B. Sypniewski
Rowan University – Camden Campus, NJ (United States of America)

ПРЕДВАРИТЕЛЬНЫЕ ЗАМЕЧАНИЯ ПО ИСПОЛЬЗОВАНИЮ ОЖИДАНИЙ И ПРОЦЕДУР ОЖИДАНИЙ В ЛИНГВИСТИКЕ КАК ТОЧНОЙ НАУКЕ

PRELIMINARY COMMENTS ON THE USE OF EXPECTATIONS AND EXPECTATION PROCEDURES IN HARD SCIENCE LINGUISTICS

Ключевые слова: лингвистика как точная наука, ожидание, коммуникативное поведение, процедура ожидания, положение дел, связь, разговор, событие

Keywords: hard Science Linguistics, expectation, communicative behavior, expectation procedure, state of affairs, linkage, conversation, event

В статье предполагается, что основой коммуникативной деятельности является ожидание. Ожидание описывается так: коммуникант верит, что во время Tp другой коммуникант совершит во время Tf некоторое действие s. Эта формула позволяет решить многие собственно лингвистические проблемы, в частности проблему эквивалентности высказываний и дейксиса.

This article assumes that the basis of communicative activity is the expectation. Waiting is described as follows: communicants believe that during Tp other communicants commits during Tf an action s. This formula allows us to solve many of linguistic issues, in particular the problem of equivalence of expression and deixis.

Introduction

Hard Science Linguistics (HSL) recognizes that people expect to see, hear, and do things. These expectations affect the communicative behavior of people depending on whether the expectations are satisfied or not. Some work has been done with expectations, e.g., (Yngve 2004:95 et seq.; Yngve 1996:283 et seq.; Burazer, 2004:123 et seq.; Sypniewski 2004:184 et seq.), most work by HSL researchers has actually been about expectation procedures which are formal descriptions of the communicative behavior resulting from the satisfaction or failure to satisfy an expectation. This paper is a brief initial attempt at describing expectations themselves and showing how they, along with expectation procedures, can be effective linguistic tools. The description is not intended to track the description of *expectation* used in probability theory and similar disciplines (Halpern et al. 2002). Fully developed descriptions of expectations will await other papers. The purpose of this paper is,

essentially, to "think out loud". Nothing in this paper is meant to be final or completely scientific.

Informal description of an expectation

For the purposes of this paper, we informally describe an expectation as follows:

An expectation, E, is a defeasible belief, B, held by a person, P, at time T_p that a certain "state of affairs", S, will occur in context, C, at time T_f.

Note: A belief has to be able to be "defeated" in order for the analysis in this paper to be valid. The notion of an expectation procedure depends on this; otherwise, there would be no way for an expectation procedure to select the proper branch to take. A belief that cannot be defeated can exist. For example, in Catholic theological thought, there is the notion of "invincible ignorance", i.e. an erroneous belief that no amount of contrary evidence can change. If we were to model such a belief with an expectation, there would only be one branch to its expectation procedure.

'Belief' is used in a roughly probabilistic sense. It is not used in relation to any theological concern

Postulate 1

For the purposes of this paper, *state of affairs*, which is not a technical term in HSL, means a description (it is not necessary for the discussion that we are having that *S* be a technical description. For our purposes, an informal description will suffice. As used here, "state of affairs" should not be construed in the same way as the phrase may be used in other disciplines, e.g., logic) of persons, tasks, and other constituents that may be part of an HSL linkage. For example, *P* may expect that *A* will come to the door and ring the door bell, so *S* includes, at least, *A*, represented in a linkage as [A], the door, which can be represented as a prop part [door], the door bell, which can be represented in a linkage as [door bell], and the sound of the bell, which could be represented as a channel <sound of door bell>. *C* is equivalent to what are referred to as the *surroundings* in HSL literature. *C* may include other constituents besides *S*.

