

# BROAD AND NARROW CONSTRAINTS ON THE ENGLISH DATIVE ALTERNATION: Some Fundamental Differences between Native Speakers and Foreign Language Learners

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The acquisition of lexico-semantic constraints on syntactic structures is central to the development of native language competence. The study of the acquisition of such constraints by foreign language learners can illuminate differences between native and foreign language competence and their respective acquisition processes. One view of foreign language learning, the Fundamental Difference Hypothesis, suggests that the universal acquisition mechanisms which guide children in first language development may not be available to adults learning foreign languages. This view leads to the expectation that certain sorts of lexico-semantic constraints — the “broad” constraints based in theta theory — should be reliably acquired by foreign language learners, while those based on narrow semantic classes of verbs should not be. Two studies test these predictions, comparing the knowledge of the broad and narrow constraints on the English dative alternation by native speakers and non-native speakers with Japanese as first language. The results are generally consistent with the predictions, but additional research will be needed to sort out the effect of associative mechanisms and of universal motivating factors, such as the principle of object affectedness.

## INTRODUCTION

LEARNING A FOREIGN LANGUAGE involves, centrally, learning words. Not, however, simply learning what words mean, but also acquiring knowledge of the syntax of words. To take a famous example, it involves learning that *give*, but not *push* can occur naturally in the double-object dative construction:

- I gave her a ball.
- \* I pushed her a ball.

even though both *push* and *give* can occur in the prepositional dative construction:

I gave the ball to her.

I pushed the ball to her.

And, although *push* seems unhappy in the double-object dative, *toss* seems quite comfortable in this construction:

Toss me another french fry.

The problem, of course, for learnability approaches to language acquisition, is to explain how one acquires the principles which determine which verbs can occur in a given structure, so that the structure can be used productively for new verbs (*Please fax me your response*), but not overgeneralized.

This paper focusses on foreign language learning (“non-primary language acquisition,” “SLA” or “L2 acquisition”) — the acquisition of a language that takes place after a first language has been acquired and after a “critical period” in childhood has past, say, in the late teens or adulthood. In the cases which we consider — these cases are common — there is a period of formal school instruction in the target language, with little natural exposure, followed by a move in young adulthood to a country where the language is spoken. An Asian foreign student in a U.S. university is a typical example.

In the case of native languages, it is clear that the principles governing lexicosyntactic alternations are indeed acquired, and the theoretical issue is how they are acquired. The problem for foreign language learning is larger. We must discover first whether and under what circumstances such alternations can be acquired and relate the answers to the theory of how they are acquired.

In this paper we deal with the acquisition of the English dative alternation by Japanese learners of English as a foreign language. However, we will first step back, or up, quite a way, to attempt to situate the theory of the foreign language acquisition of the dative alternation within a larger context: (1) in a

theory of the representation and acquisition of lexical alternations, and (2) in the theory of second language acquisition, specifically as it addresses the position of Universal Grammar in foreign language learning and the position of first language knowledge in modulating access to UG. With this background, it will be possible to derive certain predictions about the acquisition of constraints on the double-object dative by speakers of a given L1. We will then show how these predictions apply to the specific case of Japanese learning English as a second language, will report two experiments which investigate those predictions, and will interpret some preliminary results in the light of the predictions.

The organization of this paper is as follows. First, we discuss what is known about two classes of constraints on the double-object dative in English and their place in linguistic theory. We then address questions of foreign language acquisition theory as it relates to lexicosyntactic alternations. Because the theory makes predictions dependent on the native language of the learner, some basic background on datives in Japanese is provided. The subsequent sections outline the research hypotheses, describe two experiments, and interpret the results, which are in general consistent with the hypotheses, although there remain many murky areas. Finally, we return to the larger context, and make suggestions for urgently needed additional research.

### Constraints on the dative

All contemporary discussions of the dative alternation note that there are special restrictions on the double-object form, so that many examples of the "prepositional" dative cannot be directly transformed into a double-object form. The examples with *push* and *toss*, given above, illustrate the "pickiness" of the double-object structure (to borrow a term from Jackendoff 1990, p. 449). Three broad types of constraints have been noted: the "possession constraint" (or the "broad constraint"), the "verbal semantics constraints" (or the "narrow constraints"), and the "morphophonological constraint".

The morphophonological constraint has reference to the fact that Latinate verbs cannot generally occur in the double-object construction, although they freely occur in the prepositional dative. The most striking examples contrast *give* with *donate* (*I gave the museum a painting* vs. *\*I donated the museum a*

*painting*). In this investigation, we shall have little to say about morphophonology: The status of the constraint — specifically its “psychological reality” — is much less clear than that of the other constraint types. Our first experiment does include a factor of verb morphophonology, but this inclusion is simply a carryover from an experiment which we are in part replicating. In the two experiments which we shall describe below, the first is essentially concerned with the possession constraint and the second with the narrow verbal semantics constraint.

In the following sections, we discuss the possession constraint and the narrow verbal semantics constraints in turn. Most of the concepts which underly our research are readily expressed in a variety of frameworks which have been proposed. We expect that any adequate theory of lexico-syntactic alternations will be able to express the fundamental notions. In this way, we hope that our results are to some extent “pan-theoretic” and relevant to a variety of conceptions.

**The possession constraint.** The first object of a double-object dative must be a “potential possessor”, as shown in the oft-cited contrast *John sent the boarder/\*border a package*. The prepositional dative is not subject to such a restriction: *John sent a package to the boarder/border*. Borders cannot possess packages in the relevant sense, while boarders (being people) can. The constraint is also illustrated by the ungrammaticality of *\*John drove Chicago a car* (cf. *John drove a car to Chicago*): driving a car to a city does not affect the city’s possessions.

How might this generalization find a place within linguistic theory? The possession constraint is certainly part of, or a consequence of the theory of roles and of the relationship of roles to syntactic structure. That is, in current terms, the constraint is associated with theta theory and the linking of theta-roles to syntactic functions (or positions in syntactic structure). For our purposes, the exact formulation of theta theory is unimportant. What is important is that Universal Grammar provides a limited set of roles (AGENT, THEME, RECIPIENT, etc.) or, otherwise expressed, a limited set of basic semantic predicates (ACT, MOVE, CAUSE, HAVE, etc.). Roles are associated with

particular syntactic functions (SUBJECT, OBJECT, etc.), again within the constraints and markedness relationships given by Universal Grammar. All languages have realizations of the universally given system, both with respect to the sorts of roles available and the possible ways of linking them with syntax. For example, we expect languages to have a concept like AGENT and to relate it to a syntactic function such as (typically) SUBJECT. On the other hand, we do not expect any language to link a concept like "long and thin" to any syntactic function.

The double-object dative represents a universally permitted linking of a syntactic function (the first of the two objects) with a role (RECIPIENT). Thus, the contrast *John sent the boarder/\*border a package* is ultimately relatable to the (English instantiation of) theta theory.

Various syntactic theories will express this generalization in various ways. In the framework of Pinker (1989), which largely informed our research, the role relationships in a given sentence are indicated in a configuration of abstract predicates (e.g., ACT, HAVE, etc.). The "thematic core" of the double-object dative can roughly be stated as "X acts on Z for Z to have Y". Universal linking rules map the structure given by the core onto the syntactic structure. The causal agent (X) is linked to SUBJECT; the possessor (the first argument of abstract HAVE) is linked to the first object (the indirect object), and the transferred thing (the second object of abstract HAVE) is mapped to the second syntactic object (the direct object). Any meaning which is to be expressed as a double-object dative must be compatible with this thematic core. The possession constraint is thus a consequence of the thematic core. The first object must be cognitively compatible with the abstract predicate HAVE, and the verb must be compatible with possession change.

The thematic core associated with the prepositional dative is roughly "X acts on Y for Y to go to Z". Universal linking rules map the causal agent (X) onto SUBJECT; the transferred thing (Y) onto the object, and the goal location (Z) onto an oblique *to*-phrase. Note that the thematic core of the prepositional dative lacks the abstract HAVE which is responsible for the possession constraint on the double-object dative.

The class of verbs which is compatible with a given thematic core is the "Broad Conflation Class" of that thematic core. The alternation between the

prepositional and the double-object datives is expressed as a rule which relates the two thematic cores. Such rules are called "broad-range rules" (BRR). Another way of asking whether a learner has acquired the possession constraint is to ask whether the BRR has been acquired. Extending Pinker's terminology, we shall refer to the possession constraint as a broad-range constraint.

In a different account of the dative alternation, proposed by Jackendoff (1990), the possession constraint is expressed in the theta grid associated with verbs which can occur in the double-object construction. Such verbs assign a RECIPIENT role to the first object, and the RECIPIENT role is necessarily restricted to animate potential possessors (just as the first argument of Pinker's abstract HAVE is restricted). Certain verbs inherently assign this role (as does *give*); others, in particular verbs of causation of motion (such as *send* and *throw*) do not inherently assign a RECIPIENT role, but they can have their theta grids "augmented" so as to include a RECIPIENT.

