Syntactic productivity in child and adult L2 acquisition

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1. Introduction

Much of the research on children's primary language acquisition is inspired by one or both of two central problems: the developmental problem and the learnability problem. The former has to do with accounting for the particular stages of acquisition that children more or less uniformly pass through, and the latter involves attempts to explain how children bridge the formidable gap between the knowledge they can derive from experience and the complete adult grammar that they come to possess. The problems in characterizing second language acquisition, especially by adults, are not nearly as straightforward. Evidence of developmental stages can be found, but it is rarely clear-cut; factors such as the age, learning circumstances, and native language background of the learner all contribute to hindering widely accepted generalizations. As for the learnability problem in L2, even its very existence is a matter of controversy. It is much more plausible in L2 than in L1 to argue that there is no gap between the input that is available to learners and the level of proficiency in the language that they eventually attain. However, when factors such as motivation, self-image, and time-on-task are considered, a reasonable argument for similar cognitive processes with mediating social influences can be developed.

This paper will attempt to contribute to the debate over the nature of the learnability problem in L2 by replicating parts of an important learnability study conducted with first language learners (Gropen, Pinker, Hollander, Goldberg, and Wilson, 1989). The particular aspect of the learnability problem under consideration is exemplified by the grammaticality of both of the ostensibly synonymous sentences in (1), but the unacceptability of the second sentence in (2).

(1) a. John gave the book to Fred.
b. John gave Fred the book.

(2) a. John reported the accident to the police.
b. *John reported the police the accident.

How do successful speakers of English come to know the principles, if any, that govern the alternations of the (a) and (b) sentences above? Compared to the indirect object dative (IOD) forms in the (a) sentences, the double object dative (DOD) forms of the (b) sentences seem to be quite restricted in terms of the verbs they can occur with. Dative alternation, as this phenomenon is perhaps best known, has long been a rich source of controversy for researchers in both theoretical syntax and in language acquisition.

2. Background to the problem: Baker's paradox

Based on three important assumptions--productivity, no negative evidence, and arbitrariness--Baker (1979) observed that there seems to be no way a child could avoid making generalizations that would define a much larger language than the one spoken by the community. The dative alternation (along with passivization, lexical causative alternation, and locative alternation) is one of the clearest illustrations of this learnability problem. How can children possibly

learn the restrictions on dativization? Logically, at least one of the three assumptions of Baker's paradox must be wrong.

Baker himself suggested that the assumption of productivity should be rejected, and argued that children follow a principle of strict lexical conservatism. Others have argued that the "no negative evidence" assumption is not valid, citing differences in the frequency with which mothers respond in particular ways to their child's well-formed vs. ill-formed utterances. The final possibility is that the assumption of arbitrariness is unjustified. This is where most of the linguistic work has been done, and in the case of dative alternation it has taken the form of searching for generalizable properties of verbs that can systematically account for their syntactic behavior (whether they can occur in the DOD form or not). Some of the syntactic proposals have been based on such distinctions as obligatory vs. non-obligatory arguments, arguments vs. non-arguments, and the recoverability vs. non-recoverability of prepositional meaning.

3. Pinker's solution to Baker's paradox

Pinker (1989) argues against strictly syntactic criteria for distinguishing between alternating and non-alternating verbs, on the grounds that: 1) if the principles were completely abstract, children could not distinguish them; and 2) these criteria would have to be perfectly correlated with alternability. If syntactic properties of verbs are thus ruled out for predicting dativizability, the child is left with two possible cues: sounds and meanings. For Pinker, both kinds of cues are relevant in accounting for whether a verb can undergo dative alternation. A full discussion of Pinker's theory with regard to meaning cues is beyond the scope of this paper, but a brief summary is necessary in order to get the flavor of the approach that Pinker takes.

4. Syntactic cues from verb meanings: Semantic constraints

According to Pinker, dative alternation does not simply map one syntactic realization of a sentence onto another, but rather involves a change in the verb's argument structure which reflects a slight change in meaning, even if the speaker is not consciously aware of the change. The kinds of argument structure that are possible with a given verb are constrained by two sets of semantic rules: broad range rules and narrow range rules. Broad range rules dictate the kinds of properties a verb must have if it is to alternate. For example, "prospective possession" in the semantic structure of the verb is a necessary condition for dativizability. However, broad range rules are only property-predicting, not existence predicting. Narrow range rules, which allow certain groups of verbs with very closely related meanings into one of various restricted classes, are the rules which determine if a DOD form actually exists or not. Thus the verb *report*, which satisfies broad range rules (at least in a metaphorical sense), could conceivably occur in the DOD, but it does not, as is evidenced by the ungrammaticality of (2b) above. *Report* happens to fall into a narrow range class labeled by Pinker "communication of propositions and propositional attitudes;" the verbs in this class do not alternate, whereas verbs of "giving" like *give* in Example (1) may alternate.

5. Syntactic cues from verb sounds: the morphophonological constraint

Developing a proposal made by Mazurkewich & White (1984), Pinker also argues that dativizability is also partially determined by what he calls a morphophonological constraint (MPC). Looking again at Sentence (2b), there is another reason why *report* does not occur in the DOD, in addition to its membership in an undativizable narrow range semantic class. Another fact of

English is that verbs of more than one syllable tend not to occur in the DOD form, and *report* is two syllables. The actual principles underlying the MPC are considerably more intricate and complex, however, and in fact have more to do with historical developments in morphology than with phonology. As Pinker reports, English at one time had the DOD as the most common construction in sentences with both a direct and an indirect object, even after dative and accusative case markers had disappeared. The indirect object dative form (henceforth IOD) did not appear until after a period of heavy influence from French in the fourteenth and fifteenth centuries, when (by analogy to the French preposition `*a*), nouns of French and Latin origin expressing goal arguments were marked with *to* . Gradually native verbs came to appear in this argument structure as well, but Latinate verbs apparently never came to be used in the DOD.

