota-dake-ni rei-no hutari-gakusei-o suisensita (to siyoo).
 '(Lit.) (Suppose that) three or more professors recommended the two students to only Toyota.'

²² See FN 6 for the definition of A-position.

command relation after the movement through their scope interaction. In other words, we can safely assume that the following generalizations hold.

- (73) Let a QP be α , and an NP plus an NP-external FP β (where α and β are clause-mates).
- a. α can take wide scope with respect to β iff α c-commands β at LF.
 - b. α can take narrow scope with respect to β iff α is c-commanded by β at LF.

4.3.2. Evidence for isomorphism principle

We are now in a position to demonstrate that the isomorphism principle holds between a QP and an NP plus an NP-external FP. Under the assumption that the isomorphism principle holds between them, we obtain (74), and from (73) and (74), the generalizations in (75) are derived.

- (74) Let a QP be α , and an NP plus an NP-external FP β .
- a. α can c-command β at LF iff α c-commands β prior to covert movement.
 - b. α can be c-commanded by β at LF iff α is c-commanded by β prior to covert movement.

(75) Generalizations with Isomorphism Principle

Let a QP be α , and an NP plus an NP-external FP β (where α and β are clause-mates).

- a. α can take wide scope with respect to β iff α c-commands β , prior to covert movement.
- b. α can take narrow scope with respect to β iff α is c-commanded by β , prior to covert movement.

If the isomorphism principle does not hold between a QP and an NP-CM-FP, on the other hand, the generalizations in (76) should hold.

(76) Generalizations without Isomorphism Principle

Let a QP be α , and an NP plus an NP-external FP β (where α and β are clause-mates).

- a. α may take wide scope with respect to β even if α does not c-command β , prior to covert movement.
- b. α may take narrow scope with respect to β even if α is not c-commanded by β , prior to covert movement.

The following empirical materials indicate that (75) can be maintained, while (76) cannot.²³ First consider (77).

- (77) a. Sanninizyoo-no sensei-ga Toyota-ni-dake John-o suisensita (koto)
 three:more-GEN teacher-NOM Toyota-DAT-only John-ACC recommended that
 '(That) three or more professors recommended John only to Toyota'
- b. Takusan-no gakusei-ga Kimura sensei-ni-dake aisatusita (koto).
 many-GEN student-NOM Kimura teacher-DAT-only greeted that
 '(That) many students greeted only Prof. Kimura'

Under the assumption that the NP₁ c-commands the NP₂ in [NP₁-ga NP₂-o/ni Verb] (cf. Kuroda 1969/70, Hoji 1985), we expect from the generalizations in (75) that the examples in (77) give rise to the QP>FP reading but not the FP>QP reading. Under the generalizations in (76), on the other hand, we expect that they may give rise to either scope

²³ It should be noted that the generalizations in (75) cannot be accounted for by the Roothain analysis; hence, demonstrating the generalizations, we obtain yet another piece of evidence against the analysis.

orders. Our intuition confirms that they give rise to the QP>FP reading but not the FP>QP reading. (77a), for example, can be taken to mean (78a), but not (78b). We thus conclude that the generalizations in (75) must be adopted over those in (76); in particular, (75b) can be maintained while (76b) cannot.

(78) a. The QP>FP reading

There are three or more x s, x is a professor such that there is no company other than Toyota to which x recommended John.

b. The FP>QP reading

There is no company other than Toyota such that there are three or more x s, x is a professor such that x recommended John to it.

We can truth-conditionally substantiate the intuition that (77a) can be taken to mean (78a), but not (78b), by considering the situations in (79).

(79) There are six and only six professors, A, B, C, D, E, and F, and three and only three companies, Toyota, Nissan, and GM.

a. Situation 1

A, B, and C all recommended John to Toyota, but not to Nissan or GM.

D, E, and F all recommended John to GM, but not to Toyota or Nissan.

b. Situation 2

A recommended John to Toyota and Nissan, but not to GM.

B and C recommended John to Toyota, but not to Nissan or GM.

D recommended John to Nissan, but not to Toyota or GM.

E and F recommended John to GM, but not to Toyota or Nissan.

