A Comparison of Inductive and Deductive Approaches to Teaching Foreign Languages

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WHEN PRESENTING NEW GRAMMATICAL structures, foreign language teachers often offer rules first and then examples (a deductive approach). The problem many students have applying these various rules indicates that they may not in fact fully understand the concepts involved. This approach tends to emphasize grammar at the expense of meaning and to promote passive rather than active participation of the students. The question needs to be raised, then, regarding the merits of not presenting the rule first but allowing the *students* to perceive and formulate the underlying governing patterns presented in meaningful context.

Numerous studies compare and contrast inductive and deductive approaches.[1] Unfortunately, none of these studies perceives an inductive approach as one in which students consciously focus on the structure being learned. Rather, an inductive approach was equated with the Audio-Lingual Method of the sixties where learning is defined as habit formation. Students learned by rote numerous examples of a structure until the use of that structure became automatic. They were not consciously aware of what structure they were learning unless at the end of the lesson the teacher *gave them* the appropriate rule to describe what they had already supposedly learned. There was general agreement at the end of the sixties that a method treating language acquisition as habit formation was inadequate. Cognitive psychologists such as Piaget (pp. 170–72) rejected both the limited scope imposed by behavioral psychologists on the study of human behavior and the assumption that humans are passive receptacles of rotely learned knowledge. According to Piaget, while rote memory has its place in learning, it cannot be equated with comprehension. Viewing behavioral psychology as overly simplistic, he characterized learning as a dynamic process involving the interaction between environment and the innate structures of the mind. Information is never passively received, but transformed by learners' dependence on experience and maturation.

What were the implications of cognitive psychology for education? The reactions among leading language pedagogues against the Audio-Lingual Method, although all assuming a cognitive approach to learning, took several forms. Some, such as Krashen (18: pp. 170–71) and Dulay and Burt (8: p. 257), argued that since language is acquired naturally by means of an innate cognitive process, teachers need only supply comprehensible input without explicitly stating or even focusing on rules. Others, such as Ausubel (2) and Carroll, maintained that since adults are endowed with a cognitive network enabling them to understand abstract concepts, teachers should capitalize on this asset and speed up the language acquisition process by giving the learners explicit rules in a deductive learning framework.

An alternative both to traditional approaches that neglect meaningful conversation and to natural ones that avoid conscious study of grammar is an inductive approach. Student attention is focused on grammatical structure used in context so that students can consciously perceive the underlying patterns involved. Fischer (p. 99) and Hammerly (12: p. 18) recognize that an inductive approach has a place in the classroom where language learning is treated as a creative, cognitive process. Both insist, however, that an inductive approach is more difficult and should only be used for rela-

tively simple grammatical structures. Some verb inflections, as Stokes (p. 382) points out, are more difficult to master because ". . . there is little in English to help conceptually." Neither Fischer nor Hammerly takes into consideration that, while students may think they understand the rule *given* to them deductively to explain these structures, their attempts at *using* them often show only a superficial understanding at best. The merits of inductively exposing students to examples of when and how a structure is used, so that they can formulate the underlying generalizations in terms that they can best understand, needs to be reexamined.

Ausubel (1) and Carroll have asserted that an inductive approach is too difficult for slower students, and that only brighter students are capable of discovering the underlying patterns of a structure. However, neither Carroll nor Ausubel supports this assumption with any research data, and, while it seems safe to say that learning styles differ, we have no basis for associating high intelligence with inductive ability. In fact, contrary to Carroll's and Ausubel's predictions, the results of the pilot study of the present research indicate that *weaker* students *do* benefit from an inductive approach.

DEFINITIONS

Several aspects of this study differ from previous research comparing inductive and deductive approaches. First, an *inductive approach* is defined as one in which: 1) the students' attention is focused on the structure being learned; and 2) the students are required to formulate for themselves and then verbalize the underlying pattern. Controversy still surrounds the relationship of verbalization and concept formation.[2] However, the Hulstijns' study did observe that correct rule verbalization contributes to correct production.

A *deductive approach* in this study is defined as one where, regardless of the timing relative to the practice part of the lesson, students are *given* an explanation.