Since, as Pinker notes, children are generally not concerned with etymology, they must rely on sound contrasts to distinguish verbs that appear in the DOD from those which do not. As it turns out, there is a consistent phonological correlate to the native/Latinate distinction: while Latinate nouns are normally polysyllabic, native English nouns tend to consist of only one syllable. More accurately, the native class of nouns corresponds to what is known in metrical phonology as a single metrical foot; even if the word exceeds one syllable, it has stress only on the first syllable. Using the "single metrical foot' criterion for dativizability, Pinker is able to explain a number of apparent counterexamples to the constraints presented so far. For example, *promise* and *offer* can dativize, but *recommend* and *describe* cannot. In similar fashion, but with a little more wizardry, the unexpected dativizability of *assign*, *allot*, *award*, and *allow* are accounted for by the fact that they all begin with an unstressed schwa, a circumstance which keeps them in the one metrical foot category. Hidden in a footnote, however, is the admission that this analysis does not work for *arrange*, *abandon*, or *admit*; nor is he able to offer an explanation for the dativizability of *refer* and *reserve*.

6. Empirical evidence for criterion-based productivity: L1 English

In order to challenge Baker's (1979) claim that children do not overgeneralize the double object construction to non-dativizable verbs, Mazurkewich & White (1984) tested 9-, 12-, and 15-year-olds on their grammaticality intuitions about various types of existing and non-existing DOD and IOD sentences. The researchers believed that the reason that younger children had previously not been found to overgeneralize was not strict conservatism but rather the simple fact that they did not yet have in their active vocabularies the Latinate verbs that do not dativize. Indeed, Mazurkewich & White did find overgeneralizations, which diminished with increasing age. For example, the DOD constructions with verbs of the *suggest* class (e.g.. *David suggested Ruth the trip*), which violates MPC, was accepted by about half of the 9-year-olds, but only by one-third of the 12-year-olds, and by 11% of the 15-year-olds; in contrast, actually occurring double object sentences (e.g.. Diane baked Nicole a cake) were accepted at the 90% or higher level by all three groups.

7. The Gropen et al.(1989) study

Building on Mazurkewich & White's (1984) empirical work and on Pinker's (1989) theory, Gropen, Pinker, Hollander, Goldberg, and Wilson (1989) used four different data collection instruments, with both children and adults as subjects, to test a 'criteria-governed productivity' hypothesis against Baker's (1979) 'strict conservatism' hypothesis. Based on a computer search of a number

of child language corpora, they found in their Study 1 that in conversations between children aged 2-6 and their parents, both DOD and IOD appeared in comparable numbers. However, polysyllabic Latinate verbs were virtually absent in either form, not only for the children but also in their parents' speech. The only Latinate verb with Latinate prosody that was used was *explain*; interestingly, *explain* is one of the verbs most commonly overgeneralized to the DOD form by both first and second language learners.

The other three data collection methods in Gropen et al. (1989) were experimental designs. In Experiment 1, they attempted to demonstrate that the semantic and morphophonological constraints were psychologically real for adults. The researchers reasoned that if the constraints were not real for adults, then they could not possibly account for how a child avoids or recovers from overgeneralizations of the DOD. Sixty-four adults rated the acceptability of novel verbs in DOD and IOD forms, with the independent variables being +/- goal argument as prospective possessor (testing semantic constraints), and syllabicity (mono-/poly-) of the verb (testing the MPC). Although subjects judged DOD sentences involving a change in possession as being significantly more acceptable than those that did not, they evidenced only a very weak differentiation between monosyllabic and polysyllabic verbs. On just one of the four verbs presented did the subjects show a significant preference for the monosyllabic version when used in the DOD. Gropen et al. provided ad hoc reasons for the unexpected results for those three verbs, maintaining that the MPC was in effect.

Experiments 2 and 3 were designed to elicit the spontaneous production of double-object forms with novel verbs. If children were willing to produce DOD forms with verbs they had never heard before, the strict conservatism hypothesis would be untenable, and if they were willing to produce these constructions with monosyllabic but not polysyllabic verbs, the MPC would also be upheld. In Experiment 2, children used DOD forms in responding to goal-topic questions (the kind that would make DOD pragmatically most appropriate) 54% of the time with for monosyllabic verbs, and 39.1% of the time for polysyllabic verbs. Strict conservatism was clearly rejected, and Gropen et al. also cited the statistically significant difference in favor of monosyllabic verbs as evidence for sensitivity to the MPC.

The final component of Gropen et al.'s study, Experiment 3, was similar to Experiment 2, but differed in that feedback was eliminated in order to remove it as a possible confound, and an *of*-object pseudo-construction was modeled and practiced in order to demonstrate that children would not productively use a construction that was not part of their underlying grammar. The results were similar to those of Experiment 2, though this time the effect for syllabicity dropped below statistical significance.

8. Empirical evidence for criteria-governed productivity: L2 English

In a replication of Gropen et al.'s (1989) Experiment 1, this time with both native speakers and Japanese advanced L2 English speakers, Yoshinaga (1990) found robust confirmation for semantic constraints, but very weak effects for the MPC. Although the group mean ratings on the acceptability of DOD sentences were slightly higher for monosyllabic than for polysyllabic verbs, the difference reached significance only when the data of the native and non-native speakers was combined in the analysis. Using semi-free and controlled production tasks, Wolfe-Quintero (1992) investigated patterns of DOD use by Japanese and Chinese L2 speakers of English, as well as by native speakers. The non-native speakers were at two levels of proficiency: high (TOEFL > 500), and low (TOEFL < 400). On the semi-free production task, only one verb pair (*bake, construct*)

represented the minimal contrast between mono/polysyllabicity), but for this pair the difference between them on frequency of use in the DOD was not significant. This result was true for natives as well as non-natives, for Japanese as well as Chinese, and for high as well as low proficiency speakers. Wolfe-Quintero cautioned that due to the minimal amount of data on this contrast, the results could only be suggestive

