A Guide to Spoken Word Recognition Paradigms: Introduction

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Abstract

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A Guide to Spoken Word Recognition Paradigms: Introduction

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INTRODUCTION

The idea behind this guide arose like many ideas, over a cup of coffee, albeit on a terrace overlooking a lake with the Swiss Alps in the background! Wouldn’t it be wonderful, we said, if we could find in just one place all the information we wanted concerning a paradigm used to study word recognition, how it works, what you can study with it, what various problems have to be kept in mind when using it, what its advantages and limitations are, who has used it and for what, etc. As things currently stand, if you want some information on a paradigm, especially one you are unfamiliar with, you have to dig into articles, pour through methods sections, ask colleagues, e-mail friends, etc.

From an initial e-mail message sent around on InfoPsyling in 1994, our idea grew into an informal network of researchers who agreed to take part in a pot-luck type project. In our message, we wrote that our objective was to...

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gather information about spoken word recognition paradigms in the form of short summary sheets containing a number of sections to be filled in. Those interested in taking part in the project would be responsible for completing the summary sheet for a paradigm which they were particularly familiar with. In return, each participant would receive a complete copy of the summary sheets sent in and thus have a “guidebook” of the paradigms used in the field. A number of colleagues volunteered immediately, a few were cajoled into volunteering, and in the end 24 researchers agreed to take part in this project which was run, from beginning to end, via e-mail only. Over the next 2 years, the sheets sent in were reviewed by a total of 36 experts and were revised to produce the present guide. It is only in the last months of this large collaborative project that it was decided that the substantial amount of work accomplished by the authors and reviewers should not remain an informal document that would be passed from one psycholinguistics laboratory to another. Instead, *Language and Cognitive Processes* accepted to publish this guide, despite its rather original format, and hence gave it an official status.

In what follows, we first present the paradigms that are covered in the guide. We then describe the organisation of each summary sheet and we end with some first observations on the content of the sheets.

**THE PARADIGMS**

The guide contains the summary sheets of 18 paradigms or tasks (we will use these terms interchangeably, as do most researchers): auditory lexical decision, cross-modal semantic priming, cued shadowing, eye-tracking, form priming, gating, gender decision, migrations in speech recognition, mispronunciation detection, morphological priming, phoneme monitoring, phoneme restoration, phonetic categorisation, sequence monitoring, syntactic priming, word identification in noise, word monitoring and word spotting. Two comments should be made about this list. First, some paradigms are probably not as recognisable as others, either because they are relatively new (e.g. eye-tracking, migrations in speech recognition, word spotting) or because they are better known under other names (e.g. cued shadowing is also called auditory naming or auditory word repetition; sequence monitoring is better known as syllable monitoring; phonetic categorisation corresponds to the identification test used in categorical perception work, etc.). Second, a few paradigms used in spoken word recognition research do not appear in the list. The one that comes to mind immediately is shadowing, but a variant of this paradigm, cued shadowing, does have a summary sheet. Other paradigms not included for various reasons are language decision and word translation (both are used quite extensively in bilingualism research), as well as more recent imaging
techniques that may incorporate, in part or in whole, some of the paradigms covered here.

We have decided to present the paradigms in alphabetical order not only to follow the traditional presentation format in guidebooks, and hence to facilitate the use of the guide, but especially because there is no easy way of organising these paradigms into categories. Admittedly, several arrangements could be adopted (pure and more derived paradigms, all-purpose paradigms as compared to paradigms specialised in particular effects, etc.), but none of these do away with a rather large “odds and ends” section. Presenting the paradigms in alphabetical order is therefore the best solution.

SUMMARY SHEET ORGANISATION

The authors were asked to follow a particular organisational structure when presenting a paradigm so that the same kind of information could be found in all summary sheets. They were given a number of sections covering different topics (e.g. issues addressed, first uses, description, etc.), which they had to fill out. They were also asked to use the kind of telegraphic style one finds in guides, instruction manuals, etc. Admittedly, this type of prose makes for compact information, but users can always refer back to particular papers for in-depth discussions of specific topics. Below we describe what is contained in each section of the summary sheets.

Preliminary note. This is an optional section which contains any information that is needed to make the summary sheet more understandable; for example, the exact task covered by the sheet, the other names given to a task, any specific terminology needed to understand the sheet, etc.

Issues addressed. This section covers the kinds of issues that can be studied with the paradigm; for example, the processes leading to word recognition, the nature of lexical representations, the basic units of perception, the contribution of various levels of processing, the role played by different variables during word recognition, etc.

First uses. The papers which first presented the paradigm or its variants are presented here.

Description. This section contains a short description of the paradigm and of its variants.

Stimuli. This section deals with the stimuli presented to subjects (words, nonwords, etc.), their mode of presentation (oral, visual) and whether they are embedded in a larger context or not.
**Dependent variables.** The measures obtained with the paradigm are listed here; for example, reaction times, errors, confidence ratings, word responses, etc.

**Independent variables.** This section contains all the variables that are tested with the paradigm: word variables such as frequency, length, syllable structure, neighbourhood, etc.; context variables such as syntactic, semantic and pragmatic congruence or ambiguity, position of the stimulus in the context, etc.; and listener variables such as adult or child, monolingual, second language learner and bilingual, language-impaired, etc.

**Analysis issues.** The kinds of issues that have to be kept in mind when analysing the data are discussed here. These include such topics as how sensitive the measures are, what to do with missing values and high error rates, where to measure reaction time (RT) from, how to overcome the problems linked to vocal responses, what to make of fast versus slow RTs, what is considered an effect, etc.

**Effects found with paradigm.** This is usually the longest section of a summary sheet, as it lists the effects that have been studied with the paradigm. Effects are dealt with one after the other. They are named (sometimes described) and the studies which have shown the effect and those which have not are then listed. Some authors give additional details such as durations of stimulus onset asynchronies (SOAs), type of prime, type of effect (e.g. facilitation or inhibition), etc.

**Design issues.** The variables that have to be taken into account or controlled for when preparing the experimental material are mentioned in this section. These include word and context variables, the nature and number of foils, the relationship between the probe and the target, the total number of stimuli, etc. Issues relating to the experimental plan, the type of response needed and the experimental procedure are also dealt with here.

**Validity.** In this section, the evidence for the validity of the paradigm is presented; for example, replication of effects found with other paradigms, same results obtained with different versions of the paradigm, etc.

**Advantages.** Here the advantages of the paradigm are listed, e.g. it taps into a particular process, it is easy to use, it produces a number of different dependent variables, it can be used with different populations, etc.

**Potential artifacts.** Any exterior factor that might account for the results obtained are listed here, such as the danger of simple auditory matching in some paradigms, the speech production component in other paradigms, the various strategies developed by subjects in most paradigms, as well as factors that can inflate an effect or create a bias.
Problems. Although at first sight this section is quite similar to the preceding one, it deals in fact with larger problems, such as the processing locus of the paradigm, how on-line it is, its metalinguistic nature, its use with certain types of subjects, etc.

Uses with other populations. This section concerns the use of the paradigm with populations other than normal young monolingual adults used in most experiments; for example, children with or without a language disorder, brain-damaged patients, second language speakers and bilinguals, etc.

Other comments. Some final comments concerning the paradigms are offered in this section.

A summary sheet ends with the references which often make up close to half of the document.

SOME FIRST OBSERVATIONS

In what follows, we will present some first observations on the set of sheets presented in this issue. These remarks will be rather cursory given the amount of time available before going to press, but now that the guide is available, an in-depth comparative study of the paradigms will become possible. First, it is clear that these summary sheets are aimed at experienced researchers. One cannot learn to implement a task by reading its summary sheet. Many of the issues addressed are quite subtle for someone not very familiar with the spoken word recognition field. In that sense, the sheets reflect the original goal we had set for ourselves; that is, to offer colleagues in the field of spoken word recognition a survey of the important aspects and issues pertaining to specific paradigms. Second, there is some cross-sheet redundancy in such sections as “issues addressed”, “analysis issues” and “design issues”, but we decided not to do away with it as future users of the guide will probably look up selected summary sheets and will not read the guide in its entirety. It is important, therefore, that they have all the information needed to understand the sheets they are interested in. Third, one cannot but be impressed by the inventiveness of the researchers who either proposed the paradigms or who subsequently developed their variants. It is only as one leafs through the guide that one realises how rich and varied these paradigms are and how imaginative researchers have been in finding ways of studying the questions they were interested in. Fourth, it is clear that some paradigms are better established than others (e.g. auditory lexical decision, phoneme monitoring, phonetic categorisation, word monitoring, etc.) and that these, along with others (e.g. phoneme restoration, word identification in noise, gating, etc.), have been used to show a large number of effects. Other paradigms are newer and hence show
fewer effects, and some were designed to study only specific issues but in more depth. Fifth, some paradigms are clearly easier to use than others with different populations (e.g. children, language-impaired subjects, second language learners, etc.). This is clearly apparent as one reads the “uses with other populations” section. Sixth, most authors suggest that the paradigm they are describing be used along with other paradigms to obtain converging evidence for a result and to neutralise, as best possible, the variance due to the task itself. This is becoming a standard procedure in the field and its advantages are clear. Finally, the issues, potential artifacts and problems related to each paradigm are discussed in a very open and direct manner. Such topics as the locus of processing of a paradigm (pre-lexical, lexical, post-lexical), the on-line/off-line nature of the task, the amount of metalinguistic processing needed, the strategic component of the paradigm, etc., are dealt with openly. This is particularly important as every user of a task needs to have a clear understanding of the potential problems a paradigm may have.

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