METHOD

Purpose of Study. The purpose of this study was to determine if a difference exists in high school foreign language students' understanding of grammatical concepts depending on whether an inductive or a deductive teaching approach is used. It explores the advantages of both approaches for students of all ability levels rather than assuming that an inductive ap-

proach is too difficult for weak ones. Moreover, the structures studied are those usually considered to be difficult conceptually because they do not exist in the students' native language. The following specific questions are addressed:

1) Does the ability of the students (as rated by the teacher) affect their performance with either approach?

2) Does the effect of an inductive versus deductive approach vary with the structure being taught?

3) Does teacher preference for either an inductive or deductive approach influence student performance?

Sample. High school students were chosen for this study for two reasons: 1) They are capable of generating and understanding abstract concepts (Inhelder & Piaget, p. 7). Foreign languages are most often taught at this level. 2) This age group is taught by the study's researcher and constitutes, therefore, her primary area of interest.

In order to have a large sample size, three different schools participated in the study. It was necessary, therefore, to use a number of teachers whose teaching skills are unknown to me. Since their ability to use either approach would be a serious variable influencing the outcome of the study, it was decided to make the experiment written. Ideally, the assessment of the relative success of inductive and deductive approaches would be an oral one. This process would simulate a normal classroom situation and allow interaction between teacher and student.

Procedure. 319 students (152 girls and 167 boys) from three high schools participated in the study. Two of the schools were public schools with very low ethnic diversity and mid- to upper-middle class incomes; one was a private school with upper-middle to upper class incomes. The age of the students ranged from thirteen to eighteen years.

School H had approximately 1,400 students with foreign language class sizes of from seventeen to twenty-nine students. Two French teachers with a total of six classes participated in the study. Three Spanish teachers with a total of eight classes took part. All together 216 students from School H were involved.

School M had approximately 600 students with foreign language class sizes averaging eighteen students. One French teacher and one Spanish teacher, each with two classes, participated in the study. They had a total of fifty-three students in their classes.

School P was a private school with approximately 500 students from upper-middle to upper class families. Although ten percent of the students come from foreign countries (mostly Asian), they do not usually participate in the foreign language program. Foreign language classes range from nine to thirteen students. One Spanish and two French teachers were involved in the study. Each French teacher had two classes, while the Spanish teacher had one. All together, fifty students from School P participated.

The Spanish and French teachers in these schools either met personally with me or were instructed by their department head regarding the procedures for the study. They were also given an instruction sheet, necessary materials, and a brief questionnaire asking for their personal preference concerning approach.

The timing of each segment of the study depended on when the grammatical point being taught occurred in that school's curriculum. The teachers were asked to distribute the research sheets just prior to the structure's regular introduction in class; the grammatical point being taught in the study, then, was a new one for the students.

The teachers were asked 1) to divide their class into two groups with as even a distribution of foreign language ability as possible; 2) to rate each student's ability as either weak, intermediate, or strong; and, finally, 3) to note the approach used for each student.

Teachers evaluated their students' ability levels based on overall performance. Students' school grades were not used for two reasons. First, some of the research was conducted very early in the school year. Second, grades are partially reflective of motivation and, therefore, not necessarily indicative of ability.

Tests were also ruled out as a means of evaluation. A proficiency test is not feasible for beginning students. In addition, test performance could be influenced by the manner in which the material had been taught. Finally, a language aptitude test is in itself biased toward either a deductive or inductive presentation.

The inductive presentation consisted of the students reading a sheet containing two columns of about ten carefully organized contrasting examples of a structure (see Appendix A). For example, one contrasting pair teaching the imperfect in French was:

Passe Composé	Imparfait
1) *Je* **suis allé** *à* Princeton *en 1985.*	1) *J'allais* *toujours à* Princeton.

The students were then asked to write what they perceived to be the underlying pattern or explanation.

The deductive group was given a paper (see Appendix B) with the appropriate rule and the same examples as those on the inductive sheet (although not as many, since the purpose here was to illustrate the given rule, not provide enough examples that the rule could be inferred).