9. The present study

Like the studies of Yoshinaga (1991) and Wolfe-Quintero (1992) mentioned above, the present study is attempt to bring L2 evidence to bear on acquisition theories developed by L1 researchers, specifically the criterion-based productivity theory developed by Pinker and colleagues. These particular experiments are L2 replications of Gropen et al.'s (1989) Experiments 2 and 3, both of which elicited the productive use of DOD constructions with novel verbs. In both experiments, the goals were to see to what extent children would productively generalize to a form they had never heard a verb used in, and what would constrain their generalizations. Experiment 2 was conducted both with L2 children (of mixed L1 backgrounds) and L2 adults (Japanese), and Experiment 3 was conducted only with L1 Japanese adults.

10. Research questions

Based on the literature reviewed above, and most specifically the research in Gropen et al. (1989), the following research questions were posed:

1. To what extent do L2 learners conform to "strict conservatism" in their production of English DOD sentences.

2. To what extent do L2 learners exhibit "criterion-governed productivity" in their production of English DOD sentences.

3. What are the criteria that constrain L2 learners' productivity?

11. Hypotheses

Because this is a close replication of a previous study , a default assumption (that L2 learners would behave similarly to native speaking children) was adopted, and the following hypotheses were formulated:

1. Subjects will produce DOD with verbs they have never heard before, thereby falsifying the strict conservatism hypothesis.
2. Subjects will not produce DOD freely, but will tend to conform to specific criteria in their productions.

a. Subjects will produce more DOD constructions with monosyllabic than with polysyllabic verbs.
b. Subjects will produce more DOD in response to goal-topic queries (for which they are the most felicitous type of response) than to theme-topic queries (for which IOD are more felicitous).
c. Subjects will produce more DOD following DOD modeling than following IOD modeling (Experiment 1 and 2 only).
d. Subjects will produce more DOD sentences with themselves as recipients than wit other types of recipients (Experiment 3 only)
e. Subjects will produce more DOD sentences with animate recipients than with inanimate recipients (Experiment 3 only).

12. Experiment 1

12-1. Subjects

Twenty children, 11 girls and 9 boys, participated in the study. All were students participating in an ESL pull-out program at a local public elementary school; seven were 5th-graders and 13 were 4th-graders. Their mean length of residence was 1.5 years. According to the Basic Inventory of Natural Language, or BINL (Herbert, 1979), five children were at a level of 4, and the rest were level 3 (a level of 5 is used to indicate exit from the ESL program). On their grade-level Metropolitan Achievement Tests (Prescott et al., 1986), which all students take, they had mean percentile scores of 30 on Language (Grammar), and 20 on Reading. The subjects' native language backgrounds were as follows: Japanese (6); Cantonese (2), Korean (2), Marshallese (2), Farrsi (2); Laotian, Tagalog, Thai, Tongan, Vietnamese, and Vizayan one each. Although the mean age of these children (10;4) were higher than those in the L1 study (7;4), it was felt that the task would be too difficult for younger recent immigrants.

12-2. Materials

As in Gropen et al. (1989), four instruments were devised to execute four novel actions, each of them involving the causation of the transfer of an object (e.g. a ball) from an operator (either the experimenter or the child) to an animate recipient. The objects used were mostly the same as in the earlier study: the inanimate transferred objects included a ball, a boat, an airplane, a car, and a wheel, as well as a cup which replaced the previous experiment's cupcake. The animals used as both recipients and transferred objects in both studies included a mouse, a lion, a bear, an elephant, and a turtle; however, the original lamb, raccoon, and bull were replaced by a tiger, zebra, and either a hippopotamus or a kangaroo, depending on the child's familiarity.

The present study used the exact same verb stems that Gropen et al. had created for each of the novel actions: *norp, keat, orgulate*, and *calimode*. Note that two were monosyllabic and two polysyllabic. The instruments devised to carry out the actions represented by the verb stems differed somewhat from the original study. One was a set of two plastic paddles, shaped like ping-pong paddles, one red and one blue, between which the object had to be grasped and transferred. The second was a four-foot long section of flexible plastic racetrack which was held up and used like a ramp. The third instrument was a three-foot long mailing tube with a three-inch diameter; again it would be held up for the object to be inserted in one end and then roll down. The final instrument was toy basketball free-throw machine with the basket and its pole removed; the recipients would be placed where the basket use to be, and a spring-lever shooter would propel the transferred objects to them. Each of the devices was as similar to the ones described in Gropen et al. (1989) as possible.

12-3. Procedure

Children were tested individually, in their classroom but out of sight of their classmates. Each session began with an introductory section. After collecting bio-data, the researcher had the child first identify each of the toys to make sure there was no unfamiliar vocabulary. Then the researcher initially tried to elicit DOD by asking two questions: 1) "When you are playing on the playground with your ball, and somebody takes your ball away from you, what do you say to get your ball back?" and 2)" When you are at the dinner table and you want the salt [which actually was visible and out of reach], what do you say?" In cases where subjects did not produce DOD sentences, the researcher would say: "... and you could also say..." and then model the appropriate DOD construction. The 'salt' question was from the previous study; the 'ball' question was an

innovation, with the rationale that the L2 speakers might 1) need more priming; and 2) not be familiar with asking for salt. The salt question led into modeling the passing of several toy objects to toy recipients; after the experimenter passed three objects to three recipients while announcing what he was doing (e.g. "I'm passing the lion a wheel"), the child was asked to do the same thing two times.

