Cross-language psycholinguistics[1]

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Abstract

Cross-linguistic research can be of value to psycholinguistics by allowing tests of hypotheses the testing of which would be severely confounded in a single language, and by providing simple and readily available control conditions. For a long time the resources of this kind of research were virtually ignored by psycholinguists; recent renewal of the relationship between psychology and linguistics, however, has led to a revival of cross-language psycholinguistics.

Psycholinguistics is a discipline with roots in two fields. Psycholinguists should therefore surely be able to exploit the resources of both fields with equal facility: both the theoretical and empirical resources of human experimental psychology, and the knowledge about the structure of language (and languages) offered by linguistics. This brief essay considers some potentially profitable ways of drawing on the resources of both fields in the specific form of cross-linguistic research, and assesses (in a necessarily oversimplified way) the record of psycholinguistics in this area so far.

Psycholinguistics has recently entered a Third Age. During the early 1960s, when rapid theoretical advances were being made in linguistics, the First Age of (modern) Psycholinguistics cast psychologists as the linguists' trusty sidekicks: the task of psycholinguistics was to test linguistic theories for 'psychological reality'. Psycholinguistics as a discipline depended on linguistics for both its general rationale and its particular tasks. Unsurprisingly, psycholinguists soon tired of this subsidiary role. Disillusionment was further fueled by the outrageous tendency of linguistics to abandon theories for reasons actually unconnected with questions of psychological reality, consequently condemning large chunks of associated psycholinguistic research to instant obsolescence.

In its Second Age psycholinguistics accordingly asserted complete independence of linguistics. As a branch of cognitive psychology, its goal

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in this period (which covered, roughly, the 1970s) was to construct models of language performance. What was going on in linguistics seemed irrelevant to the pursuit of this goal.

What was going on at that time in linguistics was, of course, furious theoretical diversification, replacing the dominance by a single theory in the preceding decade. This in turn produced methodological innovation. Toward the end of this period, for example, some linguists began looking outside linguistics for motivation of their models. There waiting for them was by now a solid body of language data from cognitive psychology.

In this Third Age, in the 1980s, the linguists have therefore returned to psycholinguistics.[2] But instead of testing (already constructed) linguistic theory for psychological validity, this new breed — the linguist turned psycholinguist — attempts to construct theories which from the outset are designed to account for the findings of cognitive psycholinguistics. Meanwhile, many cognitive psycholinguists show a renewed receptivity to linguistics. Today, psycholinguists may be either cognitive psychologists or linguists; psycholinguistics is neither dependent on linguistics nor apart from it. It has become a properly interdisciplinary field.

The resources upon which psycholinguistic research draws appear to vary with the ups and downs of the relationship with linguistics. It would seem only natural that a discipline which began in such a close partnership with linguistics should be able to make full use of the expertise of linguistics. It has not always been so, particularly in respect of cross-language research.

Cross-linguistic work is of course commonplace in linguistics — whole subfields such as language typology and the theory of universals are devoted to it. Theoretical studies of syntax, morphology, phonology, and semantics routinely counter claims made on the basis of examples from one language by appealing to examples from another language. Other fields which are closely related to psycholinguistics also continually make comparisons across languages: social psychology, for example, in which cross-cultural comparisons often involve the use of language materials; or experimental phonetics, in which the study of phonetic categorization as a function of the listener's native-language phonetics has yielded many insights into the speech perception process; or the study of bilingualism;[3] or investigations of interference effects in second-language learning.

To be sure, one might claim that psycholinguistics is concerned with the processing of language in general, not the processing of English, Basque, Kyoto Japanese, urban teenage Hausa, or whatever. The human infant can learn any language with equal facility; what the psycholinguist seeks to understand is the general linguistic ability demonstrated in acquisition, production, and comprehension. Processing abilities which are specific to

particular languages — such as, for example, the capacity of speakers of a tone language to hear prosodic distinctions which pass speakers of other languages by — perhaps contribute little to the understanding of the general processes.

Nevertheless, cross-linguistic research has a great deal to offer psycholinguistics. Frauenfelder (this volume) discusses the theoretical issues involved. Here, three practical examples will illustrate how language-specific structure can be a useful source of empirical variables for psycholinguistic research. Suppose, first, a claim is made about the role of word class in lexical access based on an experiment involving the understanding of noun phrases consisting of a noun plus its article. However, the experiment is possibly confounded by the fact that (in the language in which this experiment was run) articles always precede nouns. How can this be dealt with? Easy — rerun the experiment in a language with postnominal determiners, and compare. Or how about a language without determiners? Or a language in which the determiner also carries gender or number information? The linguist's knowledge of variations in language structure can assist the psycholinguist to design appropriate experiments. Cross-linguistic testing can provide the crucial control condition. (See Deutsch and Wijnen, this volume, for an excellent example of this approach.)