Larson (1988, 1990), whose syntactic account of the dative is radically different from both Pinker's and Jackendoff's, nevertheless agrees in basing the theory of the dativizability on theta theory, proposing a mechanism of argument augmentation, with the effect that just those verbs which can occur with the appropriate thematic argument structure will allow the suppression of the preposition *to*, and hence allow its omission by an extension of the principle of recoverability of deletion.

Similarly, all other major attempts to give an account of the possession constraint, though they differ significantly in syntactic implementation, ground the constraint in theta theory (for example, the accounts of Grimshaw, 1989; Oehrle, 1976).

**The narrow verbal semantics constraint.** The double-object must be compatible with possession change. However, while this is a necessary condition, it is not sufficient. Among verbs which are cognitively compatible with the possession constraint, some actually occur in the double-object form, while others do not. The additional "narrow verbal semantics constraints" are illustrated by the following contrasts.

John tossed a donut to Harry.  
 John pushed a donut to Harry.

John tossed Harry a donut.  
 \* John pushed Harry a donut.

Mary told the story to Harry.  
 Mary whispered the story to Harry.

Mary told Harry the story.  
 \* Mary whispered Harry the story.

The examples illustrate that verbs of ballistic motion (like *toss*, *throw*, *kick*, etc.) are happier in the construction than verbs of continuous causation of motion (like *push*, *shove*, *pull*, etc.). Verbs which encode physical manner of speaking (such as *whisper*, *shout*) do not occur in the double-object dative, although *tell*, which encodes a manner-neutral information transfer, does. Precisely what the correct subclasses of verbs are is not completely understood. We are also far from a complete understanding of why such constraints should exist, and the ways in which they may be related to the broad-range possession constraint. For a statement of the major verbal subclasses, see Pinker (1989, p.110 et seq.), who outlines 14 subclasses, nine of which are dativizable.

How might the narrow verbal semantics constraints find an expression in linguistic theory? In the accounts of Jackendoff and Larson, which are based on argument augmentation, the narrow constraints are expressed as special conditions on the rules which augment argument structure. That is, they are not direct consequences of the definitions of theta roles and their links to syntax; rather, they are additional special restrictions applying to rules which affect argument structure. For example, while Larson does not consider the details of the narrow constraints in detail, it is clear that they function as additional conditions on augmentation rules:

*Goal Augmentation (Optional):* Add  $\theta_{\text{GOAL}}$  to the  $\theta$ -grid of  $\alpha$ .

Condition:  $\alpha$  denotes an event of motion in which the agent imparts a trajectory to the theme. (Larson, 1990, p. 616)

The phrase “denotes an event of motion in which the agent imparts a trajectory to the theme” represents a narrow constraint, in our terms, specifically, the “ballisticness” constraint.

In Pinker’s account, which treats these constraints in much greater detail than do other accounts, “narrow-range rules” complement broad-range rules to define exactly which of the verbs that are cognitively compatible with possession change actually will undergo the dative alternation. While broad-range rules relate to core thematic structure, the narrow-range rules refer to more detailed aspects of semantics. In particular, they make reference to specific “linguistically relevant manners and properties,” among which are ballisticness (differentiating *push* from *throw*) and the other features which define the narrow subclasses. These manners and properties are not given by theta theory, though they are constrained by Universal Grammar, which provides a universal list from which such features are drawn. The subclasses of verbs which undergo the alternation are the “narrow conflation classes”. We shall have occasion to speak of the “narrow-range constraints” on the double-object dative.

In sum, the possession constraint is a basic consequence of the theory of roles. The narrow verbal semantics constraints stipulate additional properties which a verb must have in order to undergo an alternation.

### Language learning and the dative alternation

The general view we shall adopt regarding Universal Grammar in foreign language learning is that the “accessibility” of UG is (partly) a function of the way UG is instantiated in the learner’s native language (L1). The strongest position (which has been called the Fundamental Difference Hypothesis) holds that UG is not available except as instantiated in the mental representation of L1 knowledge (Bley-Vroman, 1989, 1991). Related positions hold that UG is in principle fully available, but that the first language provides, in some sense, a



starting point for acquisition; or that UG is available as a constraint on possible grammars, but that there is no completely effective learning procedure for forming a particular grammar within these constraints. Within each of these general approaches, there are many possible variants, depending essentially on the concepts of "instantiation," "representation of grammar," "starting point," and "learning procedure". For our purposes, it is not necessary to disentangle these positions, and indeed the hypotheses which we shall derive probably do not distinguish among them. We will couch our arguments in the terms of the Fundamental Difference Hypothesis, although we suspect that similar predictions might be derived within other conceptions of native-language-modulated access to UG. For discussion of the controversy regarding UG in SLA see especially White (1989) and Eubank's introduction to the collection *Point Counterpoint* (Eubank, 1991).

Consider now the problem of a foreign language learner in acquiring the various constraints on the dative alternation. For a learner — either a child developing knowledge of the first language or an adult learning a foreign language — to acquire the dative alternation, appropriately constrained, requires that several aspects of the grammar/lexicon be learned. First, the relevant aspects of the meanings of individual verbs must be encoded in the learner's lexicon. If the learner cannot distinguish the meanings of *push* from *throw*, then the differences in their syntactic behavior cannot be acquired. Second, in order for the broad range constraints to be acquired (the possession constraint on the double-object form), the learner must know the relationship of the major thematic roles to syntactic functions (thematic predicates like ACT, HAVE and CAUSE; and their links to syntactic functions like SUBJECT and OBJECT). Third, in order to acquire the narrow range constraints, the learner must detect the syntactic consequences of particular "picky" semantic features (ballisticness, for example).

Pinker (1989) provides the most well-elaborated account of the acquisition of these three aspects of the system in first language development. The details of that account are not essential to our predictions. Only the broad outlines are necessary. Verbal meaning is learned by an elaborated system of event-category mapping, appropriately constrained. In the case of the broad range constraints, little need be learned: the constraints are largely a consequence of thematic

structure and the linking rules, which are innately given by UG. The narrow range constraints are the most interesting. Pinker proposes that the list of semantic features — the “linguistically relevant manners and properties” which can potentially have systematic syntactic consequences in a language — is also innately given. Of course, not all languages use the same semantic features in the same ways (or at all). In Pinker’s account, the learner, guided by this UG-given list and ignoring irrelevant features, abstracts just the features which the alternating verbs are observed to have, and forms narrow conflation classes and narrow-range rules.

With respect to adult foreign language learning, these three areas are ones in which acquisition might fail, at least in principle (see Table 1).

**Table 1**  
Areas of possible failure for adult second language learners

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a. Semantic structure of verbs	—	the relevant aspects of the meaning of verbs
b. Broad conflation classes	—	linking rules, notions of ACT, HAVE, etc.
c. Narrow conflation classes	—	syntactic consequences of “narrow” syntactic features: relevance of ballisticness, etc.

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From the point of view of second language acquisition theory, which, if any, of these areas are likely to cause difficulty?

First, would foreign language learners be unable to learn the meanings of verbs ([a] in Table 1)? While we do not wish to minimize the difficulty learners have in acquiring subtle semantic distinctions in new languages, the ability to do so is clearly there. (For one thing, adult native speakers regularly acquire new vocabulary; so that the ability to learn word meaning, narrowly construed, does not disappear during maturation.) We conjecture that learners need not be stuck thinking that there is no difference in meaning between *push* and *throw*, or that *drive* means something else than ‘drive,’ or that *give* does not involve possession change.

While the relevant aspects of semantics are probably available, what about their links to syntax? It is here that we focus our research hypotheses.

Consider the case of linking rules and the possession constraint ([b] in Table 1). If the linking rules are not functioning, the second language learners might think that *John gave Mary a book* and *John gave a book to Mary* are completely interchangeable, i.e., learners would not know that these two sentences are in fact different ways of viewing the same event. They would fail to know that *John gave Mary a book* views *Mary* as the thing that is acted on (to cause her to possess something), whereas *John gave a book to Mary* views the *book* as the thing that is acted upon (to cause it to go to Mary). The broad conflation classes are determined by the linking rules and the thematic cores; therefore, the non-functioning of the linking rule causes trouble for the Broad-Range Rules: the learners would fail to get the possession constraint. They would not know that they cannot say *I drove Chicago a car* or *I sent the border a package*. However, if the learners have linking rules, they should inevitably get the broad conflation classes, and the possession constraint should be figured out as a consequence.