Note several things about **Postulate 1**. An expectation is not something general or abstract. *E* is specific to a particular *P*, *S*, *C*, and, most importantly, T_f. *E* is held by *P* at T_p, i.e., prior to T_f in the usual case (it is possible, at least conceptually, that *P* could formulate an expectation of something occurring "now", however one defines *now*. This makes $T_p = T_f$. Practically speaking, *now* is a continuous idea so it is unlikely that *E* would be formulated at the same time its associated expectation procedure is executed) and will probably be represented as a property of [P] which we can call <E> for this discussion: [P]<E>. <*E*> will neither be satisfied or not satisfied until T_f, i.e., until $T_p = T_f$. <*E*> continues to be active until T_f when events may cancel the expectation or may reset it (the prior work on expectation procedures does not discuss "resetting" an expectation. By *resetting* an expectation I mean that a similar expectation to the one that was not satisfied at T_f continues past T_f. This expectation can either be newly created E_n or can be the same *E* that was not satisfied with a new

time component. More work needs to be done to determine which of the alternatives actually happens or whether this is simply a matter of convenience in discussion). The expectation procedure associated with [P]<E> gets executed at T_f. If <*E*> is satisfied and the appropriate portion of the expectation procedure is executed, <*E*> is no longer active.

Example 1: Assume *P* expects that *A* will call on the telephone at 3:00 pm, [P]<expect A to call at 3:00 pm>. *A* calls *P* at 3:00 pm. The expectation is satisfied and the appropriate portion of the expectation procedure (e.g., [P]<say "Hello">) is executed. *P* no longer has the expectation <expect A to call at 3:00 pm>. What if *A* does not call *P*? The expectation is not satisfied but the appropriate portion of the expectation procedure may or may not be executed immediately. It may not be executed until *P* and *A* meet (e.g., [P]<say "Why didn't you call?">) (this means that *P* determines when T_f occurs).

Example 2: *P* prepares a meal and places a dish into the oven. *P* sets the timer for 20 minutes. Even if *P* did not say so, *P* has an expectation that the dish should be ready in 20 minutes, i.e., $T_f = T_p$ + 20 minutes, (T_p is the time when the dish went into the oven). *P* checks the dish when the timer sounds and finds that it needs more cooking time. At that point, the expectation is not satisfied; the expectation procedure might result in *P*'s saying "It needs more time" and resetting the timer for 5 minutes. In this case, it is an open question whether a.) the expectation is no longer active and a new expectation is formed or b.) whether *P* resets the expectation's T_f for an additional 5 minutes (In short, does T_f become the new T_p? Does the new T_f become the new T_p + 5 minutes?). Functionally, these two options seem equivalent.

The last examples alert us to the fact that T_f is not discrete. In Example 1, the expectation procedure associated with <-*expectation*> (<-expectation> is a way of saying that the expectation is not satisfied. The portion of the associated expectation procedure is executed when expectation is not satisfied but not when the expectation <u>is</u> satisfied) will not execute simply because *A* calls at 3:01 pm. *A* is neither an automaton nor an abstract logical construct. *A* is a human being with a considerable behavioral range. In Example 2, *P* at first sets T_f to a discrete time (20 minutes from T_p) but willingly extends the time when necessary. A discrete T_f is a special case.

The "subject" of an expectation

Whenever *P* has an expectation, *P* expects something to occur at T_f, *S*. We can call this the "subject" of the expectation for convenience of discussion (we model this by saying [P]<expect x> where *x* is some short-hand phrase for *S*). Although we study and model expectations that produce some communicative behavior via their expectation procedures, the subject of an expectation need not be a linguistic or communicative event.

Example 3: *P* and *A* are in a car in traffic behind another car, which is stopped at a red light. The light turns green but the car in from of them does not move. *P* says to *A* "I wonder what part of a green light he doesn't understand?"