Second, a yet-simpler control which cross-linguistic testing can provide is one of meaningfulness. Consider an auditory comprehension experiment in which a particular observed effect is ascribed to semantic factors; a counterhypothesis, however, claims that the effect is the result of an acoustic artefact. This issue can easily be resolved by repeating the experiment exactly, except in that the subjects do not speak the language in question. These subjects, having a different lexicon but the same human auditory system, should be impervious to lexical effects but as susceptible as the original subject population to acoustic effects. Experimental replication of this kind is far simpler than designing a fresh experiment to test the issue on the same population. (See Cutler et al. 1985 for an application of this approach to the hypothesis that word–nonword differences in phoneme monitoring may reflect acoustic artefacts.)

Third, cross-linguistic testing can sometimes be the only way to answer a question. Does the order of acquisition of certain features of a language reflect their intrinsic order of difficulty, or does it reflect some more general factor (e.g. frequency of occurrence of particular forms)? Such questions can only be addressed by comparison of acquisition data from several languages differing in the frequency with which the features in question occur in speech forms. (The Berkeley cross-linguistic acquisition project, described below, offers many examples of this approach.)

But although cross-linguistic testing would seem such a natural way to do psycholinguistics, it has not featured conspicuously in all three psycholinguistic periods. Early psycholinguistics, motivated by and in close communication with linguistics, provided some notable examples. Forster's (e.g. 1966, 1968; see also Forster and Clyne 1968) studies of syntactic processing compared a right-branching language (English) with a left-branching language (Turkish); he predicted that completion of sentences missing their ends should be easier in English than in Turkish, completion of sentences missing their beginnings easier in Turkish than in English. This hypothesis is a clear example of one which could not have been tested on a single language only. Levin and Mearini's (1964) study of the processing of inflections, on the other hand, is an instance of using cross-linguistic testing as a clever way to test a general hypothesis: by comparing the amount of attention paid to the ends of words by speakers of Italian (a language with heavily suffixed inflection) and English (a language with fewer inflections), the authors found corroboration of their hypothesis that listeners pay special attention to inflections. Brown (1973) summarizes language acquisition work of the 1960s, including several unpublished studies which paid particular attention to language-specific features.

In the second period of psycholinguistics, however, cross-language work, at least on adults, seemed to disappear. There is a simple explanation one might suggest: this was the period when psycholinguistics confined itself to straight cognitive psychology, and nearly all cognitive psychologists are monolingual (usually in English); so psycholinguistic experimentation was just done in English by monolingual psychologists. There may be some truth in this simple account; but it is certainly not the whole story. On the one hand, psycholinguists of the earliest period who did cross-language research included monolingual psychologists; but the climate of psycholinguistics at the time encouraged them to seek collaborators in distant countries. And on the other hand a good deal of excellent psycholinguistic research in the second period was carried out in languages other than English, notably in Europe.

Indeed, major controversies of the time revolved around research carried out in several different languages. Take, as an example, the question of whether ambiguous lexical items cause a momentary increase in processing load during sentence understanding. Foss (1970; Foss and Jenkins 1973) measured detection of a specified word-initial phoneme and found that detection time was slowed when the target-bearing word was preceded by an ambiguous word. Later research suggested that this result was possibly confounded, one of the confounding factors being that ambiguous words are often quite short, while the unambiguous control

words in Foss's experiments had often been longer. Newman and Dell (1978) found that controlling length removed the effect of ambiguity; Mehler et al. (1978) found further that comparing longer ambiguous words with shorter controls produced FASTER detection times following ambiguous words. Foss's and Newman and Dell's experiments were conducted in English; Mehler et al.'s in French. It was never suggested that this language difference was of any relevance to the conclusions, and indeed it presumably was not. The point to make about psycholinguistic research in this period is that the particular language in which the research was conducted was irrelevant; any experiment might just as well have been conducted in some other language. That is, despite the enormous vitality of psycholinguistics in this second period, and despite the fact that psycholinguists themselves came from many language backgrounds, research which successfully capitalized on cross-linguistic differences seemed completely absent. The major psycholinguistic textbooks of the period (Fodor et al. 1974; Glucksberg and Danks 1975; Cairns and Cairns 1976; Clark and Clark 1977; Foss and Hakes 1978) attest to this: none of them provides examples of cross-linguistic argumentation, and only the first even refers to cross-linguistic work of the earlier period. All describe the concept of a linguistic universal, and each offers a brief discussion of the concept of linguistic relativity (that the nature of thought can be conditioned by the nature of language), but none uses cross-linguistic arguments in explaining core psycholinguistic issues.

