Articles

Down the Garden Path: Another Look at Negative Feedback

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This paper reports a replication of two studies carried out by Tomasello and Herron (1988, 1989), which provide support for a "Garden Path" instructional approach. In this approach, learners are led into producing errors of the kind that occur naturally in second language acquisition, and are then corrected. Tomasello and Herron found this approach more effective than a traditional Error Avoidance method of instruction. The two studies reported in this article, however, fail to show any advantage for the Garden Path approach. This paper demonstrates the importance of carrying out replication studies. It also suggests that in order for empirical studies of formal instruction to be effective it is necessary to define the instructional treatments as narrowly as possible.

ガーデンパス法による指導：
訂正によるフィードバックに関するもうひとつの視点

本研究では、Tomasello と Herron (1988,1989) によって提唱された「ガーデンパス」による指導法の有効性を検証したものである。この指導法では、第２言語学習者であれば言語学習の際に自然に生じてくる誤りを、教室で敢て引き起こすようにし、教師はそこで訂正を与えるというものである。Tomasello と Herron は、この方法が、伝統的な、誤りを生じさせない指導法より学習に効果があったと主張している。本論では、２つの追実験を行った結果、彼らの主張するような学習に効果が見られなかったことを報告する。追実験の必要性のみならず、教室における授業実験をする場合、その指導法を厳密に定義することの必要性をも強調する。

Empirical studies of the role of formal instruction in second language acquisition (e.g.. Ellis, 1984; Felix, 1981; Pienemann, 1984) focused initially on whether teaching learners specific linguistic items resulted in their acquisition. These studies were little concerned with the nature of the formal instruction provided. More recently, however, researchers have shown greater interest in the potential effect of different kinds of formal instruction (e.g.. Doughty, 1991; N. Ellis, 1991). Also, L2 acquisition theorists such as Long (1988) have advanced various arguments in support of the efficacy of particular approaches to formal instruction. Long argues that a focus on form (where learners receive negative feedback on specific linguistic features in the course of trying to communicate) is preferable to a *focus on forms* where learners receive regular grammar lessons directed at specific items.

This article seeks to contribute to the current body of work on the effectiveness of different types of formal instruction by reporting two studies based on earlier studies by Tomasello and Herron (1988, 1989). The Tomasello and Herron studies provided evidence to suggest that teaching which leads learners to make specific errors and which then offers them negative feedback (called the Garden Path approach) works better than more traditional teaching that seeks to prevent learners from making errors through the provision of explicit grammatical explanations. Tomasello and Herron's studies have subsequently been cited in support of the view that negative feedback is an important source of information in L2 acquisition (see, for instance, Carroll et al., 1992; Lightbown & Spada, 1990). The studies reported below, however, suggest that the Garden Path treatment offers no advantage over more traditional approaches.

Tomasello and Herron's Studies

Tomasello and Herron's studies investigated the effect of inducing and then correcting two kinds of error in English speaking learners of L2 French. One kind of error involved overgeneralization, for example the use of "*plus bon*" in place of the correct "*meilleur*," while the other involved L1 transfer, for example the use of an indefinite article before a profession ("*Je suis une actrice*") instead of the correct zero article ("*Je suis actrice*"). Altogether there were eight overgeneralization errors studied in the 1988 study and eight transfer errors in the 1989 study.

The subjects of both studies were adult students enrolled in two sections of a beginner-level French course at Emory University. Some of the learners were complete beginners (i.e.. had no previous exposure to French) while others had some previous classroom exposure

during high school. All the learners were native speakers of English. There were 39 subjects in the 1988 study and 32 in the 1989.

The designs of the two studies were almost identical. The learners were assigned to one of two sections alphabetically. In each study eight structures were investigated. Four were assigned to the Garden Path instructional treatment and four to the traditional, error-prevention treatment (the control) in one part of the course, and then to the opposite treatment ion the second part. In this way, a counterbalanced design was achieved, with all learners receiving some Garden Path and some traditional instruction over the whole course. The organizational structures were ranked according to expected difficulty by the teacher (one of the researchers) and then divided into four pairs: one structure of each pair was randomly assigned to each treatment. The transfer structures were randomly assigned to one or other of the conditions.

The traditional treatment involved giving examples and opportunity to practice the correct use of a structure followed by an explanation, supported by an example, of the potential error. The correct form was also demonstrated orally and in writing. The Garden Path treatment proceeded in the same way except that learners were induced to make the error, which was then written on the board and corrected. this was followed by an oral recitation of the correct form and a brief explanation. The structures were taught in different lessons, one or two weeks apart.

The learners' knowledge of the structures was tested three times using a fill-in-the blank format for the overgeneralization structures and a translation format for the transfer structures. In both cases, the tests tested "a variety of material other than that of current interest" and included only one item testing each potential overgeneralization or transfer error, although there were other items testing the unproblematic uses of these structures. The three tests were administered at three different points during the course. The time between teaching and testing varied for the different structures for both methods, but in each case the average gap was almost the same for the structures taught by the different methods.

The results were presented in terms of the average proportion of students answering correctly on the items in question, a procedure that took advantage of the counterbalanced design. The scores for the Garden Path and Control treatments were compared across all the structures using the Wilcoxon Signed Rank tests. In both studies and in each of the three tests the Garden Path treatment resulted in a significantly greater proportion of students answering correctly.

In their 1988 study, Tomasello and Heron offer two possible explanations for the apparent superiority of the Garden Path treatment. One is that the negative feedback provided by the Garden Path method induces learners to make "a cognitive comparison" between their own system and that of native speakers. The other is that disconfirming learners' expectations through error correction heightens motivation and or curiosity to discover the differentiating features of the rule and its exception. In the 1989 study, the authors mention only the first of these explanations.

A Critique of Tomasello and Herron's Studies

Tomasello and Herron's studies address an issue of central importance in L2 acquisition-the role of negative feedback. As they themselves point out, there have been no previous studies demonstrating that correcting L2 learners' errors promotes acquisition of correct target language forms. Their studies, then, together with a recent study by Lightbown and Spada (1990) constitute the first empirical demonstration that error correction may be beneficial. They also suggest that it is correction directed at errors that occur "naturally," as a product of normal interlanguage processes, that is important.

One of the points made by Tomasello and Herron is that whereas child L1 learners may be able to make use of the covert corrections that occur in caretaker's semantically contingent responses (e.g.. expansion),[1] adult L2 learners may require more explicit corrections of the kind provided by the Garden Path treatment. Their studies, however, do not address this key issue, as they provide no evidence to show that covert corrections, which occur in the course of message oriented communication, are ineffective in L2 acquisition.

Many of the doubts about the studies concern methodological issues. Beck and Eubank (1991) raise a number of objections, including the following:

1. The heterogeneity of the structures investigated.
2. The lack of a pre-test.
3. The variability in the amount of elapsed time between teaching and testing the different structures.
4. The use of tests (e.g., translation) that elicit data that may not be generalizable to other types of language performances such as natural communication.
5. The danger of "researcher expectancy," resulting from the fact that one of the researchers was responsible for teaching, contaminating the results.

6. The tests tested each potential error only once per subject. The data on individual learners' knowledge of the correct structures are very meager.

To these criticisms we would add another:

7. Tomasello and Herron provide no information on individual learners' performance, relying entirely on group statistics. It is not possible, therefore, to examine to what extent there were individual differences among the learners.

As Tomasello and Herron (1991) point out in their response to Beck and Eubank's methodological criticisms, their studies constituted an attempt "to perform an experimental investigation of negative feedback in the context of a naturally functioning classroom" (p. 514), and this "required a number of compromises in the experimental design" (p. 515). We are sympathetic to this response, not least because the studies reported in this article are also subject to "compromises" brought about by similar attempts to investigate a "naturally functioning classroom." However, we believe that the criticisms raised are sufficiently important to warrant further research. In particular, we consider it desirable to ensure that (a) there is a pre-test, (b) the target structures are tested more thoroughly, and (c) results for individual learners as well as groups are reported.

The two experimental studies reported below were carried out by different researchers independently, in different teaching contexts. For this reason, they will be reported separately. However the results of the two studies will be discussed together.

Study One: Subject-Verb Inversion Following Adverbials

The first study, conducted by Rosszell, focused on word order following adverbials such as "hardly" and "seldom." In this structure, an auxiliary is placed immediately after the adverbial, sometimes necessitating the introduction of a dummy-do:

Seldom does she go to Roppongi.

Main verb inversion never occurs:

* Seldom goes she to Roppongi.

This structure was chosen because of the potential for learner errors through analogy:

Often she goes to Roppongi.
* Seldom she goes to Roppongi.

The above structure was chosen because pre-testing of learners similar to those involved in the study had demonstrated that it resulted in the expected word errors. It is an English example of the type of over generalization structure investigated by Tomasello and Herron.

The subjects were two groups of Japanese adults (six males and 17 females) at a private language school in Tokyo. They were false beginners, in the sense that, although they had received six years of English instruction at high school and had developed a grounding in grammar, their ability to use this knowledge in communication was very limited. Intact classes had to be used for this study as it was impossible for the researchers to assign students randomly to control and experimental groups. The researchers recognize that this is a limitation of the study but believe that the use of a pre-test helped to overcome it. The experimental group (i.e., Garden Path) consisted of 13 students and the control (i.e., "Error Avoidance") group of 10. There were a further 13 subjects initially involved in the study, but these had to be excluded because they were missing for one or more of the following: the pre-test, the treatment, or the post-test.

The study addressed the following research questions: Does a Garden Path treatment result in more effective learning of subject-verb inversion following adverbials than an Error Avoidance treatment?

A standard pre-test, treatment, post-test design was employed. The tests required the subjects to sort out sets of jumbled words into sentences. They were required to begin each sentence with the word underlined:

* *Rarely* mountains to the have I gone.

Two forms of the test, each consisting of 24 jumbled sentences (four directed at the target structure and 20 distractor sentences), were devised. An initial test, which served as a basis for the two tests used in the study, was piloted on a similar group of students. One form of the test was administered as a pre-test, the other as a post-test.

The two treatments were identical to those used by Tomasello and Herron. Both began with a review of adverb placement in English, pointing out that the position of adverbs like "suddenly" and "sometimes" does not affect word order. In the Error Avoidance lesson the teacher wrote up on the board five adverbials which when placed sentence initially require subject-verb inversion and explained that these were exceptions. He cautioned the students not to overgeneralize the usual word order. He then asked the students to construct a sentence using one of the adverbs and wrote a sample sentence on the board. finally,

he gave the students a sentence to write out twice, once with the adverb ("hardly") at the beginning and once with it following the auxiliary verb. The teacher moved around the class to ensure the students produced the sentence correctly. In the Garden Path lesson, the teacher introduced the target adverbs immediately after the general review of adverb position, inducing the learners to make the expected word order error. The incorrect sentences were written on the board and corrected. finally the teacher listed the target adverbials on the board and completed the lesson in the same way as the Error Avoidance lesson. Thus, the two lessons differed in only one respect: whether the learners were given the opportunity to make the word order error. The researcher served as teacher in both lessons.

Scores for each learner (out of a possible 4) were computed for pre- and post-tests. The results for the individual students are shown in Appendix 1. Table 2 gives the descriptive statistics for the experimental and control groups. The learners manifested no knowledge of the target structure in the pre-test. However, on the post-test, all the learners except two in the experimental group achieved perfect or near-perfect scores (i.e., three or four). A *t*-test indicated that the difference between the two groups on the post-test was not significant (t = -0.77).

Study Two: Dative Alternation

The second study, conducted by Takashima, focused on dative alternation. English permits two patterns with many monosyllabic dative verbs of Anglo-Saxon origin:

Hanako gave a ride to his friend. (...V + NP + PP)
Hanako gave his friend a ride. (...V + NP + NP)

However, many polysyllabic verbs of Latin origin permit only one pattern:

Hanako explained the issue to his friend. (...V + NP + PP)
* Hanako explained his friend the issue. (...V + NP + NP)

In the case of polysyllabic verbs such as "explain" the potential exists for overgeneralization of the NP + NP pattern found with more common monosyllabic verbs, as a number of studies have shown (e.g. Hawkins, 1987; Mazurkewich, 1984).

The subjects were Japanese adults from two intact second-year English classes at a national university. Like the subjects in Study One they could be considered false beginners. One class consisting of 28 students (nine males and 19 females) served as the experimental group receiving

the garden path treatment and another consisting of 33 students (nine males and 24 females) served as the control group receiving the Error Avoidance treatment.

The study addressed the following research question: Does a Garden Path treatment result in more effective learning of the NP + NP pattern with dative verbs like "explain" than an Error Avoidance treatment?

Again, a standard pre-test, treatment, post-test design was used. In this case a single test was constructed, requiring learners to judge the grammaticality of sentences containing dative verbs. The test contained a total of 30 sentences, five of which consisted of ungrammatical sentences involving dative verbs that allow only the NP + PP pattern.

* The woman reported her husband the truth.

The other sentences consisted of correct dative verb sentences and distractor sentences (i.e., correct and incorrect sentences involving other grammatical structures).

The treatment for the two conditions began in the same way. The teacher (the researcher) explained and illustrated the us of NP + NP and the NP + PP patterns with monosyllabic verbs (e.g., "give" and "throw"). A pair of sentences was written on the board. He then introduced a number of polysyllabic verbs (e.g., "offer" and "promise") which can also take both patterns and asked the learners to make sentences again writing one pair on the board as an example. The treatments then diverged. For the experimental group, the teacher wrote on the board five verbs that take only the NP + PP pattern and asked the students to use them in sentences, which they wrote in their notebooks. The teacher then asked the students to read out their answers, wrote incorrect responses on the board and showed the students how to correct them. For the control group, the teacher wrote the same five verbs on the board and then wrote pairs of sentences for each for each, one correct and one incorrect. He pointed out the incorrect ones and explained that some verbs allow only the NP + PP pattern, warning the students that they must take care when using these verbs.

Scores on the five ungrammatical sentences on the pre- and post-tests were calculated for each learner. The scores for the individual students can be found in Appendix 1. The descriptive statistics for the experimental and control groups are shown in Table 2. In this case, many of the learners were able to judge the grammaticality of the key sentences (i.e., those requiring the NP + PP pattern) successfully on the pre-test. However, a *t*-test indicated that there was no statistically significant difference between the experimental and control groups at the commencement of the study (*t*

= 1.47). An inspection of the individual scores shows considerable variance in the ability of students to benefit from either form of instruction. In both the Garden Path and the Error Avoidance groups there were students whose performance on the grammaticality judgment test deteriorated markedly as a result of the instruction they received as well as students whose performance improved considerably.[2] Overall, both groups showed some improvement, the Garden Path group more son then the Error Avoidance group. However, this difference was not statistically significant (t = -1.47)

Discussion

Tomasello and Herron found that inducing and then correcting errors resulted in more effective learning of a range of structures than did instruction aimed at preventing the errors. However the two studies by Rosszell and Takashima reported above found no difference in the two treatments in post-tests administered shortly after the instruction in the case of structures that lent themselves to overgeneralization errors. In the Rosszell study both treatments were equally effective in enabling the students to avoid overgeneralizing the standard English word order with adverbials like "scarcely." In the Takashima study, neither treatment was entirely effective in enabling the learners to make accurate judgments of the grammaticality of sentences containing verbs that require the NP + PP pattern, nor was one treatment more effective than the other.[3]

What explanation can be given for the difference in results obtained by Tomasello and Herron on the one hand and Rosszell and Takashima on the other? One possibility is the learners involved. Tomasello and Herron investigated learners who were mainly complete beginners and who may have had little experience in classroom learning. Such learners may have found it difficult to benefit of the kind of formal explanation employed in the Error Avoidance treatment. In contrast, the Japanese learners had experienced many years of grammatical explanation during high school, therefore, may have been better placed to benefit from them.

The different results may also reflect the different designs used. It is possible, for example, that when learners' attention is focused on a single, thoroughly taught grammatical structure, as in Rosszell and Takashima's studies it makes no difference whether the instruction is of the Garden Path or Error Avoidance type. Conversely, it is possible that when learners are receiving regular instruction directed at a large number of different structures, teaching that encourages learners to make a

cognitive comparison is more effective than instruction based on grammatical explanation.

A third explanation is that any advantage for the Garden Path treatment over the Error Avoidance treatment instruction only becomes apparent some time after the instruction. It is possible that providing learners with negative feedback on their errors leads to long term retention of the correct forms, whereas traditional instruction directed at error avoidance has only a short term effect. If this were the case there would be no differences in a post-test administered shortly after the instruction but differences would emerge subsequently. This is a possibility which we have been unable to consider as no follow-up test was included in the design of the two studies.[4] It should be noted, however, that the result of Tomasello and Herron's studies do not support a latency effect. Their first test was administered between one and four days after the students were taught the structures and showed an immediate, statistically significant advantage for the Garden Path treatment. This advantage neither grew nor diminished in subsequent testing. Thus, the result of Rosszell and Takashima's post-tests contradict those of Tomasello and Herron test 1, where all the tests were administered within the same time frame. Given the pattern of results in Tomasello and Herron's later tests, there would seem to be no good reason to expect a sudden shift in favor of the Garden Path treatment over time in the case of Rosszell and Takashima's studies.

The most likely explanation is that the results obtained by Tomasello and Herron are spurious, a product of design flaws which have already been noted. Although Rosszell and Takashima's studies are also not without problems (e.g., the nature of the tests which shed no light on the learners ability to use the structures in communicative language use, and possible researcher bias).[5] The use of a pre-test and the availability of results for individual learners produced greater confidence than does the Tomasello and Herron design.

It is also possible that the two treatments are not as different as Tomasello and Herron have assumed. The Garden Path treatment induces learners to construct incorrect hypotheses, but it does not follow that all learners actually do so. The Error Avoidance treatment seek to prevent learners from making errors, but it does not follow that at some stage of the lesson the learners did not construct a mental representation of the erroneous sentences. The problem here is the general one of knowing what goes on in the mind of the individual students when confronted with a particular instructional experience.

Conclusion

Tomasello and Herron's studies have showed that inducing learners to make errors and then correcting them led to more successful learning than trying to prevent them from making errors. Consequently, they argued that overt negative feedback may facilitate L2 acquisition by encouraging learners to undertake "cognitive comparisons" of the same kind that children are believed to make in L1 acquisition. The two experimental studies reported above failed to replicate Tomasello and Herron's results, finding no difference between the two instructional treatments.

Does leading learners down the garden path, then also lead them up the creek? The answer is "no." Both Tomasello and Herron's studies and the study by Rosszell and to a lesser extent by Takashima indicate that the Garden Path treatment is effective in teaching learners difficult grammatical structures. In all the studies, learners receiving this treatment demonstrated improved knowledge of the target structures in formal language tests. Rosszell's and Takashima's studies, however, suggest that a more traditional treatment, where the teacher seeks to prevent errors by means of grammatical explanation and examples, works just as well, at least where Japanese college level learners are concerned.

It is pertinent to ask why the Garden Path treatment was successful. Was it the provision of negative feedback that enabled learners to learn the structures? If so, then Tomasello and Herron's studies can still be considered of importance for L2 acquisition researchers, given the current lack of clear evidence that negative feedback helps rule acquisition (see Carroll, Swain & Roberge, 1992). However, no such conclusion is possible. The Garden Path treatment, as described by Tomasello and Herron, included *both* negative feedback and explicit grammatical explanation. It is impossible, therefore, to decide which of these types of information the learners made use of, or in what way. One might add that the same holds for Rosszell's and Takashima's studies, which sought to replicate the instructional treatment used by Tomasello and Herron.

The lessons to be gained from all of this are primarily methodological. The most obvious is the importance of replicating studies. The field of L2 acquisition has seen too few attempts to replicate studies and too great a readiness to accept published results as evidence for theoretical positions. Another lesson is the need for care and precision in defining the instructional treatments to be examined. The warnings that followed the failures of the early comparative method studies (see Long, 1980) still do not seem to have been sufficiently heeded. The instructional

treatments in Tomasello and Herron's studies are not distinguished narrowly enough. A third lesson is the need to recognize that what ultimately counts where acquisition is concerned is not the instructional practices themselves but what individual learners make of them. We need ways of finding out what learners do mentally when they are exposed to different kinds of instruction. Only in this way can we be sure that the treatments are really different

This article also points to the dangers of attempting to apply directly the results of empirical studies of classroom instruction to language pedagogy. Tomasello and Herron's original research points to the potential usefulness of a Garden Path approach; this article suggests that such an approach may not be so effective after all. It is, of course, still not possible to decide one way or other. Perhaps the real value of empirical research lies not in the identification of techniques that "work," but rather in the preliminary investigation of techniques with the potential to work. Teachers can then try these out in their classrooms and decide for themselves whether they have any value. In so doing, of course, they can contribute to the fund of research that is necessary before we can confirm any hypothesis about instruction.

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Notes

1. The claim that children make use of covert corrections in the form of expansions is itself controversial, as Beck and Eubank (1991) point out. However, the role of negative feedback in L1 acquisition is not essential to the main point of Tomasello and Herron's studies, namely that overt negative feedback can contribute to L2 acquisition.

2. Some doubts exist regarding the reliability of grammaticality judgment tests, as there is evidence to suggest that Japanese learners at this level of proficiency do not produce consistent judgments, perhaps as a product of the fact that their knowledge of the structures is uncertain (see R. Ellis, 1991). The main point, however, is that neither the Garden Path nor the Error Avoidance treatment was entirely successful in eliminating this uncertainty, nor was one treatment better than the other at doing so.

3. One possibility raised by the Takashima study is that the ability of individual learners to benefit from a specific instructional treatment depends on learner factors such as aptitude or learning style. However, as no data was available on the subjects' learning style this possibility could not be examined.

4. Ideally, the design of these studies should have included a follow-up test. However, this was not possible as the intact groups used in the two studies dispersed shortly after the post-test, making it impossible to locate the students to administer a follow-up test.

5. Researcher bias, however, ought to have produced results favoring the Garden Path treatment, as both Rosszell's and Takashima's studies were undertaken with a view to providing support for this instructional option. Both researchers were surprised, even dismayed, to find no difference between the two instructional conditions.

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Appendix: Results for Individual Students in the Two Studies

Study 1
Number of Correct Subject-Verb Inversions
in the Garden Path and Error Avoidance Groups

Experimental Group (n = 13) Garden Path Treatment			Control Group (n = 100) Error Avoidance Treatment		
Student	Pre-test	Post-test	Student	Pre-test	Post-test
1	0	4	1	0	4
2	0	0	2	0	4
3	0	4	3	0	3
4	0	4	4	0	4
5	0	4	5	0	4
6	0	4	6	0	4
7	0	4	7	0	4
8	0	4	8	0	3
9	0	4	9	0	4
10	1	1	10	0	4
11	0	4			
12	0	4			
13	0	4			

Table 1
Descriptive Statistics for Study 1

Group	N	Mean	SD	SE
Experimental				
Pre-test	13	.077	.277	.007
Post-test	13	3.462	1.330	.369
Control				
Pre-test	10	.000	.000	.000
Post-test	10	3.800	.422	.133

Table 2
Descriptive Statistics for Study 2

Group	N	Mean	SD	SE
Experimental				
Pre-test	28	1.929	1.359	.257
Post-test	28	3.464	1.774	.335
Control				
Pre-test	33	2.455	1.416	.247
Post-test	33	2.788	1.816	.316

Study 2

Number of Correct Judgments of Sentences requiring NP + VP Pattern in the Garden-Path and Error Avoidance Groups

Experimental Group (n = 13) Garden Path Treatment			Control Group (n = 100) Error Avoidance Treatment		
Student	Pre-test	Post-test	Student	Pre-test	Post-test
1	0	5	1	3	0
2	3	5	2	1	4
3	1	2	3	1	3
4	1	4	4	1	4
5	5	2	5	3	5
6	5	4	6	1	3
7	0	3	7	3	4
8	2	5	8	5	4
9	1	5	9	2	5
10	3	4	10	2	4
11	2	2	11	4	0
12	1	5	12	1	2
13	2	5	13	3	5
14	2	4	14	4	3
15	1	0	15	4	4
16	2	3	16	4	2
17	4	5	17	2	0
18	2	5	18	4	5
19	2	0	19	0	1
20	2	0	20	3	3
21	2	5	21	3	3
22	0	4	22	5	0
23	2	4	23	2	1
24	0	4	24	5	4
25	2	0	25	1	0
26	1	3	26	2	1
27	4	5	27	0	5
28	2	2	28	2	4
			29	2	1
			30	3	1
			31	3	1
			32	1	5
			33	1	5