

## Chapter 15: Concluding remarks

In this chapter, I present my view on the contribution of the present dissertation, highlighting its main ideas and discussing its more obvious shortcomings. I will not provide a summary of the entire dissertation. Instead, I raise some questions for further study and suggest an alternative perspective in the light of which this work could be considered.

### 15.1 Linguistic relativity

As mentioned in Chapter 1, I was dissatisfied with the current policy of basing studies on English and then adapting the theories to other languages. This is, in fact, common practice both in natural language processing and in formal studies, as is beautifully illustrated by ter Meulen's opening remarks in her recent book on tense and aspect:

Even though the linguistic data in this book are limited to English, and no comparative data have been considered, the interpretive principles and semantic constraints formulated here should prove to find expression in all natural languages. The abstract semantic principles governing tense and aspect constrain the set of possible natural languages considerably (...) (ter Meulen, 1995:x)

The guiding principle for the work of the present dissertation is that statements like ter Meulen's are simply not justified. In fact, no matter how close the similarity is between human languages, one should not adopt it as a point of departure: Rather, one should investigate it on empirical grounds first.

To settle whatever point, furthermore, one must be careful. It is not possible to start with categories of one language and simply look for them in the other language, as I have argued in Chapter 6. Actually, such a method was already criticised by Quine more than twenty years ago:

The problem of evidence for a linguistic universal is insufficiently appreciated. Someone says, let us suppose, that the subject-predicate construction occurs in all the languages he has examined. Now of course all those languages have been translated, however forcibly, into English and vice versa. Point, then, in those languages to the translations of the English subject-predicate construction, and you establish the thesis; the subject-predicate construction occurs in all those languages. Or is it imposed by translation? What is the difference? Does the thesis say more than that basic English is translatable into all those languages? And what does even this latter claim amount to, pending some standard of faithfulness and objectivity of translation?

To make proper sense of the hypothesis that the subject-predicate construction is a linguistic universal, we need an unequivocal behavioral criterion of subject and predicate. [...] Timely reflection on method and evidence should tend to stifle much of the talk of linguistic universals. (Quine, 1972:446)

Proper investigation of the matter, I believe, has to be done in connection with a thorough study of the practice of translation, which is necessarily related to translation proper and to the analysis of running text (corpora), and is not content with constructed examples based on to the linguist's own (bilingual) competence.

Some of the problems involved in the two fields of translation analysis and corpus processing were illustrated in Part I (Chapters 2 and 3) and Part III, respectively. The present contribution obviously does not exhaust the problems connected with the formalization of the linguistic aspects of translation. Nor do I claim that the corpus study is exhaustive or methodologically exemplary; some of its weaknesses have already been mentioned, others will

be highlighted below. But I believe that the studies reported here were thorough enough to produce relevant conclusions and to show the degree of complexity involved. Much remains to be done, however, as I will try to describe in what follows.

## 15.2 Shortcomings of the present dissertation; further work

This dissertation covers a wide range of issues, and each one is of necessity not so deeply analysed as if it were the sole object of the dissertation. I believe nevertheless that it is an advantage to each and all subjects that they are studied in connection with others with which they are linked. Too strict a separation often hinders insight.

Still, there were some aspects that were missing. Perhaps the most obvious of all was statistical processing: Quantitative data were only treated at an informal, and admittedly naive, level, instead of being subject to rigorous statistical methods. My initial standpoint was that, as more data were gathered, such processing would then impose itself. Unfortunately, as could be appreciated in the preceding chapters, processing of the initial corpus provided so much work already that no more data were ever gathered.

In any case, it should be emphasized that I am not talking here about using an off-the-shelf commercial statistics package. On the contrary, I am aware that the methods to be used would not be straightforward and some exploratory work should have to be conducted; see e.g. Dunning (1993) for general discussion.

The other main shortcoming of this dissertation is the lack of a good formal basis. As emphasized in Chapter 8, work on formal matters was restricted to remarks very much of an exploratory sort. Many recent formal theories suggested for handling natural language were not even considered, such as situation theory (Barwise & Perry, 1983), Boolean semantics (Keenan & Faltz, 1985), or property theory (Chierchia et al., 1989), and, in general, formal theories played a minimal role in the present dissertation.

On the one hand, this can be attributed to the small empirical basis of such theories: they are generally cast in very general terms and their empirical justification is often based on particular details which arise from the interpretation of "philosophical" sentences, which are hardly ever considered by the language engineer.<sup>1</sup> One could thus argue that their apparatus, no matter how relevant for the philosophy of language, is so far from ordinary language -- and especially far from the concerns of translation into another natural language -- that it would not pay to consider them in detail for the matter at hand.