The actual experiment was divided into four blocks (one for each novel action), plus one additional block with the existing verb "give." Each block had a teaching phase, during which the experimenter would model the action physically and verbally with two sets of transferred objects and recipients, an elicited production phase, and a comprehension phase. In the elicited production phase, the researcher would ask, "Can you tell me what I'm doing with the _____?," asking either about the transferred object (theme-topic query), or the recipient (goal-topic query). Each block had two theme-topic queries and two goal-topic queries. Then, in the comprehension phase, the child was asked to perform the novel action four times, with different combinations of animals as transferred objects and recipients; two of the cues were given in DOD constructions and the other two in IOD.

In the first two blocks, corresponding to one monosyllabic and one polysyllabic verb, only the DOD form was modeled, and when children did not respond to a goal-topic query with DOD, the experimenter would model the DOD form by saying "and you can also say it ..." Furthermore, the elicitation of the DOD form (goal-topic query) in these two blocks came immediately after the two DOD model sentences. For these reasons, these blocks were said to comprise the Priming Condition. In the second two blocks, corresponding to the one remaining monosyllabic and polysyllabic verb, only the IOD form was modeled. The two IOD model sentences followed immediately two theme-topic queries, eliciting IOD forms, and only then the elicitation of DOD forms. Thus, these blocks were considered to make up the Experimental Condition. It was felt that the un-primed use of DOD constructions in these blocks would constitute strong evidence for productive generalizations. One compromise in the Experimental Condition was made, however. Because previous experiments had demonstrated the extreme difficulty of eliciting spontaneous DOD forms (e.g. Wilson et al., 1981), it was felt advisable to remind children of the possibility of a second form when they did not produce DOD sentences in response to goal-topic queries. Thus, in such instances during the third and fourth blocks, and in the "*give*" block as well, the experimenter would say, "Do you remember another way to say that?" and if no appropriate response then "Do you remember the other way to say that?" The responses to these follow-up questions were not counted in the results.

A final block consisted of the same procedures as the first two blocks using the verb "give," as a control for the efficacy of the methods.

12-4. Results and discussion

The results are summarized in Tables 1, 2, and 3. In general, the patterns of production vaguely resemble those of Gropen et al. (1989), but there is considerably less use of DOD constructions. Seventeen of 20 L2 children used a DOD construction at least once, but three of these children used it only with "give." In the Experimental Condition, there were only four L2 children who ever produced a DOD form; one of those seemed to have a strategy of using only DOD forms whatever the focus of the question. [Please note that all figures represent proportion of trials in which subjects produced DOD sentences.]

12-4-1. Production

DOUBLE-OBJECT FORM MODELED

GOAL-TOPIC QUERY (ELICITING DOUBLE-OBJECT FORM)

	Monosyllabic verb		Polysyllabic verb	
	L1	L2	L1	L2
First item	.56	.3	.19	.2
Second item	.62	.6	.62	.4

Table 1a. Experiment 1: Proportion of trials in which adult L2 subjects produced double-object sentences (comparisons of L1[1] vs. L2 Subjects).

Table 1a shows that the L2 subjects were comparably high on the second item with a monosyllabic verb and comparably low on the first item with a polysyllabic verb. A possible interpretation is that these similarities are epiphenomenal: the L2 speakers are especially sensitive to the feedback they get after the first response, and the L1 speakers are confused at first with how to deal with a novel polysyllabic verb. By the second item, their performance is indistinguishable from that with a monosyllabic verb.

THEME-TOPIC QUERY (ELICITING PREPOSITIONAL FORM)

	Monosyllabic verb		Polysyllabic verb	
	L1	L2	L1	L2
First item	.5	.4	.69	.5
Second item	.56	.25	.56	.3

Table 1b. Experiment 1: Proportion of trials in which adult L2 subjects produced double-object sentences (comparisons of L1 vs. L2 Subjects).

Table 1b shows that either both groups are surprisingly insensitive to the pragmatics surrounding DOD/IOD use (see Erteschik-Shir, 1979), or else that the modeling and priming which immediately preceded the two theme-topic inquiries had a continued or even increased effect for at least the first of these items. The latter is more plausible. The .69 DOD rate for L1 speakers for a first item theme-topic inquiry with a polysyllabic verb was their highest figure for any combination of circumstances. The same combination was notably high for the L2 speakers as well, and both groups decreased considerably on the second item.

PREPOSITIONAL FORM MODELED
(EXPERIMENTAL CONDITION)

GOAL-TOPIC QUERY (ELICITING DOUBLE-OBJECT FORM)

	Monosyllabic verb		Polysyllabic verb	
	L1	L2	L1	L2
First item	.44	.11	.38	.05
Second item	.56	.26	.38	.05

Table 1c. Experiment 1: Proportion of trials in which adult L2 subjects produced double-object sentences (comparisons of L1 vs. L2 Subjects).

[1]L1 subjects refer to those in Gropen et al.'s (1989) Experiment 2. All the L1 results are taken from Gropen et al.'s Table 10 (p. 230).

Table 1c shows that both groups were less willing to produce DOD forms after an IOD form had been modeled, and that the type of modeling is a more important factor than the pragmatic felicity. In this particular combination of conditions, more than any other, there is a consistent advantage for monosyllabic over polysyllabic verbs in terms of yielding DOD forms. It should be kept in mind that the goal-topic queries in the Experimental Condition all followed the theme-topic queries and IOD modeling, opposite to the sequence in the Priming Condition.

THEME-TOPIC QUERY (ELICITING PREPOSITIONAL FORM)

	Monosyllabic verb		Polysyllabic verb	
	L1	L2	L1	L2
First item	.19	.11	.12	.1
Second item	.19	.11	.19	.05

Table 1d. Experiment 1: Proportion of trials in which adult L2 subjects produced double-object sentences (comparisons of L1 vs. L2 Subjects).

