# ON TEACHING SYNTACTIC ARGUMENTATION

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1. What is to be taught? The first question that confronts the teacher of syntax is, quite simply, what is to be taught? I think that by far the most important thing that should be taught in the early stages of the study of syntax is syntactic argumentation.

Beginning courses in syntax have two kinds of students--those who will go on in linguistics and those who will not. By learning argumentation, those who will not continue in linguistics learn something that will stand them in good stead whatever they choose to do in the future. Indeed, for such students the study of syntax can serve as a general introduction to scientific method. On the other hand, those students who go on in linguistics will find themselves faced with a rapidly changing field in which assumptions that are basic and widely accepted today may be rejected a few years from now. What is important for the student to learn is not any set of conclusions, but rather the structure of the arguments that led to those conclusions. The student who understands this will be in a position to evaluate critically alternative analyses that will be proposed in the future. He will also be able to construct arguments of his own.

It may be necessary to emphasize that argumentation is not the only thing that should be taught in early syntax courses. The student also needs to learn how to see generalizations in data, and there is a great deal about particular syntactic constructions and analyses of them that have been proposed that the student should learn. Much of this can be taught within the framework of teaching syntactic argumentation. Those things that cannot be taught within this framework I will not discuss further in this paper. Their absence should not be interpreted as indicating that I would exclude them from a syntax course, but merely that they lie beyond the scope of this paper.

In the course of teaching syntax over the past seven years at Brandeis University and MIT, I have developed a series of syntactic problems designed to teach some of the fundamentals of syntactic argumentation which also teach at the same time something about some basic syntactic constructions. I hope that these problems can be published as a book in a year or two. In this paper, I will sketch something of the theory behind these problems.

## 2. On teaching a skill

Teaching syntactic argumentation has much in common with the teaching of other skills. In teaching a particular skill, it is first necessary to analyze the skill to determine what it consists of. Suppose that it consists of four steps. The question then arises as to which step should be taught first.

If we teach Step 1 first, we have to teach the whole thing in order to get a result. That means teaching all four steps at once--a difficult if not impossible task. For this reason, I would begin by teaching the last step, Step 4, first. This means giving students problems in which the first three steps have already been done, and they only need to do Step 4. Next, teach Step 3. Give them problems in which Steps 1 and 2 have already been done. Now they are not only doing Step 3, but they are also reviewing Step 4. In addition, they get the satisfaction of completing the task. In the same way, one should next give problems in which Step 1 is already done, introducing Step 2 and reviewing Steps 3 and 4. Last of all, Step 1 is introduced, and the student can then do the entire task from beginning to end.

## 3. 'Doing syntax'

While I certainly would not want to pretend that all of what a syntactician does can be reduced to a series of simple steps, this is nonetheless true of a significant portion of syntactic work. Oversimplifying, we can sketch the steps involved as follows:

Step 1. Find some interesting facts. (Which facts are interesting will depend, of course, on current syntactic theory and on what current theoretical issues are. In addition, there is an ability to sense which facts will prove interesting; I have seen students develop this ability over a period of time.)

Step 2. Construct a hypothesis to account for the facts.

Step 3. Construct an alternative hypothesis that accounts for the facts in a different way.

Step 4. Find grounds on which to choose between the two hypotheses.

In practice, one may often begin with Steps 1 and 2 already done, as when one takes as the point of departure the analysis of certain data that has been proposed by someone else. But in the course of doing a piece of solid syntactic work, one often formulates and rejects dozens of hypotheses, cycling through the steps outlined above again and again. A student should feel comfortable with the entire procedure.

A key point in the procedure sketched above is Step 4--the choice between hypotheses. Since this step encapsulates a great deal, let's examine somewhat more closely what it involves.

There are two kinds of grounds for choosing between alternative theories or hypotheses:[1]

(1) External (empirical) grounds
    The two theories make different empirical predictions, and
    you see which is right.
(2) Internal grounds
    Both theories make correct predictions about the data, but
    they do it in different ways. We can distinguish two kinds of
    theory-internal grounds for choosing between theories that
    make the same empirical predictions:
    (a) One hypothesis needs an additional device that the other
        does not need.
    (b) One hypothesis needs to state something twice, e. g.
        to state the same condition at two different places in
        the grammar, thus missing a generalization.

