Evaluating the Lexical Hypothesis about *Otagai* [*]

Hajime Hoji
University of Southern California

This paper explores how the *hypothetico-deductive* method can be applied to research concerned with the properties of the language faculty by illustrating how it can be applied to the language-particular hypothesis that *otagai* in Japanese is a local anaphor. The paper adopts Chomsky's (1993) conception of the Computational System (hypothesized to be at the center of the language faculty) and considers informant judgments to be a major source of evidence for or against hypotheses about the Computational System. Given that informants' acceptability judgments can be affected by various non-grammatical factors, it is imperative, for the purpose of putting our hypotheses to rigorous test, that we have a reasonably reliable means to identify informant judgments as a likely reflection of properties of the Computational System (or properties of the language faculty that are directly related to the Computational System). The paper suggests a means to do so. I maintain that we are led to some version of it once we adopt the basic assumptions noted above, along with the research heuristic, explicitly advocated by K. Popper, that we should maximize our chances of learning from errors; cf. Popper 1963. The paper then examines, in accordance with the proposed method, the predictions made under the lexical hypothesis that *otagai* is a local anaphor and shows that the predictions are not borne out. If what underlies a local anaphor is closely related to "active functional categories" in the sense of Fukui 1986 and if, as suggested in Fukui 1986, the mental lexicon of speakers of Japanese lacks them altogether, this result is as expected.

Key Words

hypothetico-deductive method, language faculty, Computational System, model of judgment making, confirmation and disconfirmation of a prediction, *confirmed schematic asymmetries*, local anaphors, *otagai*, Japanese

1. Introduction

It is widely, and at one point almost universally, assumed in the recent generative grammatical works that *otagai* in Japanese is a reciprocal anaphor corresponding to English *each other*, and hence a local anaphor. The distribution of *otagai* and "its antecedent" has been addressed and used in various works as a probe into the nature of Scrambling, the applicability of Binding Theory to Japanese, the nature of reciprocity in natural language, the status of the subject(s) in Japanese, etc.[1] It is interesting to observe that this assumption—which is in fact a lexical hypothesis concerning *otagai*—has been accepted *despite* the demonstration that it cannot be upheld, at least since the late 1990s (see note 27 below). This state of affairs seems to be related to, if not due to, the fact that the field of generative

---

[1] Cf. Yang (1994), Kitagawa (1986), Nishigauchi (1992), Saito (1992), Miyagawa (1997) and many others.

grammar at large does not have a clear sense of what counts as a demonstration that a given hypothesis is invalid. This paper addresses this problem by exploring how the *hypothetico-deductive* method can be applied to research concerned with the properties of the language faculty by illustrating how it can be applied to the hypothesis that *otagai* in Japanese is a local anaphor.

2. Methodological preliminaries

2.1. The general scientific method

In the seventh lecture of his 1964 Messenger Lectures at Cornell University "Seeking New Laws," Richard Feynman states:[2]

> In general, we look for a new law by the following process. First we guess it. Then we compute the consequences of the guess to see what would be implied if this law that we guessed is right. Then we compare the result of the computation to nature, with experiment or experience, compare it directly with observation, to see if it works. If it disagrees with experiment, it is wrong. In that simple statement is the key to science. It does not make any difference how beautiful your guess is. It does not make any difference how smart you are, who made the guess, or what his name is—if it disagrees with the experiment, it is wrong. That's all there is to it." (Feynman 1965/94: 150)

Feynman continues the above passage by adding the following "obvious remarks":[3]

> It is true that one has to check a little to make sure that it is wrong, because whoever did the experiment may have reported incorrectly, or there may have been some feature in the experiment that was not noticed, some dirt or something; or the man who computed the consequences, even though it may have been the one who made the guesses, could have made some mistake in the analysis. These are obvious remarks, so when I say if it disagrees with experiment it is wrong, I mean after the experiment has been checked, the calculations have been checked, and the thing has been rubbed back and forth a few times to make sure that the consequences are logical consequences from the guess, and that in fact it disagrees with a very carefully checked experiment. (Feynman 1965/94: 150-1)

This paper sketches how the above-mentioned general scientific method, schematized in (1), can be applied to research concerned with the properties of the language faculty.

(1)   The general scientific method (i.e., the *hypothetico-deductive* method):
        Guess — Computing Consequences — Compare with Experiment

Section 2 addresses methodological issues and makes a proposal for testing our hypotheses about properties of the language faculty. Sections 3 and 4 provide a brief illustration of the proposal; section 3 addresses what predictions are made under the hypothesis that *otagai* is a local anaphor and section 4 provides the results of an experiment disconfirming the predictions. In section 5, it will be pointed out that the experimental results are as expected under the thesis put forth in Fukui 1986.

---

[2] The passages below are taken from Feynman 1965/1994, which is a reproduction of his 1964 Messenger Lectures at Cornell University. The book was originally published in hardcover by BBC in 1965 and in paperback in 1967 by MIT Press. The page references are to the 1994 edition. The Feynman lectures can be viewed at http://research.microsoft.com/apps/tools/tuva/#.

[3] The "obvious remarks" should not be taken as reducing the significance of "the key to science" in the first quote. The point intended in the "obvious remarks" is not that we should not concern ourselves with empirical details and the testability of our hypotheses—that is given—; on the contrary, the point of the "obvious remarks" must be about the importance of empirical (as well as theoretical) rigor. The point seems to be either missed or misrepresented in Boeckx 2006, judging from the way Feynman's remarks are cited there. Similar remarks apply to the way Lakatos' work is cited in Boeckx 2006, as pointed out in Kuroda 2008: footnote 7. See also Newmeyer's 2008 review of Boeckx 2006 for much relevant discussion.

2.2. The goal of generative grammar

I would like to adopt, without discussion, that (i) the main goal of our research in generative grammar is to discover the properties of the Computational System, hypothesized to be at the center of the language faculty, and (ii) a major source of evidence for or against our hypotheses concerning the Computational System is informant judgments, as explicitly stated by N. Chomsky in *Third Texas Conference on Problems of Linguistic Analysis in English* May 9-12, 1958, published in 1962 by the University of Texas.[4]

2.3. The computational system

Minimally, the language faculty must relate 'sounds' (and signs in a sign language) and 'meanings'. A fundamental hypothesis in generative grammar is the existence of the Computational System at the center of the language faculty. Since Chomsky 1993, the Computational System is understood in generative research to be an algorithm whose input is a set of items taken from the mental Lexicon of the speaker of a language and whose output is a pair of mental representations—one underlying 'sounds/signs' and the other 'meaning'. Following the common practice in the generative tradition since the mid 1970s, let us call the former a *PF* (representation) and the latter an *LF* (representation). The model of the Computational System (*CS*) can be schematized as in (2).

(2)   The Model of the Computational System:

$$\text{Numeration } \mu \quad \Rightarrow \quad \boxed{\text{CS}} \quad \Rightarrow \quad \text{LF}(\mu)$$
$$\Downarrow$$
$$\text{PF}(\mu)$$
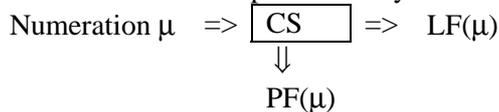
Numeration μ[5]: a set of items taken from the mental Lexicon
LF(μ): an LF representation based on μ
PF(μ): a PF representation based on μ

The PF and the LF representations in (2) are meant to be abstract representations that underlie a sequence of sounds/signs and its 'interpretation', respectively. Our hypotheses about the Computational System are thus meant to be about what underlies the language users' intuitions about the relation between "sounds/signs" and "meanings." The main goal of generative grammar can therefore be understood as demonstrating the existence of such an algorithm by discovering its properties. Construed in this way, it is not language as an 'external object' but the *language faculty* that constitutes the object of inquiry in generative grammar, as stated explicitly in Chomsky 1965: chapter 1.

2.4. The model of judgment making

Given that informant judgments are a primary source of evidence for or against hypotheses concerning the Computational System, it follows that we must have a minimally articulated model of how the informant judgment can be understood to be a reflection of properties of the Computational System. I adopt the following model of judgment making, adapting what is proposed in a series of works by Ayumi Ueyama, including Ueyama 2009.[6, 7]
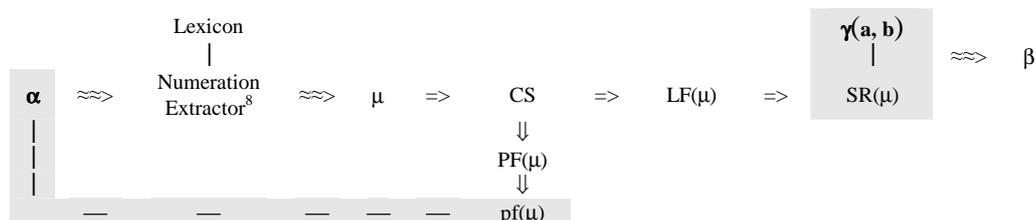
---

[4] Chomsky's remarks in *Third Texas Conference on Problems of Linguistic Analysis in English* May 9-12, 1958, published in 1962 by the University of Texas seem to point directly to what he had in mind at least around 1958, in my view more directly than what we find in his writings in the 1950s and 1960s and the subsequent years. See his remarks on pp. 167-8 in the volume, for example. Obviously, informant judgments are not the only source of evidence. When one seeks evidence elsewhere, however, one must articulate how such 'evidence' is related to the hypothesized properties of the language faculty in a way that makes the hypotheses testable. I take that to be a minimal methodological requirement for using evidence other than informant intuitions for hypotheses about the Computational System as long as the hypotheses are meant to be empirically testable.

[5] The Greek letter μ is used instead of ν because the latter would look like v and that might result in some confusion.

[6] The model in (3) can be understood as characterizing a specialized instance or aspect of the model of

(3)   The Model of Judgment Making by the Informant on **the acceptability of sentence α with interpretation γ(a, b)** (based on A. Ueyama's proposal, adapted and simplified):

```
                        Lexicon                                          γ(a, b)
                           |                                                |        ≈≈>   β
               Numeration                                                 SR(μ)
   α   ≈≈>    Extractor[8]  ≈≈>   μ   =>   CS   =>   LF(μ)   =>
   |                                       ⇓
   |                                     PF(μ)
   |                                       ⇓
    —      —       —    —    —         pf(μ)
```

- a. α: presented sentence
- b. μ: numeration
- c. γ(a, b): the interpretation intended to be *included* in the 'meaning' of α involving expressions *a* and *b*[9]
- d. LF(μ): the LF representation that obtains on the basis of μ
- e. SR(μ): the information that obtains on the basis of LF(μ)
- f. PF(μ): the PF representation that obtains on the basis of μ
- g. pf(μ): the surface phonetic string that obtains on the basis of PF(μ)
- h. β: the informant judgment on the acceptability of α under γ(a, b)

That a numeration is an input to the Computational System (*CS*) and its output representations are LF and PF is indicated by "==>" in (3). Similarly, the arrow between *LF* and *SR* and that between *PF* and *pf* indicate that *SR* obtains based on *LF* and *pf* obtains based on *PF*. What is intended by "≈≈>," on the other hand, is not an input/output relation; and "≈≈>" is used more loosely, as indicated in (4).

(4)   a. Presented Sentence α ≈≈> Numeration Extractor: ... is part of the input to ...
       b. Numeration Extractor ≈≈> numeration μ: ... forms ...
       c. SR(μ) ≈≈> Judgment β: ... serves as a basis for ...

     As discussed in some depth in Hoji 2009, the model of judgment making in (3) is a consequence of adopting the theses, shared by most practitioners of generative grammar, that the Computational System in (2) is at the center of the language faculty and that informant judgments are a primary source of evidence for or against our hypotheses pertaining to properties of the Computational System.

2.5. Informant judgments and fundamental asymmetry

     It seems reasonable to assume that the informant judgment β can be affected by the difficulty in

---

comprehension. It may be well to emphasize, as Ayumi Ueyama points out, that the act of judgment making, more often than not, requires that informant do something that is not involved in ordinary language use. Such idealization in the context of experimentation is necessary in extracting 'information' *pertaining to the properties of the Computational System* from informant judgments, as I hope will be made clear in the ensuing discussion. I should add that it may be an interesting exercise to compare (3) with the model of comprehension discussed in Townsend and Bever 2001.

[7] Hoji 2009: Appendix compares (3) with the model of judgment making suggested in Schütze 1996: 175.

[8] *Numeration Extractor* (in place of *Parser* in the original Ueyama model) is due to Yuki Takubo (p.c., December 2009).

[9] It is argued in Hoji 2009: chapter 5 that informant judgments would be qualitatively more difficult to handle if we dealt with simple (un)acceptability without involving γ(a, b) in regard to attributing the unacceptability in question to a property of the Computational System.

parsing and the unnaturalness of the interpretation of the entire sentence in question.[10] That is to say, even if the informant (eventually) finds numeration μ corresponding to the presented sentence α such that μ results in pf(μ) non-distinct from α and SR(μ) compatible with the interpretation γ(a, b), that may not necessarily result in the informant reporting that α is (fully) acceptable under γ(a, b). On the other hand, if the informant fails to find such μ, the informant's judgment should necessarily be "total unacceptability" on α under γ(a, b) and that is precisely what is predicted when it is deduced from the hypotheses in question that there is no such numeration corresponding to sentence α. This is the source of the fundamental asymmetry between a *Schema-based prediction and an ^{ok}Schema-based prediction in terms of the significance of their failure (to be borne out); the asymmetry will play the most crucial conceptual basis of what will be presented in this paper; see below.

2.6. Empirical rigor, "facts," and *confirmed schematic asymmetries*
Before proceeding further, I would like to turn to the following remarks by Feynman.[11]

> The history of the thing, briefly, is this. The ancients first observed the way the planets seemed to move in the sky and concluded that they all, along with the earth, went around the sun. This discovery was later made independently by Copernicus, after people had forgotten that it had already been made. Now the next question that came up for study was: exactly how do they go around the sun, that is, with exactly what kind of motion? Do they go with the sun as the centre of a circle, or do they go in some other kind of curve? How fast do they move? And so on. This discovery took longer to make. The times after Copernicus were times in which there were great debates about whether the planets in fact went around the sun along with the earth, or whether the earth was at the centre of the universe and so on. Then a man named Tycho Brahe evolved a way of answering the question. He thought that it might perhaps be a good idea to look very very carefully and to record exactly where the planets appear in the sky, and then the alternative theories might be distinguished from one another. This is the key of modern science and it was the beginning of the true understanding of Nature—this idea to look at the thing, to record the details, and to hope that in the information thus obtained might lie a clue to one or another theoretical interpretation. So Tycho, a rich man who owned an island near Copenhagen, outfitted his island with great brass circles and special observing positions, and recorded night after night the position of the planets. It is only through such hard work that we can find out anything.
>
> When all these data were collected they came into the hands of Kepler, who then tried to analyse what kind motion the planets made around the sun. And he did this by a method of trial and error. At one state he thought he had it; he figured out that they went around the sun in circles with the sun off centre. Then Kepler noticed that one planet, I think it was Mars, was eight minutes of arc off, and he decided this was too big for Tycho Brahe to have made an error, and that this was not the right answer. So because of the precision of the experiments he was able to proceed to another trial and ultimately found out three things [i.e., Kepler's three laws of planetary motion, HH]." Feynman (1965/94; pp. 5-6))

Given that "[i]t is only through such hard work that we can find out anything," it is clear that we should bring the utmost rigor to our attempt to identify what the "facts" are. Without being able to identify what is a likely reflection of properties of the Computational System, neither could we specify the consequences of "our guess," nor could we compare them with the results of a "very carefully checked experiment." (See the Feynman remarks quoted at the outset of this paper.)

It is proposed in Hoji 2009 that what we can regard as a likely reflection of properties of the Computational System is a *confirmed schematic asymmetry* such that sentences conforming to one type of Schema are always judged to be totally unacceptable under a specified interpretation while those conforming to the other type of Schema are not necessarily judged to be totally unacceptable. The asymmetry follows from the considerations given in sections 2.2-2.4. In Hoji 2009, the former type of Schema is called a *Schema and sentences conforming to it are called *Examples; the latter type of

---

[10] This assumption, which is in accordance with our experience as researchers, can be shown to be supported by experimental results, as discussed in Hoji 2009.

[11] This is taken from the first lecture of his Messenger Lectures, "The Law of Gravitation: an example of physical law" reproduced in Feynman 1965/1994.

Schema is called an ^{ok}*Schema* and sentences conforming to it are called ^{ok}*Example*s.

We can thus characterize a *Schema*-based prediction and an ^{ok}*Schema*-based prediction as follows:

(5)   A *Schema*-based prediction:
       The informant judgment on the presented sentence α under interpretation γ(*a*, *b*) is *always* "totally unacceptable" for *any *Example* conforming to a *Schema*.

(6)   An ^{ok}*Schema*-based prediction:
       The informant judgment on the presented sentence α under interpretation γ(*a*, *b*) is not necessarily "totally unacceptable" for ^{ok}*Examples* conforming to an ^{ok}*Schema*.

There are two crucial points intended by *schematic asymmetry*. One is that the contrast of significance is not *between examples* but it is *between Schemata*. The other is that the contrast must be such that a *Schema*-based prediction (see (5)) has survived a rigorous test of disconfirmation and furthermore it is accompanied by the confirmation of the corresponding ^{ok}*Schema*-based predictions.

The formulation of a *Schema*-based prediction in (5) is "definitive," so to speak. For an ^{ok}*Schema*-based prediction, on the other hand, there is a continuum of formulations from one extreme (as in (7)) to the other (as in (8)), with (6) falling between the two extremes.

(7)   An ^{ok}*Schema*-based prediction—extreme version 1:
       The informant judgment on the presented sentence α under interpretation γ(*a*, *b*) is not "totally unacceptable" for *at least one* ^{ok}*Example* conforming to an ^{ok}*Schema*.

(8)   An ^{ok}*Schema*-based prediction—extreme version 2:
       The informant judgment on the presented sentence α under interpretation γ(*a*, *b*) is "fully acceptable" for any ^{ok}*Example* conforming to an ^{ok}*Schema*.

The difference between the "definitive" formulation of a *Schema*-based prediction in (5) and the continuum for the formulation of an ^{ok}*Schema*-based prediction is a reflection of the fundamental asymmetry between a *Schema*-based prediction and an ^{ok}*Schema*-based prediction.

Under the formulation of an ^{ok}*Schema*-based prediction as in (6) or (7)—taking the formulation of a *Schema*-based prediction in (5) as 'invariant'—, we can state the fundamental asymmetry as follows: ^{ok}*Schema*-based predictions cannot be disconfirmed and they can only be confirmed; *Schema*-based predictions, on the other hand, can be disconfirmed although they cannot be confirmed. The informant judgment that α is not totally unacceptable under γ(a, b) (even if not fully acceptable) would therefore disconfirm a *Schema*-based prediction because that would mean, contrary to the prediction, that there is numeration μ corresponding to α that would result in LF(μ) (hence SR(μ)) compatible with γ(a, b) and PF(μ) (hence pf(μ)) non-distinct from α. While the *marginal acceptability* would thus disconfirm a *Schema*-based prediction, it would be compatible with, and hence would confirm, an ^{ok}*Schema*-based prediction as formulated in (6) or (7).

If the ultimate testability of our hypotheses lies in their being subject to disconfirmation, it follows that what makes our hypotheses testable is the *Schema*-based predictions they give rise to. To put it differently, it is by making *Schema*-based predictions that we can seek to establish a "fact" that needs to be explained in research that is concerned with the properties of the Computational System and that serves as evidence for or against hypotheses about the Computational System.

Let us say that a predicted *schematic asymmetry* gets confirmed, i.e., a *confirmed schematic asymmetry* obtains iff the informants' judgments on *Examples* are consistently "totally unacceptable" and their judgments on the corresponding ^{ok}*Examples* are not "totally unacceptable." By using the numerical values of "0" and "100" for "total unacceptability" and "full acceptability," respectively, we can more accurately express what we intend as follows: we say that a *confirmed schematic asymmetry* obtains iff the "representative value" of the *Schema* is "0" and that of the corresponding ^{ok}*Schemata* is

higher than "0." [12] On the basis of the considerations given above, I would like to maintain that *confirmed schematic asymmetries* are like "minimal units of facts" for research concerned with the properties of the Computational System.

The **Schema*-based prediction in question must survive a rigorous test of disconfirmation while at the same time the corresponding *[ok]Schema*-based predictions must be confirmed; otherwise, the predicted *schematic asymmetry* does not get confirmed. If the predicted *schematic asymmetry* does not get confirmed, i.e., in the absence of a *confirmed schematic asymmetry*, the hypotheses that have resulted in the prediction of the *schematic asymmetry* should not be used in deducing further theoretical consequences or deriving further empirical predictions. That is one of the main methodological proposals advocated in Hoji 2009.[13]

As noted above, while the requirement on the **Schema*-based prediction is quite strict, how strict the requirement should be on an *[ok]Schema*-based prediction may depend on various factors. We surely cannot expect to be able to convince others if the "representative value" of the *[ok]Schemata* is "10," "20," or "30," for example, on the scale of "0" (for total unacceptability) to "100" (for full acceptability), even if the "representative value" of the corresponding **Schema* is "0." While it is bound to be a subjective matter to determine what the "representative value" of the *[ok]Schemata* should be in order for a *confirmed schematic asymmetry* to obtain, the researchers themselves perhaps should aspire to the "standard" suggested in the formulation of an *[ok]Schema*-based prediction in (8), leaving aside its actual feasibility in every experiment.[14] Be that as it may, I maintain that identifying *confirmed schematic asymmetries* is analogous to the rigorous observation and recording of the positions of planets done by Tycho Brahe; see the Feynman remarks quoted above at the beginning of section 2.5.[15] Without *confirmed schematic asymmetries*, we would not have empirical bases for our research concerned with the Computational System of the language faculty.

2.7. The Significance of experimental results

Before turning to the discussion of empirical materials, I would like to make one last point in relation to the significance of experimental results. Suppose that we have designed and conducted an experiment to see if a predicted *schematic asymmetry* gets confirmed. Suppose that the **Schema*-based prediction does not get disconfirmed and, furthermore, the corresponding *[ok]Schema*-based predictions get confirmed; see (5)-(8) and the discussion thereabout. Does that mean that we are justified to conclude that we now have a *confirmed schematic asymmetry*? Recall that a *confirmed schematic*

---

[12] The "representative value" of a Schema is based on the informant judgments on the Examples that conform to the Schema; see Ueyama 2009 for more details. In actual practice, we must allow some room for the possibility of "errors" committed by informants. We might therefore have to be "content" with something like "5 or less" as the "representative value" of the **Schema*, among the entire informants, on the scale of "0" (for total unacceptability) to "100" (for full acceptability), for example. It must be understood that, if some informants *consistently* find **Examples* of a given **Schema* more or less acceptable, that should be regarded as a serious challenge to the prediction in question *even if* the "representative value" of the **Schema* among the *entire informants* is quite low.

[13] The proposed method is called the *Evaluation of Predicted Schematic Asymmetry* (*EPSA*) method in Hoji 2009.

[14] Hoji 2009 provides a great deal more discussion on the relevant issues, making reference to concepts such as informant's *resourcefulness*, *single-informant experiments* and *multiple-informant experiments*.

[15] One may object that identifying *confirmed schematic asymmetries* is more "theory-driven" than the observation of the motion of the planets because the construction of a **Schema* and the corresponding *[ok]Schemata* is based on hypotheses about properties of the Computational System, hypotheses (which are called *bridging statements* in Hoji 2009) about how a certain type of informant intuition arises only if a certain structural condition is met at LF, and hypotheses (which are called *pf-LF correspondences* in Hoji 2009)—presumably derived from more "basic" hypotheses—about what LF representation(s) a particular surface phonetic string can, cannot, or must correspond to, etc. It is, however, not entirely obvious that such an objection is well justified. After all, the accuracy of the observation of the planetary motions was enhanced (dramatically) by the introduction of various observation devices, including telescopes, and such devices and how to interpret what is "observed" by such devices are products of theories of various phenomena, including optics.

asymmetry obtains iff the **Schema*-based prediction has survived a rigorous disconfirmation attempt and at the same time the corresponding *^{ok}Schema*-based predictions are confirmed. The fact that the result of a particular experiment is in harmony with the prediction therefore does not necessarily mean that we have obtained a *confirmed schematic asymmetry*. For it is possible that the experimental result thus obtained might be crucially due to the particular choice of the lexical items used in the Examples conforming to the Schemata in question. What is claimed by a **Schema*-based prediction is that the informant judges any **Example* (conforming to a **Schema*) to be totally unacceptable under the specified interpretation. While the researcher might have tried his or her best to construct the **Examples* that are most natural and the easiest to parse for the intended interpretation—as he or she in fact should—it is still possible that the researcher did not have enough ingenuity to construct **Examples* conforming to the **Schema* that are not totally unacceptable under the specified interpretation.

Once the predicted experimental results have obtained in his or her own experiment(s), the researcher should therefore invite other researchers to construct **Examples* (as well as *^{ok}Examples*) in accordance with the predicted *schematic asymmetries* and to conduct their own experiments. That is to say, having obtained the expected informant judgments in our own experiment(s) is merely a start in terms of our rigorous disconfirmation attempt. Other interested researchers are thus strongly encouraged to conduct experiments themselves on the basis of the predicted *schematic asymmetries*, and make various adjustments on the lexical items in the actual Examples conforming to the Schemata, doing the best they can to construct **Examples* of the **Schema* that are not totally unacceptable under the specified interpretation. The prediction is that the **Examples* conforming to the **Schema* are totally unacceptable under the specified interpretation no matter what efforts might be made to render the **Examples* not totally unacceptable. If the **Schema*-based prediction(s) did not get a value very close to zero in any of those experiment, such a result would constitute a serious challenge to our hypotheses; we must consider how such informant judgments arise. That *should* be our basic attitude if we are interested in discovering the properties of the Computational System of the language faculty in line with the general scientific method schematized in (1).

If the **Schema*-based prediction does not get disconfirmed in many such experiments, we will finally be in a position to declare, with some confidence, that the **Schema*-based prediction has survived a rigorous disconfirmation attempt, and to the extent that the corresponding *^{ok}Schema*-based predictions get confirmed, we can say, again with some confidence, that we have indeed obtained a *confirmed schematic asymmetry*.[16]

3. *Otagai*: an illustration

3.1. Hypotheses about local anaphors in English

It has been observed at least since the mid 1960s that the informants' judgments on sentences like (9) are in accord with the general pattern as indicated below.

(9)　　a.　*John* recommended *himself*.
　　　　b.　**John* thought that Mary had recommended *himself*.

Attempts have been made to express the contrast as a reflection of the Computational System, resulting in a hypothesis about the Computational System that has the effect in (10) and a hypothesis about the mental Lexicon of speakers of English as in (11), as discussed in Chomsky 1981.

---

[16] The research attitude advocated here is thus quite different from one that takes the presence of *some* contrast between *some* examples for *some* speakers in the predicted direction as evidence in support of the hypotheses that give rise to the prediction under discussion. As argued above, the mere fact that such a contrast obtains between *some* examples for *some* speakers does not mean much for research concerned with the properties of the Computational System in line with the general scientific method schematized in (1). I might add in passing that if a **Schema* does not specify anything about prosody or intonation, the claim must be that **Examples* conforming to the **Schema* is totally unacceptable no matter what prosody/intonation might be used; cf. Miyagawa and Arikawa 2007: 652 (at the end of their section 3) for a remark that seems to be based on a rather different view.

(10)   A [+A] category must have an "antecedent" in its local domain.

(11)   *Himself* is marked [+A] in the mental Lexicon of speakers of English.