Table 1d reveals a similar reluctance by both L1 and L2 children to produce DOD forms when both priming and pragmatic considerations are unfavorable. Under these circumstances, the item's place in the sequence and the syllabicity of the verb make very little difference. Only two or three of the children in either study were willing to try DOD forms in any of them.

12-4-2. Comprehension

DOUBLE-OBJECT FORM MODELED

	Monosyllabic verb		Polysyllabic verb	
	IOD	DOD	IOD	DOD
First item	.65	.3	.8	.5
Second item	.75	.5	.7	.6

Table 2a. Experiment 1: Proportion of trials in which theme and goal were correctly understood.

As might be expected, the comprehension situation is quite different for the L2 children in this study from that of the L1 children in Gropen et al. (1989). Whereas that study reported 86% correct comprehension of DOD sentences and 95% of IOD questions across conditions, there is a lot more variability among the L2 children. Under the different conditions the range of understanding of DOD questions is 30% to 60%, and for IOD questions the range is 65% to 80%.

PREPOSITIONAL FORM MODELED

	Monosyllabic verb		Polysyllabic verb	
	DOD	IOD	DOD	IOD
First item	.55	.7	.4	.75
Second item	.55	.75	.45	.8

Table 2b. Experiment 1: Proportion of trials in which theme and goal were correctly understood.

Table 2b shows that the comprehension picture does not vary greatly between the Priming and Experimental conditions. Please note that the presentation of data in 2a and 2b is in different orders to reflect the different orders they occurred in the experiment.

	Production of DOD		Comprehension	
	Goal-topic	Theme-topic	IOD	DOD
First item	.45	.35	.8	.8
Second item	.45	.35	.9	.8

Table 3. Experiment 1: The verb *give:* Proportion of trials in which adult L2 subjects produced and comprehended double-object sentences.

The main difference between "give" and the novel verbs is that production was nearly perfectly consistent between repetitions, and with a mild effect for pragmatics. Whereas the L1 children had produced DOD sentences in response to 70% of the queries with "give," the L2 children's overall rate was a little more than half of that. In comprehension of "give" sentences, the L1 rate was 100%, while the L2 rate was 82.5%.

13. Experiment 2

Except for the subjects, Experiment 2 was identical to Experiment 1.

13-1. Subjects

The subjects in Experiment 2 were fifteen adult learners of English, with an average age of about 26 years (range 21-50). All were Japanese native-speaking company employees who were enrolled in a summer intensive English program to prepare them linguistically for overseas assignments. They were high-intermediate to advanced speakers of English, with TOEFL scores ranging from 390 to 540 (mean=485).

13-2. Results and Discussion

Results are summarized in Tables 4 and 5. Compared to L1 and L2 children, the L2 adults were the least conservative in producing double-object sentences with novel verbs when the double-object form had been modeled for them. On the other hand, they were the most conservative when neither priming nor feedback were available (theme topic queries with prepositional form modeling).

Regarding the MPH, the adult L2 subjects show no consistent sensitivity to it whatsoever. In fact, in the Priming Condition, they seem to prefer polysyllabic verbs for the double-object sentences. The explanation for this finding probably also rests with the subjects' dependence on priming and feedback. The polysyllabic verbs were visibly more difficult for many of the subjects to remember and manipulate, so that they were especially more likely to rely on the modeled sentence pattern.

The L2 adults were also insensitive to pragmatic considerations with the use novel verbs. In the Priming Condition, they used the double-object form more frequently in response to the dispreferred theme-topic queries than to goal-topic queries; the pattern was reversed in the Experimental Condition, but with very few DOD forms produced in response to either type of query.

DOUBLE-OBJECT FORM MODELED

GOAL-TOPIC QUERY (ELICITING DOUBLE-OBJECT FORM)

	Monosyllabic	Polysyllabic	Mean
First Repetition	.73	.73	.73
Second Repetition	.80	.93	.87
Mean	.77	.83	.80

THEME-TOPIC QUERY (ELICITING PREPOSITIONAL FORM)

	Monosyllabic	Polysyllabic	Mean
First Repetition	.80	1.0	.90
Second Repetition	.80	.87	.83
Mean	.80	.93	.87

PREPOSITIONAL FORM MODELED

GOAL-TOPIC QUERY (ELICITING DOUBLE-OBJECT FORM)

	Monosyllabic	Polysyllabic	Mean
First Repetition	.27	.20	.23
Second Repetition	.47	.27	.37
Mean	.37	.23	.30

THEME-TOPIC QUERY (ELICITING DOUBLE-OBJECT FORM)

	Monosyllabic	Polysyllabic	Mean
First Repetition	.07	.07	.07
Second Repetition	.07	.07	.07
Mean	.07	.07	.07

Table 4. Experiment 2: Proportion of trials in which adult L2 subjects produced double-object sentences.

Table 5 summarizes the results with the verb *give*. Interestingly, with the real (and familiar) verb, they become quite sensitive to pragmatic considerations, with DOD forms occurring after 83% of the goal-topic queries, but after only 50% o the theme-topic queries. The problem in interpreting these results is that the DOD form was modeled for *give*, so the source of subjects' willingness to produce DOD is ambiguous: it may be familiarity with this verb in the DOD construction, or it may be a priming effect again.

THE REAL VERB "GIVE"

	Goal-topic	Theme-topic	Mean
First Repetition	.87	.54	.71
Second Repetition	.8	.47	.64
Mean	.83	.50	.68

Table 5. Experiment 2: Proportion of trials in which adult L2 subjects produced double-object sentences with the real verb *give*.

14. Experiment 3

Experiment 3 was a close replication of Gropen et al.'s (1989) Experiment 3.

14-1. Subjects

The subjects in Experiment 3 were drawn from the same population as those in Experiment 1; fifteen were assigned to Experiment 2, and fourteen were assigned to Experiment 3. Again, there was only 1 female subject.