The situation in (79a) is a situation where there are three professors who recommended John only to Toyota, and it is not the case that Toyota is the only company to which three professors recommended John. In (79a), therefore, the reading in (78a) is true, but that in (78b) is false. The situation in (79b) is the opposite case, in which it is not the case that there are three professors who recommended John only to Toyota, but Toyota is the only company to which three professors recommended John. In (79b), therefore, the reading in (78a) is false, but that in (78b) is true. The fact confirms the generalizations under discussion, i.e., the sentence in (77a) is true in (79a) but false in (79b).²⁴

A similar illustration can be given with *sae* 'even'. The examples in (80), for instance, give rise to the QP>FP reading but not the FP>QP reading.

- (80) a. Sanninizyoo-no sensei-ga Toyota-ni-sae John-o suisensita (koto)
 three:more-GEN teacher-NOM Toyota-DAT-even John-ACC recommended that
 '(That) three or more professors recommended John even to Toyota'

²⁴ If we replace the NP-external FPs of the examples in (77) with the NP-internal FPs, a different picture emerges. As illustrated in (i), they appear to give rise to both the QP>FP reading and the FP>QP reading; (i-a), for example, appears to allow both of the readings in (78).

- (i) a. Sanninizyoo-no sensei-ga Toyota-dake-ni John-o suisensita (koto)
 three:more-GEN teacher-NOM Toyota-only-DAT John-ACC recommended that
 '(Lit.) (That) three or more professors recommended John to only Toyota'
 b. Takusan-no gakusei-ga Kimura sensei-dake-ni aisatusita (koto).
 many-GEN student-NOM Kimura teacher-only-DAT greeted that
 '(That) many students greeted only Prof. Kimura'

This observation seems compatible with the proposed analysis for NP-internal FPs above. Under the analysis, *Toyota-dake-ni* 'to only Toyota' in (i-a), for example, is taken to mean *Toyota, who is the only individual that satisfies the contextually most salient proposition under consideration*. When the contextually most salient proposition in this situation is understood to be: *there are three or more xs, x is a professor, such that x recommended John to y*, a reading analogous to the FP>QP reading emerges. When the contextually most salient proposition in this situation is: *the same set of three or more professors recommended John to y*, a reading analogous to the QP>FP reading is derived.

- b. 15%izyoo-no toosika-ga Toyota-ni-sae toosisita (to syoo).
 15%:more-GEN investor-NOM Toyota-DAT-even invested that suppose

'(Suppose that) 15% or more of the investors invested even in Toyota.'

We can, for example, substantiate the intuition that (80a) can be understood to mean (81a), but not (81b), by considering the situations in (82).

- (81) a. The QP>FP reading

There are three or more x s, x is a professor such that each company in a given context α has the property that x recommended John to it and Toyota is the least likely company to have that property in α .

- b. The FP>QP reading

Each company in a given context α has the property that there are three or more x s, x is a professor such that x recommended John to it and Toyota is the least likely company to have that property in α .

- (82) Toyota, Nissan, and Honda are under discussion. The professors relevant to the context are only A, B, C, D, E, F, and G.

- a. Situation 1

A, B, and C, but not D, E, F, or G, recommended John to Toyota.

A, B, and C, but not D, E, F, or G, recommended John to Nissan.

A, B, and C, but not D, E, F, or G, recommended John to Honda.

For A, B, and C, Toyota is the least likely company to recommend John to.

But Nissan is the least likely company to have the property that three or more professors recommend John to it.

b. Situation 2

A, B, and C, but not D, E, F, and G, recommended John to Toyota.

B, C, and D, but not A, E, F, and G, recommended John to Nissan.

A, B, and D, but not C, E, F, and G, recommended John to Honda.

Toyota is the least likely company to have the property that three or more professors recommend John to it.

In (82a), the reading in (81a) is true, but that in (81b) is false; however, in (82b), the reading in (81a) is false, but that in (81b) is true. The fact seems to be that (80a) can be truthfully uttered in (82a), but not in (82b), supporting the conclusion that the generalizations in (75) must be adopted over those in (76), in particular, (75b) can be maintained while (76b) cannot.^{25, 26}

We receive further support for the generalization in (75b) by comparing the examples in (77) with their 'scrambling' counterparts in (83).