By defining "local domain" so as to ensure that in (12) NP2 is, but NP1 is not, in the local domain of NP3, the contrast in (9) is accounted for.[17]

(12)   NP1 Verb [that NP2 Verb NP3]

That is to say, if one puts forth or accepts a hypothesis that expression α is marked [+A], one can make a testable prediction—as long as one also accepts something like (10) and the definition of "local domain" that has the effect noted above. One of the clearest predictions is that sentences containing α are unacceptable if α is an embedded object and is interpreted as sharing the same value as the matrix subject. We can state the predicted *schematic asymmetry* as follows:

(13)   a. ^{ok}*Schema*
             NP V himself
             NP=himself

       b.   *Schema*
             NP1 V that NP2 V himself
             NP1=himself

       c. ^{ok}*Schema*
             NP1 V that NP2 V him
             NP1=him

As suggested above, what is predicted is a *schematic asymmetry*. More specifically, the prediction is that there are no Examples conforming to (13b) that are judged not totally unacceptable while there are Examples conforming to (13a) and (13c) that are judged (more or less) acceptable under the interpretations indicated in (13a) and (13c). We are not going to address here how robust the informant judgments are on the relevant examples; we only note here that an informal survey conducted a few years ago suggests that they are fairly robust and they are in accordance with (13).[18]

3.2. Hypotheses about local anaphors in Japanese

3.2.1. Hypotheses

In much of the generative research over the past 20 years, Japanese expressions such as *otagai*, *zibun-zisin*, and *kare-zisin* have been assumed to be marked [+A] in the sense noted in the preceding subsection, and they have been called *local anaphors* in Japanese. Many generative works dealing with Japanese have provided some paradigm or other in support of such hypotheses and other works have derived and discussed various empirical as well as theoretical consequences by assuming the validity of the lexical hypotheses under discussion.[19] The claim that *otagai*, *zibun-zisin*, and *kare-zisin* are *local*

---

[17] The use of "NP" in place of "DP" here and elsewhere is inconsequential for the issues addressed in this paper..

[18] See Appendix for a summary of the informal survey.

[19] Such works are in fact numerous and they include Katada 1991, Nishigauchi 1992, Saito 1992, 2003, and Takita 2009.

anaphors can be stated as in (14); see (11).[20]

(14) Specifications in the mental Lexicon of speakers of Japanese:
    a. *Otagai* is marked [+A].
    b. *Zibun-zisin* is marked [+A].
    c. *Kare-zisin* is marked [+A].

The properties of the Computational System are assumed to be universal, with the possible exception of the so-called head parameter. The hypothesis that has the effect in (10), repeated here, is considered as being part of the Computational System or is closely related to it, and it is considered universal.

(10)   A [+A] category must have an "antecedent" in its local domain.

A natural application to Japanese of the notion of "local domain" as understood in relation to (12) would lead us to accept that in (15) NP2 is, but NP1 is not, in the local domain of NP3.

(15)   NP1-ga [NP2-ga NP3-{o/ni} to] Verb
           'NP1 Verb that NP2 Verb NP3'

With the language-specific lexical hypotheses in (14) and the universal hypothesis in (10), along with the articulation of "local domains" in Japanese just given, we make testable predictions. We turn to some of them in the following subsection, dealing only with *otagai*.[21]

3.2.2. **Schema*-based predictions and *^{ok}Schema*-based predictions

The predicted *schematic asymmetries* as indicated in (16) and (17) are among the consequences of adopting (10), (14a), and the characterization of the "local domain" as noted above.

(16)   a. ^{ok}*Schema*
             NP-ga/wa [NP1-ga otagai-o/ni V-ru/ta {to/no ka}] V-ru/ta
             NP-NOM/TOP NP1-NOM otagai-ACC/DAT V-pres/past that/wh   V-pres/past

             'NP Verb that/wh NP1 Verb otagai'
             under the reciprocal reading of *otagai* with NP1 as its "antecedent"

    b.   **Schema*
             NP1-ga/wa [NP-ga otagai-o/ni V-ru/ta {to/no ka}] V-ru/ta
             NP1-NOM/TOP NP-NOM otagai-ACC/DAT V-pres/past that/wh V-pres/past

             'NP1 Verb that/wh NP Verb otagai'
             under the reciprocal reading of *otagai* with NP1 as its "antecedent"

    c. ^{ok}*Schema*
             NP1-ga/wa [NP-ga karera-o/ni V-ru/ta {to/no ka}] V-ru/ta
             NP1-NOM/TOP NP-NOM they-ACC/DAT V-pres/past that/wh   V-pres/past

             'NP1 Verb that/wh NP Verb them'
             under the coreference between *karera* and NP1

---

[20] I leave aside the issue as to whether each of (14) is derived from more basic statements; this applies to (11) as well.

[21] The results of some experiments dealing with *zibun-zisin* and *kare-zisin* are reported in Hoji 2009.

(17) a. ^{ok}*Schema*
    [[otagai-o/ni V-ru/ta] NP1]
      otagai-ACC/DAT V-pres/past NP1

    'NP1 that *ec* Verb otagai'   (relative clause)
    under the reciprocal reading of *otagai* with NP1 as its "antecedent"

   b. **Schema*
    [[[NP-ga otagai-o/ni V-ru/ta   {to/no ka}] V-ru/ta] NP1]
      NP-NOM otagai-ACC/DAT V-pres/past that/wh   V-pres/past NP1

    'NP1 that *ec* Verb that/wh NP Verb otagai'   (relative clause)
    under the reciprocal reading of *otagai* with NP1 as its "antecedent"

   c. ^{ok}*Schema*
    [[[NP-ga karera-o/ni V-ru/ta   {to/no ka}] V-ru/ta] NP1]
      NP-NOM they-ACC/DAT V-pres/past that/wh   V-pres/past NP1

    'NP1 that *ec* Verb that/wh NP Verb them'   (relative clause)
    under the coreference between *karera* and NP1

   On the basis of the Schemata in (16), we can construct the Examples in (18) and (19).

(18) a. ^{ok}*Example*
    Mary-wa [*John to Bill*-ga *otagai*-ni toohyoosita to] omoikondeita
    Mary-TOP   John and Bill-NOM otagai-DAT voted   that believed:firmly

    'Mary thought that *John and Bill* had voted for *each other*.'

   b. **Example*
    John to Bill-wa [Mary-ga *otagai*-ni toohyoosita to] omoikondeita
    John and Bill-TOP Mary-NOM otagai-DAT voted   that believed:firmly

    '*John and Bill* thought that Mary had voted for *each other*.'

   c. ^{ok}*Example*
    John to Bill-wa [Mary-ga *karera*-ni toohyoosita to] omoikondeita
    John and Bill-TOP Mary-NOM them-DAT   voted   that believed:firmly

    '*John and Bill* thought that Mary had voted for *them*.'

(19) a. ^{ok}*Example*
    Sensei-wa [*John to Bill*-ga naze *otagai*-o suisensita   no ka] mattaku wakaranakatta
    teacher-TOP John and Bill-NOM why otagai-ACC recommended comp Q at:all   did:not:understand

    'The teacher had no idea why *John and Bill* had recommended *each other*."

   b. **Example*
    John to Bill-wa [sensei-ga naze *otagai*-o suisensita   no ka] mattaku wakaranakatta
    John and Bill-TOP teacher-NOM why otagai-ACC recommended comp Q at:all   did:not:understand

    '*John and Bill* had no idea why the teacher had recommended *each other*."

   c. ^{ok}*Example*
    John to Bill-wa [sensei-ga naze *karera*-o suisensita   no ka] mattaku wakaranakatta
    John and Bill-TOP teacher-NOM why them-ACC recommended comp Q at:all   did:not:understand

    '*John and Bill* had no idea why the teacher had recommended *them*."

On the basis of the Schemata in (17), we can construct the Examples in (20) and (21).

(20) a. *ᵒᵏExample*
      [[*ec* sensyuu-no senkyo-de *otagai*-ni toohyoosita] *John to Bill*]-wa
          last:week-GEN election-at otagai-DAT voted   John and Bill-TOP

      Susan-ga dare-ni toohyoosita ka sitte   odoroita.
      Susan-NOM who-DAT voted   Q know:and were:surprised

      '*John and Bill*, who had voted for *each other* at the election last week, were surprised to learn who Susan had voted for.'

   b. **Example*
      [[*ec* [[Susan-ga sensyuu-no senkyo-de *otagai*-ni toohyoosita] to] omoikondeita]
           Susan-NOM last:week-GEN election-at otagai-DAT voted   that believed:firmly

      John to Bill]-wa Susan-ga dare-ni toohyoosita ka sitte   odoroita.
      John and Bill-TOP   Susan-NOM who-DAT voted   Q know:and were:surprised

      '*John and Bill*, who thought that Susan had voted for *each other* at the election last week, were surprised to learn who Susan had voted for.'

   c. *ᵒᵏExample*
      [[*ec* [[Susan-ga sensyuu-no senkyo-de *karera*-ni toohyoosita] to] omoikondeita]
           Susan-NOM last:week-GEN election-at them-DAT voted   that believed:firmly

      John to Bill]-wa Susan-ga dare-ni toohyoosita ka sitte   odoroita.
      John and Bill-TOP   Susan-NOM who-DAT voted   Q know:and were:surprised

      '*John and Bill*, who thought that Susan had voted for *them* for the election last week, were surprised to learn who Susan had voted for.'

(21) a. *ᵒᵏExample*
      [[*ec* kondo-no yakusyoku-ni *otagai*-o suisensita] *John to Bill*]-wa
          this:time-GEN post-DAT   otagai-ACC recommended John and Bill-TOP

      iroirona hito-ni   meeru-o okutte riyuu-o   setumeisiteiru rasii.
      various   people-DAT email-ACC send:and reason-ACC were:explaining it:seems

      'I hear that *John and Bill*, who had recommended *each other* for the new post, are emailing various people to explain why.'

   b. **Example*
      [[*ec* [Mike-ga kondo-no yakusyoku-ni naze *otagai*-o suisensita   ka] siritagatteita]
          Mike-nom this:time-GEN post-DAT   why   otagai-ACC recommended Q   wanted:to:know

      John to Bill]-wa iroirona hito-ni   meeru-o okut-te riyuu-o   sirabeteiru   rasii.
      John and Bill-TOP   various   people-DAT email-ACC send:and reason-ACC are:investigating it:seems

      'I hear that *John and Bill*, who wanted to know why Mike had recommended *each other* for the new post, are emailing various people to find out why.'

   c. *ᵒᵏExample*
      [[*ec* [Mike-ga kondo-no yakusyoku-ni naze *karera*-o suisensita   ka] siritagatteita]
          Mike-nom this:time-GEN post-DAT   why   them-ACC recommended Q   wanted:to:know

      John to Bill]-wa iroirona hito-ni   meeru-o okut-te riyuu-o   sirabeteiru   rasii.
      John and Bill-TOP   various   people-DAT email-ACC send:and reason-ACC are:investigating it:seems

      'I hear that *John and Bill*, who wanted to know why Mike had recommended *them* for the new post, are emailing various people to find out why.'

The predictions are thus as follows:

(22) The *Schema-based prediction:
      The *Examples conforming to the *Schemata in (16b) and (17b) are totally unacceptable,
      including the (b) examples in (18)-(21).

(23) The ^{ok}Schema-based prediction:
      The ^{ok}Examples conforming to the ^{ok}Schemata in (16a), (17a), (16c) and (17c) are not totally
      unacceptable, including the (a) and (c) examples in (18)-(21).

4. Experiments and results

One can test a *Schema-based prediction and corresponding ^{ok}Schema-based predictions by
checking informant judgments on *Examples and the corresponding ^{ok}Examples, to see if we obtain a
confirmed schematic asymmetry. Here, I would like to briefly introduce the general design of
experiments that we have been conducting.[22]

The examples are presented on-line to the informants, along with the specification of their
intended interpretations. The specifications of the intended interpretations are as in (24), for example,
once translated into English.

(24) a. under the interpretation that "John voted for Bill and Bill voted for John"
      b. under the interpretation that karera 'them' and John to Bill 'John and Bill' refer to the same
          individuals

In an experiment on the predicted schematic asymmetries in (16) and (17), for example, the 12
Examples in (18)-(21) are presented to informants in a random fashion, (i) one at a time or (ii) three at a
time (e.g., those in (18)), depending upon the test type chosen by each informant.

Depending upon the chosen test type, the informants either (i) choose "No" (for "not acceptable no
matter what") or "Yes" (for "(more or less) acceptable") or (ii) indicate how acceptable they find each
example by clicking one of the five radio buttons as in (25).

(25)   Bad < ===== > Good
           o   o   o   o   o

(26)   0, 25, 50, 75, 100

What the informant has indicated is converted to numerical values as in (26), i.e., the worst score is
converted to "0" and the best score to "100." Likewise, the "Yes" or the "No" answer in the "Yes-or-No"
test gets converted to "0" or "100," respectively, although the informants are not informed how their
judgments get converted to numerical values.

The informants are allowed to return to the experiment website and report their judgments in the
same experiment again, and in fact as many times as they wish; they may repeat the same "test type" as
before or choose a different "test type" (as to "Yes-or-No" or "Five-ranking" and also as to "one at a
time," "three at a time" (or "all in one sheet" in some cases)). In the event that one informant has
reported his/her judgment on the same experiment more than once, regardless of the "test type," that
informant's average score on a given example is used when calculating the average score on that
example for the entire informants in the experiment. The results we have obtained so far indicate that
the choice of the "test type" does not make a significant difference.

The *Schema-based predictions under the lexical hypothesis in (14a)—that otagai is marked

---

[22] I should like to acknowledge that the program for the basic design of our on-line experiments has been created by
Ayumi Ueyama.

[+A]—are clearly disconfirmed. Provided in (27) is a summary (as of January 30, 2010) of the results of the experiment on the predicted *schematic asymmetry* in (16) and (17).