14-2. Materials

The same four instruments as in Experiment were used to instantiate the same actions. However, this time the recipients/goals were of three types: the subject him/herself, one of six toy animals (which also represented possible possessors), or one of several inanimate objects (a book, a videotape, an electric pencil sharpener, a blackboard eraser, a microcomputer). The transferred objects were a ball, a wheel, a comb, a pencil, a spoon, and a cup.

14-3. Procedure

The procedure were very similar to that in Experiment 2. However, in place of priming and feedback with the novel verbs, there was an extended training stage with DOD forms used in conjunction with real verbs. The DOD construction was modeled a total of six times, two each for human (self), animate, and inanimate recipients. Modeled an equal number of times was the non-existent ***of*-object** form, which was included to demonstrate that the experimental task did not involve metalinguistic game-playing by the subjects; presumably the modeling of DOD forms with inanimate recipients was intended to serve the same purpose (Gropen et al. are not explicit on this point).

During the four blocks of the elicited production task, the novel verbs were not modeled in either form. The experimenter simply demonstrated the action by saying , e.g. "This is norping," while performing the action with the subject as recipient. For each verb the experimenter then posed six goal-topic queries, two consecutive questions for each type of recipient (subject, animate, inanimate). Finally, the same procedure was followed with the verb *give*.

14-4. Results and Discussion

The results, which are summarized in Tables 6 and 7, were quite different from what was expected. There was very little variation according to type of recipient, syllabicity of verb, or repetition. In fact, the only interesting variation was among subjects.

Most subjects were exceptionally consistent in their responses. Eight subjects took a DOD strategy, using DOD sentences nearly exclusively; two subjects each used the *to*-dative and the non-existing *of*-dative for all but a very few items; one subject consistently used *for*-datives; and the remaining two subjects used mixed, but also very consistent strategies.

One was "sensitive" to the MPC, using DOD for all and only items with monosyllabic verbs. The other used *to*-datives for all sentences in which he was the recipient; for the rest he used *of*-datives. Strangely, he then used DOD forms

for all instances with the verb *give*. An explanation for this rather astonishing finding does not readily spring to mind, but given the more expected results of Experiment 2, it is unlikely that these subjects came to the task with radically different representations of the English DOD construction. Rather, this task, which was included largely to allay fears that subject performance on Experiment 2 might be an artifact of that task, demonstrated that a very strong task effect is possible.

SUBJECT AS RECIPIENT

	Monosyllabic	Polysyllabic	Mean
First Repetition	.60	.53	.57
Second Repetition	.63	.57	.60
Mean	.62	.55	.58

ANIMATE RECIPIENT

	Monosyllabic	Polysyllabic	Mean
First Repetition	.60	.53	.57
Second Repetition	.60	.53	.57
Mean	.60	.53	.57

INANIMATE RECIPIENT

	Monosyllabic	Polysyllabic	Mean
First Repetition	.57	.53	.55
Second Repetition	.57	.53	.55
Mean	.57	.53	.55

Table 6. Experiment 3: Proportion of trials in which adult L2 subjects produced double-object sentences.

The results with *give* are shown in Table 7. All of the subjects who consistently used DOD forms with novel verbs continued to do so with *give*, as well as the subject who had exclusively used *for*-datives. In addition, one of the two subjects who had always used *of*-datives, and one of the two had used only *to*-datives, both used DOD forms for themselves as recipients with *give*. It is these two subjects who cause the percentages to show a stronger trend DOD with the subjects recipients.

Recipient	Subject	Animate	Inanimate	Mean
First Repetition	.93	.80	.80	.84
Second Repetition	.93	.80	.80	.84
Mean	.93	.80	.80	.84

Table 7. Experiment 3: Proportion of trials in which adult L2 subjects produced double-object sentences with the real verb *give*.

15. General Discussion

Returning to the hypotheses formulated earlier, the L2 children and adults did indeed confirm Hypothesis 1 by producing DOD constructions using novel verbs they had never heard before , but in very small numbers during the Experimental Condition. There was clearly an effect for priming and feedback. As an example of how sensitive the L2 learners were to feedback, one child, after using an IOD form on the very first goal-topic query, responded to the feedback indicating the possibility of DOD form by using DOD forms exclusively throughout the rest of the experiment Thus, though strict conservatism can be rejected, the pattern of weak conservatism is certainly evident when comparing the two conditions might be even stronger in a situation where no feedback is available.

Regarding Hypothesis 2, it is also clear that L2 learners' productions are not random; they are operating under some criteria. However, regarding the morphophonological constraint of Hypothesis 2a, they are not following it consistently; the subjects display a preference for monosyllabic verbs under some combinations of conditions, but not others. Hypothesis 2a cannot be confirmed for neither children nor adults.

Regarding pragmatic considerations, DOD forms were used slightly more with goal-topic queries than with theme-topic queries, but the difference is never consistent until it applies to the real verb "give." At best, weak support is indicated for Hypothesis 2b.

Regarding the effect of priming, including modeling and feedback, a clear influence was shown by the results, and Hypothesis 2c is strongly supported. This is a consistent interesting finding in both studies, but discussed very little in the Gropen et al. (1989) article. Due to the fact that the DOD forms were modeled numerous times before the beginning of the experiment and then again at certain times during the elicitation process, there was a general increase of DOD forms during the whole first half of the experiment. Thus, due to an interaction of modeling with order of presentation, there was a tendency for both groups to use the DOD more frequently in response to theme-topic queries than to goal-topic queries, and with polysyllabic verbs rather than monosyllabic verbs. On the other hand, in the second half of the experiment when the priming effect wore off and the modeling was withdrawn, the use of DOD decreased for both groups, but more drastically for the non-native speakers. This result suggests that future research must take care to consider the possible effects of priming.

