INDOCTRINATION IN LINGUISTICS EDUCATION

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1. CONCLUSIONS WITHOUT EVIDENCE

The transmission of a body of knowledge from one generation to the next is an important function of institutionalised education. This function is usually satisfied by pedagogical texts, that is, the spoken and written text of educational instruction, found in classroom lectures and textbooks. My goal in what follows is a close scrutiny of the discourse of pedagogical texts in the language sciences.

I make two points in this article. First, the content and discourse of education in language studies results in a form of indoctrination. I say this because traditional textbooks and lectures usually transmit as knowledge a set of conclusions that the older generation believes to be correct. By and large, they do not transmit knowledge of the evidence for these conclusions, that is, the reasons for accepting a conclusion, considerations of obvious alternative conclusions, and argumentation for or against a conclusion. As a result, the textbooks and lectures have the effect of making the young conform to the beliefs of the older generation. The younger generation is thereby disabled from questioning the conclusions of the older generation, and from exploring better alternatives. I see this as indoctrination.

Second, it is possible to minimise if not avoid indoctrination in textbooks and lectures by presenting not only the knowledge of the conclusions arrived at by the academic community, but also the knowledge of the evidence for and against these conclusions.

2. INDOCTRINATION IN TRADITIONAL EDUCATION

Let me briefly step outside the domain of language studies to illustrate what I mean by indoctrination outside . In an introductory textbook in the physical sciences, we are likely to find statements of the kind illustrated below:

A dropped coin falls to the ground because of gravity.

The Earth rotates around its axis.

All matter is made up of molecules.

There are two atoms of hydrogen and one of oxygen in a molecule of water.

Oxygen has a valency of two, and carbon has a valency of four.

Every one of the above statements expresses a hypothesis that leads to an explanation of a set of observed facts. There is considerable evidence for each of these hypotheses, but none of them is a fact. Furthermore, there is no guarantee that further evidence in future research will not demonstrate that these hypotheses are false.

Let me take a concrete example of how we invent hypotheses in order to explain something. Take the proposition that night and day are the result of the Earth's rotation around its axis. Is this a fact that we know for certain, or is this an assumption that we have reliable

evidence for?[1] A brief reflection tells us that it is not a fact. The alleged rotation of the Earth is not something that can be observed by an observer on the Earth. It is a hypothesis that allows us to explain a set of observed facts.

What are the facts whose explanation involves the hypothesis that the earth revolves round its axis? Let us take a look at the night sky from the earth. Though the stars in the night sky keep changing their locations at different rates, the North Star, also called Polaris, hardly changes its location. From the reference point of an observer on earth, the stars near Polaris appear to move around Polaris in circles. When they are above Polaris, they move from east to west, and continue moving from west to east under Polaris. The stars farther away from Polaris move from east to west and then slip below the horizon, when we can see them no longer. The Sun and the Moon move from east to west and then dip down the horizon in the same fashion. Why does the sky appear to move in this systematic fashion every day?

Let us imagine that the sky is like a huge basketball, and the earth is like a huge tennis ball suspended inside the basketball. We are ants sitting on the tennis ball, staring at the stars studded on the inside of the basketball. The observed changes in the location of the stars can be either due to the rotation of the basketball around the tennis ball, or due to the rotation of the tennis ball inside the basketball. Thus, given the same observations, we can have two different interpretations:

The observed puzzle

> In relation to the Earth, Polaris does not change its position, but the other stars move in circles around Polaris. Why does the sky appear to move in this systematic fashion every day?

Two explanations

Interpretation A: The Earth is stationary; the sky that contains the stars is revolving around the earth along an axis that connects the Earth and Polaris.

Interpretation B: The sky that contains the stars is stationary; the Earth is rotating around an axis that connects the Earth and Polaris.

A few centuries ago, Ptolemy chose interpretation A, and constructed a theory on the basis of which the positions of celestial bodies can be calculated. Copernicus, on the other hand, chose interpretation B, and constructed an alternative theory, modified subsequently by

[1] I use the word fact to refer to a statement about the world whose truth hs been verified, and which cannot turn out to be incorrect when further knowledge becomes available. There is considerable evidence that supports the statements about gravity, the Earth's rotation, molecules, and so on, but none of them has been proved to be true beyond doubt. The distinction between 'facts' and 'interpretations' of facts is too complex to be dealt with in this article, but the following example may give an intuitive sense of the distinction. The statement, "Kim has tears in her eyes," is a statement of fact whose correctness can be checked by observation. In contrast, the statement, "Kim is sad," is a statement of interpretation, based on the observation of Kim's facial expression, words, tears, and so on.

In ordinary language, an 'assumption' is something that we take to be true in order to proceed. Thus, one may say, "I assume that you are familiar with this book," in order to proceed with a discussion of the book. In the language of science, however, an 'assumption' is something that we postulate in order to explain something. Thus, the sentence, "Every material body in the universe attracts every other material body," states an assumption which leads to an explanation for the phenomena of falling bodies. In this sense, the term assumption means roughly the same as 'hypothesis' or 'law'.

Kepler and Newton. Modern science accepts B on the grounds that the theory that incorporates B is relatively simpler than the one that incorporates A.

Once we realise that the statement that the earth rotates around its axis is not a fact, but a reasonable interpretation of the changes in the observed locations of the heavenly bodies relative to each other and the earth, it becomes easier to see that this interpretation is not infallible. It opens up the possibility of evaluating the evidence for the interpretation, and looking for alternative interpretations of the same facts.