(27)

Schema group 1	*Otagai* is in the embedded object position.			
	Schema 1 A	54 values	98	
	Schema 1 B	54 values	63	
	Schema 1 C	54 values	86	
Schema group 2	*Otagai* is in the embedded object position. The intended "antecedent" is the relative head.			
	Schema 2 A	54 values	98	
	Schema 2 B	54 values	59	
	Schema 2 C	54 values	71	
27 participants, 655 answers				

"Schema group 1" is for (16) and "Schema group 2" is for (17). "Schema 1 A" covers the ^{ok}*Examples* in (18a) and (19a), "Schema 1 B" the **Examples* in (18b) and (19b), and "Schema 1 C" the ^{ok}*Examples* in (18c) and (19c). Likewise, "Schema 2 A" covers the ^{ok}*Examples* in (20a) and (21a), "Schema 1 B" the **Examples* in (20b) and (21b), and "Schema 1 C" the ^{ok}*Examples* in (20c) and (21c). "655 answers" means that there have been 655 occurrences of a reported judgment. As noted, some informants have judged the same example more than once; but in such cases the values in (27) are based on the average score on a given example by the same informant.

The values of "Schema 1 B" and "Schema 2 B" should be close to "0" according to the predicted *schematic asymmetries* in (16) and (17). The informant judgments as indicated in (27) thus clearly disconfirm the **Schema*-based predictions based on the lexical hypothesis in (14a).

It may be possible that someone can in the future come up with a way to modify and hence save a version of the lexical hypothesis in (14a), and those in (14b) and (14c); see footnote 23. Several attempts are in fact discussed in Hoji 2009 and it is concluded there that such attempts either end up being *content-reducing* (or *degenerating*) *problemshift* in the terms of Lakatos 1979/1978—resulting only in the elimination of the **Schema*-based prediction without introducing a new **Schema*-based prediction—or simply fail to save the hypotheses under discussion. I leave the challenge of saving those hypotheses in a *theoretically progressive* way to those who wish to make use of them in their theoretical discussion.

5. Fukui's (1986) thesis and the absence of local anaphors in Japanese

While it is not possible to *empirically* demonstrate the *non-existence* of elements in Japanese that are marked [+A]—for it is not possible to *empirically* demonstrate the non-existence of anything—their *non-existence* in Japanese is an immediate consequence if we adopt the thesis put forth in Fukui 1986 (and also in Kuroda 1988 under its reinterpretation in Hoji 1996c). Fukui (1986) proposes that the mental Lexicon of speakers of Japanese does not contain what is responsible for making functional categories "active." Given the assumption that what most crucially underlies a local anaphor is an "active functional category"—cf. Lebeaux 1983 and Chomsky 1986: 175f—it follows that Japanese does not have local anaphors. Given this, the results of the experiments reported above are just as expected. That is to say, the fact that the researchers have so far failed to identify what qualifies as a local anaphor in Japanese *despite* the concerted efforts by a substantial number of practitioners for nearly three decades, is not puzzling, after all.[23]

---

[23] Although I did not discuss experiments on the hypotheses in (14b) and (14c), the **Schema*-based predictions

6. Concluding remarks

This paper started out by considering the basic scientific method, what Feynman calls "the key to science," as schematized in (1), repeated here.

(28)   The general scientific method (i.e., the *hypothetic-deductive* method):
         Guess — Computing Consequences — Compare with Experiment

After pointing out what informant judgments can reasonably be considered as a reflection of properties of the Computational System, I adopted, with slight modification, Ueyama's model of judgment making, and proceeded to examine predictions made under the lexical hypotheses in (14a), also repeated here.

(14)   Specifications in the mental Lexicon of speakers of Japanese:
         a.   *Otagai* is marked [+A].
         b.   *Zibun-zisin* is marked [+A].
         c.   *Kare-zisin* is marked [+A].

The hypotheses in (14), combined with the universal hypothesis in (10), along with the articulation of "local domains" in Japanese noted above, make definite and testable predictions.

As we have observed in section 4, the **Schema*-based predictions under (14a) are clearly disconfirmed.[24] I have also noted that this result is in fact as expected. If what underlies a local anaphor is closely related to an "active functional category" in the sense of Fukui 1986, and if the mental Lexicon of speakers of Japanese lacks "active functional categories" altogether, as suggested in Fukui 1986, the absence of local anaphors in Japanese is exactly what we expect.[25]

Recall that the mere presence of *some* contrast among *some* Examples (for *some* speakers) as predicted by the hypotheses in question does not constitute sufficient ground for a *confirmed schematic asymmetry*. Given the fundamental asymmetry between a **Schema*-based prediction and an [ok]*Schema*-based prediction, what needs to be demonstrated is that the former survives a rigorous disconfirmation attempt and at the same time the latter gets confirmed. Thus, even if there were *some* speakers who detected a significant contrast among *some* relevant Examples in question, that in and by

---

made under those hypotheses have also been disconfirmed.

As H.-D. Ahn (p.c., 12/12/2009) suggests, one might pursue the possibility that the hypotheses in (14) are valid but that *otagai*, *zibun-zisin* and *kare-zisin* always occur in a structural position in which they have a covert "antecedent" in its local domain. While such a move does save (14) from refutation (and one might even claim that it allows us to maintain the thesis that Japanese shares a "universal property" of having [+A] elements), it results in the elimination of the **Schema*-based predictions. Hence that would be a *content-reducing* (or *degenerating*) *problemshift* in the sense of Lakatos 1970/1978. Furthermore, if we accepted the view that what formally underlies a local anaphor is something like an "active functional category," it would be puzzling that there does not seem to be any *confirmed schematic asymmetry* in support of the presence of an "active functional category" in Japanese. (I am not aware of any empirical evidence in support of the existence of DPs in Japanese and of the EPP (feature) in Japanese that forms a *confirmed schematic asymmetry* in accordance with the *EPSA* method advocated here.)

We should also add that being able to save them from refutation would not justify one's use of (14) in making further empirical predictions, in relation to "reconstruction effects" in "scrambling" (i.e., in OSV), for example, because we have not yet obtained any *confirmed schematic asymmetry* in support of (14) in the simplest paradigm involving SOV. Using (14) in making further empirical predictions would go against the research heuristic, explicitly advocated by K. Popper (cf. Popper 1963), that we should maximize our chances of learning from errors.

[24] I have thus concluded that the hypothesis in (14a) should not be used in deducing further theoretical consequences or deriving further empirical predictions if we wish to discover properties of the Computational System and if we wish to maximize our chances of learning something about the Computational System from our failed predictions.

[25] Narita to appear contains interesting discussion pertaining to the Fukui thesis and related issues.

itself would not mean much; it must be demonstrated that the informants judge *any *Example* conforming to the *Schema* totally unacceptable while at the same time judging *[ok]Examples* of the corresponding *[ok]Schema* significantly more acceptable. Although one might wonder if that might be too high a standard for actual research because we perhaps cannot fully control various non-grammatical factor, I should like to mention that it is in fact possible to obtain a *confirmed schematic asymmetry* in accordance with the above-mentioned standard. In experiments on bound variable anaphora and the local disjointness effects of Binding Principle B, the "representative values" of the *Schemata* are lower than "5" (and quite close to "0") in the "0-100" scale while those of the corresponding *[ok]Schemata* are well over "90." The results of such experiments, for which I must refer the readers to (a revised version of) Hoji 2009, thus indicate clearly that the "high standard" is in fact attainable.[26]

In line with the point made in section 2.7, obtaining the expected informant judgments is merely a start in terms of our rigorous disconfirmation attempt. That is to say, other interested researchers should conduct experiments themselves on the basis of the predicted *schematic asymmetries*, making various adjustments on the lexical items in the actual Examples conforming to the Schemata; as noted above, they should do the best they can to construct *Examples* of the *Schema* that are not totally unacceptable under the specified interpretation. The prediction is that the *Examples* of the *Schema* will still be totally unacceptable under the specified interpretation despite such efforts.

It is in light of the above that we must appreciate the significance of the experimental results reported above, which clearly invalidate the lexical hypothesis in (14a). While I would be quite surprised if the *Schema*-based predictions under the lexical hypotheses in (14a) did not get disconfirmed in other "instantiations" of the same experimental design, what is crucial is not whether we might actually obtain experimental results that would be in harmony with the predicted *schematic asymmetries* in accordance with the lexical hypotheses in (14a). Even if we obtained results in harmony with the predicted *schematic asymmetries* in *some* experiments, that would not be nearly as significant as there being a result of an experiment that *disconfirms* the *Schema*-based predictions under the lexical hypotheses in (14a), for the reasons adduced in the preceding discussion.

7. Appendix: An analysis of *otagai*[27]

7.1. Introduction

Given the conclusion reached above that *otagai* is not a local anaphor, one might ask what it might be. In this Appendix, I will point out that the observations about *otagai* that can be summarized in (29)—some of which have already been discussed above—are consistent with the proposals in (30) although puzzling under the hypothesis that *otagai* is a local anaphor.[28]

---

[26] Some of the results of the earlier experiments on some of the relevant *Schema*-based predictions are reported in Hoji 2006a, which is available at: http://www.gges.org/hoji/research/hp-papers.cgi. Those experiments are not nearly as systematic as the current experiments; their results, nonetheless, provide a fairly clear illustration of the point made in the text.

[27] This Appendix is based on Hoji 2006b. *Postscript in 2006* at the end of Hoji 2006b states as follows:

> I have been advocating the view in the preceding pages at least since the spring of 1993. Most of the empirical materials are contained in "*Otagai*," presented at the 16th West Coast Conference on Formal Linguistics, University of Washington, March 2, 1997 and "Movement and Dependency: On the Landing Site of Scrambling," presented at the Stanford University Linguistics Colloquium, May 26, 1995. Some of the arguments are introduced in Ueyama 1998, and Hoji 2003. One might wonder why the hypothesis that has been falsified quite clearly and blatantly has continued to be used in a crucial way in many of the works even up to the present time. The reason, I believe, has to do with the lack of understanding on the part of many practitioners of the significance of *negative predictions* and *falsification* in linguistic science, which is addressed to some extent, but admittedly insufficiently in Hoji 2003.

[28] It should be noted that *otagai* in many of the examples to be supplied below appears in an "argument position" where, according to Pollard and Sag 1992, "exempt anaphors" are not allowed. For many of the examples with

(29) a. The "antecedent" of *otagai* need not be in the local domain of the latter.
    b. The "antecedent" of *otagai* need not c-command the latter as long as the relevant anaphoric relation is that of coreference.
    c. *Otagai* need not have an antecedent.
    d. Split antecedence is possible for *otagai*.
    e. Familiar Weak Crossover (WCO) effects are observed when the "antecedent" of *otagai* is "quantificational" and hence bound variable anaphora is at stake.

(30) Proposals
    a. The internal structure of *otagai* is [$_{NP}$ *pro* [$_N$ *otagai*]][29]
    b. What has been considered as the anaphoric relation between *otagai* and "its antecedent" must be understood as that between the *pro* in [$_{NP}$ *pro* [$_N$ *otagai*]] and the "antecedent" of *pro*.

Under the proposals in (30), the observations in (29) can be restated as in (31).

(31) a. The "antecedent" of *pro* in [*pro* [*otagai*]] need not be in the local domain of [*pro* [*otagai*]].
    b. The "antecedent" of *pro* in [*pro* [*otagai*]] need not c-command the latter as long as the relevant anaphoric relation is that of coreference.
    c. *pro* in [*pro* [*otagai*]] need not have an antecedent.
    d. Split antecedence is possible for *pro* in [*pro* [*otagai*]].
    e. Familiar Weak Crossover (WCO) effects are observed when bound variable anaphora is at stake.

In section 7.2, I will first point out that the reciprocal reading is not the only reading for *otagai* and it is perhaps not the primary reading, judging from the definitions found in major dictionaries. In section 7.3, I will illustrate the relevant observations in (29), restated in (31). I will address the postulation of *pro* in [$_{NP}$ *pro* [$_N$ *otagai*]] in section 7.4 by making reference to the absence of Principle B effects.

7.2. Non-reciprocal readings of *otagai*

Before we start the main discussion, I would like to make some remarks regarding the reciprocal interpretation associated with *otagai*. Despite the common assumption made in the generative works, the reciprocal interpretation is not obligatory for *otagai*.[30] Consider (32), for example.

"exempt anaphors" provided in Pollard and Sag 1992, we can construct analogous Japanese examples with *otagai*. Some of the examples with *otagai*, however, do not have their *each other* analogues; see for example the split antecedence cases in section 7.3.4. In this paper, I will not discuss in any depth the distributional similarities and differences between "exempt anaphors" of Pollard and Sag (1992) and *otagai* (i.e. [*pro* [*otagai*]]), or whether and how the distributional properties that they share can be characterized in a principled manner.

[29] By *pro* I mean a phonetically empty argument, leaving aside the questions in (i) in this paper.
(i) a. whether it is [$_{N(P)}$ *ec*] or [$_{D(P)}$ *ec*], the question that is tied to whether Japanese nominal phrases are NPs or DPs.
    b. whether it has the binding-theoretic [+pronominal] feature.
The proposed structure [$_{NP}$ *pro* [$_N$ *otagai*]] can be translated in terms of the DP analysis of the Japanese nominal phrases, without any consequences, as far as the materials in this paper are concerned. But see Hoji 1995, where it is argued that the empty argument is [$_{N(P)}$ *ec*] and that it does not have the binding-theoretic [+pronominal] feature.

[30] In fact, the typical dictionary definitions of *otagai* do not make reference to reciprocity. There are no entries for *otagai* in *the Sanseido Japanese Language Dictionary 4th Edition* (1972) or *Koozien* (1955). *Otagai* is formed by attaching the prefix *o* to *tagai* and the meaning and the distribution of *otagai* and *tagai* are quite similar, although not completely identical. In fact, *otagai* is used in example sentences under the entry of *tagai*. It thus seems safe to assume that the dictionary definitions of *tagai* are meant to cover *otagai* as well.)
As the definitions for *tagai*, *the Sanseido Japanese Language Dictionary 4th Edition* (1972, p. 770) gives (i) and (ii).

(32)   [John to Bill]$_1$-ga hissininatte [*pro*$_1$ otagai]-o urikondeita (koto)
              John and Bill-NOM   desperately   otagai-ACC was:promoting (fact)

            '[each of John and Bill]$_1$ was promoting himself$_1$ with utmost enthusiasm'

The sentence form in (32) is compatible with the situation described by the English sentence under it. Examples like (33) also illustrate that *otagai* need not yield a reciprocal interpretation.