Experiment 3 explored the semantic "possession constraint" by testing whether L2 adult subjects would use more DOD forms with prospective possessors (themselves or animals as recipients) than with inanimate objects as recipients. Although the important dissociation for Pinker's theory is that between animate and inanimate recipients, Gropen et al. (1989) in fact demonstrated a larger dissociation between subject and other recipients than between animate and inanimate recipients (the percentages were 52% (subject), 38% (animate), and 32% (inanimate). With adult L2 subjects, this trend was statistically confirmed with the verb *give*; for the novel verbs, however, any possible effect for recipient was strongly overridden by an effect for "task strategy." Hypothesis 2d, predicting the greatest productivity for subject as DOD sentences due to the familiar association of DOD forms with personal pronouns, was thus not confirmed. Likewise, Hypothesis 2e, predicting a preference for animate over inanimate recipients on the basis of the possession constraint, was not confirmed. Because of the strong task effect, these hypotheses cannot be said to have been tested adequately.

16. Preliminary conclusions

This paper has attempted contribute to the discussion on the acquisition of English dative alternation by replicating with L2 subjects two of the experiments devised by Gropen, Pinker, Hollander, Goldberg & Wilson (1989). In L2 as in L1, during childhood and as an adult, strict conservatism does not guide the language learner. Learners do demonstrate caution, however, in using new forms productively, thus weak conservatism appears to be an apt general characterization. L2 learners appear to be more conservative than L1 learners, but they are more sensitive to feedback. Since the amount, quality, and consistency of feedback to the types of learners represented in this study is likely to be superior to that of L1 learners, their tendency seems to be a reasonable one. Such tendencies do not provide a clear answer to the learnability problem, but they suggest that some sort of multi-factor "constraint satisfaction" model might be the most promising in terms eventually accounting for all "messy" behavior exhibited by both L1 and L2 learners.

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APPENDIX A

Procedures for Experiments 1 and 2

Materials: ball, boat, airplane, car, wheel, cup, mouse, lion, bear, turtle, tiger, zebra, elephant, hippo, kangaroo

Preliminary
We're going to play some word games with these toys.

Have child name objects.

What do you say if a boy takes your ball away and you want it back.
Or, you can say "Give me my ball back." Have child repeat.
What do you say at the dinner table when you want the salt?
Or, you can say "pass me the salt." Have child repeat.

Act out: I'm passing the mouse a ball.
I'm passing the tiger a car.
I'm passing the hippo a wheel.

Now you try one. Tell me.
OK? Now one more time.

Block One
Can you say norp?
This is an new kind of action; I'll show you how to norp using a mouse.
I'm norping the mouse a ball.
I'm norping the mouse a wheel.

P1. Can you tell me what I'm doing with the mouse?
[norping the mouse a cup]
(Another way of saying that is "I'm norping the mouse a cup)

P2. Can you tell me what I'm doing with the lion?
[norping the lion a boat]
(Another way of saying that is "I'm norping the lion a boat)

P3. Here's a airplane. Can you tell me what I'm doing with the airplane?
[norping the airplane to the tiger]

P4. Here's a wheel. Can you tell me what I'm doing with the wheel?
[norping the wheel to the turtle]

C1. Can you norp the lion to the bear?
C2. Can you norp the mouse to the zebra?
C3. Can you norp the elephant a turtle?
C4. Can you norp the tiger a hippo?

Repeat basically same procedure with 3 more made-up verbs (orgulate, keat, calimode), and finally with one real verb (give).

With first 2 verbs (norp and orgulate), double object form is modeled at beginning of cell, and again after a non-double object response when one would be appropriate.
With last 3 (keat, calimode, give) , prep dative is modeled; if double object form is not given where appropriate, child is asked if she remembers another/the other way to say it.

Block Two
Can you say orgulate?
This is an new kind of action; I'll show you how to orgulate using a mouse.
I'm orgulating the mouse a cup.
I'm orgulating the mouse a car.

P1. Can you tell me what I'm doing with the bear?
[orgulating the bear a boat]
(Another way of saying that is "I'm orgulating the bear a boat)

P2. Can you tell me what I'm doing with the hippo?
[orgulating the hippo an airplane]
(Another way of saying that is "I'm orgulating the hippo an airplane)

P3. Here's a ball. Can you tell me what I'm doing with the ball?
[orgulating the ball to the turtle]

P4. Here's a wheel. Can you tell me what I'm doing with the wheel?
(orgulating the wheel to the elephant)

C1. Can you orgulate the bear to the mouse?
C2. Can you orgulate the zebra to the elephant?

C3. Can you orgulate the lion a turtle?
C4. Can you orgulate the hippo a tiger?

Block Three
Can you say keat?
This is an new kind of action; I'll show you how to keat using a mouse.
I'm keating the airplane to the mouse.
I'm keating the car to the mouse.

P1. Here's a ball. Can you tell me what I'm doing with the ball?
[keating the ball to the lion]

P2. Here's a wheel. Can you tell me what I'm doing with the wheel?
[keating the wheel to the elephant]

P3. Can you tell me what I'm doing with the hippo?
[keating the hippo a cup]
(Do you remember another way of saying that?)
(Do you remember the other way of saying that?)

P4. Can you tell me what I'm doing with the zebra?
[keating the zebra a boat]

(Do you remember another way of saying that?)
(Do you remember the other way of saying that?)

C1. Can you keat the turtle a hippo ?
C2. Can you keat the mouse a tiger?
C3. Can you keat the bear to the zebra?
C4. Can you keat the elephant to the lion?

Block Four

Can you say calimode?
This is an new kind of action; I'll show you how to calimoding using a mouse.
I'm calimoding the ball to the mouse.
I'm calimoding the car to the mouse.

P1. Here's an airplane. Can you tell me what I'm doing with the airplane?
[calimoding the airplane to the tiger]

P2. Here's a wheel. Can you tell me what I'm doing with the wheel?
[calimoding the wheel to the zebra]

P3. Can you tell me what I'm doing with the turtle?
[calimoding the turtle a boat]
(Do you remember another way of saying that?)
(Do you remember the other way of saying that?)

P4. Can you tell me what I'm doing with the hippo?
[calimoding the hippo a cup]
(Do you remember another way of saying that?)
(Do you remember the other way of saying that?)

C1. Can you calimode the hippo a turtle?
C2. Can you calimode the tiger a mouse?

C3. Can you calimode the zebra to the bear?
C4. Can you calimode the lion to the elephant?

Control

This is an action with a mouse.
I'm giving the wheel to the mouse.
I'm giving the airplane to the mouse.

P1. Here's a ball. Can you tell me what I'm doing with the ball?
[Giving the ball to the zebra]
P2. Here's a boat. Can you tell me what I'm doing with the boat?
[Giving the boat to the turtle]

P3. Can you tell me what I'm doing with the elephant?
[Giving the elephant the car]
(Do you remember another way of saying that?)
(Do you remember the other way of saying that?)
P4. Can you tell me what I'm doing with the bear?
[Giving the bear a cup]
(Do you remember another way of saying that?)

(Do you remember the other way of saying that?)

Can you give the hippo the turtle?
Can you give the elephant the mouse?

Can you give the lion to the bear?
Can you give the zebra to the tiger?

Appendix B

Experiment 3 Procedures

Recipients: the student, one of six toy animals, or an inanimate object (a book, a videotape, a computer, a blackboard eraser, a pencil sharpener)

transferred objects: ball, wheel, comb, pencil, spoon, cup

Preliminary
Introduce all of the toys

"Can you tell me, using the word 'send, what I'm doing with you?"
2-O You're sending me a ball

"Can you tell me, using the word 'send, what I'm doing with you?"
2-O You're sending me a comb

"Can you tell me, using the word 'send, what I'm doing with you?"
2-O You're sending me a cup

"Can you tell me, using the word 'move', what I'm doing you?"
of You're moving me of a spoon

"Can you tell me, using the word 'move', what I'm doing with you?"
of You're moving me of a wheel

"Can you tell me, using the word 'move', what I'm doing with you?"
of You're moving me of a pencil

"Can you tell me, using the word 'send, what I'm doing with you?"
2-O You're sending me a cup

"Can you tell me, using the word 'send, what I'm doing with the mouse?"
2-O You're sending the mouse a pencil

"Can you tell me, using the word 'send, what I'm doing with the picture?"
2-O You're sending the videotape a spoon

"Can you tell me, using the word 'move', what I'm doing with you?"
of You're moving me of a wheel

"Can you tell me, using the word 'move', what I'm doing with the lion?"

of You're moving the lion of a comb

"Can you tell me, using the word 'move', what I'm doing with the ?"
of You're moving the telephone of a spoon

Block One
Can you say norp?
This is norping.
This is norping

Are you ready?
Can you tell me, using the word norp, what I'm doing with you? comb
Are you ready?
Can you tell me, using the word norp, what I'm doing with you? spoon

We'll put the here.
Can you tell me, using the word norp, what I'm doing with the tiger? cup
We'll put the here.
Can you tell me, using the word norp, what I'm doing with the elephant? wheel

We'll put the here.
Can you tell me, using the word norp, what I'm doing with the book? ball
We'll put the here.
Can you tell me, using the word norp, what I'm doing with telephone? pencil

Block Two
Can you say orgulate?
This is orgulating.
This is orgulating

Are you ready?
Can you tell me, using the word orgulate, what I'm doing with you? cup
Are you ready?
Can you tell me, using the word orgulate, what I'm doing with you? ball

We'll put the here.
Can you tell me, using the word orgulate, what I'm doing with the bear? comb
We'll put the here.
Can you tell me, using the word orgulate, what I'm doing with the turtle? pencil

We'll put the here.
Can you tell me, using the word orgulate, what I'm doing with tissue box? wheel
We'll put the here.
Can you tell me, using the word orgulate, what I'm doing with pencil sharpener? spoon

Block Three
Can you say calimode?
This is calimoding.
This is calimoding

Are you ready?
Can you tell me, using the word calimode, what I'm doing with you? cup

Are you ready?
Can you tell me, using the word calimode, what I'm doing with you? pencil

We'll put the tissue box here.
Can you tell me, using the word calimode, what I'm doing with the tissue box? wheel
We'll put the eraser here.
Can you tell me, using the word calimode, what I'm doing with the eraser? ball

We'll put the turtle here.
Can you tell me, using the word calimode, what I'm doing with turtle? spoon
We'll put the elephant here.
Can you tell me, using the word calimode, what I'm doing with elephant? comb

Block Four
Can you say keat?
This is keating.
This is keating

Are you ready?
Can you tell me, using the word keat, what I'm doing with you? spoon
Are you ready?
Can you tell me, using the word keat, what I'm doing with you? ball

We'll put the eraser here.
Can you tell me, using the word keat, what I'm doing with the eraser? pencil
We'll put the videotape here.
Can you tell me, using the word keat, what I'm doing with the videotape? cup

We'll put the bear here.
Can you tell me, using the word keat, what I'm doing with bear? comb
We'll put the lion here.
Can you tell me, using the word keat, what I'm doing with the lion? wheel

Control
Now we will use a real word "give" for a real action

Are you ready?
Can you tell me, using the word give, what I'm doing with you? ball
Are you ready?
Can you tell me, using the word give, what I'm doing with you? cup

We'll put the pencil sharpener here.
Can you tell me, using the word give, what I'm doing with the pencil sharpener? comb
We'll put the book here.
Can you tell me, using the word give, what I'm doing with the book? pencil

We'll put the mouse here.
Can you tell me, using the word give, what I'm doing with mouse? wheel
We'll put the tiger here.
Can you tell me, using the word give, what I'm doing with tiger? spoon