We conjecture that foreign language learners will in fact learn the broad constraints ([b] in Table 1); they will acquire the possession constraint successfully. To do this, learners must access notions like ACT, HAVE, agent, patient, and so forth, and the linking rules which map the thematic notions such as agent and patient onto the syntactic argument structures. Now, the notions of agent, patient, and so forth are cognitively universal; all languages use such concepts and all languages link such concepts to syntactic functions. It is even likely that if native language has a construction similar to the double-object dative of English, it will be subject to something like the English possession constraint. Thus, such concepts will be available more-or-less directly in the learner's native language; and so, under the Fundamental Difference Hypothesis, they should be accessible to foreign language learners.

The narrow conflation classes ([c] in Table 1), however, which also have their basis in universal grammar, may well not be uniformly available to adult second language learners.

In order to acquire the proper narrow-range rules, the foreign language learner must (1) distinguish potentially linguistically relevant manners and properties such as ballisticness from linguistically irrelevant manners and properties such as *pushingly* and then (2) note the fact that certain of these manners and properties are present in the double-object form. We propose that during first language development, the learner is open to the full range of linguistically relevant manners and properties which can be involved in the syntax of languages. After the native language grammar is fixed, the adult learner no longer has direct access to that universal list of linguistically relevant manners and properties. Essentially, adult foreign language learners do not know which of the myriad features which distinguish meanings of words are likely to have syntactic consequences. Hence they cannot easily zero in on precisely what it is that characterizes dativizable verbs and distinguishes them from non-dativizable verbs.

The range of variation among languages with respect to the syntactic coding of such manners and properties is quite large (as Benjamin Whorf observed). Under the Fundamental Difference Hypothesis, the learner will have difficulty in acquiring the narrow semantic constraints except in the unlikely event that the native language selects the same manners and properties and uses them in syntax in a similar way. If the learner's native language uses a ballisticness distinction, say, to constrain a double-object-type syntactic alternation, but not "manner of speaking" (*speak vs. shout*), then the learner will notice only ballisticness but not manner-of-speaking. If neither ballisticness nor manner-of-speaking has similar syntactic consequences in the native language, then the learner will not be able to pick up either constraint on the English double-object construction.

It is important to be clear about this prediction. In particular, it is not predicted that learners might not, with exposure, be more likely to accept particular dativizable verbs than particular non-dativizable verbs in the double-object construction. Even if the learner does not have any principled way of distinguishing a dativizable verb, like *throw*, for instance, from a non-dativizable verb such as *push*, the learner will still hear *throw* as a double-object dative and in the prepositional form, but will hear *push* in the

prepositional form and not in the double-object. Hence, *throw* with a double-object form and a prepositional form and *push* with a prepositional form may be "strengthened".

Consequently, in time the learner gradually may attain the judgments which native speakers have with respect to actually occurring verbs. Yet the learner still has not figured out that ballisticness constrains the dative alternation; all he knows is that he hears the word *throw* in double-object constructions, but not the word *push*. Therefore, if a novel word which encodes 'ballistic motion in the manner of using some device' were invented, the learner whose native language does not have analogous constraints would do badly on the novel dative verb (or would do equally well on a *push*-like novel verb and a *throw*-like novel verb), because he does not know what it is that allows *throw* to be dativizable but *push* not to be. The native speaker on the other hand, whose grammar is governed by principle rather than merely by observed occurrence, should treat the novel verbs correctly.

In making this argument about narrow constraints, we are necessarily rather cautious about our predictions. At several stages one can only speculate about what is plausible, given reasonable assumptions about learners, linguistic theory, and the fundamental difference hypothesis. This is particularly true with respect to the concept of strengthening. In general, we follow many current researchers (especially Pinker, 1991) in holding that language behavior is governed both by systems of principles and also by associative mechanisms, such as our proposed strengthening. The basic claim with respect to the narrow constraints is that native speakers have discovered principles (albeit rather ungeneral principles) but that non-natives merely rely on what has been heard, and how often.

In sum, we expect that foreign language learners of English would successfully learn semantic structures of verbs. Furthermore, the broad constraint (the possession constraint) will be successfully acquired by a learner of English as a foreign language due to the availability of the universal linking rules and thematic relations through the learner's native language. However, the narrow constraints will generally not be learned (or will be learned only when the learner's native language happens to use similar linguistically relevant manners and properties in a similar way). Our own research attempts

to explore these expectations by studying the constraints on the dative which are developed by Japanese speakers in learning English. In order to make more specific predictions, it is necessary at the outset to analyze the relevant constructions in Japanese in some detail.

### Facts of Japanese

**The dative construction in Japanese.** We assume, along with other researchers (Baker 1988; Marantz 1981, 1984; Miyagawa 1989), that Japanese has true double-object verbs where both of the subcategorized elements behave like objects. One important motivation for this assumption involves the passive structure. The ability of an NP to appear as the subject of passive is evidence that it serves as a true object in the non-passive structure (Baker, 1988, p. 177). In Japanese, either of the objects with the particle *-o* or the particle *-ni* can become a subject of a passive. (2) and (3) are passive sentences corresponding to (1).

- (1) John-ga    Mary-ni    hon-o    atae-ta.  
 John-Nom    Mary-Dat    book-Acc    give-Past  
 "John gave Mary a book."
- (2) Hon-ga    John-ni (yotte)    Mary-ni    atae-rare-ta.  
 book-Nom    John-by                Mary-Dat    give-Pass-Past  
 "The book was given to Mary by John."
- (3) Mary-ga    John-ni (yotte)    hon-o    atae-rare-ta.  
 Mary-Nom    John-by                book-Acc    give-Pass-Past  
 "Mary was given a book by John."

One way of accounting for this alternation is through the theory of Case. In a true double-object construction, Case is assigned to the objects by the verb itself. If the passive morphology reduces a verb's ability to assign Case, then an explanation is available for why an object "becomes" subject in the passive. If the construction were not a true double-object and if Case were assigned

independently of the verb, then there would be no motivation for movement to subject position; indeed the passive examples ought to be ungrammatical, since they would be doubly Case-marked (see Yoshinaga 1991 for more detailed treatment of this argument).

Thus, there is a Japanese dative construction which is in its essential respects parallel to the English double-object dative. Furthermore, there is no alternation of double-object and prepositional forms.

The situation is somewhat obscured by the existence of a scrambling operation in Japanese which may appear to mimic the English alternation, as example (4) shows, where the order of the direct object, *book-o*, and the indirect object, *Mary-ni*, is reversed in contrast to (1).

- (4) [<sub>S</sub> John-ga [<sub>VP</sub> hon-o<sub>i</sub> [<sub>VP</sub> Mary-ni t<sub>i</sub> atae-ta]]]  
           John-Nom           book-Acc           Mary-Dat give-Past  
           "John gave a book to Mary."

This scrambling operation is not a rule only for the dative constructions; rather, it is a more general rule which is applied to other structures in Japanese (see Saito 1987 for more detail). Its nature is different from the operation of the English dative alternation, which is a rule of lexico-syntactic alternation.

**The Japanese dative construction and the possession constraint.** In this section, we argue that the Japanese double-object dative has a possession constraint, like the corresponding English construction. In order to make this argument, it is necessary to distinguish the dative Case-marking particle *ni* from the locative postposition *ni*.

In Japanese, there seem to be three types of verbs which can occur in the *ni -o* construction as in (5).

(5) The *ni*-*o* construction:

NP-ga	NP-ni	NP-o	V
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(6) Type 1

a. Mary-ga	John-ni	hon-o	nage-ta.
b. Mary-ga	place-ni	hon-o	nage-ta.
Mary-Nom		book-Acc	throw-Past.

"Mary threw John a book/threw a book to the place."

(7) Type 2

a. Mary-ga	John-ni	hon-o	atae-ta.
b. *Mary-ga	place-ni	hon-o	atae-ta.
Mary-Nom		book-Acc	give-Past.

"Mary gave John/\*place a book."

(8) Type 3

a. *Mary-ga	John-ni	hon-o	oi-ta.
b. Mary-ga	place-ni	hon-o	oi-ta.
Mary-Nom		book-Acc	put-Past.

"Mary put \*John/place a book."

The verbs of type 1 can have a place argument marked with *ni*, as well as an animate argument marked with *ni*. Thus, both sentence (6a) and (b) are perfectly grammatical and make sense. However, animate arguments marked with *ni* can undergo passivization, whereas place arguments marked with *ni* cannot as shown in (9) and (10).

(9) Type 1

a' John-ga <sub>j</sub>	t <sub>j</sub>	hon-o	nage-rare-ta.
John-Nom		book-Acc	throw-Pass-Past

"John was thrown a book."



## (10) Type 1

b' * Place-ga <sub>j</sub>	t <sub>j</sub>	hon-o	nage-rare-ta.
Place-Nom		book-Acc	throw-Pass-Past

"Place was thrown a book."