In this case, *P* expects that all drivers will move their cars when a red light turns to green, i.e., *P* expects a certain non-communicative behavior to take place when the light changes. It is the non-occurrence of the movement that provokes *P* to get snarky (it is tempting to see *E* as the cause of the communicative behavior. I think that this is incorrect and that there is no causal relation. I think that *E* is associated with a particular set of communicative behaviors which, as mentioned elsewhere in this paper, may evolve over time. If *E* caused a certain communicative behavior, we would see the behavior every time there was a similar *E*. This may not be the case) and communicate with *A* in a certain way.

At times, the expectation may seem to be "continuous" meaning that *P* may have the same expectation whether it is satisfied or not. This seems to be the case when some event repeats. In Example 3, *P* expects that cars will always begin to move when a red light changes to green regardless of the location of the traffic light or the time of day. In Example 1, if *A* does not call at precisely 3:00 pm, *P* may have the expectation that *A* will still call and T_f will have the value of *soon thereafter* (This shows that T_f is not necessarily discrete and may not even be precise), i.e., an unspecified time in the not too distant future, whatever *P* thinks the not too distant future may be.

The origin of an expectation

Hastily considered, an expectation may seem to exist in some storehouse in the brain or other part of *P*. This is a holdover from thinking in the logical domain. An expectation may or may not be consciously created. Most likely, it derives from experience or training. If we are taught that water boils at 212° F, we expect to see signs of boiling when a thermometer in a pot of water on the stove reaches 212° F. If no signs appear, we may inquire about the "problem", i.e. the failure to satisfy our expectation. None of us discovered the relation between the temperature and boiling. We were taught it, formally or informally. Learning this lesson resulted in the creation of the expectation (indeed, the purpose of some or all kinds of training may be the creation of a set of expectations in the student. Learning may mean that the student has developed these expectations. More work on this topic needs to be done) that the relation between the temperature and boiling produces certain observable occurrences.

The role of experience and training in the creation of expectations alerts us to the dynamic nature of expectations. An expectation may be modified by experience or training or both over the course of time. Expectation procedures may be modified as well (the modification of expectation procedures may be the purpose of training; think, for a moment, of anger management. We can see a general relation between expectation, expectation procedures, and behavioral conditioning). We may be asked to "tone down" our responses to certain situations or to be "more assertive" in others.

The relation between expectations and expectation procedures

We study expectations, which are related to expectation procedures that produce some communicative behavior, depending on whether the expectation is satisfied, or

not. An expectation procedure is a binary setting procedure only one part of which gets executed depending on the value of <expectation> (Yngve 1996:283). The expectation procedure is not triggered until T_f. We can say, somewhat more formally, that the expectation is a property of *P* such that [P]<expect x>]. The expectation has no value until T_f when the expectation can be either *True* or 1, i.e. it is satisfied or *False* or 0, i.e. it is not satisfied. The value of <expect x> is determined at T_f by assessing whether the expected occurrence did, indeed, occur (by "correct", I do not mean to suggest that *B* is proved in the same way a logical argument is proved. Such a requirement would be too restrictive. The *S* and *C* that were predicted at T_p do not have to be equivalent (in the logical sense) to the *S* and *C* that exist at T_f. They need only be similar to a tolerable degree of variation), i.e. whether *S* and *C* exist as predicted by *E* at T_p. For the researcher, assessment is always based on observation.

At first glance, it is tempting to say that what we write down in our model of the expectation procedure existed sometime prior to T_f. Recall that we make our models after T_f. We already know what the communicative behavior was. What, if anything, existed before T_f but after T_p? Asking the question this way assumes that the expectation procedure has an existence separate and apart from *P*, which is not the case. *P* may plan a response to a certain <expect x>/<-expect x> but this is not necessary. *P* may only have a general sort of communicative behavior in response to <expect x>/<-expect x> in mind. In Example 1, the expectation procedure may be something like this:

[P]<expect A to call at 3:00pm>::[P]<answer phone>
[P]<-expect A to call at 3:00pm>::[P]<express concern>