There is a sharp difference between the second period of psycholinguistics and the current state of the art. It is unclear whether the cause of the current renaissance of cross-language psycholinguistics is the reawakened interest of linguists in what psycholinguistics has to offer, or a renewed confidence toward linguistics on the part of psychologists — or both. For whatever reason, it is clear that a change has occurred. A few examples will illustrate the new climate:

1. Language acquisition work has enthusiastically adopted the view that parallel cross-linguistic investigations can give a more adequate account of the basic language-acquisition process than research on any given question in a single language. (See Slobin 1981 for an account of changing views in acquisition work which is similar to the view of psycholinguistics presented here.) The Berkeley-based project comparing syntax acquisition in English, Italian, Turkish, and Serbo-Croation (see for example Ammon and Slobin 1979; Johnston and Slobin 1979; Slobin 1982) is the most illustrious example; but see also Hakuta (1981) on the acquisition of relative clauses, Karmiloff-Smith (1979) and Levy (1983) on the acquisition of gender, and many of the papers in Wanner and Gleitman (1982).

2. There has been a revival of controversy about strong versions of the linguistic relativity hypothesis: that structural differences between languages can lead to speakers of different languages having different cognitive processes and capacities; see for example Bloom (1981, 1984), Au (1983, 1984).

3. Comparison between different orthographies has led to fruitful research on reading (see for example Chen and Juola 1982; Bentin et al. 1984; Seidenberg 1985). Particularly interesting are the exploitations of the dual orthographic representation of Serbo-Croation (e.g. Feldman, 1981, 1986; Katz and Feldman 1983; Lukatela, Lorenc, Ognjenovic, and Turvey, 1981; Lukatela, Savic, Gligorijevic, et al. 1978; Lukatela, Savic, Ognjenovic, and Turvey 1978) and of Japanese (Feldman and Turvey 1980; Coltheart 1982).

4. In English, subject relative clauses are easier to process than object relative clauses, but the two types of relative clause necessarily have different word orders. In French, however, the structural variation can be effected by a change in a single vowel: '*L'homme qui/que voit l'oiseau ...*'. Frauenfelder et al. (1980) were thus able to test the comparative difficulty of subject and object relatives without word-order confounding; they found that in the absence of semantic cues, object relatives are indeed more difficult to process.

5. New light was shed on the 'units of perception' debate by the finding that evidence in favor of the syllable as a perceptual unit could be found in French, which has relatively regular and clearly bounded syllables, but not in English, which has highly irregular syllable structure and frequently unclear syllable boundaries (Cutler et al. 1983, 1986).

6. Universality versus language-specificity of phonological rules which govern preferred word order in fixed phrases such as 'dribs and drabs' was studied by Pinker and Birdsong (1979). As predicted, sequences conforming to putatively universal rules were preferred by native speakers of English and French irrespective of the language in which the sequences were presented.

7. In a paradigm example of the use of cross-linguistic testing to control for possible artefacts arising from language-specific structure, Byrne and Davidson (1985) examined preferred word order for pairs of concepts such as 'cart' and 'horse'; because the preferred ordering was the same for speakers of subject-final and subject-initial languages, they concluded that the preference reflected a cognitive universal.

These are only a very few, quite disparate, examples of the new wave of cross-language psycholinguistics. This essay has presented a highly oversimplified view of the development of modern psycholinguistics. It has concentrated on what can be represented as the very core of

psycholinguistics: modeling human language performance, as a component of the larger cognitive psychological endeavor of modeling all aspects of human cognition. Three periods have been identified, in each of which the relationship between linguistics and psycholinguistics was different. Cross-language research flourished in the first period, languished in the second, and flourishes again in the third. Since the nature of the relationship between linguistics and psychology in the third period is not at all what it was in the first, it appears that the necessary condition for cross-language psycholinguistics is not a particular type of relationship with linguistics, but simply that this relationship be close.

The fact that cross-linguistic research is routine in linguistics and in other areas closely related to psycholinguistics makes it remarkable that core psycholinguistics succeeded in ignoring it for so long. In its Third Age, however, psycholinguistics seems to have realized the usefulness of cross-language research to all its most central issues; this fruitful source of research material should never fall into disuse as long as psycholinguistics remains a lively discipline.

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Notes

1. This paper has benefited greatly from comments by Don Foss, Uli Frauenfelder, and Phil Johnson-Laird, but all omissions, over-simplifications and idiosyncracies of historical viewpoint remain the responsibility of the author. Correspondence address: MRC Applied Psychology Unit, 15 Chaucer Road, Cambridge CB2 2EF, England.
2. Three representative examples: Frazier (e.g. Frazier and Fodor 1978), Elman (e.g. Elman and McClelland 1984), Prideaux (e.g. 1984).
3. It is a remarkable fact that the extensive and lively research on bilingualism in the 1970s, much of which was published in the main psycholinguistic journals, concerned itself exclusively with cognitive psychological issues — such as whether the lexical stock for a speaker's two languages was stored together or separately — and never with issues in which the particular structure of the language in question would play a role.

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