(9), which is passivization of (6a), is possible, but (10), which is passivization of (6b), is not. This indicates that *ni* in (6a) is Case realization of the dative Case assigned by the verb, whereas the *ni* appearing with *place* in (6b) must be a postposition which has the ability to assign Case, just like an English preposition, such as *to*. Hence, it is clear that the *ni*'s in (6a) and (6b), which on the surface appear to be the same, are in fact, different elements: *ni* which appears with an animate in (6a) is a dative Case marker, and *ni* which appears with *place* is a locative postposition.

The distinction between the two elements, the dative Case marker *ni* and the locative postposition *ni*, is clearly related to whether the word is an animate object or an inanimate object, since the only difference between (6a) and (6b) is that one appears with an animate object and the other appears with an inanimate object. More precisely, the dative *ni* can appear with animate objects only. This obviously also derives from the possession constraint on the dative construction, since only animates can possess in the relevant sense. In Marantz's terms, then, *throw* can assign a second role, namely the theme role, in addition to the goal role, only when the verb describes possession change.

Type 2 represented by a verb like *ataeru* 'give,' cannot have a place argument marked with *ni*, as shown in (7). This is because of the nature of the verb itself; just as in English, \**Give a book to place.* does not make sense. The fact that it does not make sense is related to the fact that *give*, by its nature, denotes a change of possession; and place cannot possess in the relevant sense. Thus, type 2 is at least compatible with the notion of a possession constraint on a double-object form in Japanese.

Needless to say, *John-ni*, as well as *hon-o*, can undergo the passivization as shown in (11).

## (11) Type 2

- |    |                      |                |                |                 |
|----|----------------------|----------------|----------------|-----------------|
| a. | John-ga <sub>j</sub> | t <sub>j</sub> | hon-o          | atae-rare-ta.   |
|    | John-Nom             |                | book-Acc       | give-Pass-Past. |
| b. | Hon-ga <sub>j</sub>  | John-ni        | t <sub>j</sub> | atae-rare-ta.   |
|    | Book-Nom             |                |                | give-Pass-Past. |

As discussed in the previous section, both NP's are objects of *ataeru*.

A verb like *oku* 'put,' does not show a change of possession and only allows a locative as contrasted in (8). Thus, the *ni -o* construction which appears with the type 3 verbs cannot be analyzed like the double-object forms due to the possession constraints on the double-object forms. Therefore we predict no passive corresponding to the *ni -o* construction for *oku*. And indeed the passive corresponding to (8b) is ungrammatical as shown in (12).

## (12)

- |    |                         |                |          |                |
|----|-------------------------|----------------|----------|----------------|
| a. | * Place-ga <sub>j</sub> | t <sub>j</sub> | hon-o    | ok-are-ta.     |
|    | Place-Nom               |                | book-Acc | put-Pass-Past. |
- "Place was put a book."

In summary, it is reasonable to conclude that in Japanese there is a dative *ni*, which is different from the locative *ni*, and the dative *ni* shows the possession constraint.

**Japanese datives and the Fundamental Difference Hypothesis.** If this analysis is correct, Japanese learners of English as a foreign language should successfully acquire (more accurately, transfer from Japanese) the possession constraint on the double-object dative. The linking rules and concepts of the thematic cores such as ACT, HAVE, and so forth, are universal. The Japanese language therefore must also have such universal properties which determine the broad conflation classes. In fact, as we have observed above, Japanese has a possession constraint governing a construction very similar to the English double-object dative.

The narrow semantic constraints, on the other hand, should be quite difficult. Features which form the English narrow conflation classes, such as ballisticness, for instance, are irrelevant to Japanese dative construction. That is, the Japanese language lacks the equivalent narrow-range rules.

Japanese learners of English might be able to do well on judging the acceptability of the double-object form if the verbs are actually existing verbs, such as *push* or *throw*. They may be able to do this well even without knowledge of the narrow-range constraint, because of the strengthening mechanism of exposure. However, they will not be able to do well on judging the acceptability of the double-object form with novel verbs because the Japanese language lacks relevant narrow-range rules.

### RESEARCH QUESTIONS AND HYPOTHESES

The purpose of our experiments shown in the following sections is to investigate how and to what extent Japanese learners of English as a second language judge the acceptability of the double-object constructions both in the broad and narrow conflation classes of verbs. It should be clear that we require information about novel verbs, and that we require comparisons of native-speaker performance with learner performance. We designed two experiments, the first addressing the possession constraint and the second the narrow semantic constraints. For our first experiment, we followed an experiment done by Gropen, et al. (1989). The first experiment addresses research questions 1 and 2; the second experiment addresses 3 and 4.

1. Is the possession constraint psychologically real for adult English native speakers?
2. Are adult Japanese learners of English sensitive to the possession constraint?
3. Is the narrow-range rule psychologically real for adult English native speakers?
4. Are adult Japanese learners of English sensitive to the narrow-range rule?

The hypotheses corresponding to research questions 1 and 2 for the first experiment are as follows:

*Research hypothesis 1*

The possession constraint will be psychologically real for adult native speakers of English. That is, they will be sensitive to the possession constraint. Thus, they will rate the double-object dative with verbs which involve a change of possession as more acceptable than those which do not involve a change of possession.

*Research hypothesis 2*

Adult Japanese learners of English will be sensitive to the possession constraint. This is because the Japanese language has a possession constraint. Thus, their performance will be the same as that of the native speakers of English.

The hypotheses corresponding to research question 3 and 4 for the second experiment are as follows:

*Research hypothesis 3*

The narrow-range rule will be psychologically real for adult native speakers of English. That is, they will be sensitive to the narrow-range rule. Thus, they will rate the double-object dative verbs with verbs that represent the narrow conflation classes as being more acceptable than those which do not. Their performance will not differ significantly depending on which the verbs are real or novel.

*Research hypothesis 4*

Performance of adult Japanese learners of English on rating the novel verbs will differ from that of the native speakers because the Japanese language lacks corresponding narrow-range rules. Hence, their ability to distinguish novel verbs which obey the constraints from those which do not should be significantly less than that of native speakers.

## EXPERIMENTS

### Subjects (both experiments)

Both experiments contrasted groups of native English-speaking subjects with Japanese learners of English. There were 64 native speakers and 66 Japanese speakers for a total of 130 subjects in the first experiment. The second experiment consisted of 85 native speakers and 85 Japanese speakers for a total of 170 subjects. The subjects were intended to represent comparable populations in both experiments.

In both experiments, the subjects, both the native speakers and Japanese speakers, are either undergraduates, graduates, instructors, or professors at the University of Hawai'i, Hawai'i Pacific University, Kapi'olani Community College, the University of Arizona, or Denver University during the time of this study.

Over 90 percent of the Japanese subjects were students (graduate and undergraduate). In the first experiment, 21 (32%) were undergraduate, 43 (65%) were graduate, and 2 (3%) were instructors. For the second experiment, 31 (37%) were undergraduate, 52 (61%) were graduate, and 1 (1%) was instructor (1 [1%]= not reported).

The majority of the native speakers were also students, but some faculty were also included. In the first experiment, 11 (17%) were undergraduate, 42 (66%) were graduate, and 11 (17%) were instructors. In the second experiment, 23 (27%) were undergraduate, 51 (60%) were graduate, and 11 (13%) were faculty.

The number of male and female subjects was about equal. For the first experiment, the native English speaker group consisted of 32 (50%) males and 31 (48%) females (1 [2%] not reported); the Japanese speaker group consisted of 35 (53%) males and 29 (44%) females (2 [3%] not reported). In the second experiment, the native English speaker (NS) group consisted of 45 (53%) males and 39 (46%) females (1 [1%] not reported); the Japanese speaker (JPN) group consisted of 40 (47%) males and 43 (51%) females (2 [2%] not reported).

No Japanese subjects were beginners. Their proficiency level is considered to be quite high. It was crucial to avoid poor performance just because their

English proficiency was low. In the first experiment, the Japanese subjects' Test of English as a Foreign Language (TOEFL) scores ranged from a low of 498 to a high of 670 ( $\bar{x} = 579.4$ ,  $SD = 40.9$ ). The subject from the second experiment had TOEFL scores ranging from a low of 500 to a high of 670 ( $\bar{x} = 572.5$ ,  $SD = 41.7$ ).

40 of the Japanese speakers and 28 of the native speakers used in the first experiment were also used in the second experiment (for details, see Yoshinaga 1991, especially pp. 69–76 and Appendix I–IV).

### Materials (first experiment)

The first experiment was intended to replicate the essential features of Gropen, et al. (1989).

The questionnaire consisted of a page of instructions followed by four pages of test material. The test material consisted of 8 short paragraphs, each followed by 11 short sentences of which the subjects had to rate the acceptability.