Thus, the statements in the list we saw earlier are all examples of hypotheses that scientists have postulated. What is the evidence for postulating these hypothese? Most textbooks in physics and chemistry do not give us an answer. Unfortunately, very few textbooks and lectures even acknowledge the hypothetical character of these propositions, let alone discuss the details of evidence and argumentation. Similar remarks apply to textbooks in other disciplines that I am familiar with.

Without the accompanying evidence for hypotheses, the knowledge transmitted in textbooks and lectures becomes opaque: they are not amenable to critical evaluation. As a result, students are forced to accept a set of conclusions without knowledge of the reasons for believing them, which amounts to indoctrination.

Introductory books can indeed be free of this problem. The best example of a non-indoctrinating introduction to physics is probably Einstein and Infeld's *Evolution of Physics*. There are other books in physics with a similar flavour, such as Richard Feynman's *Character of the Physical Law*. Feynman's *Lectures in Physics*, based on the undergraduate course he taught at Caltech, is still one of the best undergraduate textbooks in physics that combines understanding of the concepts with detailed discussions of evidence. Another excellent textbook of this kind is Leon Cooper's *An Introduction to the Meaning and Structure of Physics* . It gives a glimpse of the thinking processes in sciences from a historical perspective, and carefully lays out the kinds of evidence that led to the modification of scientific hypotheses. Such books, however, do not seem to be popular with those who make decisions on what to prescribe, probably because their open-endedness poses challenges which neither teachers nor students wish to face.

What I would like to do in the rest of this article is to demonstrate the nature of institutional indoctrination in pedagogical texts in linguistics using familiar examples from morphology and syntax. I will then indicate how such texts can be revised in order to avoid this danger.

3. INDOCTRINATION IN MORPHOLOGY

3.1. Traditional Presentation

In a first year lecture on morphology, or a chapter on morphology in an introductory textbook, we find information along the lines given in box I:

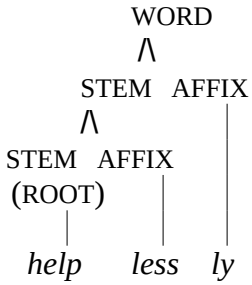
Box 1: Typical Textbook Illustration

The English word *unhappy* consists of *un-* and *happy*. The word *happiness* consists of *happy* and *-ness*. Similarly, *happily* consists of *happy* and *-ly* , and *slowly* consists of *slow* and *-ly*.

Such pieces out of which we can form words are called **morphemes**. *Happy, slow, un-, -ness,* and *-ly* are some of the morphemes of English. The study of the structure of words in terms of the morphemes they contain is called **morphology**.

Morphemes like *happy* and *slow* can occur independently as words. In contrast, morphemes like *un-, -ness,* and *-ly* cannot occur as independent words. They can occur only as parts of words, attached to some other form. The former are called **free morphemes**, and the latter are called **bound morphemes**.

Bound morphemes are also called **affixes**. Affixes are attached to **stems**. For instance, the affix *-ly* in the word *helplessly* is attached to the stem *helpless*, and the affix *-less* is attached to the stem *help*. A stem that cannot be divided any further is called a **root**. In the word *helplessly,* the stem *help* is the root.



This piece of discourse gives students the impression that terms like ‘morpheme’, ‘affix’, and ‘stem’ refer to entities in observable reality. The most dangerous part perhaps is the very definition of the subject of morphology as the study of the structure of words in terms of morphemes. This means that for the subject of morphology to exist, we must recognise the existence of morphemes.

Now, a linguist knows that terms like morpheme and affix, like subject, object, and syllable, refer to hypothetical constructs which are part of the linguist’s invention, not part of observable reality. In other words, they have the same status as notions like molecule, gravity, magnetic field, and electric charge. We cannot observe molecules and gravity, though we can observe the effects that we attribute to molecules and gravity. Similarly, we cannot observe morphemes, but we can observe the effects that we attribute to morphemes. Take the representations in (1):

(1) Alleged structure of *happy* and *unhappy*:

hypothesis:	WORD		WORD
			/\
	hæpi	Un	hæpi
fact:	[hæpi]		[Unhæpi]

When we tell the student that the word *unhappy* consists of two morphemes, and that the morphological structure of this word is represented as (1), what we mean to say is that these are assumptions that most linguists have proposed in order to explain a set of facts. Hence, the first sentence of the text in box 1 should be rewritten as (2), to bring out the hypothetical character of the statement:

(2) Linguists assume that the word *unhappy* consists of the morphemes *un-* and *happy*.

Stated this way, the proposal is open to questioning. It immediately leads to two related questions.

(3) a. Why should we believe that *unhappy* consists of *un-* and *happy*?
b. Why should we believe that there are such a things as morphemes?

3.2. The Relevant Data and Generalisations

As indicated in section 2, questions such as "Why should we assume that there is such a thing as gravity?", "Why should we assume that there is such a thing as magnetic field?" are usually answered by pointing to a set of data that calls for an explanation, and to how our postulations allow us to provide an adequate explanation. Let us use the same strategy to answer our questions on word structure and morphemes.