(33)   [Yamada-san to Suzuki-san]$_1$-wa [*pro*$_1$ otagai]-ga (sorezore)
              Yamada-san   and Suzuki-san-TOP   otagai-NOM (each)

            Pari-ni dekakeru koto-ni natta.
            Paris-to visit   fact-dat   became

            'As for [Yamada and Suzuki]$_1$, it has turned out that they$_1$ (each) will go to Paris.'

Examples such as (32), (33) and other examples to be provided below, which are quite easy to construct, indicate that the semantics of *otagai*, which I do not spell out in this paper, has the effect that the [*pro$_1$ otagai]* in (34), for example, can be understood, in principle, as corresponding to any of (35).

(34)   [John and Bill]$_1$ V ... [*pro*$_1$ otagai] ...

(35) a.   [John and Bill] V ... [John and Bill] ... ("group reading")
       b.   John V ... Bill ... and ... Bill V ... John ...("crossing/reciprocal reading")
       c.   John V ... John ... and ...Bill V ... Bill ... ("parallel/respective reading")

In what follows, the nature of the reciprocal interpretation associated with *otagai* and how it arises will not be addressed. I will only be concerned with the (allegedly) necessary structural relations between *otagai*, more precisely *pro* in [*pro* [*otagai*]], and its "antecedent."

7.3. Observations
    In this section, the five observations recorded in (29) will be illustrated and will be shown to be compatible with the proposals in (30).

7.3.1. Locality
    That *otagai* need not have its "antecedent" in its local domain is illustrated by examples like (36), representing *otagai* in accordance with (30); see section 3.2.2.[31]

(i)   Each individual (each thing) that has a relationship (to that which is under discussion). (In many cases it refers to two people (things).) (This is my translation of *(Sore-ni) kankei-o motu hitori hitori (hitotu hitotu). (Hutari (hutatu no monogoto) nituite yuu bawai-ga ooi)*.)

(ii)   A situation/manner in which the same holds, in some respect, of the two (or more) people (or things) that are related. (This is my translation of *Kankei aru hutari (izyoo) no monogoto-ga aru ten-de onazi de aru yoosu.*)

Koozien (1955, p. 1355) gives (iii) and (iv).

(iii)   Both of the two opposing parties. In particular, both oneself and the other. (This is my translation of *Aitaisuru hutatu no mono no soohoo. Tokuni zibun to aite to.*)

(iv)   The state in which both parties are the same. (This is my translation of *Soohoo-ga dooyoo-de aru koto.*)

[31] We can make one or the other "reading" more salient. Suppose John and Bill hate each other and they are both in love with Mary. Uttered in such a context, the strongly preferred "reading" is the "parallel reading" for (i-a) and the "crossing reading" for (i-b).

(i) a.   [John to Bill]$_1$-wa [$_{CP}$ Mary-ga [*pro*$_1$ otagai]-ni horeteiru to] omotte yorokonde iru

          '[each of John and Bill]$_1$ is rejoicing, thinking that Mary is in love with him$_1$'

      b.   [John to Bill]$_1$-wa [$_{CP}$ Mary-ga [*pro*$_1$ otagai]-ni horeteiru to] omotte gakkari site iru

(36) a. [John to Bill]$_1$-wa [$_{CP}$ Mary-ga [*pro*$_1$ otagai]-ni horeteiru to] omoikondeita
      [John and Bill]-TOP   [Mary-NOM   otagai-DAT   is:in:love   that] believed:firmly

      '[each of John and Bill] believed that Mary was in love with the other.'
      '[each of John and Bill]$_1$ believed that Mary was in love with him$_1$.'

    b. [John to Bill]$_1$-wa [Chomsky-ga naze [*pro*$_1$ otagai]-o suisensita no ka]
      [John and Bill]-TOP   [Chomsky-NOM why   otagai-ACC recommended comp Q]

      wakaranakatta
      did:not:understand

      '[each of John and Bill] did not understand why Chomsky had recommended the other.'
      '[each of John and Bill]$_1$ had no idea why Chomsky had recommended him$_1$.'
      '[John and Bill]$_1$ had no idea why Chomsky has recommended them$_1$'

7.3.2. C-command

Examples like (37) show that the "antecedent" of *otagai* (and of *pro* in [*pro* [*otagai*]] under (30)) need not c-command *otagai* (and hence *pro* in [*pro* [*otagai*]] under (30)) as long as the relevant anaphoric relation is that of coreference, as is independently pointed out in Kuno and Kim 1994.

(37) a. [[*pro*$_1$ otagai]-no koibito]-ga [John to Bill]$_1$-o yuuwakusita
        otagai-GEN   lover-NOM   [John and Bill]-ACC seduced

      (to yuu uwasa-ga matizyuu-no wadai-ni natte ita)
      '(The rumor that) each other$_1$'s lovers seduced [John and Bill]$_1$ (had become a hot topic of the town.)'

    b. [[*pro*$_1$ otagai]-no koibito]-ga [John to Bill]$_1$-ni iiyotta   (koto)
        otagai-GEN   lover-NOM   [John and Bill]-DAT   tried:to:seduce (fact)

      'John's lover tried to seduce Bill, and Bill's lover tried to seduce John.'

7.3.3. Without an antecedent

In examples like (38), there is no "antecedent" for *otagai*, at least in any obvious way.

(38) a. Haru-no atatakana kaze-ga *otagai*-o totemo siawasena kimoti-ni sita.
      Spring-GEN warm   wind-NOM otagai-ACC very   happy   feeling-DAT made

      'The warm spring wind made *otagai* (=both of them) feel very happy.'

    b. *Otagai*-ga manzoku nara, boku-wa monku-o iwanai tumori da.
      otagai-NOM satisfied   if   I-TOP   complaint-ACC say:not plan   copula

---

      '[each of John and Bill] is deeply disappointed, thinking that Mary is in love with the other'
Similarly, (ii-a) has a strong tendency to be taken as corresponding to the "parallel reading" and (ii-b) to the "crossing reading."
(ii) a. (due to Hiro Oshita (p.c. 3/94))
      [John to Bill]$_1$-wa hitobanzyuu [*pro*$_1$ [otagai]]-no minouebanasi-o sita
      John and Bill-TOP all night long   otagai-GEN life:story-ACC did
      '[John and Bill] each revealed their respective life stories all night long'
   b. [John to Bill]$_1$-wa hitobanzyuu [*pro*$_1$ [otagai]]-no minoue:banasi-o kiita
      John and Bill-TOP all night long   otagai-GEN life:story-ACC   listened:to
      '[John and Bill] listened to each other's respective life stories all night long'

'If *otagai* (=both of them) are satisfied, I will not raise issues.'

If *otagai* is analyzed as [*pro* [*otagai*]], the acceptability of examples like (38) is not particularly surprising; they are instances of the referential use of *pro*. Without an antecedent, the interpretation for *otagai* in examples like (38) is that of a "group reading."

7.3.4. Split antecedence

Split antecedence is possible for *otagai*, as illustrated in (39), with *otagai* being represented as [*pro* [*otagai*]].

(39) a. Ieyasu$_1$-wa Nobunaga$_2$-ni [Singen-ga   sin-eba [*pro*$_{1+2}$ otagai]-no ryoodo-ga
          Ieyasu-TOP   Nobunaga-DAT   [Shingen-NOM die-if   otagai-GEN   territory-NOM

          sibarakuwa antai-da to] tugeta
          for:a:while   safe-be   that] told

          'Ieyasu$_1$ told Nobunaga$_2$ that, if Shingen dies, their$_{1+2}$ territories will be safe for a while'

      b. Ieyasu$_1$-wa Nobunaga$_2$-ni [Singen-ga [*pro*$_{1+2}$ otagai]-o hometeita to] tugeta
          Ieyasu-TOP   Nobunaga-DAT   [Shingen-NOM   otagai-ACC was praising that] told

          'Ieyasu$_1$ told Nobunaga$_2$ that Nobunaga was praising them$_{1+2}$'

As in the case of (38), the relevant interpretation for *otagai* is that of a "group reading." Split antecedence is not limited to cases of coreference, as indicated in (40).

(40) a. [subete-no Kyuusyuu-no daimyoo]$_1$-ga [Sikoku-no dokoka-no   daimyoo]$_2$-ni
          all-GEN   Kyusyu-GEN   war:lord-NOM   Shikoku-GEN some:place-GEN war:lord-DAT

          [Singen-ga sin-eba [*pro*$_{1+2}$ otagai]-no ryoodo-ga sibaraku-wa antai-da to]
          [Shingen-NOM die-if   otagai-GEN   territory-NOM for:a:while-TOP safe-be   that]

          tugeta (koto)
          told   (fact)

          '[every feudal king in Kyuusyuu]$_1$ told [a feudal king of some place in Shikoku]$_2$ that, if Shingen dies, their$_{1+2}$ (respective) territories will be safe for a while'

      b. [subete-no Kyuusyuu-no daimyoo]$_1$-ga [Sikoku-no dokoka-no   daimyoo]$_2$-ni
          all-GEN   Kyusyu-GEN   war:lord-NOM   Shikoku-GEN some:place-GEN war:lord-DAT

          [Singen-ga [*pro*$_{1+2}$ otagai]-o hometeita to] tugeta (koto)
          [Shingen-NOM   otagai-ACC was:praising that] told   (fact)

          '[every feudal king in Kyusyu]$_1$ told [a feudal king of some place in Shikoku]$_2$ that Shingen was praising them$_{1+2}$'

The relevant reading in (40a), for example, is that for each feudal king in Kyusyu *x* there is a feudal king of some place in Shikoku *y* such that *x* told *y* that if Shingen dies *x* and *y*'s territories will be safe for a while. This is an instance of so-called split-binding; see Lasnik 1989, Appendix. The split-antecedence possibility is compatible with the proposals in (30), as indicated with the use of *pro* in (39) and (40); but it would be puzzling if *otagai* were a local reciprocal anaphor on a par with English *each other*.

7.3.5. Weak Crossover effects

According to the proposals in (30), the relevant relation in sentences with *otagai* is between *pro* in [*pro* [*otagai*]] and the "antecedent" of *pro*. In section 7.3.2 we have seen that *pro* in [*pro* [*otagai*]] (hence *otagai*) need not be c-commanded by its "antecedent" if the relevant relation is that of

coreference.
  Now consider (41).

(41)   (Watasi-wa) [kanarino kazu-no   nihonzin huuhu]$_1$-ga [pro_1 otagai]-no
        (I-TOP)   considerable number-GEN Japanese couple-NOM   otagai-GEN

        (katute no) onsi-o   batoosuru   (no-o   mita)
        (former)   teacher-ACC harshly:criticize (COMP-ACC saw)

        '(I saw) [a good number of Japanese couples]$_1$ harshly criticize their$_1$ (former) teachers].'

The relevant reading is that it is true for a good number of Japanese couples that, for each couple, I saw the husband x and the wife y harshly criticize the former teachers of x and y. Confining ourselves to such readings, the embedded clause of (41) can be understood as corresponding to any of (42).

(42)   For a good number of couples, it is true of each of the couples that
   a.   the husband x and the wife y harshly criticized x and y's shared teacher(s) of the past
   b.   the husband x harshly criticized the wife y's former teacher(s), and the wife y harshly
        criticized the husband x's former teacher(s)
   c.   the husband x harshly criticized x's former teacher(s), and the wife y harshly criticized y's
        former teacher(s)

  Given that the relevant readings here are instances of bound variable anaphora, we predict that they become unavailable in a typical Weak Crossover configuration. Such indeed seems to be the case.

(43)   *(Watasi-wa) [[pro_1 otagai]-no (katuteno) onsi]-ga [kanarino kazu-no
        I-TOP   otagai-GEN (former)   teacher-NOM considerable number-GEN

        nihonzin huuhu]$_1$-o batoosuru   (no-o   mita)
        Japanese couple-ACC harshly:criticize (COMP-ACC saw)

        '(I saw) their$_1$ (former) teachers harshly criticize [a good number of Japanese couples]$_1$.'

The embedded clause of (43) seems to fail to yield the interpretation corresponding to (44).[32]

(44)   For a good number of couples, it is true of each of the couples that
   a.   [the husband x and the wife y]'s shared teacher(s) harshly criticized x and y
   b.   the husband x's former teacher(s) harshly criticized the wife y and the wife y 's former
        teacher(s) harshly criticized the husband x's former teacher(s)
   c.   the husband x's former teacher(s) harshly criticized x and the wife y 's former teacher(s)
        harshly criticized y

As we have seen earlier, if coreference, rather than bound variable anaphora, is at stake, the c-command is not a necessary condition for the relevant reading to obtain. The same point is illustrated below.

(45) a. (Watasi-wa) [[pro_1 otagai]-no (katuteno) onsi]-ga
         I-TOP   otagai-GEN (former)   teacher-NOM

         [John to Mary]$_1$-o batoosuru   (no-o   mita).
         John and Mary-ACC   harshly:criticize (COMP -ACC saw)

         '(I saw) their$_1$ (former) teachers harshly criticize [John and Mary]$_1$.'

---

[32] The degree of the unavailability of the bound reading seems to vary to some extent, depending upon which "reading" is considered. But I suppress the issues pertaining to such variations here.

b. ?(Watasi-wa) [[pro_1 otagai]-no (katuteno) onsi]-ga
    I-TOP   otagai-GEN (former)   teacher-NOM

[sono nihonzin huuhu]$_1$-o batoosuru (no-o   mita)
that Japanese couple-ACC harshly:criticize (COMP-ACC saw)

'(I saw) their$_1$ (former) teachers harshly criticize [that Japanese couple]$_1$.'