Each paragraph contained a novel verb in a prepositional dative form and a novel noun whose meaning is related to the verb's meaning. Half of the novel words were polysyllabic, and the other half were monosyllabic. The novel words are counterbalanced across the paragraphs and subjects. Thus, we created 8 different versions of the questionnaire as in Table 2. Paragraphs one through four have verbs which specify a change of possession. In paragraphs 5 and 6, the verbs mean merely transportation, and in paragraphs 7 and 8, they signify just a benefactor. The paragraphs also vary according to whether they used the preposition *to* or *for*. The forms of the novel nouns varied across the paragraphs in the example published in the report of the Gropen, et al. (1989) study; appropriate forms of the novel nouns for each paragraph were reconstructed based on the published information.

The eleven short sentences and rating scales, ranged from –3 through +3, followed each paragraph. Two of the sentences were datives: a double-object dative and a prepositional dative. The remaining nine sentences were distractors: one simple transitive sentence which lacks an indirect object, five passive sentences, and imperatives of two datives and simple transitives.

**Table 2**  
Verbs used in each questionnaire version

Paragraph	Questionnaire			
	1	2	3	4
1 TO possessive	norp	dorfinize	tonk	repetrine
2 TO possessive	calimode	norp	dorfinize	tonk
3 FOR possessive	moop	calimode	norp	dorfinize
4 FOR possessive	orgulate	moop	calimode	norp
5 TO non-possessive	pell	orgulate	moop	calimode
6 TO non-possessive	repetrine	pell	orgulate	moop
7 FOR non-possessive	tonk	repetrine	pell	orgulate
8 FOR non-possessive	dorfinize	tonk	repetrine	pell

Paragraph	Questionnaire			
	5	6	7	8
1 TO possessive	pell	orgulate	moop	calimode
2 TO possessive	repetrine	pell	orgulate	moop
3 FOR possessive	tonk	repetrine	pell	orgulate
4 FOR possessive	dorfinize	tonk	repetrine	pell
5 TO non-possessive	norp	dorfinize	tonk	repetrine
6 TO non-possessive	calimode	norp	dorfinize	tonk
7 FOR non-possessive	moop	calimode	norp	dorfinize
8 FOR non-possessive	orgulate	moop	calimode	norp

#### Procedures (first experiment)

The questionnaire for the first experiment was distributed to the subjects (native speakers and Japanese speakers) during the spring semester, summer session, and fall semester of 1990.

The subjects were asked to rate the "acceptability" of the eleven sentences after reading a paragraph. Instructions emphasized that the subjects should rate the sentences based on their feeling, rather than on right or wrong. The scale provided was a seven-point rating scale, ranging from -3, *completely odd*, through zero (0), *do not know*, through 3 *perfectly natural*. The use of the scale was illustrated by providing sample ratings of sentences using the verbs *give* and *say* in double-object forms, with the 3 marked for *give* and -3 for *say*.

There were no time limits. The subjects could spend as much time on the questionnaire as they needed. This was important in this study, especially because each paragraph may have been difficult to understand because of the novel verbs.

#### **Analytical design (first experiment)**

The design included one between-subjects factor (native language: Japanese or English) and four within-subjects factors (form: prepositional or double-object; semantics: possession or nonpossession; preposition type: *to* or *for*; and morphophonology: monosyllabic or polysyllabic). This design is identical to that of Gropen et al, with the addition of the factor of language. The factor of morphophonology will not be discussed. We will focus, rather, on the possession constraint. A five factor repeated measure analysis of variance was used to determine whether or not the overall differences are significant. To determine which pairs of means are significantly different, individual pairs of means were compared by examining simple effects and conducting post hoc comparisons. The  $\alpha$ -decision level was set at  $\alpha < .05$  (in fact, all significant differences in the results were at  $p < .01$ ). In reporting the results, we indicate statistically significant effects with an asterisk (\*).

#### **Results (first experiment)**

In our discussion of the results of the first experiment, we first note the results obtained by Gropen et al. in order to compare them with ours. In order to examine the possession constraint, Gropen, et al. (1989, p. 222), first looked at the effect of semantics (poss/nposs) and found it to be significant,  $F(1, 63) = 194.290^*$ , showing that their subjects rated the possessive verbs as being more



acceptable than the nonpossessive verbs. They point out that these main effects are best interpreted in light of a significant two-way interaction between semantics (poss/nposs) and form (prep/DO),  $F(1, 63) = 191.310^*$ , reflecting the fact that in judging the double-object form, the subjects considered that the verbs which did not involve possession were worse than those that did involve possession,  $F(1, 63) = 247.020^*$ ; however, in judging the prepositional form, the subjects did not care whether or not the verbs involved possession (Gropen, et al., 1989, p. 222).

In the present study, there was also a significant effect for semantics,  $F(1, 128) = 71.962^*$ . This indicates that there are consistent mean differences in the ratings of the possessive and nonpossessive across the two language groups, NSs and JPNs, as in Gropen, et al.'s native speakers of English. Our study also showed a significant two-way interaction between semantics and form,  $F(1, 128) = 113.356^*$ . When judging the double-object form, both the native and Japanese speakers considered that the verbs which did not involve possession were worse than those that did; whereas when judging the prepositional form, they did not care whether the verbs involved possession.

**Table 3**

Descriptive statistics for the possessive double-object form and nonpossessive double-object form in the native and Japanese speakers

	poss DO		nposs DO	
	$\bar{x}$	<i>SD</i>	$\bar{x}$	<i>SD</i>
NS	1.09	(1.50)	-0.58	(1.13)
JPN	0.09	(1.61)	-1.25	(1.43)

Figure 1

Mean difference in ratings of the possessive double-object form and the nonpossessive double-object form in the native and Japanese speakers as compared to Gropen, et. al.'s study

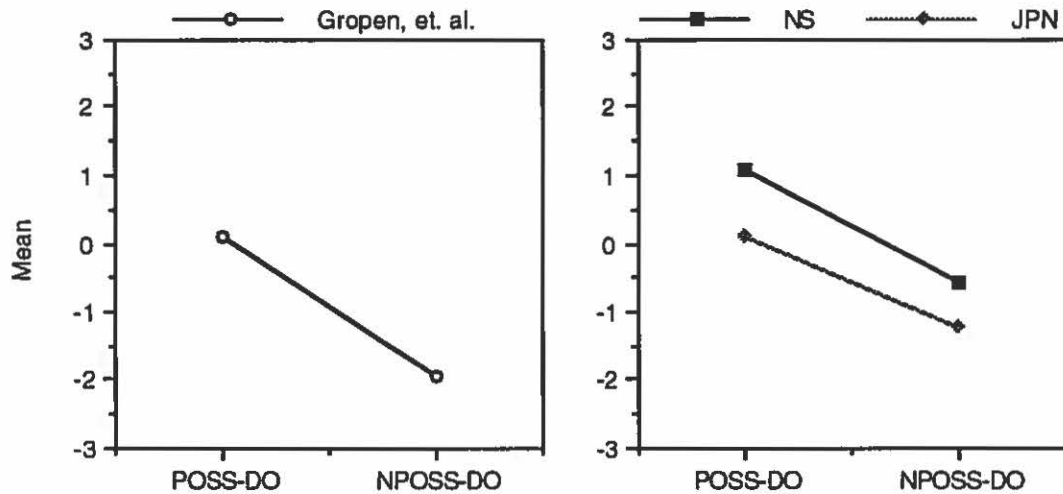


Table 3 and Figure 1 show the consistent mean differences in rating between the double-object forms which involve possession and those that do not. The Japanese speakers rated both relatively lower than the native speakers as reflected in the significant overall effect of language,  $F(1, 128) = 8.668^*$ ; yet, both groups, the NS and JPN, rated the double-object forms of the verbs which involve possession much higher than those that do not. The post hoc comparison of the possessive double-object form and the nonpossessive double-object form in the present study demonstrated that the difference between the possessive double-object form and the nonpossessive double-object form was statistically significant,  $F(1, 128) = 109.902^*$ . The native speakers rated both the possessive double-object form and the nonpossessive double-object form relatively higher than Gropen, et al.'s native speakers of English, but our native speakers and Gropen, et al.'s speakers both showed ratings for the possessive double-object which were much higher than those for the nonpossessive double-object form. In addition, there was no interaction

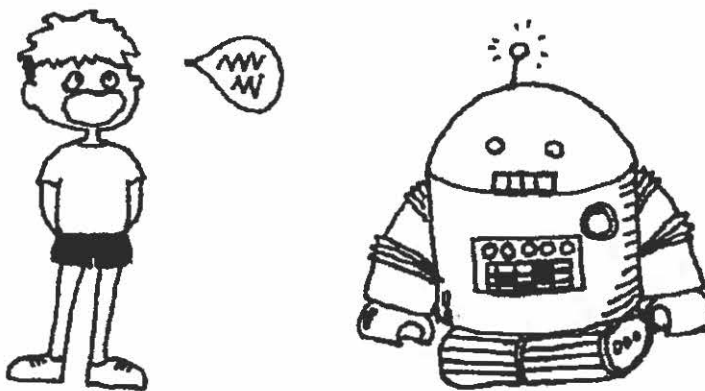
between semantics and language within the double-object form,  $F(1, 128) = 1.3886$  n.s. This indicates that the two groups did not behave differently on semantics. The Japanese speakers rated the possessive double-object form much better than the nonpossessive double-object form, just as the native speakers did. Evidently, the Japanese speakers show comparable sensitivity to the possession constraint, in line with our research hypotheses 1 and 2.

### Materials (second experiment)

The questionnaire used in the second experiment was developed specifically for the purpose of testing the narrow verbal semantics constraints. An example from the questionnaire can be found in Figure 2.

Figure 2

An example of the questionnaire used in the second experiment



Joe invented a robot, which he named Spot, which only responds to high pitched voices, so he had to learn to speak in a special way, which he called *feening*. Therefore, when Joe needs to communicate to his robot, he would always *feen* the commands to the robot.

-3	-2	-1	0	1	2	3	Joe is <i>feening</i> a message to Spot.
-3	-2	-1	0	1	2	3	Joe is <i>feening</i> him a message.

The questionnaire consisted of a page of instructions followed by five pages of test material. The test material consisted of thirteen short paragraphs with pictures that depict each situation described in the paragraphs, followed by two short sentences of which the subjects had to rate the acceptability.

For the second experiment, both real and made-up verbs were included, unlike in the first experiment, which included only made-up verbs. There were thirteen paragraphs in the materials; twelve were relevant to the research questions. One (using the verb *moop*) was added to the questionnaire to explore a separate methodological issue, not relevant to the question under investigation here. In the following, we concentrate only on the twelve relevant cases. Six out of these paragraphs contained a real verb in a prepositional dative form, and six consisted of made-up verbs in the prepositional dative form. The real verbs were selected carefully, half from the principled subclasses of verbs that have the BRR applied to them but fail to dativize, thus do not have the NRR applied to them. The made-up verbs were given in a context which conveyed a certain meaning to the verb that fit the situation. Corresponding to each real verb was a made-up verb belonging to the same narrow conflation class. We tried to keep the made-up verbs from being too close in meaning to the real verbs, so that the subjects would not think that the made-up verb was actually a real verb in "code." Three out of the six real verbs were dativizable verbs; the other three were non-dativizable. Three out of the six made-up verbs were dativizable while the remaining three were non-dativizable. Thus, the three variables are fully crossed, as Table 4 shows.

Care was taken to ensure that the meanings of the made-up verbs were clear. For this purpose, pictures which depict the situation described in the paragraph were presented so that visual representation would help the subjects grasp the verb's meaning more clearly. In addition, the paragraph was written with simpler sentences and easier vocabulary so that difficulty in understanding the paragraph would not affect, in particular, the Japanese subjects' answers. Only monosyllabic non-Latinate verbs were used for both real and made-up verbs.

**Table 4**  
Verbs used in the second experiment

	Made-up verbs	Real verbs
Dativizable	doak <sup>a</sup> gomp <sup>b</sup> pell <sup>c</sup>	show throw send
Nondativizable	japed <sup>d</sup> tonk <sup>d</sup> feene <sup>e</sup>	pull push whisper

The verbs are categorized as being either real, made-up, dativizable, or nondativizable verbs.

- <sup>a</sup> show type (show/ask/tell, etc.): Illocutionary communication.
- <sup>b</sup> throw type (throw/toss/kick, etc.): Instantaneous causation of ballistic motion.
- <sup>c</sup> send type (send/mail/ship, etc.): Transfer of possession mediated by separation in time and space.
- <sup>d</sup> pull/push type (pull/push/carry, etc.): Continuous causation of accompanied motion in some manner.
- <sup>e</sup> whisper type (whisper/shout/yell, etc.): Manner of speaking.

The two short sentences and rating scales ranging from -3 to +3 followed each paragraph. The real or made-up verb in the paragraph was present in the two short sentences. One sentence contained a prepositional form and the other contained a double-object form. 20 different versions of the questionnaires were produced using different random orders of items.

#### Procedures (second experiment)

The subjects were asked to rate the acceptability of the two dative sentences after reading a paragraph and figuring out the meanings of the verbs. Instructions again emphasized that the subjects should rate the sentences based on their feelings, rather than right or wrong. The scale provided was just like that of the first experiment; a seven-point rating scale, ranging from -3, which means *very unnatural* through zero, which means *not sure*, to +3, which means

*perfectly natural*. The use of the scale was illustrated by two examples, each with a paragraph, picture, and two sentences. For the first example, the verb *explain* was used. *Explain* in the prepositional form was rated with a +3. In the double-object form, it was marked -3. In the second example, the verb *give* was used. *Give* in both the prepositional form and in the double-object form was marked with +3, meaning that they both sounded natural.

There was no time limit. Just as in the first experiment, the subjects were able to spend as much time on the questionnaire as needed. This is very important, especially for the paragraphs with the made-up verbs, because of the time needed to figure out the meaning, especially for non-native speakers.

The second experiment was administered during the summer session and fall semester of 1990.

#### **Analytical design (second experiment)**

The design of the study had one factor which distinguished among subjects (language) and two factors which distinguished among stimulus items (authenticity and dativizability). Authenticity is a two-level factor which encodes whether the verb is either real (REAL) or made-up (MU). Dativizability is a two-level factor: verbs which can occur in both the prepositional and double-object constructions are dativizable (DAT); those which can only have prepositional forms are non-dativizable (NDAT).

We designed this experiment in order to allow us to perform repeated-measures analyses of variance both on subjects and on items and to calculate a composite "quasi- $F$ ", as recommended by Clark (1973). (The design of the first experiment, following Gropen et al., did not permit this analysis of inter-item variability.) Where appropriate, we report analysis of variance on subjects as  $F_1$  and on items as  $F_2$ ; the composite  $F$ -value is given as  $\min F'$ . Following other researchers, and for consistency with the practice of Gropen et al., we decide statistical significance based on  $F_1$ , though we include the other  $F$ -values to aid in evaluating the generalizability of our findings beyond the particular items on the test. As in the first experiment, the  $\alpha$ -decision level is set at  $\alpha < .05$ .

### Results (second experiment)

As in the first experiment, the Japanese subjects rated the sentences overall as less grammatical than did the native speakers,  $F_1(1, 168) = 18.305^*$ ;  $F_2(1, 8) = 10.128^*$ ;  $\min F'(1, 19) = 6.520^*$ . This is consistent with what was observed in the BRR case.

Overall (including both native speakers and Japanese subjects), there was a significant main effect for dativizability,  $F_1(1, 168) = 381.652^*$ ;  $F_2(1, 8) = 17.292^*$ ;  $\min F'(1, 9) = 16.542^*$ . This effect was seen for both the real ( $F(1, 168) = 508.480^*$ , simple effects test) and the made-up verbs ( $F(1, 168) = 508.480^*$ , simple effects test), although there were signs of an interaction between dativizability and authenticity ( $F_1(1, 168) = 164.574^*$ ;  $F_2(1, 8) = 3.744$  n.s.;  $\min F'(1, 9) = 3.660$  n.s.) — a matter to which we shall return, since it requires an understanding of differences between natives and non-natives.

Recall that in the first experiment, testing the BRR, natives and non-natives behaved similarly (as reflected in the lack of a significant interaction of language and dativizability). In the second experiment, in contrast, there was a significant interaction of language and dativizability,  $F_1(1, 168) = 17.885^*$ ;  $F_2(1, 8) = 5.691^*$ ;  $\min F'(1, 14) = 4.317^*$ . This is the crucial datum. In case of NRR, the Japanese speakers are behaving differently from the native speakers. Native speakers have a much clearer differentiation of dativizable and non-dativizable verbs than the Japanese. This is expected under our theory.

Table 5 and Figure 3 show clearly the nature of the interactions of the experimental factors. Native speakers distinguish the dativizable from the non-dativizable real verbs (2.29 vs. -1.69); that is, they distinguish cases which obey the narrow constraints from those which do not. They are also sensitive to the narrow constraints for the made-up verbs (1.14 vs. -0.56). This itself is an important result. It shows the psychological reality of the narrow constraints on the double-object dative applied to novel verbs — a fact never heretofore shown, though predicted by Pinker's theory.