We begin by noting that when we examine a dictionary of English, we find words such as the following:

(4)

Data	A	B	C	D
a.	happy	common	clear	afraid
b.	unhappy	uncommon	unclear	unafraid

These words exhibit a set of correspondences in both meaning and pronunciation. *Unhappy* means 'opposite of happy', *uncommon* means 'opposite of common', *unclear* means 'opposite of common' and *ungrammatical* means 'opposite of grammatical'. Thus, if the meaning of *happy* is M1, the meaning of *unhappy* is opposite of M1, if the meaning of *common* is M2, the meaning of *uncommon* is opposite of M2, and so on.

(5)

	A	B	C	D
a.	M1	M2	M3	M4
b.	opp. of M1	opp. of M2	opp. of M3	opp. of M4

The pattern in (5) can be stated as the following general observation:

(6) General observation 1:
If the meaning of the word in (4a) is X,

then the meaning of the corresponding word in (4b) is ‘opposite of X’.

Turning to pronunciation, we find that *happy* is pronounced as the sound sequence /hæpi/, while *unhappy* is pronounced as the sequence/Un/ followed by the sequence /hæpi/; *common* is pronounced as the sequence /kåm™n/, while *uncommon* is pronounced as the sequence/Un/ followed by /kåm™n/; and so on:

(7)

	A	B	C	D
a.	/hæpi/	/kåm™n/	/kli™(r)/	/™freid/
b.	/Unhæpi/	/Unkåm™n/	/Unkli™(r)/	/Un™freid/

The pattern in (7) can be stated as the following general observation:

(8) General observation 2:
If the pronunciation of the word in (7a) is /Y/,
then the pronunciation of the corresponding word in (7b) is /UnY/.

In other words, there is a systematic correspondence in both meaning and pronunciation between the words in (4a) and (4b). Let us refer to such pairs of words as RELATED WORDS. What we mean be relatedness is this: if we know the properties (either meaning or pronunciation) of the one of the related words, we can infer the properties of the other. Thus, if we know the meaning of*happy* and *common,* we can infer the meanings of *unhappy* and *uncommon*. Hence *happy* and *unhappy* are related words, *common* and *uncommon* are related words, and so on.[2]

We have not introduced the notion of morphemes yet. However, we can now see what morphology is about: it is the study of the systematic relationships of the kind illustrated in (4). Let us now go on to explore the role of morphemes in this study.

3.3. An Explanation

We can express the systematic relationship in pronunciation and meaning illustrated in (4) if we make the following hypotheses:

(9) Explanation

a. Hypothesis A:
Each of the words in (4b) are composed of two parts, namely:

/\	/\	/\	/\	
un happy	un common		un clear	un grammatical

b. Hypothesis B:
(i) The word part *un* has the pronunciation /ʊn/.
(ii) The word part *un* can be attached to an adjective to derive an adjective.
(iii) If*un* is attached to an adjective that means {X},
then the meaning of the derived adjective is {opposite of X}.

Hypotheses A and B together correctly predict the results in (5)-(8).

3.4. Motivation for the Postulation of Morphemes

Given hypothesis (9b), we can account for the systematic sound-meaning correspondences in the remaining *un-* words in the dictionary. The argument for the assumption that the words in (4b) can be broken up into word parts can now be stated as follows:

(10) Argumentation for breaking up *unhappy* into *un* and *happy*

Step I: The words in (4) illustrate a systematic correspondence in meaning and pronunciation in an English dictionary, stated as (6) and (8).

Step II: If we make the assumptions in (9), we can provide an explanation for (6) and (8).

Step III: In the absence of an alternative explanation for (6) and (8), we conclude that (9) is correct.

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[2] Implicit in what I have said above is the idea that the notion of 'morphological relatedness' is prior to the notion of morpheme. The idea of a morpheme is generally proposed as a means to capture morphological relatedness, but the notion 'morpheme' may not be the only way of capturing it. There are proposals in the literature to capture morphological relatedness without morphemes, but a discussion of these is beyond the scope of this article.

Step IV: If we accept the explanation in (9), we must also accept the claim that *unhappy* consists of the parts *un* and *happy*.

Step IV provides an answer to the question that we raised earlier, namely, "Why should we assume that *unhappy* consists of *un-* and *happy*?"

Let us turn to the issue of morphemes. A morpheme is a unit smaller than the word, which means that a morpheme need not be a word by itself. Why should we assume that in addition to the notions WORD and SENTENCE, we also need the notion MORPHEME in linguistic theory? The argument can be stated as follows:

(11) Argumentation for the notion morpheme:

Step I: The words in (4) illustrate a systematic correspondence in meaning and pronunciation in an English dictionary, stated as (6) and (8).

Step II: If we make the assumptions in (9), we can provide an explanation for (6) and (8).

Step III: In the absence of an alternative explanation for (6) and (8), we conclude that (9) is correct.

Step IV: If we accept the explanation in (9), we must also accept the claim that *unhappy* consists of the word parts *un* and *happy*, that *uncommon* consists of the word parts *un* and *common*, and so on.

Step V: *un* is a word part but not a word by itself. We assume a morpheme to be a unit smaller than the word, such that a morpheme need not be a word by itself. Hence, if we accept (9), we must accept the notion morpheme.

3.5. Evidence from Experimental Results

The arguments in (10) and (11) are based on evidence from natural corpus, that is, the record of utterances produced under natural conditions of linguistic communication. Additional evidence for the notion comes from experimental data. Let us conduct the experiment described in (12):

(12) Experimental results

A speaker of English is taught the coinage *blemous* , as illustrated in the sentence *This vegetable is very blemous* which means 'this vegetable is very easy to cook by frying'. (S)he is then asked to interpret the sentence *Those carrots are unblemous.* Even though the speaker has never come across the word *unblemous* before, (s)he interprets the sentence as asserting that the carrots are not easy to cook by frying. The results are replicated in experiments with other pairs of coinages like *grimpish/ungrimpish, sisp/unsisp*, and *frelous/unfrelous.* In contrast, when the same experiment is done with coined pairs like *blemous/fiblemous*, the speaker (experimental subject) is unable to interpret the meaning of the second coinage.

The puzzle illustrated by this experiment is the following. Given the meaning of *blemous*, a speaker of English is able to understand the meaning of *unblemous* but not the meaning of *fiblemous.* Why? This puzzle is explained by hypothesis (9b). Given the adjective *blemous* which means 'easy to cook by frying', a speaker of English interprets *unblemous* as /Un + blem™s/. By (9biii), its meaning is 'not easy to cook by frying', i.e., opposite of blemous. In contrast, English has no morpheme *fi*, and hence the meaning of *fiblemous* is not derivable through morphological composition.

Once again, the argument for the notion morpheme is that if we assume the statements in (9b), we have an explanation for the experimental results in (12). In the absence of an alternative explanation, therefore, we accept (9b) as tentatively correct. If so, we need to accept the notion morpheme which is crucial for this explanation.

If we are dealing with morphology as part of a basic introduction to language structure at the first year undergraduate level, I think the pursuit of the question "Why should we believe there are such things as morphemes?" can end with the kinds of evidence presented above. In such a course, we can minimise indoctrination by replacing the first part of the text in box 1 with that in box 2.

Box 2: Presenting evidence in support of conclusions

When we compare pairs of words like *happy/unhappy*, *common/uncommon*, and *clear/unclear*, we notice that they exhibit systematic correspondences in both pronunciation and meaning. With respect to pronunciation, we notice that the second member of each pair begins with the sound sequence /ʌn/, and is followed by the sound sequence found in the first member of the pair. Thus, the pronunciation of *unhappy* is /ʌn/ followed by the sound sequence of *happy* /hæpi/, the pronunciation of *unclear* is /ʌn/ followed by the sound sequence of *clear* /kli™/, and so on. With respect to meaning, we find that the meaning of the second member of each pair is expressible as the opposite of the meaning of the first member. Thus, *happy* means 'mentally elated', while *unhappy* means 'opposite of mentally elated'. *Common* means 'frequent', while *uncommon* means 'opposite of frequent'.

Let us use the term **related words** to refer to pairs of words which exhibit such systematic correspondences. *Happy* and *unhappy* are related words, *clear* and *unclear* are related words, and so on. **Morphology** is the study of the patterns of relatedness among words.

In order to express the patterns of relatedness among words, most linguists assume that words can be composed of smaller parts. For instance, we may assume that *unhappy* consists of *un* and *happy*, that *unclear* consists of *un* and *clear*, and so on.

A. *happy* *clear* *common* *afraid*

B. *un+happy* *un+clear* *un+common* *un+afraid*

We can now say that the piece *un* has the pronunciation /ʌn/ and the meaning {opposite of}. Since the words in both A and B are adjectives, we also assume that *un* is attached to adjectives to derive new adjectives. These assumptions allow us to explain not only the patterns of relatedness found in the actual words in a dictionary, but also how people interpret the meanings of words they have not seen before. For instance, suppose a speaker of English is told that the meaning of the word *blemous* is 'easy to cook by frying'. If the speaker is now given the word *unblemous*, and asked what it means, (s)he would say 'difficult to cook by frying'. This behaviour of the speaker follows from the assumption that *unblemous* consists of *un* and *blemous*, and that its meaning is 'opposite of the meaning of blemous'.

Linguists use the term **morpheme** to refer to such word parts. We assume that the word *happily* consists of the morphemes *happy* and *ly*, the word *lawlessness* consists of the morphemes *law*, *less*, and *ness*, the word *decentralisation* consists of the morphemes *de*, *centre*, *al*, *ise*, and *ation*, and so on.

In a similar manner, we can present evidence for other basic constructs like bound and free morphemes, inflections and derivations, affix and stem, and so on. As yet another illustration, consider the presentation of the evidence for the notions of inflection and derivation in box 3, and compare it with the absence of evidence in traditional textbooks:

Box 3: Presenting evidence in support of conclusions

Take the verb *employ*, to which we can attach the past tense morpheme *-(e)d* or the present tense morpheme *-(e)s* to get *employed* (employ + ed) and *employs* (employ +s) respectively. We can also attach the noun forming morphemes *-er* and *-ment* to this verb to get *employer* (employ + er) and *employment* (employ + ment). However, we cannot attach *-er* and *-ment* to *employed* or *employs*: the forms **employeder* (employ+ed+er), **employser* (employ+s+er), **employedment* (employ+ed+ment) and **employsment* (employ+s+ment) are not possible English words. Now, this is not a peculiar property of *employ*: it is true for all English verbs. e.g. *kill, kills, killed, killer* but **killser, *killeder; enjoy, enjoyed, enjoys, enjoyment,* but **enjoysment, *enjoyedment*. We can explain these facts by assuming the following principle for English:

> The morphemes *-er* and *-ment* cannot attach to verb stems containing tense morphemes.

Similar patterns appear in adjectives. We can attach the comparative and superlative morphemes *-er* and *-est* to *soft* to get *softer* (soft+er), *softest* (soft+est). We can also attach to *soft* the noun forming morpheme *-ness* and the adverb forming morpheme *-ly* and get *softness* (soft+ness) and *softly* (soft+ly). However, we cannot attach *-ness* and *-ly* to *softer* and *softest*: the forms **softerness* (soft+er+ness), **softerly* (soft+er+ly), **softestness* (soft+est+ness) and **softestly* (soft+est+ly) are not possible words in English. As in the case of tense morphemes, we can see that the behaviour of *soft* generalises to other adjectives as well. To explain these facts, let us assume that:

> The morphemes *-ness* and *-ly* cannot attach to adjective stems containing comparative and superlative morphemes.

Turning to nouns, we find *boy, boys* (boy+s) *boyhood* (boy+hood) but not **boyshood* (boy+s+hood). Similarly, we have *queen, queens* (queen+s), *queenly* (queen+ly), but not **queensly* (queen+s+ly). We can say *king, kings* (king+s), *kingdom* (king+s+dom), but not **kingsdom* (king+s+dom). Such facts can be explained by assuming that:

> The morphemes *-hood, -ly,* and *-dom* cannot attach to noun stems containing the plural morpheme.

We appear to be making more or less the same kind of generalisation in all these separate principles. Now, let us suppose that tense morphemes, comparative and superlative morphemes, and plural morphemes belong to a single class. Let us refer to them as the class of **inflectional** morphemes**.** Let us also suppose that noun forming *-er, -ment, -ness, -dom, -hood,* adverb forming*-ly,* and adjective forming *-ly* belong to another class of morphemes. Let us refer to them as the class of **derivational** morphemes. Using this classification, we may formulate the following general principle in English grammar:

> A derivational morpheme cannot attach to a stem containing an inflectional morpheme.

If we assume that *-ful, -less, -al, -ity, -ize,* etc., are derivational morphemes, the above principle will correctly predict that forms like **cupsful* (cup+s+ful), **hatsless* (hat+s+ less), **medicinesal* (medicine+s+al), **sanerity* (sane+er+ity), **revolutionsize* (revolution+ s+ize), etc., are unacceptable words in English. Since this principle allows us to explain all these facts, we conclude that the concepts of inflection and derivation are legitimate constructs in English morphology, and possibly in morphological theory in general.

The discussion above must have made it clear that the term ‘morpheme’ does not refer to an observable entity in the data, but to an entity created by the linguist’s imagination. The traditional treatment of morphemes in introductory textbooks and lectures fails to clarify this aspect of knowledge. Like conventional pedagogical texts in other disciplines, it commits the fallacy of reification, by presenting a product of human imagination as a concrete entity of observable reality.

In order to ensure that the teaching of introductory morphology does not result in the closure of young minds, it is important that we pay attention to the following:

> First, we should make it very clear that morphemes are not entities that we can observe; they are hypothetical constructs, that is, entities that linguists have created in order to explain certain observations.
>
> Second, we should present to the students the evidence that lends credibility to the notion of morphemes. This involves the presentation of the relevant data, clear articulation of what needs to be explained in the data, an explanation, and an argument on the basis of the explanation. Consideration of evidence also includes obvious alternative explanations which might invalidate our arguments for the notion morpheme. If we can establish that the alternative explanation is not as good as the one with the notion morpheme, we must do so. If the contingencies of an introductory course prevent us from making this move, we should at least make it clear to the students that the relevant evidence and argumentation has not been provided.
>
> Third, we should make it clear to students that even though there are reasons to believe that there are such things as morphemes, this belief is not infallible. We should not be surprised if someone discovered a new way of explaining all facts of morphological relatedness without the notion ‘morpheme’.

To go back to the conventional pedagogical text in box 1, I have fleshed out the evidence that bears upon the notion morpheme. The revised version in Box 2 and appendix to box 2 avoids this indoctrination. Similarly, box 3 outlines the evidence for postulating the distinction between inflections and derivations.

The text in box I also introduces other notions like affix, stem, and root. A non-indoctrinating text should also provide evidence for the postulation of these notions, thereby answering the questions “Why do we need the notion ‘affix’?”, “Why do we need to distinguish between free and bound morphemes?”, and “Why do we need to distinguish between prefixes and suffixes?” I will not pursue these issues here. Instead, I will turn to an example of indoctrination in syntax, and give another illustration of how its dangers can be minimised.

4. INDOCTRINATION IN SYNTAX

4.1. Traditional Presentation: Quirk and Greenbaum

My illustration from syntax is drawn from Quirk and Greenbaum’s (1973) *A University Grammar of English*, which appears to be a popular textbook in many countries which were once British colonies. Take their SVCOA analysis of clause structure that involves the entities S(ubject), V(erb), O(bject), C(omplement), and A(dverbial). Quirk and Greenbaum do not spell out the substance of these labels, but expect readers to develop an intuitive notion based on examples like the following:

(13) a. John carefully searched the room.
S A V O

b. He had given the girl an apple.
S V O O

c. They made him the chairman every year.
S V O C A

d. Mary is in the house.
S V A

e. Mary is a kind nurse.
S V C

f. I put the plate on the table.
S V O A

g. We have proved him wrong/a fool.
S V O C

Quirk and Greenbaum make further distinctions within these labels, such as two kinds of objects, namely, direct objects and indirect object, and two kinds of complements, namely, subject complements and object complements.

(14) a. He had given the girl an apple.
S V Ind.O Dir.O

b. Mary is a kind nurse.
S V Subj.C

c. We have proved him wrong/a fool.
S V O Obj.C

Let us begin by acknowledging that the terms subject, object, complement, and so on refer to the constructs of linguistic analysis, not to the concrete entities in the data. The statement that *John* is the subject of *John slept* asserts a hypothesis, as part of our interpretation of the sentence. It is not a statement of fact.

What is the evidence to believe that there are such things as SUBJECTS and OBJECTS? What is the evidence to believe that it is necessary to make a distinction between DIRECT and INDIRECT OBJECTS? Answers to such questions do not appear in Quirk and Greenbaum, or in most other pedagogical texts for that matter.

Before considering the question of evidence, it would be useful to keep apart three types of labels, namely, labels referring to grammatical categories, grammatical functions, and semantic roles. A GRAMMATICAL CATEGORY refers to a class of words (e.g. nouns, verbs, prepositions, adjectives, and adverbs) or a class of phrases (e.g. noun phrase, verb phrase, prepositional phrase, adjectival phrase, and adverbial phrase). A GRAMMATICAL FUNCTION expressed by labels like subject and object is the syntactic function of an item in relation to verb in the structure of a clause. A SEMANTIC ROLE such as agent, experiencer and beneficiary is the semantic relation of an entity to the verb. Thus, in *John pinched Bill*, the expression *John* is the agent and the subject of *pinch*, but in *Bill was pinched by John* the expression John remains the agent, but is no longer the subject. The meaning relations (agent, undergoer) remain the same, but the syntactic relations (subject, object) have changed.

Let us take a closer look at the distinction between direct and indirect objects. Traditional grammars follow the labeling given in (15), while Quirk and Greenbaum follow the labeling in (16):

(15) Proposal A: Traditional Grammars

a.	*John*	*gave*	*Mary*	*a book .*	
	NP	V	NP	NP	categories
	SUBJECT	PREDICATE	IND.OBJECT	DIR.OBJECT	functions
	AGENT	ACTION	GOAL	UNDERGOER	meanings

b.	*John*	*gave*	*a book*	*to Mary*.	
	NP	V	NP	PP	categories
	SUBJECT	PREDICATE	DIR.OBJECT	IND.OBJECT	functions
	AGENT	ACTION	UNDERGOER	GOAL	meanings

(16) Proposal B: Quirk and Greenbaum

a.	*John*	*gave*	*Mary*	*a book .*	
	NP	V	NP	NP	categories
	SUBJECT	**VERB**	IND.OBJECT	DIR.OBJECT	functions
	AGENT	ACTION	GOAL	UNDERGOER	meanings

b.	*John*	*gave*	*a book*	*to Mary*.	
	NP	V	NP	PP	categories
	SUBJECT	**VERB**	DIR.OBJECT	**ADVERBIAL**	functions
	AGENT	ACTION	UNDERGOER	GOAL	meanings

What is traditionally called an indirect object carries the meaning of goal, beneficiary, or recipient, while the direct object carries the meaning of patient or undergoer. This raises a question. Given that most approaches to syntax make a distinction between meanings such as undergoers and goals independently of notions like subject and object, why do we need two kinds of objects distinguished in terms of meaning?

In traditional grammars, the expression *to Mary* in (15b) is an indirect object. Quirk and Greenbaum label it as an adverbial since it is a prepositional phrase. One might therefore think that for something to be called an object, it should be a noun phrase. However, they treat the clause *that the earth is round* as an object in *John discovered that the earth is round*, even though it is not a noun phrase. Why didn't they treat this clause as an adverbial, or some other non-object function? To make things worse, they label *every year* in *John wins prizes every year* as an adverbial even though it is a noun phrase, the reason being that it refers to time. By this logic, they ought to treat the expression last year in *Last year was a disaster* as an adverbial, not a subject.

To understand what these questions really mean, let us compare proposals A and B with proposal C below:

(17) Proposal C: an alternative

a.	*John*	*gave*	*Mary*	*a book .*	
	NP	V	NP	NP	categories
	SUBJECT	PREDICATE	**OBJECT**	**OBJECT**	functions
	AGENT	ACTION	GOAL	UNDERGOER	meanings

b.	*John*	*gave*	*a book*	*to Mary*.	
	NP	V	NP	PP	categories

SUBJECT	PREDICATE	**OBJECT**	**OBJECT**	functions
AGENT	ACTION	UNDERGOER	GOAL	meanings

Contrary to (15) and (16), the labeling in (17) assigns the same grammatical function object to both *Mary* and *a book* . The distinction between them is located at the level of meanings (undergoer vs. goal), not grammatical categories or grammatical functions. In contrast, (15) distinguishes between them twice: both in terms of meanings (undergoer. vs. goal) and in terms of grammatical functions (ind.obj. vs dir. obj). (16) distinguishes between them both in terms of meanings (undergoer vs. goal) and in terms of grammatical categories (indirect object vs. adverbial). Since the distinctions in terms of grammatical categories and meanings is available independently of grammatical functions, we should not make a redundant functional distinction. Instead of calling something an indirect object, for instance, we can call it a goal object.

4.2. A Thought Experiment: a New Framework of Analysis

Let us try a thought experiment. The distinction between direct and indirect objects is made because they have different meanings. In order to get a sense of the needlessness of this strategy, let us conduct a thought experiment of extending the logic of distinguishing between two kinds of objects to propose a classification of different kinds of subjects. Thus, we would label agent subjects as direct subjects, and goal subjects as indirect subjects:

(18) a. Those children painted a picture.
DIR. SUBJECT

b. Those children were given a prize.
IND. SUBJECT

Those children in the first sentence is a direct subject because the children are the agents of painting, while *those children* in the second sentence is an indirect subject because the children are the recipients of the prize.

It is fairly clear that the terminology of direct and indirect subjects is totally unnecessary because the relevant distinctions are independently expressed by semantic roles like agent and goal. If we reject the terminology of direct and indirect subjects on the grounds that it serves no purpose, we should also reject the terminology of direct and indirect objects by the same rationale. Requiring students to learn this terminology and label clausal elements in terms of this framework is indoctrination that makes students incapable of distinguishing between knowledge and redundant labels.

4.3. Motivation for Subjects and Nonsubjects

A non-indoctrinating approach to grammatical functions would begin with what is called Occam's Razor, which states that one should not complicate matters by introducing additional entities unless necessary. The need for a construct in an analysis is demonstrated by its ability to participate in explanations. That is, we must demonstrate that there exist a set of facts whose explanation crucially calls for the notion we wish to introduce.

Let us begin with the traditional style of introducing the notion 'subject':

Box 4: Conclusions without evidence

> In English the subject appears before the verb. Thus, in the sentence *The boy saw the girl*, the subject is *the boy*. Note that the verb agrees with the subject in number and person. Thus, we say *The ogre hates the witches*, but *The ogres hate the witches*.

The discourse in box 4 presupposes the truth of the notion 'subject'. All that it does is to tell the student how to find it. It does not permit the question, "Why should we believe that there are such things as subjects?" and hence leads to indoctrination.

What kinds of evidence would provide support for the postulation of a distinction between subjects and non-subjects? Let us start with the data in (19):

(19) Data

a. The ogre hates the witches.
b. * The ogre hate the witches.
c. The ogres hate the witches.
d. * The ogres hates the witches.

A change in the number (singular vs. plural) of what we have called the subject requires a corresponding change in the verb. In contrast, changing the number of the object from plural to singular does not trigger any change in the verb. Compare (19a) with (19e), and (19c) with (19f):

(19) e. The ogre hates the witches.
f. The ogres hate the witch.

In order to account for the facts in(19), we may postulate the following principles:

(20) Explanation: English

a. In a clause, the unit that immediately appears before the verb is the subject.
b. The verb agrees with the subject in number and person.

By (20a), the subject of sentences (19a) and (19b) is *the ogre*, whose number is singular. The verb in (19a) is also singular, which is consistent with (20b). In contrast, the verb is plural in (19b), which is disallowed by (20b). Hence, the combination of (20a) and (20b) correctly predicts that (19b) is ungrammatical. Similar reasoning explains the ungrammaticality of (19d).

Based on this explanation, we may formulate the argument for the notion 'subject' as follows:

(21) Argument

Step I: We can account for the puzzle in (19) if we postulate the principles in (20).
Step II: In the absence of a better or equally good explanation, we take (20) to be correct.
Step III: (20) crucially requires the use of the notion subject.
Step IV: Hence, the notion subject is necessary in syntactic theory.

The argument in (21) differs from the indoctrinating text in a fundamental way. The indoctrinating text takes the notion of subject for granted, and mentions agreement as a way of identifying subjects. The non-indoctrinating text begins with the facts of agreement, constructs an analysis of these facts, and uses this analysis to argue for making a distinction between subjects and non-subjects.

4.4. An Alternative: Semantic Roles

At this point, a skeptic may ask: why do we appeal to the notion 'subject' to account for the agreement facts? Why can't we use principle (22) instead of (20a) and (20b)?

(22) Alternative explanation I
In a clause in English, the verb must agree with its agent in number and person.

The agent of *hate* in (19) is *the ogre(s)*.[3] Therefore (22) correctly predicts the facts in (19). Given that (22) is simpler than the combination of (20a) and (20b), we must choose reject (20) and choose (22). If so, the argument for subjecthood is no longer legitimate.

Though (22) appears to have an edge over (20), further exploration shows that (22) is incorrect. In order to make a carefully considered choice between (20) and (22), one must select constructions in which the subject and the agent are not the same. The passive construction meets this requirement:

(23) a. The witches are hated by the ogre(s).
b. * The witch are hated by the ogre(s).
c. The witch is hated by the ogre(s).
d. * The witches is hated by the ogre(s).

The principles in (20) correctly predict agreement between the verb and *the witch(es)*. In contrast, (22) incorrectly predicts agreement between the verb and *the ogre(s)*. Therefore we accept (20) and reject (22). Given this result, our argument for subjecthood in (21) remains valid.

The debate need not be over at this point, but for an introductory course one need not explore this issue at any greater depth, unless the students pursue further questioning.

It is not my intention here to go into the details of the evidence that convinces a community of syntacticians that the notion subject is necessary in syntactic theory. All that I wish to do is illustrate the kinds of evidence that can be brought into an introductory treatment of grammatical functions in a textbook or classroom lecture.

4.5. What it Takes to Provide Evidence for Grammatical Functions

To reiterate what I have said, if teachers and textbook writers wish to avoid indoctrination, it is necessary that they present to students not only the conclusions of the academic community, but also the evidence that bears upon the conclusions. By evidence, we mean the motivation for the conclusions, argumentation, and discussion of alternatives.

As the first step towards non-indoctrinating modes of knowledge dissemination, we must make it clear that the statements in (24) below do not assert the facts of English, but a set of conclusions on how English sentences can be analysed.

(24) a. A clause in English consists of a subject followed by a predicate, followed optionally by one or more of the following: direct object, indirect object, subject complement, object complement, and adjunct.

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[3] Strictly speaking, the verb *hate* has an experiencer (the 'hater'), not an agent, and hence (22) should be formulated as "the verb must agree with its most prominent semantic role…" Though this is an important detail, I ignore it for expositional ease.

b. The sentence *John gave Mary a book yesterday*. has the clause structure subject + predicate + indirect object + direct object + adjunct.

A lecture or textbook that presents these conclusions to beginning students should also present the reasons for accepting (or rejecting) these conclusions. That is to say, they should respond to questions like:

(25) a. Why should we believe that there are such things as subjects and nonsubjects?
b. Why should we make a distinction between direct and indirect objects?

Such questions are answered by demonstrating that

> There exist certain facts which can be explained by postulating the notions of subject and object (or subject, direct object, and indirect object).
>
> The explanation involving these notions is the best one available.
>
> Therefore, until we find better or equally good explanations which do not appeal to the notions of subjects and nonsubjects, we must accept the above explanation.
>
> Hence, we tentatively conclude that we need the notions subject and nonsubject.

The third step is the presentation of obvious alternatives which are simple enough to be presented to beginners. In the case of subject and nonsubjects, alternative explanations in terms of semantic roles and relative word order appear to be good candidates.

If pedagogical texts present the relevant evidence in the manner outlined above, it will help to prevent the illusion that the terminology of grammatical functions invented by linguists refer to concrete entities in the data, and that the statements in terms of these entities refer to observable facts. It will also help students become aware of the fallibility of these frameworks and theories: however good an explanation may appear to us on the basis of available evidence, there is always a possibility that fresh evidence will show that the currently accepted explanation is incorrect, or that there are simpler (and hence) better explanations.

The presentation of evidence in pedagogical texts has two additional advantages. First, it will bring the mode of inquiry in pedagogical texts closer to that of research texts. Pedagogical texts will then be good role models for students to do independent research in projects and theses, thereby facilitating the transformation from learner to researcher. Second, if we incorporate the awareness of evidence into our syllabuses, textbooks, lectures, and examinations, it will form the basis for independent critical thinking among students.

To go back to the pedagogical text under scrutiny, once students realise that the Quirk and Greenbaum textbook is not infallible, and that their framework of clause structure requires careful critical evaluation, they will be able to see that it is an incoherent and unmotivated framework. First, Quirk and Greenbaum mix up grammatical categories, grammatical functions, and meanings. In their SVOCA framework, the terms subject and object refer to grammatical functions, while the term verb refers to grammatical category, and the term adverbial refers to a combination of categories (NP vs PP) and meaning (time and place vs. property). It is this confusion which leads them to postulate obligatory adverbials as in the prepositional phrase in *Mary is in the room*, as distinct from complements such as the adjective in *Mary is kind*. and saying that *to Mary* is an adverbial in *John gave a book to Mary*. The way I see it, requiring students to internalise this irrational system in a blind uncritical manner is not very different from requiring them to internalise superstitions.

5. THE DANGERS OF TEACHING THE APPLICATION OF FRAMEWORKS

What I have been trying to say is that labels like morpheme, affix, subject, object, topic, comment, syllable, onset, coda, [voice], [sonorant], etc., refer to concepts which constitute frameworks of analysis, not to observable entities in the data. Hence, it is important that we do not take these frameworks for granted, but instead present evidence for or against them.

By and large, pedagogical texts in linguistics in most parts of the world concentrate on presenting a given framework to students, and teaching them the use of this framework. The validity of the framework is taken for granted, never questioned. For instance, we teach them CV framework of syllable structure and expect students to break up a word into a sequence of phonemes, and label them as C's and V's. We hardly ever present evidence that demonstrates the need for the postulation of C's and V's. We present Quirk and Greenbaum's SVOCA framework of clause structure and expect students to be able to break up a clause into its component parts, and apply the labels of the framework to each unit. We hardly ever present any arguments in support of this framework, let alone reveal its incoherence.

It does not matter which framework of analysis we choose. Whether it is Quirk and Greenbaum, Government Binding, Lexical Functional Grammar, Systemic Functional Grammar, Head Driven Phrase Structure Grammar, or Relational Grammar, taking a framework for granted and teaching students its application without questioning the evidence for the framework is a foolproof recipe for closure of the mind. A student who is indoctrinated in this manner in any given framework of analysis will be blind to its defects, and incapable of responding to what is useful in other frameworks. It has been my experience that victims of this treatment become incapable of critically evaluating what they have uncritically imbibed. Rather than developing the potential of the young mind, this kind of education results in disabling the young mind.

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INDOCTRINATION IN LINGUISTICS EDUCATION

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