- (83) a. Toyota-ni-dake sanninzyoo-no sensei-ga John-o suisensita (koto)
 Toyota-DAT-only three:more-GEN teacher-NOM John-ACC recommended that
 '(Lit.) (That) only to Toyota, three or more professors recommended John'
- b. Kimura sensei-ni-dake takusan-no gakusei-ga aisatusita (koto).
 Kimura teacher-DAT-only many-GEN student-NOM greeted that
 '(Lit.) (That) only Prof. Kimura, many students greeted'

²⁵ A remark similar to the one in FN 24 applies here.

²⁶ English facts seem to support the generalizations under discussion as well. The examples in (i), for instance, give rise to the QP>FP reading, but not the FP>QP reading.

- (i) a. Three professors recommended John only to Toyota.
 b. 10% of the professors introduce John even to Mary.

The examples in (83), unlike those in (77), give rise to the FP>QP reading, in addition to the QP>FP reading. (83a), for example, seems to give rise to both of the readings in (78), and this intuition is truth-conditionally substantiated because it can be truthfully uttered in both of the situations in (79). Given the assumption that the NP₂ can c-command, or be c-commanded by, the NP₁ in the configuration of [NP₂-*ni/o* NP₁-*ga* Verb], prior to covert movement (cf. Hoji 1985, Ueyama 1998, 2002), the contrast between (77) and (83) with regard to the availability of the FP>QP reading is consistent with the generalization in (75b), but not with that in (76b).

Let us now turn to a demonstration that the generalization in (75a) can be maintained while that in (76a) cannot, and for this purpose, consider (84).

- (84) a. Kimura sensei-wa Toyota-ni-dake sanninzyoo-no gakusei-o suisensita.
 Kimura teacher-TOP Toyota-DAT-only three:more-GEN student-ACC recommended
 '(Lit.) Prof. Kimura recommended only to Toyota three or more students.'
- b. Kimura sensei-wa John-ni-dake 10%izyoo-no hon-o susumeta.
 Kimura teacher-TOP John-DAT-only 10%:more-GEN book-ACC recommended
 '(Lit.) Prof. Kimura recommended only to John 10% or more of the books.'

Under the assumption that the NP₂ c-commands the NP₃ in the configuration of [NP₁-*ga* NP₂-*ni* NP₃-*o* Verb], prior to covert movement (cf. Hoji 1985 and Hayashishita 2000b), the generalizations in (75) lead us to expect that the examples in (84) give rise to the FP>QP reading but not the QP>FP reading. Under the generalizations in (76), on the other hand, we expect that they may give rise to both of the readings. According to our intuition, the facts are what the generalizations in (75) lead us to expect; (84a), for example, can be taken to mean (85b), but not (85a). Hence, I conclude that (75a) can be maintained while (76a) cannot.

(85) a. The QP>FP reading

There are three or more x s, x is student such that there is no company other than Toyota to which Prof. Kimura recommended x .

b. The FP>QP reading

There is no company other than Toyota such that there are three or more x s, x is a student such that Prof. Kimura recommended x to it.

The following situations, for example, allow us to truth-conditionally substantiate the intuition that (84a) gives rise to (85b), but not (85a).

(86) There are six and only six students, A, B, C, D, E, and F, and three and only three companies, Toyota, Nissan and GM.

a. Situation 1

Prof. Kimura recommended A, B, and C to Toyota but not to Nissan or GM.

Prof. Kimura recommended D, E, and F to GM, but not to Toyota or Nissan.

b. Situation 2

Prof. Kimura recommended A to Toyota and Nissan, but not to GM.

Prof. Kimura recommended B and C to Toyota, but not to Nissan or GM.

Prof. Kimura recommended D to Nissan, but not to Toyota or GM.

Prof. Kimura recommended E and F to GM, but not to Toyota or Nissan.

(86a) is a situation where there are three students who Prof. Kimura recommended only to Toyota, and it is not the case that Toyota is the only company to which Prof. Kimura recommended three students. In (86a), therefore, (85a) is true, but (85b) is false. The situation in (86b) is the opposite case. It is a situation where it is not the case that there are three students who Prof. Kimura recommended only to Toyota, but Toyota is the

only company to which Prof. Kimura recommended three students. In (86b), therefore, (85b) is true, but (85a) is false. The fact seems to be that (84a) can be truthfully uttered in (86b) but not in (86a), confirming the generalizations in (75).²⁷

Let us go through a similar illustration with *sae* 'even'. The examples in (87), for instance, give rise to the FP>QP reading but not the QP>FP reading.