Although we can distinguish between external and internal grounds for choice between theories, in practice the two are closely related. For example, suppose we have two hypotheses, Theory A and Theory B. We then find some facts that Theory A accounts for and Theory B does not. We would then choose Theory A over Theory B on external (empirical) grounds. However, it may still be possible to save Theory B by modifying it in some way. At this point, the choice between Theory A and Theory B may shift from external grounds to internal grounds if it can be shown that the modification needed to enable Theory B to account for the facts involves an additional device that Theory A does not need or having to state something twice, thus missing a generalization. Thus, in practice there is a close interplay between evaluating theories on external grounds and evaluating them on internal grounds. In many cases, because of the ever-present possibility of modifying a hypothesis shown to be inadequate on external grounds, arguments based on theory-external grounds reduce to arguments based on theory-internal grounds.

Teaching the grounds for choosing between alternative hypotheses is really the focal point of early courses in syntax. It is taught not

only in the homework problems assigned, but during the class itself. Whenever someone in the class suggests an alternative solution to a problem, the class is immediately faced with the choice between the hypothesis that has just been suggested and the one that was already under consideration or had already been provisionally adopted. In each case, all the criteria for choice between hypotheses come into play.

Since the choice between hypotheses is the last in the series of steps outlined above, it is the one to be taught first. The problems then progress upward in a series of steps, from choice between already constructed hypotheses to the more difficult task of hypothesis construction itself.

4. A progression of syntactic problems

The problems that I have been using in teaching syntactic argumentation divide themselves into ten stages. While these stages represent steps in the progression from the choice between already formulated hypotheses to hypothesis construction itself, it is necessary to remember that they do not form a strict hierarchy—that is, it is not necessary to do everything at one stage before doing something at the next stage. Second, while the problems are arranged here in terms of where they fit in with respect to learning syntactic argumentation, more is involved. At the same time, the students are also learning particular syntactic rules and constructions, since these are used in the problems themselves. In some cases, considerations of which rules or constructions depend on which others dictate the order of teaching them, rather than the place of particular problems in the series of ten stages. Finally, it should be mentioned that some of the problem formats sketched below are written problem assignments, while others are formats for class discussion. In fact, one of the chief purposes of the written problems themselves is to serve as springboards for class discussion. The problems and students' different approaches to them always raise a number of issues which then become the central focus of class discussion. For this reason, flexibility on the part of the teacher is important; he or she should ideally be ready to let class discussion go wherever the issues raised by the problems and the students lead it. It is only when the discussion seems to be turning into an area that is unlikely to prove fruitful or that involves issues that would best be dealt with at a later time that the teacher should turn off the discussion on a particular topic.

Thus, while there must be considerable flexibility in the actual handling of the problems in the classroom situation, they do arrange themselves into a natural progression, which I will briefly sketch below. For each problem I will state four things:

(1) what is given
(2) the task
(3) what the problem teaches
(4) what the problem reviews.

(3) and (4) are stated here solely in terms of argumentation skills, ignoring the particular syntactic rules and constructions that are being taught by means of the problem.

Stage One
(1) Given: (a) Two hypotheses
(b) Crucial evidence that decides between the two hypotheses
(2) The task: Which hypothesis do we adopt and why?
(3) Teaches: Choice between hypotheses on external (empirical) grounds
(4) No review
There is a variation of this problem format which, instead of giving the student only the crucial evidence that decides between the two hypotheses, gives him a number of sentences and asks him which of these sentences provide(s) crucial evidence, asking him to explain why.