Both groups were then given an exercise sheet to assess their comprehension. In a cloze test, the students had to decide which tense, mood, or verb was correct. They did not actually have to conjugate the verb. None of the instances used in the examples appeared in the test so that the students were being tested on their ability to transfer what they had just learned to new but parallel situations (see Appendix C).

Teachers were asked to complete a questionnaire indicating which approach they prefer and in what situations they use one or the other. They were also asked if their teacher training had emphasized either approach. The purpose of this questionnaire was to determine if their preference corresponded to the presentation which led to higher scores on the cloze tests. Their responses were categorized according to whether: 1) the teacher used one approach more frequently; 2) his/her training stressed one approach more than the other; 3) either a) time, b) structure, c) type of student, or d) other factors influenced selection of approach.

Structures Used. Savoir and *connaître* (which represent two concepts rather than the one for "to know" in English) were used in the beginning level French classes.

The beginning level Spanish classes used a) *ser* and *estar* (which represent two concepts rather than the one for "to be" in English); b) *conocer* and *saber* (which parallel French *connaître* and *savoir*).

Both intermediate French and Spanish classes learned the imperfect tense and the subjunctive mood, which are based on concepts unfamiliar to speakers of English.

All of the materials written in Spanish were read by native Spanish teachers to help ensure that the examples used were grammatically correct, representative of what would be said by a native, and well chosen in terms of the concept being taught.

RESULTS

An analysis of variance was used to deter-

mine the relative effectiveness of the two pre-
sentations (inductive and deductive) as
measured by the cloze tests given immediately
afterwards. Initially, a five-way analysis was
done to evaluate the influence not only of: 1)
presentation on the students' performance, but
also of 2) student ability; 3) teacher; 4) school;
and 5) the grammatical structure being learned.
Teachers and schools were the random vari-
ables, with teachers being nested in schools.
The other variables were fixed.

The disadvantage of a five-way analysis,
however, is that it spreads the subjects thinly
across the cells and results in a weak test of the
major factors of interest, i.e., approach, struc-
ture, and ability. Since the first analysis re-
vealed that teachers and schools were not
significant factors, a second analysis was carried
out. In this one, teacher and school were elimi-
nated in order to focus on the main areas of
interest.

Effect of Approach on Score. Table I demon-
strates that presentation was not significant.
Table II shows that the mean scores for the two
presentations were almost the same. This was
the case even though the concepts used were
complex ones not found in English, and the
sample included students of all ability levels.

Effect of Structure. Table I shows a significant
relationship between structure and score, indi-
cating that the structures were not of equal dif-
ficulty (see Table III). Based on the mean score
of each structure, the imperfect was the most
difficult for students to learn, followed by *con-
naître (conocer)/savoir (saber)*, the subjunctive, and
ser/estar. (The fact that the highest mean score
was for *estar/ser*, which was only learned by one
teacher's classes at school M, may also reflect
the fact that this school's scores were slightly
higher in general. Thus, this structure is not
necessarily the easiest of the four.)

Although three of the grammatical points in
the study were specifically mentioned by Ham-
merly (12: p. 18) as being too difficult for an
inductive approach, the students learning with
an inductive presentation had a slightly higher
mean score for all four structures than those
given a deductive presentation (see Table IV).

The differences in score between presenta-
tions are small, but the trend is consistently in
favor of the inductive approach. In fact, the
greatest difference between the mean scores for
each presentation is for *connaître (conocer)/savoir
(saber)*, which ranked as one of the hardest
structures in the study. In other words, the in-

TABLE I
Analysis of Variance II

Source	DF	F Value	PR F
Structure	3	15.64	0.0001**
Presentation	1	2.03	0.1550
Ability	2	1.42	0.2422
Structure/Presentation	3	0.62	0.6027
Structure/Ability	6	1.00	0.4264
Presentation/Ability	2	0.67	0.5148
Structure/Presentation/Ability	6	1.06	0.3894

**Significant at the .01 level.

TABLE II
Mean Scores for Presentations

Presentation	Number	Score
Inductive	159	7.0503
Deductive	160	6.7625

TABLE III
Mean Scores of Structures

Structure	N	Score
Ser/Estar	33	8.57158
Subjunctive	68	7.5294
Conn/Savoir	95	6.6421
Imperfect	123	6.3171

Note. Conn/Savoir = Connaître (Conocer)/Savoir (Saber).