- (87) a. Kimura sensei-wa Toyota-ni-sae sanninzyoo-no gakusei-o suisensita.
Kimura teacher-TOP Toyota-DAT-even three:more-GEN student-ACC recommended

'(Lit.) Prof. Kimura recommended even to Toyota three or more students.'

- b. Kimura sensei-wa John-ni-sae 10%izyoo-no zidoosya gaisya-o
Kimura teacher-TOP John-DAT-even 10%:more-GEN car company-ACC

syookaisita.
introduced

'(Lit.) Prof. Kimura introduced even to John 10% or more of the automobile companies.'

The fact that (87a) can be taken to mean (88b), but not (88a), for example, can be truth-conditionally substantiated by considering the situations in (89).

²⁷ The examples in (i) contrast with those in (84), and they give rise to both the QP>FP reading and the FP>QP reading. This observation seems compatible with the proposed analysis for NP-internal FPs above for the reason mentioned in FN 24.

- (i) a. Kimura sensei-wa Toyota-dake-ni sanninzyoo-no gakusei-o suisensita.
Kimura teacher-TOP Toyota-only-DAT three:more-GEN student-ACC recommended
'(Lit.) Prof. Kimura recommended to only Toyota three or more students.'
- b. Kimura sensei-wa John-dake-ni 10%izyoo-no hon-o susumeta.
Kimura teacher-TOP John-only-DAT 10%:more-GEN book-ACC recommended
'(Lit.) Prof. Kimura recommended to only John 10% or more of the books.'

(88) a. The QP>FP reading

There are three or more x s, x is a student such that each company in a given context α has the property that Prof. Kimura recommended x to it, and Toyota is the least likely company to have that property in α .

b. The FP>QP reading

Each company in a given context α has the property that there are three or more x s, x is a student such that Prof. Kimura recommended x to it, and Toyota is the least likely company to have that property in α .

(89) Toyota, Nissan, and Honda are under discussion. The students relevant to the context are only A, B, C, D, E, F, and G.

a. Situation 1

Prof. Kimura recommended A, B, and C, but not D, E, F, and G, to Toyota.

Prof. Kimura recommended A, B, and C, but not D, E, F, and G, to Nissan.

Prof. Kimura recommended A, B, and C, but not D, E, F, and G, to Honda.

For A, B, and C, Toyota is the least likely company for Prof Kimura to recommend them to.

But Nissan is the least likely company to have the property that Prof. Kimura recommends three or more students to it.

b. Situation 2

Prof. Kimura recommended A, B, and C, but not D, E, F, and G, to Toyota.

Prof. Kimura recommended B, C, and D, but not A, E, F, and G, to Nissan.

Prof. Kimura recommended A, B, and D, but not C, E, F, and G, to Honda.

Toyota is the least likely company to have the property that Prof. Kimura recommends three or more students to it.

In (89a), the reading in (88a) is true, but that in (88b) is false; however, in (89b), the reading in (88a) is false, but that in (88b) is true. The fact seems to be that (87a) can be truthfully uttered in (89b), but not in (89a), supporting the conclusion that the generalizations in (75) must be adopted over those in (76), in particular, (75a) can be maintained while (76b) cannot.²⁸

Once again, we can further confirm the generalization in (75a) by considering 'scrambling' examples. For instance, the examples in (90) contrast with those in (84) in that the former, but not the latter, gives rise to the QP>FP reading, in addition to the FP>QP reading.

- (90) a. Kimura sensei-wa sanninzyoo-no gakusei-o Toyota-ni-dake suisensita
Kimura teacher-TOP three:more-GEN student-ACC Toyota-DAT-only recommended

'Prof. Kimura recommended three or more students only to Toyota.'

- b. Kimura sensei-wa 10%izyoo-no hon-o John-ni-dake susumeta.
Kimura teacher-TOP 10%:more-GEN book-ACC John-DAT-only recommended

'Prof. Kimura recommended 10% or more of the books only to John.'

Under the assumption that the NP₃ can c-command, or be c-commanded by, the NP₂ in the configuration of [NP₁-ga NP₃-o NP₂-ni Verb], prior to covert movement (cf. Hoji 1985 and Kitagawa 1994), the contrast can be accounted for by the generalization in (75a), but not by that in (76a).²⁹

²⁸ A remark similar to the one in FN 27 applies here.

²⁹ A remark similar to the one in FN 10 applies here.

In summary, we have observed that the generalizations in (75), repeated here, hold.

(75) Generalizations with Isomorphism Principle

Let a QP be α , and an NP plus an NP-external FP β (where α and β are clause-mates).

- a. α can take wide scope with respect to β iff α c-commands β , prior to covert movement.
- b. α can take narrow scope with respect to β iff α is c-commanded by β , prior to covert movement.

Given that (75) can be straightforwardly accounted for under the assumption that the isomorphism principle holds between a QP and an NP plus an NP-external FP, together with the inherent properties of both of the elements, (75) demonstrates the effects of the isomorphism principle.³⁰

4.4. Summary and additional remarks

In summary, I have argued above that the isomorphism principle in (3) holds (i) between a QP and a referential expression, and (ii) between a QP and an NP plus an FP. (3) is repeated here for convenience.

³⁰ As in the case of the previous demonstration in Section 4.2, one may wonder if the generalizations in (75) can be replaced with those in (i). Such is however not the case, given the facts mentioned above that the examples in (83) give rise to the QP>FP reading, and those in (90) allow the FP>QP reading.

(i) Generalizations with Linear Principle

Let a QP be α , and an NP plus an NP-external FP β (where α and β are clause-mates).

- a. α can take wide scope with respect to β iff α precedes β , prior to covert movement.
- b. α can take narrow scope with respect to β iff α is preceded by β , prior to covert movement.

(3) Isomorphism Principle

When two noun phrases, α and β , undergo covert movement, their c-command relation prior to the movement cannot be altered.

This chapter thus confirms the generalization in Chapter 3 that in the configuration of [... QP_{Sub} [... QP_{Obj} ...]], the wide scope reading of the QP_{Sub} over the QP_{Obj} may obtain based on the LF in (2a) while that of QP_{Obj} over the QP_{Sub} is not based on the LF in (2b), supporting the thesis that the former may emerge through LF compositional computation while the latter does not. (2) is also repeated here for convenience.

(2) (Ψ stands for an element that denotes a one-place predicate.)

a. LF: [Ψ QP_{Sub} [Ψ QP_{Obj} [Ψ ... t_{Sub} [... t_{Obj} ...]]]]

b. LF: [Ψ QP_{Obj} [Ψ QP_{Sub} [Ψ ... t_{Sub} [... t_{Obj} ...]]]]

Before leaving this chapter, I would like to make a remark on the nature of the isomorphism principle itself. Although I have argued for the isomorphism principle above, this principle is difficult to state in terms of theoretical primitives. In the general framework of the minimalist program (cf. Chomsky 1995), for example, covert movement is stated in terms of Copy and Merge. Thus, the incorporation into the grammar of this principle as it is stated requires us to put constraints on these primitive operations. It would therefore be desirable to derive its effects of this principle independently.

In Chapter 3, I have argued that the *shortest move* principle in (91) is an absolute principle, contra Fox (2000), who claims that a QP, after moving to the closest position in which it is interpretable, can continue to raise as long as the *scope economy* principle is not violated.

(91) (= Fox 2000:Ch.2 (6), p.23)

Shortest Move

QR must move a QP to the closest position in which it is interpretable. In other words, a QP must always move to the closest clause-denoting element that dominates it.

Given (91) as an absolute principle, together with the isomorphism principle, it is always the case that the landing site of a given QP after covert movement is identified from its pre-movement position. It would therefore be possible to remove covert movement from the generative procedure of the grammar altogether, and the problem alluded to above would cease to be a problem. Acknowledging a number of arguments for covert movement (cf. Mar 1985:Ch.1), however, I leave open the issue of whether or not covert movement can be dispensed with, and continue to assume covert movement with the two principles in the following chapters.