Be this as it may, I personally do not consider the above argument convincing. I believe it would pay to consider at least some of the ideas of these theories seriously and try to develop a contrastive framework in their terms. Game theoretical semantics seems to me at present a particularly fruitful area in that respect: preferences and constraints on rule ordering seem to

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<sup>1</sup> Illustrative examples are *This sentence is false* (self reference); *I want to know who came first and what Mary gave John* (conjunction of interrogatives); *John believes the world is flat or  $2+2=5$*  (failure of logical omniscience).

provide a plausible formalization path for the networks put forward here. I have no doubt, however, that this would amount to as much work as was involved in producing the present text; and thus I can only wish I will be able to do it some day.

Finally, it is obvious that, as a dissertation on natural language processing, the processing part has been very little of concern here. My standpoint is, as explained in Chapter 1, that one cannot do language engineering without analysing real language. And that, to make something qualitatively much better than the implemented system reported on my Master's dissertation (Santos, 1988), the studies presented here, as well as the contrastive model suggested, are a theoretical pre-requisite. To those who would like to see a working prototype of some sort (I myself would), I offer the following remark by Einstein: "There is nothing as practical as a good theory" (cited in Goddard & Wierzbicka, 1994:21). In the present work, that was what I aimed at, not at a practical system.

### **15.3 Contribution of the present dissertation; further work**

Let me now provide a general, positive assessment of the present dissertation as well. This is needed because I fear that its length may make it difficult to select the most relevant parts.

I would like to believe that the dissertation contains three important contributions:

1. The first is the description of Portuguese that I propose -- and the comparison/contrast with English -- which is embodied in Chapters 6 and 7. It is an original description of the tense and aspect system of Portuguese, and it is grounded on several years of empirical work. It is probably impossible to find a reader who agrees with every point I have made. Nevertheless, I hope that it will also be impossible to find a reader who disagrees with most. In addition, by documenting in Part III much of the empirical basis, I hope that the work may be useful for others interested in the processing and study of Portuguese, no matter how much they disagree with my conclusions. This kind of description is, furthermore, particularly useful for computational applications dealing with Portuguese, and especially for machine translation between the two languages studied here.

In fact, I venture to suggest it will be useful for Portuguese linguistics in general, giving the little attention that both matters of aspect and of contrastive analysis have received until lately in Portuguese, as can be appreciated by the following quotations. The first is by a researcher in aspect of the Arts Faculty of Lisbon, in her Master's dissertation:

For that, I needed a classification of Portuguese verbs, established according to relevant properties from an aspectual point of view which allowed me to analyse the material gathered. But, unfortunately, until now, no Portuguese linguist has dared to engage in such a sleazy task. [...] I was forced to sketch a classification. However, [...] I am aware that an enterprise like this requires much more linguistic and psycholinguistic basic research. (Leiria, 1991:17, my translation)

The second can be found in a recent book on contrastive studies and translation by a well-known professor of Portuguese linguistics (and lexicographer) at the University of Oporto:

Whereas in what concerns translation there is, at least, a generic notion more or less acceptable, for understanding what contrastive analysis is there are not many working tools in our country and/or in Portuguese. (Vilela, 1994:10, my translation)

[...]

Contrastive semantics does not yet have, neither theoretically nor methodologically, ways to proceed without supporting itself in closely-related disciplines, and, up to now, has not done anything but criticising the existing bilingual dictionaries and (current) lexicographic practice. (Vilela, 1994:143, my translation)

I hope thus that the studies reported in the present thesis may contribute to improve the poor situation, apparently generally acknowledged, in which semantic studies involving Portuguese find themselves.

2. The second contribution is the computational model for tense and aspect contrast developed, the translation network. I believe that its description in Chapter 5, together with its application in Chapter 7 and discussion from a formal point of view in Chapter 8, provide a sufficiently detailed specification and motivation. In addition, I hold that the particular translation networks suggested allow for the systematization of a large number of actual translation pairs, involving situations which are far from trivial.

Another interesting consequence of the model put forward is that it allows one to formalize certain features of the translation relation, which is a major advantage compared to simply informal discussions of what translation is or should be.

3. Third, I hope that the whole dissertation can be read as an empirical proof of the correctness of the relativist approach to natural language processing. I.e., that it empirically demonstrates that the best way to look at each particular language is to see how it works, without requiring that it should not differ too much from another one.

One thing should be re-emphasized, though: To acknowledge differences is not an "irreducible" standpoint. Rather, to be aware of differences is, in my view, also the best way to acknowledge the similarities and the complementarities. Here, as everywhere, to conceal differences is not to reduce (or dispose of) them.

Finally, some minor contributions can also be mentioned:

- a systematization of actually occurring translation pairs according to information preservation, in Section 3.4;
- a tentative proposal of a methodology for corpus-based contrastive studies, in Section 3.8;
- the insistence on vagueness and compactness as relevant descriptive tools, pervasive in the whole text and specifically discussed in Sections 4.4.3 and 8.2.2.2.

I have also expressed my own views on English tense and aspect (Chapters 5 and 7) and on translation (Chapter 3). But probably the most controversial statements are in my critical review of the subject of tense and aspect in general (Chapter 4). My view of a tense and aspect system was followed, in Section 6.9.2, by the sketch of some extensions to the basic model employed. These extensions need to be worked out in full (and they need empirical contrastive corpus-based investigation of the kind described here as well). My intention is to continue to work on them in the near future.

## **15.4 Formalization of natural language from a translation perspective**

There is only one new suggestion I have left for the present chapter, since it is an hypothesis which arose while considering the dissertation as a whole.

If one looks at the attempt at formalization of (a part of) natural language as translation into a formal language, which is an idea present in most formal theories to date, then the study conducted in this dissertation could be of interest for natural language formalization in the following way:

By regarding natural language as the source language and a formal language as the target language, formalization could be (meta-)analysed with the translation model I sketched above. This would mean, roughly, that the same ingredients could be present: translationese, category mismatches, vagueness and/or compactness.

I believe this would explain many of the controversies involving translation into a logical form (for example, which quantifier is involved in a generic sentence, whether a particular noun phrase has a collective or a distributive reading, etc.).

To explore such an analogy seriously, however, considerable amounts of translated text would be required, something which seems hard to get. Therefore, the interest of this remark, which must be investigated on another occasion, will probably be confined to the scientific methodology quarters.

## **15.5 On the study of time in artificial intelligence**

One of my most puzzling realizations during and after doing the present work has been that neither has the work on time in artificial intelligence had the slightest relevance for it, nor does what I have found out or proposed seem to be of relevance for artificial intelligence work in that domain, of which I take Shoham (1988) as a distinguished representative.

This is all the more puzzling given my own expectations (formulated in Section 1.2) and the widespread general intentions in the field: It has become commonplace to mention that to study the representation of time in natural language will necessarily be of advantage for the modelling of time in reasoning processes in general, and thus will have a bearing on subsequent work on those matters in theoretical computer science and artificial intelligence alike (see e.g. Kent's (1993) or Moens's (1987) concluding remarks).

After all, it is highly conspicuous that both the study of time in natural language processing/ linguistics and in artificial intelligence draws on many of the same philosophical and logical sources, and often uses the same mathematical and computational tools. Why then are their conclusions, and results, so widely apart as to be (almost) mutually irrelevant?

I do not have an answer to this question.

I can only offer the following tentative remarks: the study of time in artificial intelligence is concerned with modelling prediction, planning and explanation, activities which are performed by intelligent agents and which essentially concern time. The studies of natural language are

concerned with the way knowledge about time is ingrained in human language(s). If there is nothing fundamentally wrong with either branch of investigation (and I do not believe there is), it seems either (i) that neither kind of study has gone sufficiently deep to find the interrelationship(s) or (ii) the way people plan and predict is simply not expressed in natural language. I.e., there is no one-to-one correspondence between the way people make plans in order to behave "normally" and their ability to describe those plans, or to narrate a coherent story.

In a way, the latter hypothesis seems plausible since most of the reasoning described e.g. by Shoham (1988) is not tightly linked to the ability to speak a natural language. But it still does not explain why it appears that the way we use the language (and plan or predict the world) is so different from what the language itself conveys, i.e., from the knowledge it embodies.

## 15.6 Closing up

Writing this dissertation has provided a real life example of a complex event whose linguistic categorization is obviously a simplification.

For one thing, it illustrates two possible relationships between end and completion. Surely, this dissertation has been completed, but much of the work/activity associated to it has not stopped: I go on detecting translationese from English whenever I read (translated) stories in Portuguese to my children, I go on noting interesting contrasts when attending English conferences or teaching Portuguese grammar, and I will hopefully go on writing on these matters. On the other hand, I finished writing the dissertation, but the work is not completed: Can one ever complete the study of the contrasts between two languages? Can one ever produce a sufficiently encompassing model of translation that applies to real text?

Then, the result is a highly structured object. However, there is no straightforward mapping between the parts and the activity: One certainly does not start in the beginning and keep writing until the end.

Finally, the two languages also differ interestingly in the way they perceive the writing of a thesis. In English, as Moens has noted, writing a dissertation is more of an activity than an accomplishment. In fact, when you are inside it, you only "see" the activity. Only from outside (afterwards) can you perceive the accomplishment. In other words, the temporal endpoint of a dissertation is external, not internal.

This is in a way easier to convey in Portuguese, since *escrever uma tese* ('write a dissertation') is clearly an *Obra*. There are, as all Portuguese know, *Obras* which are never completed. To emphasize the result of writing the dissertation, one must use other verbs, related to several consequent states, which are, however, clearly outside the meaning of *escrever a tese* proper: *Acabei a tese* ('I have finished the dissertation'); *Já entreguei a tese* ('I have delivered the thesis'); *Já me doutorei* ('I've got my Ph.D.').

I will leave for another occasion the investigation of the differences and similarities of noun (phrase)s in the two languages. Therefore, I hereby stipulate that "my dissertation" and "a

minha tese" correspond exactly to the present text.