For the real verbs at least, the Japanese also appear to distinguish the dativizable from the non-dativizable verbs (1.26 vs. -1.59). This is expected within our theory, which holds that performance on the real verbs can approximate that of native speakers. We cannot claim to have precisely

predicted this result, or indeed to have predicted any particular contrast between natives and non-natives on real verbs, since we do not yet know the precise relationship between quantity of or quality of exposure and attaining native-like performance.

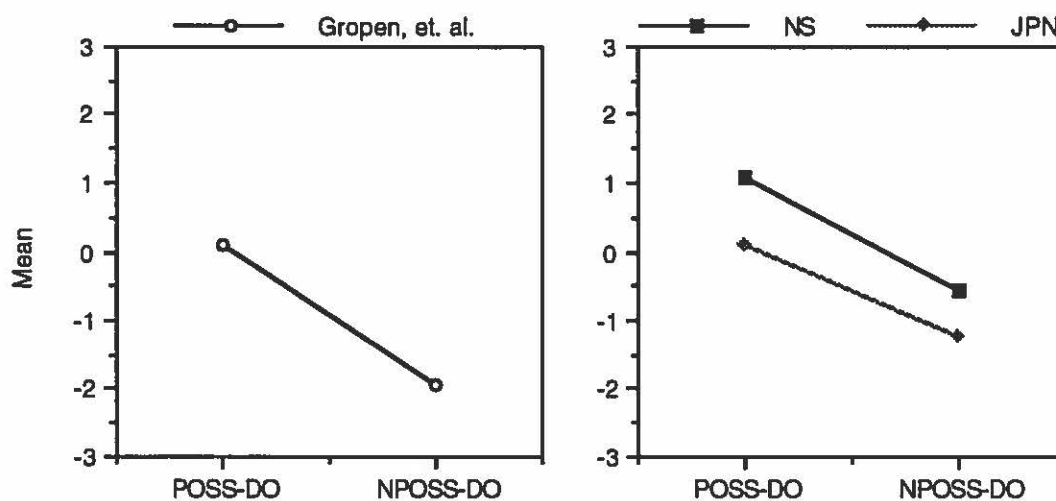
**Table 5**

Descriptive statistics for real and made-up verbs that are dativizable and nondativizable in the native and Japanese speakers.

	REAL		MU	
	$\bar{x}$	<i>SD</i>	$\bar{x}$	<i>SD</i>
NS DAT	2.29	(0.98)	1.14	(1.64)
NS NDAT	-1.69	(1.74)	-0.56	(1.70)
JPN DAT	1.26	(1.59)	-0.19	(1.61)
JPN NDAT	-1.59	(1.20)	-0.99	(1.46)

**Figure 3**

Mean differences between real and made-up verbs that are dativizable and nondativizable in the native and Japanese speakers





More interesting, and stronger support for the theory, is the differing effect of the made-up/real distinction on natives and non-natives (main effect for authenticity:  $F_1(1, 168) = 6.304^*$ ;  $F_2(1, 8) = 0.152$  n.s.;  $\min F'(1, 11) = 0.844$  n.s.; interaction of authenticity and language:  $F_1(1, 168) = 5.751^*$ ;  $F_2(1, 8) = 0.974$  n.s.;  $\min F'(1, 21) = 2.268$  n.s.). The Japanese speakers rated differently from the native speakers depending on whether the verbs were real or made-up. The difference between the real and made-up means for the NS was a negligible 0.01 ( $F(1, 168) = 0.005$  n.s., simple effects test), while the corresponding difference for the JPN was 0.42 — a significant difference,  $F(1, 168) = 12.040^*$ . This is what the Fundamental Difference Hypothesis predicts. Native speakers will not be as affected by whether a verb is real or made-up as a non-native.

Because these issues are so crucial to the theory, it is necessary explore the relevant data in somewhat greater detail. What about Japanese speakers' ability to distinguish the dativizable to non-dativizable made-up verbs? It is the learners' knowledge of the narrow constraints on novel verbs that is our primary concern. Therefore, we calculated another analysis of variance, concentrating on only the made-up verbs.

Within just the made-up verbs, there were significant main effects for language, ( $F_1(1, 168) = 19.152^*$ ;  $F_2(1, 4) = 359.303^*$ ;  $\min F'(1, 167) = 18.183^*$ ) and somewhat less clearly for dativizability ( $F_1(1, 168) = 78.146^*$ ;  $F_2(1, 4) = 2.047$  n.s.;  $\min F'(1, 4) = 1.995$  n.s.), and — critically — a significant interaction of dativizability and language ( $F_1(1, 168) = 10.341^*$ ;  $F_2(1, 4) = 94.277^*$ ;  $\min F'(1, 137) = 9.319^*$ ). This significant interaction of dativizability and language reflects a lower ability to apply the narrow constraints on the part of learners as compared to native speakers. The sensitivity of Japanese to the narrow constraints on novel cases looks on the face of it to be degraded or nonexistent, as expected under our conception of the foreign language learning of lexicosyntactic alternations. The Japanese subjects may develop some knowledge of dativizability of particular real verbs, due perhaps to exposure, but they have difficulty discerning the principles and applying them productively to novel cases, as shown by their relatively poor performance on the made-up verbs

## GENERAL DISCUSSION

The results of the first experiment confirm, first, that native speakers of English extend the possession constraint on the double-object dative in English to novel instances (made-up verbs). This result replicates the findings of Gropen, et al. (1989), and it suggests, more generally, that broad-range constraints, relating thematic to syntactic structure, are acquired (or activated) during native language development and applied productively: they are psychologically real. Second, the first experiment shows that Japanese learners of English are also sensitive to the possession constraint with novel verbs. This is consistent with our hypothesis that foreign language learners will acquire broad-range constraints and apply them productively. The natives and non-natives showed a similar pattern of sensitivity to the possession constraint (as reflected in the lack of any statistically significant interaction of the factors of dativizability and language in the first experiment).

Narrow semantic constraints are also applied productively to novel cases by native speakers, as the results of the second experiment show. However, in contrast to the case of the broad constraints, the Japanese speakers learning English are significantly less able to apply the constraints than are the native speakers (as reflected in the statistically significant interaction of the factors of language and dativizability in the analysis of the made-up verb cases of the second experiment). More generally, the results are consistent with a degraded ability of these foreign language learners to acquire narrow constraints (in comparison with native speakers), in contrast to their excellent ability to acquire broad constraints (indistinguishable from that of native speakers). The Fundamental Difference Hypothesis had led us to expect this difference between broad and narrow constraints.

The second experiment also included examples using real, existing verbs. Not surprisingly, the native speakers handled these examples easily. The Japanese speakers also showed some ability to distinguish the dativizable from the non-dativizable real verbs (though less clearly than did the native speakers). Our interpretation is that in the case of actually occurring verbs, foreign language learners can respond to input patterns, so that verbs which actually

are encountered in the double-object form will be felt to be more natural in that form than those which are not. This strengthening mechanism may operate in foreign language learners without any abstraction of the principled verbal subclasses which in fact underlie the patterns.

While the outcomes of the experiments are in general consistent with our research hypotheses, two aspects of the results are puzzling. In one case, a result is merely not predicted; in the other case, the result seems to run counter to the hypotheses. The two questions raised are: (1) Why are native speakers better able to distinguish the grammaticality of real verbs than novel verbs in the dative constructions? and (2) Why are foreign language learners at all sensitive to the difference between dativizable and non-dativizable novel verbs? We deal with each question in turn.

#### **Why are native speakers better able to distinguish the grammaticality of real verbs than novel verbs in the dative constructions?**

Native speakers have clearer intuitions about degrees of grammaticality for real than for made-up verbs. On the face of it, this ought to be unsurprising: after all, they have heard the real verbs but not the made-up verbs. However, nothing we have said till this point would predict this difference. Indeed, the assumption has been that the speakers extract general principles and apply them in making decisions of grammaticality, not that they simply ask themselves what they have heard before. They operate on rules, not on instances. The results of the second experiment suggest that this view is too simple. Evidently "familiarity" also affects native speaker grammaticality judgements in these cases. What sort of familiarity are we talking about here? Note that it is not a case of familiarity of the exact sentences, or of co-occurring particular words, but rather of an association between verbs and abstract frames. That is, in addition to rules, there must be a mental association between a given verb and the syntactic frames in which it has actually been observed to occur. Thus, a verb like *give* which is likely to have been frequently encountered in the double-object form, will be strongly associated with that structure and hence more easily judged to be grammatical in that structure. A fortiori, a verb which has never been heard at all (such as *gomp*), although it

may be grammatical in the double-object form (obeying the narrow-range constraint) will be relatively more difficult to accept.