Postulate 2 – a rough description of an expectation procedure for Example 1

While we can more completely describe the two tasks (<answer phone> and <express concern>) after T_f, it is unlikely that prior to T_f either task need be described further in any substantial way. Prior to T_f, *P* may not know what his response will be or may only know it in a very general way. Our concern, if we were to have one, to know this information comes as a hold-over from the traditional linguistic concern with words or "language use" rather than the more scientific concern with people communicating with each other. If we were concerned with the linguistics of language, we would have to account for any difference between what *P* expected to say to *A* at T_p and what actually was said at T_f because traditional linguistic concerns and theories are closely coupled to first-order logic, which demands equivalence. Are phrases like "Hello *A*" and "Hi *A*" and "It's your nickel; start talking" equivalent and equivalently predicted? Such considerations lead to needless and unprofitable discussion; instead, if we look at **Postulate 2** scientifically, we can see that any of the previous phrases satisfies the <answer phone> task as well as any of the others.

Uses for expectations

Expectations are useful linguistic tools. If we are correct about the relation between experience, training, and expectations, expectations are a way to bring these matters into our linguistic models. I want to pay particular attention to the role of time in expectations. Time is not considered in traditional linguistics (this is due to the long association between the linguistic tradition and first-order logic, which does not include any consideration of time either). Traditionally, language is considered to operate in some timeless, Platonic realm which, alone, separates traditional linguistic concerns from the real world in which time is very much a concern. By considering time, we can avoid problems that are difficult to resolve with traditional tools. Take, for example, deixsis. There are two problems with the traditional attempts to "resolve" deixsis. First, the tradition attempts to resolve the problem through language only; the second is that the tradition tries to resolve everything in real time which the tradition considers as only that time in which a sentence is being uttered. HSL insists that people are the proper subject for linguistic study so we see that people who discuss a particular topic often use shorthand with pronouns and the like to refer to matters of interest. Expectations play a role here. The communicating individuals expect to talk about and refer to the same thing. A conversation is not just a random collection of disjointed or unrelated words, phrases or sentences. As we have seen, the expectation is created prior to T_f. If we assume that the conversation takes place at T_f, we see that the communicating individuals have similar expectations about the subject matter of their discussion prior to T_f, i.e., at T_p, no matter how brief the period between T_p and T_f might be. In short, the references are resolved before the reference, at least in a general way. There is simply not enough time to do it otherwise. Once we see that the anaphoric and cataphoric references are resolved prior to the conversation, we need not expect a problem with deixsis at all. If a problem of reference does exist, there are usually conversational ways of signaling the problem (we might hear snippets like "Are we talking about the same thing?"; "I thought you meant…"; or similar conversation), assuming that the problem is identified during the conversation. The problem exists due to differing expectations between communicating individuals made prior to the conversation or modified as the conversation goes along. The differences can be resolved through some discussion at which time the communicating individuals may have new, compatible expectations.

Conclusion

Expectations have an important role to play as powerful linguistic tools. They can help us see that some traditional problems, like deixis, are problems in theory but not in the real world. Expectations help us understand how people overcome what many linguists think of as very thorny problems. Expectations can be used to bring human experience and training into our linguistic models. Time, which is currently not an important consideration in traditional linguistic discussions, can now play its rightful part in explaining how people communicate with other people.

Bibliography

1. Burazer L. Reconstituting notions of reference. in Yngve et al. 2004.

2. Halpern J., Riccardo P. Reasoning about Expectation, Proceedings of the Eighteenth Conference on Uncertainty in Artificial Intelligence, 2002.

3. Sypniewski B. Lottery betting. in Yngve et al. 2004.

4. Yngve V. From Grammar to Science: New Foundations for General Linguistics. John Benjamins: Philadelphia. 1996.

5. Yngve V. Linguistics as a Science. Indiana University Press: Bloomington 1986.

6. Yngve V. An outline of hard-science phonetics-phonology. in Yngve et al. 2004.

7. Yngve V., Zdzisław W. Hard-science linguistics. Continuum: New York. 2004.

(0,4 п.л.)