TABLE IV
Mean Scores for Presentation by Structure

	Presentation	N	Score
Conn/Savoir	D	48	6.333
Conn/Savoir	I	47	6.9574
Estar/Ser	D	15	8.5333
Estar/Ser	I	18	8.6111
Imperfect	D	62	6.2580
Imperfect	I	61	6.3770
Subjunctive	D	35	7.4857
Subjunctive	I	33	7.5757

Note. Conn/Savoir = Connaître (Conocer)/Savoir (Saber).

ductive presentation fared best when one of the
more difficult structures was being learned!

Student Ability. Teachers were asked to evalu-
ate the ability of the students in the study based
on overall class performance. As shown by
Table V, overall, teacher perceptions with
regard to student ability corresponded to how
well these students did in the study.

TABLE V
Mean Scores of Ability Levels

Ability	N	Score
Strong	119	7.3277
Average	134	6.7313
Weak	66	6.5000

These teacher evaluations were then used to determine if either an inductive or deductive presentation is more appropriate for certain ability levels. According to Ausubel (1: p. 153) and Carroll (p. 84), only gifted students are capable of constructing the hypotheses necessary in an inductive approach. The findings of the present study, however, reveal that an inductive presentation is just as well suited as the deductive approach to *all* ability levels. In fact, the trend, although minimal, is in favor of the inductive approach.

When the difference between the mean scores of the two approaches within each ability is computed, the weak students benefited the most from using an inductive presentation (see Table VI). The differences between the mean scores of the two presentations for all ability levels are small but interesting in light of previous bias against using an inductive approach with weak or even average students.

Summary. Three hundred and nineteen students in French and Spanish classes at three high schools learned when to use one of four structures. The structures were: 1) the imperfect tense in Spanish and French; 2) the subjunctive mood in Spanish and French; 3) *connaître* (*conocer*)/*savoir* (*saber*) in Spanish and French; and 4) *ser/estar* in Spanish. These structures were chosen because they are based on concepts not found in English and are considered difficult to learn.

One hundred and fifty-nine students were given an inductive presentation of the structures, and one hundred sixty students were

TABLE VI
Mean Scores for Presentation by Ability

Ability	Presentation	N	Score
Weak	D	31	6.2903
Weak	I	35	6.6857
Average	D	77	6.6363
Average	I	57	6.8596
Strong	D	52	7.2307
Strong	I	67	7.4029

given a deductive one. In the inductive presentation, students were given a sheet with contrasting examples of the structure's usage and were asked to write what they perceived to be the underlying rule. In the deductive presentation, students were given a sheet with the rule stated first, followed by examples. Both groups then took the same cloze test to determine their comprehension of when to use the structures.

As shown in Table I, no significant difference was found between the mean scores of either presentation for any of the four structures (see Table IV). That students did as well with the inductive presentation as with the deductive offers strong evidence against the notion that an inductive approach should not be used for difficult structures. Another issue addressed by the study was whether the inductive approach is too difficult for weak students. The teachers had rated their students as either weak, average, or strong. The correlation between ability and approach was not significant (see Table VI), which contradicts Ausubel (1) and Carroll's assertion that an inductive approach is too difficult for slow students.

CONCLUSIONS

The purpose of this study was to determine the relative effectiveness of an inductive presentation and a deductive one either when difficult concepts are being learned or when the students are weak. No significant differences were found between the results using the two presentations. However, the trend was in favor of an inductive approach for students of all ability levels learning grammar commonly considered to be difficult (i.e., grammar based on concepts not found in English).

Structure. Scholars have long maintained that an inductive approach should not be used for difficult concepts.[3] The findings of the present study do not support this point of view. On the contrary, those structures with overall scores showing them to be the hardest in the study benefited most from an inductive approach.

A possible reason for past bias against an inductive approach is that it was generally viewed as no more than habit formation rather than as a cognitive activity. In the present study, students were required to verbalize the underlying rule as part of the inductive learning process. Rather than rotely repeating examples of the structure until acquiring unconscious patterns of behavior, they used the examples

provided to hypothesize the governing pattern. Their success with this approach corroborates Bruner's findings that students do better when having to discover underlying patterns themselves rather than being told them. Even Ausubel (1), despite his preference for a deductive approach for adults, conceded that an inductive approach was valuable for students not yet possessing the concepts under which to subsume new ones.