Stage Two
(1) Given: (a) Data
(b) Two hypotheses, both of which account for the data
(2) The task: Which hypothesis do we adopt and why?
The task here actually involves two steps:
(a) Check to make sure that both hypotheses are actually adequate on external (empirical) grounds
(b) If so, which hypothesis is to be preferred on theory-internal grounds?
(3) Teaches: Choice between hypotheses on theory-internal grounds.
(4) Reviews: Choice between hypotheses on external (empirical) grounds, in that both theories must be checked against the data first to ascertain that both hypotheses account for it and that there are consequently no grounds for a choice on external grounds.
Many of the instances of choice between hypotheses that arise in class fall into this category; consequently, a great deal of class time is spent on this kind of problem.

Stage Three
(1) Given: Two hypotheses

(2) The task: Use X to construct an argument to decide between the two hypotheses. X may be a particular construction (e.g. idiom chunks) or a particular rule (e.g. THERE-Insertion).

(3) Teaches: How to take some construction or rule and use it to construct an argument.

(4) Reviews: Choice between hypotheses on external (empirical) grounds.

Stage Four

(1) Given: Two hypotheses

(2) The task: Construct an argument to decide between them. Here students have to find the relevant evidence on their own.

(3) Teaches: How to find evidence on their own.

(4) Reviews: Choice between hypotheses on external (empirical) grounds.

The first few times students are asked to find the relevant evidence on their own, the relevant arguments in fact are of the same essential form as the arguments they constructed as Stage Three. Only later do they have to find evidence in uncharted areas.

Ways that data can enter into consideration in problems

(1) It is given in the problem. There are two variations on this: either the problem includes only the crucial data, or else they are given a number of sentences that include the crucial data.

(2) Students are told to use construction X or rule X to construct an argument.

(3) They have to come up with the data on their own.

There is thus a progression with respect to how data enters into consideration. While this is part of the general progression, this progression with respect to how data enters repeats itself at a number of different points in the general progression in argumentation.

Stage Five

Stages Three and Four deal with figuring out exactly what empirical predictions different hypotheses make. Stage Five deals with combining hypotheses.

(1) Given: Two or more hypotheses or assumptions, all of which were either motivated or assumed previously.

(2) The task: Show that these hypotheses or assumptions cannot all be correct.

(3) Teaches: How to combine hypotheses or assumptions and see what they predict taken together. While the predictions that individual hypotheses make one at a time may be

correct, it is still possible that the predictions that
they make together are not correct.

(4) Reviews: Choice between hypotheses on external (empirical)
grounds.

### Stage Six

Stage Six is an exercise in theory expansion as a step toward theory
construction.

(1) Given: (a) Two hypotheses which, as they stand, are equal on
theory-internal grounds.

    (b) Some additional data enters. It can enter in any of
the three ways mentioned above. The additional data
is such that it makes it necessary to modify one hy-
pothesis in such a way that it will then be rejected on
theory-internal grounds.

(2) The task: (a) Students check the two hypotheses on both internal
and external grounds, as the hypotheses stand
initially.

    (b) They have to modify one of the theories to account
for the additional data. This is the new step. It
also involves checking both theories on external
grounds against the new data.

    (c) Compare the two theories on internal grounds, and
choose between them.

(3) Teaches: A new step-modifying a theory to account for additional
data. This is the first step toward formulating their
own hypotheses.

(4) Reviews: (a) Evaluating theories on external grounds.

    (b) Evaluating theories on internal grounds.

In addition, there is the variable of how the additional data enters:
students may be given it, they may not be given it but rather told
where to look, or they may be asked to come up with it on their own.
How the data enters thus may give a review of a different kind, de-
pending on how it enters.

### Stage Seven

Stage Seven is an exercise in hypothesis formulation.

(1) Given: (a) Data

    (b) Two ideas about how the data can be accounted for.

(2) The task: (a) Formulate these ideas as explicit hypotheses.

    (b) Compare the two hypotheses and find grounds for
deciding between them.

This format leaves open the question of how students are to decide
between the two hypotheses. In some cases, they will look for ways
in which the two hypotheses make different predictions about additional

data and attempt to find the crucial data, thereby deciding between the two hypotheses on external (empirical) grounds. In other cases, with the data held constant, the only grounds for choice between the two theories will be theory-internal.