In putting forth this explanation, we are not suggesting that associations rather than rules are used, not suggesting that rules are unnecessary. Our research is consistent with a large body of results suggesting that principles are applied productively to novel cases where no such associations exist. We are claiming that in the performance task of making judgements, native speakers may be affected by familiarity, in our specific sense, as well as by grammaticality. We are certainly not proposing that such associations based on familiarity are part of grammatical competence.

This line of explanation leads to specific testable predictions, which need now to be investigated further. In particular, the broad-range possession constraint should show the same difference between real and novel cases. One simple experiment would be to replicate the Gropen et al. design using real verbs. The results should be much sharper than with novel verbs. A somewhat more interesting prediction is that among the real verbs, there should be a familiarity effect. In a separate study, the actual frequency of occurrence of particular verbs in the double-object construction should be tabulated (based on sample corpora) and compared to experimentally elicited grammaticality judgements.<sup>1</sup> Ideally a statistical model could be constructed, involving the two factors of familiarity and grammaticality, appropriately scaled and weighted.

It will not have gone unnoticed that we are introducing the concept of strength of association, which we proposed as the primary determinant of non-native judgements, into the explanation of native speaker judgements.<sup>2</sup> This move is consistent with the tenet of the Fundamental Difference Hypothesis

<sup>1</sup> See Wolf-Quintero (1990) for evidence that verbs which are grammatical in a given structure differ in likelihood of being produced in that structure. Wolf-Quintero suggests that verbs may be "associated with their lexical structures to different degrees in mental representation" and that "strength of association with particular lexical structures is an important part of lexical representation" (Wolf-Quintero, 1990 pp. 88, 102).

<sup>2</sup> This is no radical innovation. The idea that associative mechanisms as well as rules play a role in performance is consistent with generative approaches to competence. For example, such a "hybrid model" is explicitly suggested by Pinker (1991), who proposes for example that regular past-tense inflection is primarily under the control of rules, whereas associative mechanisms are invoked when speakers are asked to produce the past tense of irregular verbs: the latter case shows the effect of form frequency characteristic of associative processes.

that the foreign language learner has no access to mechanisms which are not already in use in the native language. The difference between native and non-native competence is that the associative mechanisms which play a secondary role in natives' judgements are the primary basis for the non-natives' judgements.

This observation provides a context for our second question. If non-native judgements are simply a consequence of familiarity then:

**Why are foreign language learners at all sensitive to the difference between dativizable and non-dativizable novel verbs involving narrow semantic constraints?**

Non-natives are significantly less able to make judgements in the case of novel verbs than are native speakers. However, there is a small difference in their ratings for the dativizable and non-dativizable novel verbs. We interpreted this result as "sharply degraded" ability, arguing that it was consistent with a lack of the narrow semantic constraints. Certainly, if we had predicted that non-natives would master the narrow constraints, such a small difference would be embarrassing. Nevertheless, since we predicted a lack of knowledge of the constraints, even a slight sensitivity to the constraint requires some comment.

There are two possibilities for explaining this sensitivity on the part of non-natives. One involves the test instrument; the other involves the "motivation" for the narrow constraints.

First, the apparent sensitivity may be a consequence of the way the instrument was constructed. When a subject is presented with a novel verb, the subject may (consciously or unconsciously) see the made-up word as "code" for a real word. Consider the example with *gomp*. A device is shown hurling cabbages across a ravine. Suppose some subjects think that *gomp* is code for *throw*. If so, they may translate the examples to be judged into "real" examples with, for example, *throw*. Thus, there will be a "washover" from judgements of real verbs to judgements of novel verbs. In constructing the instrument, we tried to avoid creating cases of "code". Further research is needed to investigate this potential problem of the methodology. (It must be said that the same

possibility exists for the Gropen et al. instrument.) Two approaches suggest themselves. One is simply to work on refining the instrument, avoiding even more scrupulously the creation of examples too close in meaning to occurring verbs. Another (more interesting) approach would be to measure in some way the closeness of the mental association of a made-up word to a real word (for example, by seeing how long it took the subject to perform some task with the real word, having been exposed to the putative "code" word, thus measuring the degree of activation of the real word). It would be necessary to include novel verbs of identical theoretical grammaticality but with differing closeness of association to real words. One could then model the judgements of the made-up verbs as a function of the degree of activation of the corresponding real words. (This approach essentially uses empirically determined measures of activation of the "coded" real words to "calibrate" the instrument. )

The second approach to explaining the apparent slight sensitivity of non-natives to the narrow constraints is completely independent of the instrument. It relies on the concept of "object affectedness" as a partial motivation for language-particular narrow semantic constraints on constructions.

It is probably not accidental that the narrow classes of verbs which occur in the double-object form are the ones they are. For example, it is no accident that the *throw* class of verbs is dativizable while the *push* class is not; rather than the other way around. The double-object structure presents the goal (recipient) argument as being more directly or completely affected than does the prepositional dative, in which the goal is encoded as an oblique (the object of *to*). This point has been made from a variety of approaches, and of structures other than the dative, the locative alternation in particular. There is also reason to believe that something like "object affectedness" applies to all languages, not just to English. (See Foley & Van Valin, 1984, especially Chapter 2 for one approach; for a summary and useful review of some evidence, consult Gropen et al., 1991. )

The principle of object affectedness influences (in part) a speaker's choice of syntactic expression. For example, a speaker may choose to say "They loaded the wagon with hay" or "They loaded hay onto the wagon", depending on whether the wagon or the hay is presented as "affected".

What is the relationship between this principle and the narrow semantic constraints? Object affectedness does not obviate the need to posit such constraints as part of the grammar of a language. The principle influences speaker choices; it does not itself put limits on grammaticality. Consider the ballisticness constraint, the narrow semantic constraint ruling out *push* in the double-object. It is certainly possible to conceive of events of pushing in which the recipient of something pushed can be viewed as being centrally affected in the event; yet, the double-object construction cannot be used to present a pushing event from this perspective.

Still, in ordinary cases, it is probably likely that pushing will be seen as affecting the transferred entity rather more than the recipient. And certainly, ballistic actions (like throwing) are ordinarily more amenable to being viewed as affecting the recipient than are non-ballistic events. In sum, the "need" for the double-object form for ballistic events is arguably greater than for non-ballistic events. One might call this relationship between object affectedness and narrow constraints "motivation" or "rationale" (borrowing terms from Pinker 1989, p. 109 et seq.).

If the principle of object affectedness works in language in general, influencing a speaker's choice of expression, then object affectedness might be applied in some general way to foreign language use, even though (following the Fundamental Difference Hypothesis), the particular narrow-range constraints would not be acquired. Specifically, a learner, like a native speaker, might be influenced by object affectedness in choosing whether to use the double-object or prepositional dative. Consider then a judgement test such as that given in our second experiment. In cases which violate the narrow constraints, the recipient is less likely to be viewed as affected (since object affectedness in part "motivates" the narrow constraints). In those cases, the double-object form may seem less felicitous to the subjects, hence lowering, slightly, their judgements of acceptability. For native speakers, of course, the narrow constraints rule out those forms, causing a much sharper differentiation of the dativizable from non-dativizable novel verbs.

In sum, under this account the learners' apparent slight sensitivity to the narrow constraints is a result of object affectedness, whereas the sharp

difference between ungrammatical and grammatical forms on the part of native speakers reflects their knowledge of the constraints themselves.

These are murky waters, which cannot be cleared by a single experiment. Urgently needed is additional theoretical work on the nature of the narrow constraints, their relationship to "motivating" principles like object affectedness, and the universality of object affectedness itself. In addition, empirical research is required. The account given assumes that object affectedness might influence a non-native speaker's choice of form. To investigate this, we need experimental work in which object affectedness can be manipulated and its effect on learner production measured. Some initial work has been done in among native-speaking children (experiment 3 of Gropen et al., 1991 might be a good model), which could be adapted to foreign language learners. With more complete knowledge of object affectedness among foreign language learners, we can be more certain of our interpretation of the results of our second experiment.

### CONCLUSION

The study of the acquisition of lexico-semantic constraints on syntax by foreign language learners can yield insights into the structure of non-native languages, their relationship to the learner's first language, to the data of experience, and to Universal Grammar. Our research suggests that learners are able to acquire such constraints in the foreign language to the extent that the native language provides support. Our particular conclusion is that narrow semantic classes with syntactic relevance, such as the narrow classes of verbs which can be dative, will not ordinarily be learned. Although exposure to many examples may result in behavior similar to that of native speakers for actually occurring words, performance on novel words will show that these constraints have not been productively grasped.

Research such as ours also suggests that it will be productive to move away from simplistic arguments about whether UG is "alive" or "dead" to more articulated views of language acquisition, in which foreign language performance is seen to be shaped by universal motivating principles, by the



instantiation of UG in the first language, by specific structures of the first language, and even by the frequency structure of the available input. The explanation will require both rule formation and associative mechanisms.

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