Ability. Another factor believed to influence the effectiveness of the inductive approach is the ability of the students. Both Ausubel (1) and Carroll have asserted that weak students are not capable of generating new ideas autonomously. In the present study, however, ability was not a significant factor.

If enough examples are provided that clearly illustrate a grammatical point, weak students who succeed in perceiving and formulating the underlying concept themselves will have done so in terms which make sense to them. When given the rule, they risk only superficial understanding or, worse, may rely on simply memorizing the rule without any real comprehension.

Limitations. Because of the large number of teachers who participated in this study, it was decided to reduce their influence on the students' performance as much as possible. While this could not be done completely, limiting each approach to a written presentation minimized the teacher factor as much as possible. To realize the maximum potential of either approach, student-teacher interaction is needed. Class discussion is especially helpful in an inductive approach, where students, during the hypothesis formation process, could benefit from input from their teachers and peers. If their perceptions were initially incorrect, the teacher or even their fellow students would help steer them in the right direction. The fact that an inductive presentation where students had to formulate their ideas without help produced such good results attests to the success that such an approach would have in a normal classroom learning situation.

Further Research. The Role of Explicit Knowledge. In the inductive presentation in this study, the students were required to verbalize what they perceived to be the rule before they took the test. If any students neglected to do this, their tests were eliminated from the study.

While studies have addressed the issue of the explicit rule knowledge, the importance of verbalization for concept formation still remains unresolved.[4] In Seliger's study (23), the grammatical point tested was uncomplicated: "The indefinite article was chosen because of the simplicity of the pedagogical rules which are normally employed to teach it" (p. 361). Furthermore, he was testing adults who had learned the structure in diverse situations. In the Hulstijn study, complicated structures were tested, but, again, the students had already learned them prior to the study. Therefore, knowledge of the underlying concept had become automatic for many of the subjects. In Hammerly's study (12), the structure was conceptually difficult and had been learned together by the students in class, but he waited twelve weeks before testing them. As in the other studies, usage may have become automatic for the students by the time they were tested. The importance of verbalizing difficult concepts that have not yet become automatic responses needs to be studied.

Individual Preference. Unfortunately, because of curriculum differences among the schools in the present study, most students could participate only once. Therefore, the possibility that certain students do better with one or the other approach was not explored.

If a longitudinal study were conducted, the same students could be exposed to both approaches. One question that needs to be addressed is whether certain learning styles cause individuals to be more receptive to either an inductive or deductive approach.

Implications of Research. Much recent discussion on language learning has revolved around whether explicit grammatical knowledge has a central role in today's language classroom. Most of the research has focused on children learning English as a second language who are exposed to the target language learned outside the classroom.[5]

Students learning a foreign language as an academic subject and who have contact with that language for four or five class periods a week are in a different situation. Language students should focus on learning grammar in the context of communicative situations. They cannot, however, be expected to learn a foreign language as an academic subject in exactly the same way as infants learning their native language or even as children learning a second language while in the target culture. As Ausubel (2) and Terrell (31) point out, we should capi-

talize on adults' capacity to comprehend under-lying patterns, and thereby hasten the learning process.

Because the inductive approach has been associated with audio-lingual habit formation theories of the sixties, it has often been neg-lected in discussions centering on cognitive learning and explicit rule knowledge. The present study demonstrates that an inductive approach is, indeed, possible in a cognitive framework, and that it can be as effective as deductive approaches for difficult grammatical structures regardless of language ability.

This study does not propose that teachers use only an inductive approach in the classroom. Teachers need to be flexible enough to incor-porate various approaches into their lessons de-pending on the particular situation. An advan-tage of an inductive approach, however, is the active rather than passive participation of the students. Cognitive research has shown that discovering rather than being told underlying patterns favorably affects retention.[6] Further-more, in an inductive approach, grammar is presented in meaningful context.