(3) Teaches: How to take an idea and formulate it as an explicit hypothesis.

(4) Reviews: (a) Checking hypotheses on external grounds (to make sure that the hypotheses they formulate account for the data).

             (b) Looking for additional grounds for choice between hypotheses--either differing predictions about additional data (external grounds) or theory-internal grounds.

We are now moving in the direction of formulating hypotheses. As we do this, we are continually reviewing the various aspects of the basic skill of choosing between alternative hypotheses.

Stage Eight

(1) Given: (a) Data

        (b) A hypothesis to account for the data.

(2) The task: Construct a better hypothesis. In some cases, the alternative hypothesis that the students construct will be preferable on external grounds (i.e. it makes correct predictions about additional data that the initial hypothesis did not make), while in other cases the alternative hypothesis will be preferable on theory-internal grounds.

(3) Teaches: A new step--constructing a hypothesis.

(4) Reviews: (a) Checking a hypothesis on external grounds (to make sure that the new hypothesis they construct is empirically adequate).

             (b) Looking for additional grounds for choice between hypotheses--either differing predictions about additional data (external grounds) or theory-internal grounds.

A variant of the Stage Eight format that is actually midway between Stage Seven and Stage Eight might also be used. In this variant, the student is given some data and a hypothesis to account for it, as at Stage Eight. He is also given an idea for a better hypothesis to account for the data, and is asked to formulate this idea as an explicit hypothesis and to construct an argument in favor of his alternative hypothesis over the hypothesis that was given at the outset. This format teaches and reviews the same things that the Stage Eight format does; it is somewhat easier than Stage Eight in that the student

is given an idea for a better hypothesis rather than having to think it up on his own.

Stage Nine
(1) Given: Data
(2) The task: Construct a hypothesis to account for the data.
(3) Teaches: Constructing a hypothesis.
(4) Reviews: All criteria for choice between hypotheses. In the course of doing problems in this format, the student will have to formulate a number of different hypotheses and compare them on both external and internal grounds.

At the same time that students are progressing through the various stages that are sketched here, they are also working with data and learning how to extract generalizations from data, as well as learning about syntactic theory and current theoretical issues and controversies. Thus, they will be ready for Stage Ten.

Stage Ten
(1) Given: Nothing
(2) The task: Find some interesting data and construct a hypothesis to account for it.
(3) Teaches: A new step--finding the data on which to base a hypothesis.
(4) Reviews: Everything--hypothesis construction as well as all grounds for choice between hypotheses.
The format of Stage Ten is not a problem format but a term paper. The student is on his own at every step on the way. But the problems he has done previously, together with what he has learned about extracting generalizations from syntactic data and about current syntactic theory, have prepared him for most of what he has to do at this stage. Stage Ten is rarely reached in the first syntax course, but by using well-constructed problems in the various formats sketched above, the introductory syntax course can lay the basic groundwork.

Returning to the analysis of 'doing syntax' in terms of four steps that was given in Section 3, it can now be seen how the progression of stages sketched above starts out with the last step in the chain (how to choose between alternative hypotheses) and works up to the beginning (the formulation of hypotheses) and then, finally, to the discovery of data that can only be accounted for by means of hypotheses that will have interesting consequences for syntactic theory.

To really do work at Stage Ten, a student must know current theoretical frameworks and therefore which hypotheses are and which are not theoretically interesting at a given time. But, for the general

student who will not go on in linguistics as well as for the future lin-
guist, there does exist another area to be learned--that of syntactic
argumentation itself. This is something that is basically theory-
independent and therefore not subject to change as syntactic theories
change. In this paper I have attempted to show that syntactic argu-
mentation can be analyzed and taught by means of problems that put
the student in the position of one who is 'doing syntax'. My pain point
has been that it is possible to teach argumentation by structuring the
problems in a series of stages that work up from the last step in the
process (choosing between alternative hypotheses) to the process of
hypothesis construction itself.

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1. Throughout this paper, I use the terms 'theory' and 'hypothesis'
interchangeably.