Recall that split antecedence is possible between *pro* in [*pro* [*otagai*]] and its "antecedents." In section 7.3.4, we have seen an instance of 'split coreference' and an instance of 'split binding', so to speak. Along the lines of the preceding discussion in this section, we predict that 'split coreference' continues to be possible even when *pro* in [*pro* [*otagai*]] is not c-commanded by its "antecedents" but 'split binding' becomes unavailable if the relevant c-command relation fails to obtain. These predictions also seem to be borne out, as the following examples indicate.[33]

(46)   [pro_{1+2} otagai]-no atarasii kooti-ga John$_1$-ni Mary$_2$-o syookaisita
              otagai-GEN new   coach-NOM John-DAT Mary-ACC introduced

(sono sikata-ga hendatta   koto-ga gakkoozyuu-no uwasa-ni natteiru)
that   manner-NOM was:unusual fact-NOM all:over:school-GEN rumor-DAT has:become

'(the fact that the way in which) their$_{1+2}$ new coach introduced Mary$_2$ to John$_1$ (was strange has become a hot topic of conversation all over the school)'

(47)   [subete-no dansi gakusei]$_1$-ga [zyosi gakusei-no dareka]$_2$-ni
         all-GEN   male student-NOM female student-GEN someone-DAT

[pro_{1+2} otagai]-no atarasii kooti-o   syookaisita
         otagai-GEN new   coach-ACC introduced

(sono sikata-ga hendatta   koto-ga gakkoozyuu-no uwasa-ni natteiru)
that   manner-NOM was:unusual fact-NOM all:over:school-GEN rumor-DAT has:become

'(the fact that the way in which) every male student$_1$ introduced to some female student$_2$ their$_{1+2}$ new coach (was strange has become a hot topic of conversation all over the school)'

(48)   *[pro_{1+2} otagai]-no atarasii kooti-ga [subete-no dansi gakusei]$_1$-ni
              otagai-GEN new   coach-NOM all-GEN   male student-DAT

[zyosi gakusei-no dareka]$_2$-o syookaisita
female student-GEN someone-ACC introduced

(sono sikata-ga hendatta   koto-ga gakkoozyuu-no uwasa-ni natteiru)
that   manner-NOM was:unusual fact-NOM all:over:school-GEN rumor-DAT has:become

'(the fact that the way in which) their$_{1+2}$ new coach introduced to every male student$_1$ some female student$_2$ (was strange has become a hot topic of conversation all over the school)'[34]

It is argued in Hoji 1998 that the comparative ellipsis construction in Japanese (sometimes called

---

[33] In accordance with the *EPSA* method proposed in the main text above, one may want to conduct experiments to see whether the **Schema*-based predictions as indicated in (43) and (48) survive a rigorous disconfirmation attempt; see, however, the remark at the end of section 7.5.

[34] The English translation here is meant to remind the reader that the *ni*-marked argument c-commands the *o*-marked argument in (46)-(48).

CM-Comparative) provides a syntactic context in which sloppy identity readings can obtain.[35] It is observed there that examples like (49) allow the sloppy reading.

(49)   [John to Bill]-ni yorimo sakini sensei-ga   [Mike to Sam]-ni
         John and Bill-DAT   than   early   teacher-NOM Mike and Sam-DAT

         [*pro* otagai]-no atarasii roommate-o syookaisita (koto)
              otagai-GEN   new   roommate-ACC introduced   (fact)

         'the teacher introduced to [Mike and Sam] their new roommate earlier than to [John and Bill]'
         ([ok]sloppy reading)

It seems that (49) can be understood as corresponding to (50), for example.

(50)   The time at which the teacher introduced to Mike Sam's new roommate and the teacher
         introduced to Sam Mike's new roommate was before the time at which the teacher introduced
         to John Bill's new roommate and the teacher introduced Bill John's new roommate.

Note that in (49) *pro* in [*pro* [*otagai*]] is c-commanded by [*Mike to Sam*]. Given the assumption that the availability of the sloppy identity readings is subject to the same c-command condition as that of bound variable anaphora,[36] the absence of the sloppy reading in (51) is as expected.[37]

(51)   [John to Bill]-ni yorimo sakini [*pro* otagai]-no koibito-ga
         John and Bill-DAT   than   early   otagai-GEN   lover-NOM

         [Mike to Sam]-ni iiyotta   (koto)
         Mike and Sam-DAT   tried:to:seduce (fact)

         'their lovers tried to seduce [Mike and Sam] earlier than [John and Bill]' (*sloppy reading)

(51) cannot seem to have an interpretation corresponding to (52), despite the fact that (53) does allow the interpretation corresponding to (54).

(52)   the time at which Sam's lover tried to seduce Mike and Mike's lover tried to seduce Sam was
         before the time at which John's lover tried to seduce Bill and Bill's lover tried to seduce John

---

[35] See Hayashishita 2009 and the references cited there for issues concerning comparatives in Japanese.

[36] This assumption, while it seems more or less standard, is not uncontroversial. Fiengo and May (1994), for example, argue against it; see also Hoji 1996a, 1996b and the references there as well as the references in Fiengo and May 1994.

[37] For concreteness, I assume, as in Hoji 1998, that *John to Bill-ni yori* 'than John and Bill' in (49) and (51) is represented as in [$_{CP}$ [$_{NP}$ *John to Bill*]-ni [$_{C'}$ [$_{IP}$ *ec*] [$_C$ *yori*]]], before the LF copying operation takes place, along the lines of Pesetsky's (1982) analysis of Gapping. After the relevant raising of *Mike to Sam-ni* 'Mike and Sam-DAT' and other operations have taken place, a structure like (though not necessarily exactly as) [$_{IP}$ λx [$_{IP}$...x ... [*pro otagai*] ...]] will be created in the derivation of the structure in (49). This will be copied onto the empty IP in [$_{CP}$ [$_{NP}$ *John to Bill*]-ni [$_{C'}$ [$_{IP}$ *ec*] [$_C$ *yori*]]], yielding [$_{CP}$ [$_{NP}$ *John to Bill*]-ni [$_{C'}$ [$_{IP}$ λx [$_{IP}$...x ... [*pro otagai*] ...]] [$_C$ *yori*]]], in which *pro* is c-commanded by x.; see footnotes 5 and 7 in Hoji 1998. In the case of (51), on the other hand, the resulting structure will be [$_{CP}$ [$_{NP}$ *John to Bill*]-ni [$_{C'}$ [$_{IP}$ λx [$_{IP}$...[*pro otagai*] ...x ...]] [$_C$ *yori*]]], in which *pro* is not c-commanded by x. Nothing hinges, however, on the choice of the exact analysis of the comparative ellipsis construction in Japanese here as long as the relevant difference in terms of c-command can be captured; see footnote 5 of Hoji 1998.

(53)   [*pro*₁ otagai]-no koibito-ga [Mike to Sam]₁-ni iiyotta (koto)
         otagai-GEN   lover-NOM   Mike and Sam-DAT   tried:to:seduce (fact)

         'their₁ lovers tried to seduce [Mike and Sam]₁'

(54)   Sam's lover tried to seduce Mike and Mike's lover tried to seduce Sam

As in the case of the **Schema*-based predictions in the preceding two subsections, the **Schema*-based prediction as indicated above has not been tested by the *EPSA* method yet.

7.4. On the Postulation of *pro* in [*pro* [*otagai*]]
7.4.1. Binding Principle B Effects
      We have observed that the empirical materials presented above are compatible with the proposals (30); but they are also compatible with an alternative analysis of *otagai*, according to which *otagai* itself is a pronominal instead of having an internal structure as indicated in (30a). Under such an analysis, we would expect *otagai* to have all the properties discussed in the preceding section: it does not require its "antecedent" to be in its local domain, or in a position c-commanding it; it can appear with an antecedent, it allows split antecedence; but the failure of the c-command makes split binding, although not in that of split coreference.
      One may argue that examples like (32), repeated below now without *pro*, would be incorrectly ruled out under such an analysis because Principle B of Binding Theory would be violated, and may take that as support for the proposal in (30) over the alternative analysis under discussion.

(55) (=(32) without *pro*)
         [John to Bill]₁-ga   hissininatte [otagai]₁-o   urikondeita   (koto)
         John and Bill-NOM desperately otagai-ACC was:promoting (fact)
         '[each of John and Bill]₁ was promoting himself₁ with utmost enthusiasm (as in a competition)'

It is observed in Hoji 1995, however, that Principle B effects are not observed in Japanese when the relevant anaphoric relation is that of coreference, as illustrated in (56).[38]

(56)   John$_i$-ga kare₁-o urikondeita
         'John₁ was promoting him₁'

The availability of the anaphoric relation between the subject NP and *otagai* in examples like (32), therefore, does not constitute evidence for the [*pro* [*otagai*]] analysis in (30) over the *otagai*-as-a-pronominal analysis.
      It is argued in Hoji 1995 that we do observe Principle B effects even in Japanese when bound variable anaphora is at stake. The argument is based on the alleged contrast as indicated in (57) and (58).[39]

---

[38] If *otagai* is treated as a pronominal, (i) may be a structurally more accurate translation of (32).
(i)   [John and Bill]₁ were promoting them₁ with utmost enthusiasm.

[39] In subsequent research (e.g., Hoji 2003 and 2009), it is pointed out that the unacceptability of examples like (57) is not as robust as predicted but that more robust unacceptability judgments obtain if the object NP appears before the subject NP in examples like (57). We can strengthen the empirical basis for the argument here concerning (57)-(59) by considering the OSV version of those examples. In this paper, I suppress the complications involved and illustrate the point by means of (57)-(59), to simplify the discussion.

(57) a. *[Toyota to Nissan]$_1$-ga (hissininatte) soko$_1$-o urikondeita
Toyota and Nissan-NOM (desperately) it-ACC was:promoting

(no-wa sensyuu-no kaigi-de da)
(COMP-TOP last week-GEN meeting-at be)

'(It was at the meeting last week that) [each of Toyota and Nissan]$_1$ was promoting it$_1$ with utmost enthusiasm.'

b. *[kanari-no kazu-no kaisya]$_1$-ga (hissininatte) soko$_1$-o urikondeita (no-wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [each of [a good number of companies]]$_1$ was promoting it$_1$ with utmost enthusiasm.'

c. *[Toyota sae]$_1$-ga (hissininatte) soko$_1$-o urikondeita (no-wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [even Toyota]$_1$ was promoting it$_1$ with utmost enthusiasm.'

(58) a. [Toyota to Nissan]$_1$-ga (hissi-ni-natte) soko$_1$-no kogaisya-o urikondeita
Toyota and Nissan-NOM (desperately) it-GEN subsidiary-ACC was:promoting

(no-wa sensyuu-no kaigi-de da)
(COMP-TOP last week-GEN meeting-at be)

'(It was at the meeting last week that) [each of Toyota and Nissan]$_1$ was promoting it$_1$'s subsidiary with utmost enthusiasm.'

b. [kanari-no kazu-no kaisya]$_1$-ga (hissi-ni-natte) soko$_1$-no kogaisya-o urikondeita (no-wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [each of [a good number of companies]]$_1$ was promoting it$_1$'s subsidiary with utmost enthusiasm.'

c. [Toyota sae]$_1$-ga (hissi-ni-natte) soko$_1$-no kogaisya-o urikondeita (no-wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [even Toyota]$_1$ was promoting it$_1$'s subsidiary with utmost enthusiasm.'

Now, consider the examples in (59).

(59) a. [sono nihonzin huuhu to kono Amerikazin huuhu]$_1$-ga
that Japanese couple and this American couple-NOM

(hissininatte) [otagai]$_1$-o urikondeita
(desperately) otagai-ACC was:promoting

(no-wa sensyuu-no kaigi-de da)
(COMP-TOP last week-GEN meeting-at be)

'(It was at the meeting last week that) [each of [that Japanese couple and this American couple]]$_1$ was promoting otagai$_1$ with utmost enthusiasm'

b. [kanari-no kazu-no huuhu]$_1$-ga (hissi-ni-natte) otagai$_1$-o urikondeita (no -wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [each of [a good number of couples]]$_1$ was promoting otagai$_1$ with utmost enthusiasm'

c. [kono huuhu sae]$_1$-ga (hissi-ni-natte) otagai$_1$-o urikondeita (no-wa sensyuu-no kaigi-de da)
'(It was at the meeting last week that) [even this couple]$_1$ was promoting otagai$_1$ with utmost enthusiasm'

Crucially, the bound variable readings, i.e. the distributive readings, seem possible here. For example, it seems that (59a) can have an interpretation corresponding to (60); and (59b) to (61).[40]

(60)   It is true of that Japanese couple as well as of this American couple that
     a.   the husband x and the wife y were promoting x and y
     b.   the husband x was promoting the wife y, and y was promoting x.
     c.   the husband x was promoting x, and the wife y was promoting y

(61)   For a good number of couples, it is true of each of those couples that
     a.   the husband x and the wife y were promoting x and y
     b.   the husband x was promoting the wife y, and y was promoting x.
     c.   the husband x was promoting x, and the wife y was promoting y

If Principle B effects are observed when bound variable anaphora is at stake, and if *otagai* were a pronominal, being subject to Principle B, the bound readings should be unavailable in (59) on a par with (57); see note 39. The availability of the bound readings in (59) thus argues against treating *otagai* itself as a pronominal although such a view is consistent with the observations made in section 7.3. If what is "bound" by the quantificational subject in (59) is *not* otagai itself but *pro* in [*pro* [*otagai*]], as suggested in (30), the binding is not local, and hence the absence of Principle B effects is in (59) is as expected.

7.4.2. Parallelism between *otagai* and kinship terms

Given the conclusion reached in the main text, one might wonder how one is to understand the empirical bases put forth in the literature in support of the hypothesis that *otagai* is a local anaphor. This subsection addresses this question. It will be observed that the relevant patterns of judgments on examples with *otagai* also seem to obtain for examples with a kinship term in place of *otagai*. To the extent that a kinship term such as *titioya* 'father' is represented as [*pro* [*titioya*]], the empirical materials to be presented below are also compatible with the [*pro* [*otagai*]] analysis of *otagai* in (30).

The contrast in (62), in particular the status of examples like (62b), has been taken as evidence that *otagai* must be c-commanded by its "antecedent" (or more precisely, must be A-bound).[41]

(62) a. (Saito's (1992) (12b))
          [Karera$_1$-ga [otagai$_1$-o   hihansita]] (koto)
          they-NOM   each other-ACC criticized   fact

          'They$_1$ criticized each other$_1$'

      b. (Saito's (1992) (13b))
          ?*[[Otagai$_1$-no   sensei]-ga [karera$_1$-o hihansita]] (koto)
             each other-GEN teacher-NOM they-ACC   criticized   fact

          'Each other's$_1$ teachers criticized them$_1$'

The claim that the "antecedent" of *otagai* must be in the local domain of the latter has been based on the alleged status of examples like (63).

---

[40] In the terms of the discussion in section 7.3.5, the relevant bound readings are possible only when *pro* in [*pro* [*otagai*]] is c-commanded by its "antecedent."

[41] Saito (1992, footnote 6) attributes to Yang 1984, Ueda 1984, and Kitagawa 1986 the observation that *otagai* exhibits the Specified Subject Condition effect and has the binding properties of an anaphor.

(63)   (taken from Ishii 1989, apparently cited from Yang 1983)

*karera$_1$-ga [Mary-ga otagai$_1$-o   aisiteiru to]   itta
they-NOM   Mary-NOM each other-ACC love   COMP said

'they$_1$ said that Mary loves each other$_1$'

In section 7.3.2, we have seen examples in which *pro* of [*pro* [*otagai*]] and its "antecedent" can be anaphorically related in a configuration where *pro* fails to be c-commanded by its "antecedent"—i.e., where *otagai* fails to be c-commanded by its "antecedent" in the terms of the standard treatment of *otagai*—as in the case of (62b). The relevant examples are repeated here.

(37)   a.   [[*pro$_1$* otagai]-no koibito]-ga [John to Bill]$_1$-o yuuwakusita
                otagai-GEN   lover-NOM   [John and Bill]-ACC seduced

(to yuu uwasa-ga matizyuu-no wadai-ni natte ita)
'(The rumor that) each other$_1$'s lovers seduced [John and Bill]$_1$ (had become a hot topic of the town.)'

b.   [[*pro$_1$* otagai]-no koibito]-ga [John to Bill]$_1$-ni iiyotta   (koto)
                otagai-GEN   lover-NOM   [John and Bill]-DAT   tried:to:seduce (fact)

'John's lover tried to seduce Bill, and Bill's lover tried to seduce John.'

In section 7.3.1 as well as in section 4, we have discussed examples like (36), repeated here, in which the antecedent of *pro* of [*pro* [*otagai*]] (or that of *otagai* under the "standard" view).

(36)   a.   [John to Bill]$_1$-wa [$_{CP}$ Mary-ga [*pro$_1$* otagai]-ni horeteiru to] omoikondeita
                [John and Bill]-TOP   [Mary-NOM   otagai-DAT   is:in:love   that] believed:firmly

'[each of John and Bill] believed that Mary was in love with the other.'
'[each of John and Bill]$_1$ believed that Mary was in love with him$_1$.'

b.   [John to Bill]$_1$-wa [Chomsky-ga naze [*pro$_1$* otagai]-o suisensita   no ka]
                [John and Bill]-TOP   [Chomsky-NOM why   otagai-ACC recommended comp Q]

wakaranakatta
did:not:understand

'[each of John and Bill] did not understand why Chomsky had recommended the other.'
'[each of John and Bill]$_1$ had no idea why Chomsky had recommended him$_1$.'
'[John and Bill]$_1$ had no idea why Chomsky has recommended them$_1$'

Suppose that *otagai* is *not* an anaphor and that what was considered in the literature to be the relation of anaphor binding is in fact that between *pro* in [*pro* [*otagai*]] and its "antecedent," as suggested above. Since coreference is subject to various lexico-semantic, pragmatic (as well as structural) factors, to a much greater degree than bound variable anaphora, it is expected, under such a view, that various such factors affect the availability of the relevant coreference involves *pro* and hence, apparently, the availability of the anaphoric relation between *otagai* and its "antecedent."

It is interesting to observe in this connection that when the coreference between *pro* in [*pro* [*otagai*]] and its "antecedent" (i.e., the anaphoric relation between *otagai* and its "antecedent" in the terms of the standard view) seems restricted, as in (64) below, the coreference between *pro* in [*pro* [*titioya*]] '[*pro* father]' (and other kinship terms) and its "antecedent" also seems restricted in the same way, as indicated in (65).

(64) [John to Bill]$_2$-ga [[Mary to Sue]$_1$-ga [$pro_{1/*2}$ otagai]-o aisiteiru to] it-ta (koto)
'[John and Bill]$_2$ said that [Mary and Sue]$_1$ loves them$_{1/*2}$'

(65) Jane$_2$-ga [Mary$_1$-ga [$pro_{1/*2}$ titioya]-o aisiteiru to] it-ta (koto)
'Jane$_2$ said that Mary$_1$ loves her$_{1/*2}$ father'

(64) and (65) seem to be equally degraded with the 'long-distance' association.

 (66a) and (66b) seem to contrast with (64) and (65), and allow the long-distance association, despite the fact that these examples have exactly the same structural properties in the relevant respects.

(66) a. [John to Bill]$_2$-ga [[Mary to Sue]$_1$-ga [$pro_{1/2}$ otagai]-o yuuwaku siteiru to] omoikondeita (koto)
'[John and Bill]$_2$ believed that [Mary and Sue]$_1$ was seducing them$_{1/2}$'

     b. Jane$_2$-ga [Mary$_1$-ga [$pro_{1/2}$ titioya]-o yuuwaku siteiru to] omoikondeita (koto)
'Jane$_2$ believed that Mary$_1$ was seducing her$_{1/2}$ father'

The 'long-distance' association in (66a) seems to become even more readily available if the embedded plural NP subject is replaced by a singular term.

(67) [John to Bill]$_2$-ga [Sue$_1$-ga [pro_2 otagai]-o yuuwaku siteiru to] omoikondeita (koto)
'[John and Bill]$_2$ believed that Sue$_1$ was seducing them$_2$'

 Now consider the example in (68).

(68) $^{*?}$[pro_1 otagai]-no koibito-ga [John to Bill]$_1$-no kooti-o yuuwakusita (koto)
'each other's$_1$ lovers seduced [John and Bill]$_1$'s coach(es)'

In (68), the relevant anaphoric relation seems difficult to obtain, in contrast to (37), repeated here again.

(37) a. [[pro_1 otagai]-no koibito]-ga [John to Bill]$_1$-o yuuwakusita
              otagai-GEN   lover-NOM   [John and Bill]-ACC seduced

(to yuu uwasa-ga matizyuu-no wadai-ni natte ita)
'(The rumor that) each other$_1$'s lovers seduced [John and Bill]$_1$ (had become a hot topic of the town.)'

     b. [[pro_1 otagai]-no koibito]-ga [John to Bill]$_1$-ni iiyotta   (koto)
              otagai-GEN   lover-NOM   [John and Bill]-DAT   tried:to:seduce (fact)

'John's lover tried to seduce Bill, and Bill's lover tried to seduce John.'

It seems that the contrast between (68) and (37) can be duplicated with a kinship term replacing *otagai*, as indicated in (69) and (70).

(69) $^{*?}$[pro_1 titioya]-no aizin-ga John$_1$-no kooti-o yuuwakusita (koto)
'his$_1$ father's lover seduced John$_1$'s coach'

(70) a. [pro_1 titioya]-no koibito-ga John$_1$-o yuuwakusita (to yuu uwasa-ga matizyuu-no wadai-ni natte ita)
'(The rumor that) his$_1$ father's lover seduced John$_1$ (has become a hot topic of the town.'

b. [*pro*₁ titioya]-no koibito-ga John₁-ni iiyotta (koto)
'his₁ father's lover tried to seduce John₁'

It thus seems that whatever is wrong with (68) is wrong with (69) as well.[42]
The examples in (71) also seem degraded.

(71) a. *?[John to Bill]₁-no koibito-ga [*pro*₁ otagai]-o yuuwakusita (koto)
'[John and Bill]₁'s lovers seduced each other₁'

b. *[John to Bill]₁-no koibito-ga [*pro*₁ otagai]-no kooti-o yuuwakusita (koto)
'[John and Bill]₁'s lovers seduced each other's₁ coach(es)'

Consider the kinship-term analogues of (71) given in (72).

(72) a. *?John₁-no koibito-ga [*pro*₁ titioya]-o yuuwaku sita (koto)
'John₁'s lovers seduced his₁ father'

b. *John₁-no koibito-ga [*pro*₁ titioya]-no kooti-o yuuwakusita (koto)
'John₁'s lovers seduced his₁ father's coach(es)'

As indicated, the examples in (72) seem to have the same status as (71).
Given the view that the degraded status of (68) and (71) is due to some non-syntactic factors, we expect that we can construct more or less acceptable examples that are of the same structures as (68) and (71), by an appropriate choice of lexical items. This is precisely what seems to happen, as indicated by the examples in (73).

(73) a. [*pro*₁ otagai]-no kooti-ga (siai zenya-ni) [John to Bill]₁-no kozinteki na mondai-o (hoodoozin-ni) bakurosita (koto)
'each other's₁ coaches announced (to the press) [John and Bill]₁'s personal problems (on the night before the bout)'

b. ?(ziko-no ato-de) [John to Bill]₁-no zyoosi-ga [*pro*₁ otagai]-o mimatta (koto)
'(after the accident) [John and Bill]₁'s bosses went to see each other₁ (in the hospital(s))'

c. (siai-ga sematte kita aru hi) [John to Bill]₁-no kooti-ga [*pro*₁ otagai]-no rensyuu aite-o yamiutisita (koto)
'(when the day of the bout approached) [John and Bill]₁'s coaches assaulted each other's₁ sparring partners'

The strong parallelism observed between the *otagai* examples and their kinship-term analogues leads us to expect that we can make more or less acceptable examples with a kinship term, just as we have been able to construct more or less acceptable examples with *otagai* such as (73). Such is indeed

---

[42] If the anaphoric relation in (i) is difficult to obtain for some speakers, the one in (ii), I expect, is equally difficult to obtain for the same speakers.
(i) [*pro*₁ otagai]-no sensei-ga [John to Bill]₁-o hihansita (koto)
'their₁ teachers criticized [John and Bill]₁'
(ii) [*pro*₁ titioya]-no sensei-ga John₁-o hihansita (koto)
'his₁ father's teacher criticized John₁'
Many speakers including this author find both (i) and (ii) (and in fact (62b) as well) to be acceptable with the relevant anaphoric relation.

the case, as illustrated in (74).[43]

(74) a. [pro_1 titioya]-no aizin-ga (kekkonsiki no zenzitu-ni) John$_1$-no kozinteki na mondai-o
hoodoozin-ni bakurosita (koto)
'his$_1$ father's lover announced (to the press) John$_1$'s personal problems (on the day before the marriage)'

b. ?(ziko-no ato-de) John$_1$-no zyoosi-ga [pro_1 titioya]-ni mimai-no denwa-o kaketa (koto)
'(after the accident) John$_1$'s boss gave his$_1$ father a call of concern'

c. (oyako taiketu-ga sematta aru hi) John$_1$-no kooti-ga [pro_1 titioya]-no rensyuu aite-o
yamiutisita (koto)
'(when the day of the bout between the son and the father approached) John$_1$'s coach assaulted his$_1$ father's sparring partner'

It thus seems reasonable to conclude that the examples cited in the literature as evidence that *otagai* is a local anaphor is a small subset of those in which the anaphoric relation between *pro* in [*pro* [*otagai*]] and its "antecedent" cannot be easily established for reasons that are not purely structural and we do not fully understand.

It has been argued that word order changes affect the "binding possibility" for the "anaphor" *otagai*. Saito (1992, p. 75), for example, notes that (62b), repeated here, improves if the object is "scrambled" over the subject, as in (75) below.

(62) b. (Saito's (1992) (13b))
?*[[Otagai$_1$-no   sensei]-ga   [karera$_1$-o   hihansita]] (koto)
each other-GEN teacher-NOM they-ACC   criticized   fact

'Each other's$_1$ teachers criticized them$_1$'

(75)   (Saito's (1992) (14b))
?[Karera-o$_1$ [[otagai$_1$-no   sensei]-ga [t_1 hihansita]]] (koto)
they-ACC   each other-GEN teacher-NOM   criticized   fact

'Them$_1$, each other's$_1$ teachers criticized t_1'

Given the preceding discussion, one may suspect that the word order affects the coreference possibility between *pro* and its "antecedent" not only in cases involving [*pro* [*otagai*]] but also in cases involving [*pro* [*titioya*]]. This in fact seems to be the case, as illustrated below.

(76) a. *?[pro_1 otagai]-no atarasii sensei-ga (Mary-ni) [John to Bill]$_1$-o syookaisita (koto)
'each other's$_1$ new teachers introduced [John and Bill]$_1$ (to Mary)'
b. [John to Bill]$_1$-o [pro_1 otagai]-no atarasii sensei-ga (Mary-ni) ec$_1$ syookaisita (koto)
'[John and Bill]$_1$, each other's$_1$ new teachers introduced (to Mary)'

(77) a. *?[pro_1 titioya]-no atarasii sensei-ga (Mary-ni) John$_1$-o syookaisita (koto)
'[his$_1$ father]'s new teacher introduced John$_1$ (to Mary)'

---

[43] It seems that the parallelism between (73) and (74) continues to obtain when we consider their quantificational analogues. But the relevant empirical discussion is not provided here because it would involve some nontrivial complications, such as having to do with so-called Spec-binding, among other things. Despite the striking parallelism between [*pro* [*otagai*]] and [*pro* [*titioya*]] that we have observed, we would not be surprised to find cases in which the parallelism breaks down, insofar as the semantico-functional properties associated with *otagai* are not exactly the same as those associated with *titioya* 'father'.

      b.   John$_1$-o [*pro*$_1$ titioya]-no atarasii sensei-ga (Mary-ni) <u>ec</u>$_1$ syookaisita (koto)
          ' John$_1$, [his$_1$ father]'s new teacher introduced (to Mary)'

Just as we detect improvement in (76b) over (76a), so we also detect improvement in (77b) over (77a).
     We have observed that the coreference is possible between *pro* in [*pro* [*otagai*]] and its "antecedent" in precisely the same structural configurations as in (76a) (and (62b)). This strongly suggests that the relevant relation in (76) is not that of anaphor-binding but that of coreference. Once we accept that the relevant relation is that of coreference between *pro* in [*pro* [*otagai*]] and its "antecedent"—rather than the binding of *otagai* by its "antecedent"—the improvement observed in (76b) cannot be evidence for the A-positionhood of "landing site of scrambling." It seems that what is relevant is a notion such as salience; and this is supported by the parallelism observed between (76) and (77) (as well as other examples given above.) The discussion in this subsection thus leads us to conclude that one of the two major empirical arguments for (optionally) treating clause-internal Scrambling as an instance of A-movement based on the "binding of *otagai*" is not valid.

7.5. Conclusion

     The empirical considerations discussed above clearly indicate that the hypothesis that *otagai* is a local anaphor cannot be maintained. And we have explored above the "analysis" of *otagai* as suggested in (30), repeated here.

(30) a.   The internal structure of *otagai* is [$_{NP}$ *pro* [$_N$ *otagai*]]
      b.   What has been considered as the anaphoric relation between *otagai* and "its antecedent"
          must be understood as that between the *pro* in [$_{NP}$ *pro* [$_N$ *otagai*]] and the "antecedent" of *pro*.

The postulation of *pro* in [$_{NP}$ *pro* [$_N$ *otagai*]] has been given support by the absence of Principle B effects even when bound variable anaphora is at stake.[44] One may argue that *otagai* is ambiguous and can be

---

[44] Given the suggested analysis in (30), one may object that the coreference between *pro* and its 'antecedent' should be possible in (i), just as in the case of (ii-b) (and (ii-a)).
(i)   *?[*pro*$_1$ [otagai]]-ga [John to Bill]$_1$-o suisensita
             'each other$_1$ recommended [John and Bill]$_1$'
             'they$_1$ recommended [John and Bill]$_1$'
(ii)   a.   [kare$_1$-no [titioya]]-ga John$_1$-o suisensita
            'his$_1$ father recommended John$_1$'
      b.   [*pro*$_1$ [titioya]]-ga John$_1$-o suisensita
            'his$_1$ father recommended John$_1$'
(What reading is considered for (i) might affect its status, but I suppress that issue here.)
     I would like to suggest that the status of (i) is due to the same condition that is responsible for the status of (iii), namely, the universal part of Condition C in Lasnik 1989—Condition D in Huang 1988.
(iii) (with the "standard judgments)
      a.   *he$_1$ recommended John$_1$'s student
      b.   *kare$_1$-ga John$_1$-no gakusei-o suisensita (koto)
            'he$_1$ recommended John$_1$'s student'
In Hoji 1990, it is pointed out that the effects of Condition D can be made weaker if there is an "antecedent" for the "dependent term" (*he* and *kare* in (iii)) in a position where it is not c-commanded by the "dependent term." Thus speakers seem to find examples in (iv) and (v) to be significantly improved over (iii).
(iv) a.   ?John$_1$'s mother does not tell us why he$_1$ had recommended John$_1$'s student
      b.   ?/??John$_1$ does not tell us why he$_1$ had recommended John$_1$'s student
(v)   a.   John$_1$-no hahaoya-ga [naze kare$_1$-ga John$_1$-no gakusei-o suisensita ka] iwanai (koto)
            'John$_1$'s mother does not tell (us) why he$_1$ had recommended John$_1$'s student'
      b.   John$_1$-ga [naze kare$_1$-ga John$_1$-no gakusei-o suisensita ka] iwanai (koto)
            'John$_1$ does not tell (us) why he$_1$ had recommended John$_1$'s student'
Now, (i) too seems to improve in the same way, as indicated below.
(vi)   [John to Bill]$_1$-ga [naze [*pro*$_1$ [otagai]]-ga [John to Bill]$_1$-o suisensita ka] kakusite iru (koto)

analyzed either as [$_{NP}$ *pro* [$_N$ *otagai*]] or as a local anaphor. Although the empirical materials discussed above are <u>compatible</u> with such an analysis, we must recognize that there is no syntactic environment in which the local anaphor *otagai* can appear but [$_{NP}$ *pro* [$_N$ *otagai*]] cannot. Such an analysis therefore is not testable, making the proposed move *content-reducing* or *empirically degenerating* in the terms of Lakatos 1979/1978; see note 23.

One may wonder whether the analysis of *otagai* suggested in (30) gives rise to a *confirmed schematic asymmetry* in the terms of the text discussion above. Since we have not conducted relevant experiments, we do not have the answer to the question. However, to the extent that the anaphoric relation involves the so-called null argument (represented above as *pro*), there would be an additional complication in obtaining a *confirmed schematic asymmetry*, as discussed in Hoji 2003: 2.2.2, and we would not be surprised if we did not obtain a *confirmed schematic asymmetry* as clearly and robustly with *otagai* as we do with bound variable anaphora involving a "singular-denoting" dependent term.

References

Boeckx, Cedric. 2006. *Linguistic Minimalism: Origins, Concepts, Methods, and Aims*. New York: Oxford University Press.

Chomsky, Noam. 1965. *Aspects of the Theory of Syntax*. Cambridge, Mass: MIT Press.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

Chomsky, Noam. 1986. *Knowledge of Language*. New York: Praeger.

Chomsky, Noam. 1993. "A Minimalist Program for Linguistic Theory," in K. Hale & S. J. Keyser (eds.), *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*. Cambridge, Mass: MIT Press.

Feynman, Richard. 1965/1994. *The Character of Physical Law*. New York: The Modern Library.

Feynman, Richard. 1974. "Cargo Cult Science," 1974 Caltech commencement address, reproduced in Feynman 1997, pp. 338-346. (Available at: http://www.physics.brocku.ca/etc/cargo_cult_science.php; reproduced in Feynman 1997.)

Feynman, Richard. 1997. *Surely You're Joking, Mr. Feynman!*. New York: Norton & Company. (The hardcover was originally published in 1985.)

Fiengo, Robert, and Robert May. 1994. *Indices and Identity*. Cambridge, Mass: MIT Press.

Fukui, Naoki. 1986. *A Theory of Categories Projection and Its Applications*, Doctoral dissertation, MIT.

Hayashishita, J-R. 2009. "*Yori*-comparatives: A reply to Beck et al. (2004)," *Journal of East Asian Linguistics* 18: 65-100.

Hoji, Hajime. 1990. *Theories of Anaphora and Aspects of Japanese Syntax*. Ms. University of Southern California, Los Angeles.

Hoji, Hajime. 1995. "Demonstrative Binding and Principle B," *NELS* 25: 255-271.

Hoji, Hajime. 1996a. "Sloppy Identity and Formal Dependency," *WCCFL 15*.

Hoji, Hajime. 1996b. "Sloppy Identity and Principle B," in H. Bennis, P. Pica, and J. Rooryck, eds., *'Atomism' and Binding*, Dordrecht: Foris. pp. 205-235.

Hoji, Hajime. 1996c. "A Review of *Japanese Syntax and Semantics* by S-Y. Kuroda," *Language* 74: 146-152.

Hoji, Hajime. 1998. "Null Object and Sloppy Identity in Japanese." *Linguistic Inquiry* 29: 127-152.

Hoji, Hajime. 2003. "Falsifiability and Repeatability in Generative Grammar: A Case Study of Anaphora and Scope Dependency in Japanese," *Lingua* 113: 377-446.

Hoji, Hajime. 2006a. "Assessing Competing Analyses: Two Hypotheses about 'Scrambling' in Japanese," in Ayumi Ueyama, ed., *Theoretical and Empirical Studies of Reference and Anaphora—Toward the establishment of generative grammar as an empirical science*, a report of the Grant-in-Aid for Scientific Research (B), Project No. 15320052, Supported by Japan

---

'[John and Bill]$_1$ are hiding why they$_1$ had recommended [John and Bill]$_1$'

To substantiate this suggestion, it would be necessary to articulate how Condition D is to be formulated so as to correctly apply to (i) and not to (ii), which is beyond the scope of this paper. I should also like to note that it is not entirely clear how unacceptable and hopeless examples like (iii-b) are, to begin with.

Society for the Promotion of Science, Kyushu University, pp. 139-185. (Available at: http://www.gges.org/hoji/research/hp-papers.cgi.)

Hoji, Hajime. 2006b. "Otagai," in Ayumi Ueyama, ed., *Theoretical and Empirical Studies of Reference and Anaphora—Toward the establishment of generative grammar as an empirical science*, a report of the Grant-in-Aid for Scientific Research (B), Project No. 15320052, Supported by Japan Society for the Promotion of Science, Kyushu University, pp. 126-138. (Available at: http://www.gges.org/hoji/research/hp-papers.cgi.)

Hoji, Hajime. 2009. *A Foundation of Generative Grammar as an Empirical Science*. Ms. University of Southern California, Los Angeles.

Huang, James. 1988. "Comments on Hasegawa's Paper," in Tawa Wako and Mineharu Nakayama, eds., *Proceedings of Japanese Syntax Workshop Issues On Empty Categories*. pp. 77-93.

Ishii, Yasuo. 1989. "Reciprocal Predicates in Japanese," in K-D. Jong and Y.-K. No, eds., *Proceedings of the Sixth Eastern States Conference on Linguistics*, The Ohio State University. pp. 150-161.

Katada, Fusa. 1991. "The LF Representation of Anaphors," *Linguistic Inquiry* 22: 287-313.

Kitagawa, Yoshihisa. 1986. *Subjects in Japanese and English. Doctoral dissertation*, University of Massachusetts, Amherst.

Kuno, Susumu and Soo-Yeon Kim. 1994. "The Weak Crossover Phenomena in Japanese and Korean," in N. Akatsuka, ed., *Japanese Korean Linguistics vol. 4*, 1-38. Stanford: CSLI.

Kuroda, S.-Y. 1988. "Whether We Agree or Not: A Comparative Syntax of English and Japanese," *Linguisticae Investigationes* 12: 1-47.

Kuroda, S.-Y. 2008. "Mathematics and Generative Grammar—"Beyond Explanatory Adequacy" and Mathematical Realism of Language: A Fable for Naoki Fukui," *Sophia Linguistica* 56: 1-36.

Lakatos, Imre. 1970. "Falsification and Methodology of Scientific Research Programmes," in I. Lakatos and A. Musgrave (eds.), *Criticism and the Growth of Knowledge*, Cambridge: Cambridge University Press. pp. 91-195. (Reprinted as Lakatos 1978: chapter 1; the page references are to Lakatos 1978.)

Lakatos, Imre. 1973. "Science and Pseudoscience," included in Lakatos 1978 as "Introduction: Science and Pseudoscience." (pp. 1-7) (The page references are to Lakatos 1978; the transcript can be obtained at http://www.lse.ac.uk/collections/lakatos//Default.htm.)

Lakatos, Imre. 1978. *The Methodology of Scientific Research Programmes: Philosophical Papers Volume 1*, edited by John Worrall and Gregory Currie, Cambridge: Cambridge University Press.

Lasnik, Howard. 1989. "On the Necessity of Binding Conditions, in H. Lasnik, ed., *Essays on Anaphora*," Dordrecht: Kluwer Academic Publishers. pp. 149-167.

Lebeaux, David. 1983. "A Distributional Difference between Reciprocals and Reflexives," *Linguistic Inquiry* 14: 723-30.

Miyagawa, Shigeru. 1997. "Against Optional Scrambling," *Linguistic Inquiry* 28: 1-25.

Miyagawa, Shigeru. and Koji. Arikawa. 2007. "Locality in syntax and floating numeral quantifiers," *Linguistic Inquiry* 38: 645-670.

Narita, Hiorki. to appear. "The Tension between Explanatory and Biological Adequacy. A Review of Naoki Fukui's (2006) *Theoretical Comparative Syntax: Studies in Macroparameters*," *Lingua*.

Newmeyer, J. Fredrick. 2008. "A Review of *Linguistic Minimalism: Origins, Concepts, Methods, and Aims. by Cedric Boeckx*," *Language* 84: 387-395.

Nishigauchi, Taisuke. 1992. "Syntax of Reciprocals in Japanese," *Journal of East Asian Linguistics* 1: 157-96.

Pesetsky, David. 1982. *Paths and Categories*, Doctoral dissertation, MIT.

Pollard, Carl and Ivan S. Sag. 1992. "Anaphors in English and The Scope of Binding Theory," *Linguistic Inquiry* 23: 261-303.

Popper, K. 1959. *The Logic of Scientific Discovery*. London and New York: Routledge. (The English translation of *Logic der Forschung* 1934.)

Popper, Karl. 1963. "Science: Problems, Aims, Responsibilities," *Federation Proceedings (Baltimore), Federations of American Societies of Experimental Biology* vol. 22, Issue 4: 961-972.

Saito, Mamoru. 1992. "Long Distance Scrambling in Japanese," *Journal of East Asian Linguistics* 1: 69-118.

Saito, Mamoru. 2003. "A Derivational Approach to the Interpretation of Scrambling Chains," *Lingua* 113: 481-518.

Schütze, Carson. 1996. *The Empirical Base of Linguistics: Grammaticality Judgments and Linguistic Methodology*, Chicago: University of Chicago Press.

Takita, Kensuke. 2009. "VP-scrambling, Linearization Preservation, and the Theories of Control," NELS 40 abstract. (http://web.mit.edu/nels40/program/abstracts/NELS40Takita.pdf)

Townsend, D. J. & T. G. Bever. 2001. *Sentence Comprehension: The Integration of Habits and Rules*, Cambridge, Mass: MIT Press.

Ueda, Masanobu. 1984. "On the Japanese Reflexive *Zibun*: A Non-parameterization Approach," Ms., University of Massachusetts, Amherst.

Ueyama, Ayumi. 1998. *Two Types of Dependency*, Doctoral dissertation, University of Southern California, distributed by GSIL publications, University of Southern California, Los Angeles.

Ueyama, Ayumi. 2009. "Model of Judgment Making and Hypotheses in Generative Grammar," in S. Iwasaki, H. Hoji, P. Clancy, and S.-O. Sohn, eds., *Japanese/Korean Linguistics 17*, CSLI. (http://www.gges.org/hoji/research/hp-Ayumi.cgi.)

Yang, Dong-Whee. 1984. "The Extended Binding Theory of Anaphors," *Theoretical Linguistics Research* 1: 195-218.