NOTES

[1]See Chastain & Woerdehoff, Hammerly (12), Jenkins, Politzer, Seliger (23), Sjoberg & Tropez, Smith, Tucker et al., Von Elek & Oskarsson.

[2]For further information on the value of verbalization, see Carroll, Hammerly (13), Rivers, Seliger.

[3]See Carroll, Hammerly (12), Fischer. Fischer refers to what he calls the transfer theory of learning to support the notion that an inductive approach should only be used to teach concepts that students have already learned in their native language (p. 100). Hammerly specifically singles out *ser/estar* and the imperfect tense as being too difficult for an inductive approach.

[4]Hammerly (13); Seliger (24); Hulstijn & Hulstijn.

[5]Krashen (17, 18); Dulay & Burt (7-10).

[6]See Bruner (p. 32) and Sjoberg & Tropez.

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APPENDIX A

Savoir = To know
Connaître = To know

Read the following examples to see how *savoir* differs in meaning from *connaître*.

1. Je *connais* Paul.
2. Elle *connait* son ami.
3. *Connais-tu* son frère?
4. Nous *connaissons* cet homme.
5. Je *connais* Paris.
6. *Connais-tu* le Canada?
7. C'est un étudiant à Princeton University, alors il *connait* bien Princeton.
8. Je *connais* l'art de Picasso.
9. Marie *connait* la littérature de Molière.
10. *Connais-tu* les tragédies de Racine?

1. Je *sais* son nom.
2. Elle *sait* qu'il est mon ami et qu'il *sait* jouer de la guitar.
3. *Sais-tu* l'âge de son frère?
4. Nous *savons* que cet homme *sait* nager.
5. Je *sais* que Paris est en France.
6. *Sais-tu* que le Canada est grand?
7. Il *sait* qu'il y a une université à Princeton.
8. Je *sais* que Picasso est peintre.
9. Marie *sait* que Molière est un écrivain (writer).
10. *Sais-tu* que Racine a écrit (wrote) des tragédies?

How is the meaning of *Savoir* different from that of *Connaître?* Write your answer below.

APPENDIX B

Connaître = To know
Savoir = To know

Savoir indicates a knowledge of fact or of something learned. When it is followed by an infinitive, it means "to know how" (to know how to play a sport, etc.).

Connaître indicates acquaintance with people, places, and the work of people (art, literature, etc.). It is always followed by a direct object.

EXAMPLES:

Je *connais* Paul.
Elle *connait* Paris.
Je ne *connais* pas l'art de Picasso.
Je *sais* qu'il parle français.
Je *sais* son nom.
Elle *sait* jouer au tennis.

APPENDIX C
Savoir/Connaître

Fill in the following blanks with either *Savoir* or *Connaître*. Do not worry about conjugating the verb; just write the infinitive.

Je ne (1) _____ *pas ou je veux aller pour mes vacances. Je préfère aller à une ville que je ne (2)* _____ *pas. Je (3)* _____ *que Genève est en Suisse. Puisque (since) je (4)* _____ *faire du ski, peut-être je vais aller en Suisse. (5)*

_____ *-tu s'il y a des stations de ski (ski resorts) qui ne coûtent pas très chers. Je (6)* _____ *un homme qui est très sportif; peut-être il (7)* _____ *des stations de sport d'hiver. Que veux-tu faire ce weekend? Je (8)* _____ *bien l'art de Cezanne, et je (9)* _____ *qu'il y a une exposition de son art au musée. (10)* _____ *-tu si le musée est ouvert (open) à huit heures du soir? Peut-être nous pouvons aller ensemble (together) au musée.*

From the Editor: A Word of Thanks

TRUTH, ACCURACY, AND QUALITY ARE THE heart of any first-rate scholarly publication. The extent to which they are present in *The Modern Language Journal* results from the combined efforts of authors, referees, staff members, and the editor. But without the expert advice of the numerous scholars who donate their time and their expertise as a professional service, the reliability of a publication such as this one would be constantly in doubt. The individuals listed below served as field consultants and referees at various times during the preparation of volume seventy-three of the *MLJ*. In printing their names here, the editor expresses publicly his sincere gratitude for many hours of reading and evaluating manuscripts submitted for publication: