

## “Because” and the Concepts of Causation

On the face of it, the semantic analysis of *because* seems a simple enough matter. If we look up the word in a dictionary, say the *Concise O. E. D.*, we find the definition “by reason, on account, for the reason that, inasmuch as, since” and we have no qualms in accepting this, since we have become quite used to receiving a group of so-called synonyms in lieu of a definition. The grammarian might add that *because* functions as conjunction, *because of* as preposition, and from our own linguistic experience we know that it most frequently occurs in answers to *why*-questions. Hence we feel on safe ground if we say that *because* marks the word or phrase that follows upon it as the indication of the reason for an activity or state of affairs. But saying this is not saying very much. It merely tells us that we can often replace *because* with *by reason, on account, etc.*, but it does not really tell us what we are communicating when we use these terms. For although this kind of replaceability has, of course, something to do with meaning and semantics—in the sense that words are considered replaceable with one another if there is a modicum of semantic equivalence between them—it has nothing to do with semantic analysis. A person may know very well that the word *motor-car* can be replaced with the word *automobile* and at the same time know little or nothing about the characteristics an item must have in order to be correctly called *motor-car* or *automobile*. Yet, from both a linguist’s and a psychologist’s point of view it would be very useful to have some sort of description or characterisation of the item to which a particular word can be correctly applied.

Note that I say ‘item’—and not ‘thing’ or ‘object’—because I want to keep the term as open as possible. Semantic analysis, as has been repeatedly pointed out (e.g., Olson, 1970; Ceccato, 1960; von Glaserfeld, 1963; 1972), has been hampered for a very long time by two assumptions. On the one hand, the traditional theory of reference with its more or less cavalier disregard of epistemological problems has propagated the idea that ‘meaning’ connects words to real-world objects (which, of course, entails that we cannot properly name or meaningfully talk about ‘irreal’ items), and, on the other hand, some exponents of the logical-positivist school have maintained that ‘meaning’ is dependent on a proposition’s truth or falsity, or at least its verifiability. For the kind of semantic analysis that we might call cognitive, the existence of things and the truth of statements are hardly ever relevant. What matters are the CONCEPTUAL items the linguistic statements invoke and the relations that are posited between them.

Although we know that etymology is often misleading where semantics is concerned, we are, I think, on safe ground if we assume that the word *because* has

something to do with causation or the concept of causality. This is a concept that has traditionally interested philosophers of every ilk and it has, in more recent times, come to be investigated also by psychologists (Piaget, 1930; Michotte, 1963).

The first thinker to lay down a classification of the kinds of items that go under the name of 'cause' was, of course, Aristotle. A classification, no matter how tidy and useful it may be, is not necessarily equivalent to an analysis of the classified items. To psycholinguists this should be a commonplace. The grammatical classification of words that separates, say, nouns from verbs, is not only useful but probably indispensable to the grammarian. For the semanticist, on the other hand, it is not a particularly helpful one, because the moment he analyses verbs and nouns, he finds that both classes contain items that designate conceptual structures that involve activities and conceptual structures that do not. This is probably so, because grammatical classifications are (or at least were originally) based on criteria that regarded the morphology of words and phrases or, as we would say today, 'surface' characteristics, and not meaning or content. Aristotle's classifications of causes, however, was undertaken in an effort to clarify some of the ideas or principles that underlie not only linguistic expressions but also ordinary every-day thinking, and the mere fact that his classification is still alive today, some twenty-three hundred years later, is proof of some sort of success. Thus it may well be worth looking at what Aristotle had to say.

As you may recall, he had four types of cause: (1) the 'material', (2) the 'formal', (3) the 'efficient', and (4) the 'final'. The order in which he presents them is determined by the reasons he gives for attempting the classification:

Knowledge is the objective of our inquiry, and men do not think they know a thing till they have grasped the 'why' of it.... So clearly we too must do this as regards both coming to be and passing away and every kind of physical change, in order that, knowing their principles, we may try to refer to these principles each of our problems (Aristotle, 1947: 122).

The first two, i.e. the 'material' and the 'formal' causes, are relevant to the BEING of things, or, as we would say today, to the ontological aspect. Ordinary language users are not very often concerned with ontology. The verb *to be* may, indeed, have such a function. but in practice it is exceedingly rare. Apart from Hamlet's much repeated rhetorical question, some translations from the Latin (mainly of Luther and Descartes), and the more recent whimsies of the existentialists, I have hardly any truly ontological occurrences of *to be* on record. (Note that phrases such as *There are people who smoke* are mostly not concerned with the reasons of BEING, but merely express the proposition 'Some people smoke'; they are, therefore, not what I should call truly ontological.)

## 1. 'Material' causes

As to the point that interests us here, we find that it is difficult, if not impossible, to fit the word *because* into a sentence that deals with a cause of the strictly 'material' kind.

*This statue is, because it is made of bronze* sounds decidedly odd to our modern ears, yet this is what Aristotle seems to have intended, and not an explanatory or definitional statement of the kind: *This is a bronze statue, because it is made of bronze*. Even his very own examples of 'material' cause, "the bronze is the cause of the statue, the silver the cause of the bowl" (1947: 122), are unacceptable today, except in the explicit context of Aristotelian ontology.

Thus we might be tempted to say that, whatever else the word *because* may designate, it is not used to designate a 'material' cause.

Unfortunately Aristotle has made the matter much more complicated for us by saying, a little further on, that the premises of a syllogism are the 'material' cause of the conclusion (1947: 123). This is as explicit as it is baffling. To us, today, it would seem that the logical relation involved here is much closer to what he has called 'formal' causation—but, alas, we can no longer argue with Aristotle.

Statements directly derived from a syllogism do, in fact, frequently contain *because* (e.g. *Socrates is mortal because he is a man*, *Socrates is mortal because all men are mortal*, and we may even find *Socrates is a man because he is mortal*, which last is not a logical deduction.

At this point, then, all we can say is that although *because*, on the one hand, is not used to designate the ontological relation between matter and being, it does, on the other hand, designate a 'material' cause of the syllogistic type. This may not be much of a discovery, but let us see a little further.

## 2. 'Formal' causes

Second, in Aristotle's classification, comes the 'formal' cause. He mentions it in many places but that does not seem to make it any clearer. It is closely connected with the concepts of 'form' and 'essence', which, as you may have found yourselves, are among the most difficult and elusive in the Aristotelian edifice. I propose to disregard all the metaphysical questions in which the ancient Master involves his 'formal' cause and to focus attention very briefly on the one point that seems relevant to our discussion. The relation of 'formal' causation, Aristotle says (1947: 123), is found to pertain between the parts of a definition and the 'form' or 'archetype' it defines. In my interpretation that means, if *man* is defined as a 'featherless biped', I can correctly say that my having two legs and no feathers is the 'formal' cause of my being a man; or, which is more to the point, *I am a man because I have two legs and no feathers*.

On the face of it, it should make no sense to turn such a sentence around. Logically speaking, *I have two legs and no Feathers because I am a man* would seem to be putting the cart before the horse. Yet, I can imagine a context in which a sentence such as *The poor old man, he can't see because he's blind* could be uttered and would be quite reasonable. I do not know what Aristotle would have

done about this. For our purposes, I can see no reason why such inversions of the normal definition should not be lumped together with the ‘formal’ causes and these, in turn, lumped together with the syllogistic ‘material’ ones which we discussed before. With regard to the use of *because* I can discover no difference in any of the above examples. If we started with the premise *No blind man can see* and went on to *This man is blind*, we could conclude quite logically, *This man can’t see*—and having set up the syllogism, we can happily say either *This poor old man can’t see because he’s blind* or *This poor old man is blind because he can’t see* (because men who cannot see are called ‘blind’).

I am, of course, not suggesting that the two statements are logically equivalent. From the premise *No blind man can see* it does not follow that all men who cannot see are blind; but the definition ‘A blind man is a man who cannot see’ entitles me to CALL any man who cannot see ‘blind’. As far as the use of *because* is concerned, however, it seems to make no difference whether the ‘causal’ relation is a definitional or a syllogistic one. In both cases we can loosely characterise the function of *because* by substituting for the above examples a cumbersome but more explicit expression of the kind: ‘My believing/saying A is based on, or justified by, B.’ And as a rule we do not quarrel with that kind of statement, provided the relation between A and B is, in fact, a logical or a generally accepted definitional one.

On a conceptual level, this is, I believe, a rather important point especially with regard to the other uses of *because* to which we shall come in a moment. I am, therefore, anxious to make it as clear as I can.

In statements such as

*Socrates is mortal because he is a man,*  
*I am a man because I have two legs and no feathers,*  
*This poor old man cannot see because he is blind,*  
*This poor old man is blind because he cannot see, etc.*

the piece that follows the word BECAUSE does in no way specify a reason or CAUSE why the subject of the phrase preceding it is what it is said to be or HAS the property or affliction that is attributed to it. The piece that follows the word *because* is merely our justification or reason for CALLING the subject of the first part whatever we did call it, or for making the attribution we did make. The *because*, therefore, introduces the reason for something we are saying and NOT the causal explanation of a state of affairs.

### 3. ‘Efficient’ causes

This quite drastically discriminates this use of *because* from the ones that stem from the two other causes listed by Aristotle, i.e. the ‘efficient’ and the ‘final’ ones. In the words of the Master the ‘efficient’ cause is: “The primary source of the change or coming to rest; ... and generally what makes of what is made and what causes change of what is changed” (1947: 122). This definition points at once to another difference that sets the ‘efficient’ cause apart from the first two, and that is, it concerns situations which involve a CHANGE. Whenever we witness a change, we look for an item that we can hold responsible for it, an item that in

some way instigates the change—and that item is precisely what, today no less than in the days of Aristotle, we then call the ‘efficient’ cause of the change. An ‘efficient’ cause, therefore, is always intended to explain a state of affairs that is in some way different from a preceding state of affairs. But what, we are now driven to ask, is a change?

We all know what the word *change* means and we are quite expert at recognizing the kind of situation to which we can correctly apply it. Nonetheless it will do no harm if we try to specify, by way of a minimal definition, precisely what elements or features a situation must manifest for us to call it a ‘change’.

First of all, I should say, there must be an item that we can consider the ‘victim’ or ‘patient’ (or, if you insist on using that hopelessly ambiguous word, the ‘object’) of the change. Second, we must have at least two records or observations or, metaphorically speaking, two snapshots of that item; for it is quite impossible to speak of change if we have one single record only. This is so, because change, as we already anticipated above, requires the recording of a difference; and, to be precise, not a difference between separate individual items (e.g., a pot of cold water and a second pot of boiling water standing side by side on the kitchen stove), but a difference found in one and the same item at different moments (e.g., a pot of water, cold at first, and subsequently boiling). In other words, we speak of change whenever two records of experience have:

- (a) different coordinates in time,
- (b) such characteristics as enable us to consider the records globally the same,
- (c) some specific discrepancy, such as the presence of a component part or attribute in one of the records and not in the other.

Let me say at once that there is still a certain amount of mystery about condition (b). Our concept of ‘sameness’ and/or ‘identity’ is closely connected to what Piaget has called ‘invariances’. It is also involved in what he and others have come to call ‘object constancy’ or ‘object permanence’. We do know for certain that it is a concept which infants form very early in their cognitive career, and we can safely assume that it is one of the pillars of the fabulously complicated structure which at some point in our lives we come to call ‘reality’. The operational analysis of the concept of identity is not only extremely difficult but also highly controversial. Fortunately there can be no doubt that we all have and use that concept. We can say this for several reasons, but above all because we all are relatively proficient users of a language. If we were not able to hold objects constant, i.e., to consider them ‘the same’ at different moments in time, we could not even begin to name them, let alone fit them into relational structures such as are designated by the words and sentences of the language we use. If, on the strength of this, we may use the concept of sameness without supplying a further definition, I should like to represent the three conditions necessary for the use of the term ‘change’ by a simple diagram (Diagram 1). It is the kind of diagram that Silvio Ceccato, who one day will be recognised as the outstanding pioneer of conceptual analysis, taught us to draw some twenty-five years ago (Ceccato, 1960; 1968; von Glasersfeld, 1963, 1972).

t1		t2		t1		t2
X.....=.....X		X	or	X.....=.....X		X
not A	≠	A		A	≠	not A

In plain words this means that we can speak of ‘change’ if we have a record (or snapshot) of an item X at time 1 and a record of the same item X at time 2, and X has an adjunct at time 2 which it did not have at time 1, or, alternatively, had an adjunct at time 1 which it no longer has at time 2. (I use the term ‘adjunct’ to indicate that it can be an attribute, a property, or anything at all that we consider in some way appurtenant to X.)

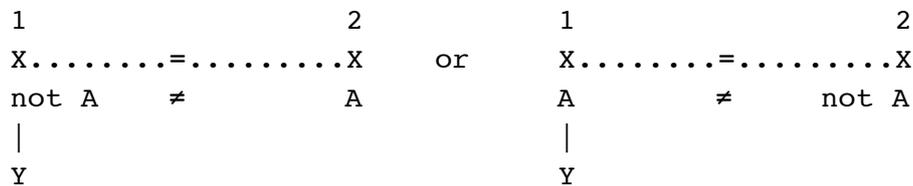
Now the very fact that we consider X to be the same X at time 1 and at time 2, makes it somewhat uncomfortable to have it both with and without the adjunct A. Having it with A at one moment, and without A at the next (or *vice versa*), constitutes a difference, and this difference is in contrast to the sameness we have assumed. So we begin to look for something else, some other item, that we might hold responsible for the appearance of the difference.

David Hume, who is generally considered the originator of the concept of causality as it is used in modern science, examined how we come to hold a specific item responsible for a given change, an item which we then call ‘cause’ while the change becomes its ‘effect’. He was adamant about the fact that no matter how closely we scrutinize the causing item, we can never find any trace or seed of the effect in it. The causal nexus, according to him, is due exclusively to our finding that “particular objects are constantly conjoined with each other” in our experience (Hume, 1950).

As T. R. Miles (1963) has pointed out, the causal impression very often occurs the first time we experience such a sequence, “whereas if the stimulus conditions are wrong it does not occur however often the experiment is repeated”. Philosophers since Hume have spent a good deal of time on this question, and Bertrand Russell (1953), half a century ago, picked a good example of the difficulty. If our idea of causality springs from nothing but the frequent association of two events in our experience, why is it that we do not consider day the cause of night or night the cause of day, for what could be more ‘constantly conjoined with each other’ in our experience?

From my point of view, the reason why we cannot consider night the cause of day, or *vice versa*, is that there is nothing but difference between the two items. In other words, there is no X that we might hold constant in order to get the necessary equality relation between something at time 1 and something at time 2. There is, in fact, no ITEM that changes. If we identify day with light, night is merely the absence of light—and we are not prepared to pass, by means of a causal or other rational relation, from nothing to something or *vice versa* (*ex nihilo nilnil* is generally accepted except by mystics, who, of course, have no qualms about being irrational). If however, we happen to have a window from which, by day, we can see a distant mountain range, we have no difficulty in holding the daylight responsible for the fact that at one time we see the mountains and at another time, i.e. at night, we do not. For the X in this case, the item that we hold constant (in the sense that we consider it to be there even when we cannot see it) is the mountain range.

To speak of ‘cause’, then, we need to expand our diagram of ‘change’ and to introduce into it another item, an item which can be held responsible for the occurrence of the change and which has to be co-present with X at time 1 or at any rate present at some intermediary time BEFORE time 2 at which the change is an accomplished fact. (This ‘co-presence’ or ‘contiguity’ is precisely one of the variables in Michotte’s [1963] famous experiments.)



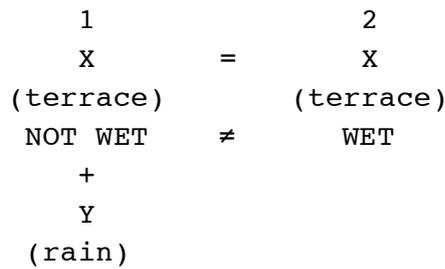
The situation represented here has all the elements required for ‘change’, and in addition there is the co-presence of an item Y at time 1, i.e. the item we consider to be the ‘efficient’ cause of the difference found in X at time 2 (the appearance or disappearance of A).

It is with some relief, I think, that we can now say that Hume’s idea of the role of experiential association in the concept of causation is, after all, not all wrong. There seems to be no doubt about the fact (and modern physics is, indeed, based on it) that it is only by experiential association that we can pick a particular and specific item for the role of ‘efficient’ cause in a given situation or for a given change: but before we can use this associated item as ‘cause’, we have to establish an identity with regard to the X of time 1 and the X of time 2. (As Ceccato has pointed out [1970:16], the difference which we consider the ‘effect’ of the ‘cause’ we are then looking for, results from a comparison of the X of time 1 with the X of time 2, the first serving as paradigm. What I am stressing here, however, is the fact that the two X’s must have been considered identical in some way before the difference between them could be considered an ‘effect’.)

Coming back to the word *because*, we can now say that it is, indeed, frequently used to introduce the specification (i.e., the phrase that follows it) of something that is considered the ‘efficient’ cause of what the other half of the statement asserts. As I have tried to show, this is a radically different conceptual function from the ones we have called ‘syllogistic’ or ‘definitional’. Even if we construct a set of propositions that have the superficial form of a syllogism, e.g. *All pots, when put on the fire, boil. This pot is put on the fire, Therefore this pot boils*, and then, as we did above, derived from it the sentence: *This pot boils because it was put on the fire*, we could not help being aware of the fact that we interpret *it was put on the fire* as the reason or, if you prefer, the explanation why the pot is boiling and not as the logical or definitional justification for saying so; we are, in fact saying that it is the fire that MAKES the pot boil—and we are prepared to say this since we have seen it happen often enough to formulate it as a generalised expectation or even as ‘natural law’.

The usage of language, however, has complicated the matter considerably. Take an innocent looking sentence such as: *The terrace is wet because it rained*. Without any further context, we should be inclined to understand this as an explanation, i.e. as the specification of an accepted (or at least provisionally or

hypothetically acceptable) causal connection, which we can diagram according to our model (Diagram 3).



Once such a connection has been accepted as ‘true’, or even only as ‘probable’, it can be used as a basis for utterances that are neither logical nor linguistic transformations of it, but that are nevertheless sanctioned by usage. For instance, if I have spent the morning in my study, from which I can see the rain but not the terrace, no speaker of English would take exception if I said: *I know the terrace is wet, because it has rained*. On the surface this implies a causal connection between *it has rained* (the cause) and my KNOWING (effect) that the terrace is wet. This is, of course, an abbreviated way of saying: *Since we all accept the proposition ‘rain causes terraces to be wet’, the fact that it has rained causes me to know that the terrace is wet*. (Needless to say, the statement implies all sorts of other things as well, e.g. that certain spatio-temporal conditions for the application of the ‘accepted’ causal connection have been satisfied, but these are aspects with which we need not be concerned here.) The important point is that the causal relation expressed by the *because* in this case is not an ‘efficient’ but a ‘syllogistic’ one derived from a syllogism that contains an accepted causal connection as one of its premises (e.g., Rained-on terraces are wet, This terrace has been rained on, Therefore this terrace is wet).

As we have seen (p. 133), the syllogistic *because* can be used in both directions and it designates no more than that the speaker has derived his statement from a syllogism which he considers valid and that he, therefore, considers himself justified in saying what he does say. Characteristically, the statement we have just been examining can be turned around, too. If I have spent the morning in a windowless study, where I get no hint as to what the weather is doing, and then come out onto the terrace, I can correctly say: *I know that it has rained, because the terrace is wet*. Again, the ‘efficient’ causal connection between the rain and the wetness of the terrace is contained in the syllogism from which the statement is derived, and the *because* of the utterance is a syllogistic one (an ‘inductive’ one, to be precise, which may be quite invalid, because my wife may have been watering the flower boxes on the terrace).

This linguistic possibility of using *because* in statements that are indirectly (and sometimes very circuitously) derived from an implied (and sometimes only purported) causal connection of the ‘efficient’ type (which can easily be presented as an ‘empirical’ or ‘scientific’ FACT) is obviously an invaluable tool for the demagogue, be he intellectual or political. It is often difficult, indeed, to unravel the different types of cause that may be embedded in the conceptual structure underlying a *because*-statement. The only defence we have is to ask ourselves whether, on the basis of our own experience or such other dependable knowledge

as we may have, we are prepared to agree that the purported cause is in fact based on an 'efficient' one that we can accept.

#### 4. 'Final' causes

We are now left with the 'final' cause, the fourth and last in Aristotle's list. In his words it is: "that for the sake of which a thing is done, e.g. health is the cause of walking about" (1947: 123).

Nowadays we might say *so-and-so jogs for the sake of his health or because of his health*. This at once demonstrates that the word *because*, apart from the functions we have discussed so far, has yet another one in situations that involve a 'final' cause. Hence we have to examine what kind of conceptual structure this type of cause might be. As Aristotle already saw, the relation that matters here is that of means towards an end, activities enacted or instruments used to achieve a goal or a purpose—the very thing against which some behaviorists have fought with unflagging constancy of purpose. Fortunately we do not have to discuss here whether or not ends, purposes, and goals are viable concepts in the realm of psychology; where language and linguistic expressions are concerned we cannot move a foot without stumbling over them. The semanticist had better deal with them, even if B. F. Skinner tells us that they are meaningless.

Whatever 'end', 'goal', or 'purpose' might designate, there can be little doubt that it must be something that is desired and not yet attained. That is to say, it can only be something we envision, imagine, and project into the future, and not something we experience in the same way as we experience seeing the mountains through the window or hearing the kettle whistle on the stove. I propose to call this particular way of experiencing FORWARD REPRESENTATION in order to differentiate it not only from perception and from any actual present experience, but also from remembering (which would be representing, or calling forth, the record of something in the past).<sup>1</sup>

If someone says, *so-and-so jogs because of his health*, he is saying, among other things, that so-and-so (or maybe he, the speaker) believes that jogging causes a change from less health to more health, and that he considers such a change desirable. According to what we saw a moment ago, this means that jogging is, or can be considered, an 'efficient' cause of an improved state of health in the jogger. Yet, in the statement *so-and-so jogs because of his health*, it is 'health' that seems to be considered the cause of the 'jogging'. On the one hand, then, a 'finalistic' statement requires the belief in a causal connection of the 'efficient' type, but on the other, *qua* statement, it puts the expected change in the place of the cause and the assumed cause in the place of the effect. A diagram for 'final' cause, therefore, would have to look like Diagram 4, where the subject X, at time 1, represents to himself (on the basis of past experience) his own state of improved health as the effect caused by the activity of jogging, and then, since he wants to improve his health and believes in the reliability or efficacy of that causal connection, he actually carries out the activity of jogging at time 2.

---

1. In my later writings, I took to spelling "representation" with a hyphen when it was intended to refer to the re-play of a past experience.



contextual or situational information, i.e. information that is not contained in the single, isolated piece of language.

## 5. Conclusion

We can summarize the functions of *because* within the range of conceptual situations covered by Aristotle's list of causes and try to establish whether there are ways and means of distinguishing between them.

First of all we can say that any statement containing *because* will be of the form *A because B*, where *B* designates the item which is introduced *by because* as the cause of *A*. (Note that this is so, regardless of whether the statement actually shows the *sequence A because B* or the frequent inversion *because B, A*.)

When *because* marks a causal relation of the syllogistic or definitional type, corresponding to Aristotle's 'formal' and 'material' causes, we noted that the statement can be loosely paraphrased by *A is justified by B*, where 'justified' means either STRICTLY LOGICALLY or DEFINITIONALLY justified. In these cases, we have said, the *because* introduces an explanation of why the speaker says or believes *A*, and *B* is not an explanation of the state of affairs specified by *A*. The conceptual situation underlying this type of *because* is a static one and does in no way involve a change or process or, indeed, any temporal element or sequence of events.

When *because* marks a causal relation of the 'efficient' type, the underlying conceptual situation must involve a change—although this may not be immediately obvious from the linguistic surface. In this case the *because* does introduce *B* as an explanation of the state of affairs specified by *A*. This explanation is NOT based on a syllogism or a definition, but, as the natural scientists learned from Hume, on cumulative experience and inductive inference. There seems to be no foolproof paraphrase for this function of *because*; but, as a rule of thumb, we can say that the 'efficient' *A because B* is the only one that can be satisfactorily transformed into *B causes A* (e.g. *Having two legs and no feathers causes me to be a man* is not really acceptable; nor is *The wetness of the terrace causes me to know that it has rained*, whereas we have nothing to object to in *The rain causes the terrace to be wet*).

Lastly, when *because* marks a causal relation of the 'final' type, the underlying conceptual situation necessarily involves the representation of a desired change and the efficient cause that is believed to produce it, such that in the linguistic expression *A because B* the phrase *A* designates this efficient cause, while *B* designates the expected effect projected into the future. In this case the statement can be satisfactorily paraphrased by an expression containing *in order to* (which, of course, involves a change in the linguistic surface structure).

All this may sound rather neat and easy. In practice it is neither. We find many a *because* that remains ambiguous as to the kind of cause it marks, and this is mostly due to a particular ambiguity of the phrase *B*, i.e. the phrase that specifies the causing item. If we hear: *John left because he was hungry*, the classification of the cause will depend on how we define *hungry*. One possibility is to define it as a physical state, e.g. 'gnawing pain in the stomach', in which case we may be satisfied with the paraphrase *his hunger caused him to leave*—and thus we

may classify the cause as an 'efficient' one, but not without certain reservations. It would be correct insofar as the physical state actually precedes the effect it is said to cause; but we would hardly accept it as a generally established causal connection that people who have that kind of pain in their stomachs 'leave'; yet, given certain situational circumstances, we might consider it plausible. Alternatively we might define *hungry* as 'desiring to eat', in which case the phrase *B* involves a very obvious 'final' cause.

In other instances we need to know a good deal about the situational context to make a decision. A statement such as *Mary left because of John*, taken by itself may involve an 'efficient' or a 'final' cause, and it is only when we discover that John insulted her a moment ago or, alternatively, that he happens to be arriving at the airport in half an hour, that we can decide the issue.

Such a lack of specificity, as we all know, is the rule rather than an exception in natural language. We have to live with it and, on the whole, we manage well enough. The one thing we must not lose sight of, however, is that language can function as a vehicle for communication only insofar as it is specific and systematic. Uncovering and making explicit the fixed semantic relations between linguistic expressions and the conceptual structures they designate would seem to be one of the best ways of making sure that our language does not lose the communicatory capability on which much, if not all, our scientific endeavour depends.

## References

- Aristotle (1947) *Physics* (Book II), Oxford Translation, reprinted in: Richard McKeon (ed.), *Introduction to Aristotle* (New York: Random House).
- Ceccato, Silvio (1946) "Divagazioni di 'animal semioticum' ", *Sigma* 4-5, 294-302.
- Ceccato, Silvio (1960) "Operational Linguistics and Translation", in: S. Ceccato (ed.), *Linguistic Analysis and Programming for MT* (Milan: Feltrinelli). (Also New York: Gordon and Breach, 1962.)
- Ceccato, Silvio (1968) *Cibernetica per tutti 1 & 2* (1970) (Milan: Feltrinelli, 1968, 1970).
- Glaserfeld, Ernst von (1963) *Operational Semantics* (Brussels: Euratom Publications).
- Glaserfeld, Ernst von (1972) "Semantic Analysis in Terms of Conceptual Situations", *Linguistics* 94, 90-107.
- Hume, David (1750) "Skeptical Doubts Concerning the Operations of Understanding", in: *Philosophical Essays Concerning Human Understanding* (London), reprinted in: *An Enquiry Concerning Human Understanding* (New York: Washington Square Press, 1963).
- Michotte, A. (1963) *The Perception of Causality* (London: Methuen).
- Miles, T. R. (1963) "Michotte's Experiments and the Views of Hume", in: Michotte, 1963.
- Olson, David R. (1970) "Language and Thought: Aspects of a Cognitive Theory of Semantics",
- Piaget, Jean (1930) *The Child's Conception of Causality* (London: Kegan Paul).

Piaget, Jean, and M. Lambercier (1958) ‘La causalite perceptive visuelle chez l’enfant et chez l’adulte’, *Archives de Psychologie*, 36:142-43, 77-201.  
Russell, Bertrand (1953) *Mysticism and Logic* (London: Pelican Books).

---

This paper was downloaded from the Ernst von Glasersfeld Homepage, maintained by Alexander Riegler.



It is licensed under the Creative Commons Attribution-NonCommercial-NoDerivs License. To view a copy of this license, visit <http://creativecommons.org/licenses/by-nc-nd/2.0/> or send a letter to Creative Commons, 559 Nathan Abbott Way, Stanford, CA 94305, USA.

Preprint version of 13 Feb 2006