DIALOGUE PROSODY

Gösta Bruce, Ursula Willstedt, Paul Touati and Antonis Botinis
Department of Linguistics and Phonetics, Lund University, Sweden

The present paper is the first report from a research project, which started recently in January 1988 and which is planned to run for three years. The project is called Contrastive Interactive Prosody - with the acronym KIPROS based on the project title in Swedish - and has got financial support from the Bank of Sweden Tercentenary Foundation. This paper contains mainly a summary of the research plan for the project and also reports on the ongoing research work.

There are three important starting points for the KIPROS project. The first starting point is the research on prosody that has been conducted in phonetics in Lund through the years and that covers many aspects of prosody. Research on Swedish prosody led to the development of the so-called Lund model of prosody (cf. Bruce 1977, Bruce & Gårding 1978, Gårding & Bruce 1981, Gårding 1982, Bruce 1985). The second starting point is the contrastive study of prosody conducted in Lund and directed towards the development of a general model of prosody particularly by Gårding. Examples from this research are Gårding (1981), Gårding, Botinis & Touati (1982), Gårding, Lindau, Norlin & Svantesson (1986) and most recently Touati (1987). A third starting point is the great interest in recent years taken in the study of interaction and dialogue analysis within linguistics and child language research in Lund (cf. Sigurd 1986, Söderbergh & Bredvad-Jensen 1987).

Our current, accumulated knowledge of prosody is based mainly on the study of prosody in fairly simple, well controlled experimental situations, i.e. so-called laboratory speech. The kind of methodology that we have been advocating then has typically been the simulation of a very simple dialogue - a question-answer-paradigm - where our informant has been playing the roles of both interlocutors (cf. Bruce 1977). Against the background of this research we now consider it possible and important to take the step from studying prosody in these simple situations towards investigating the role of prosody in communicatively more natural and relevant, but also more complex situations such as in interactive speech and dialogue.

A nice demonstration of the role of prosody in interactive speech is the comparison of two different tape recorded versions of the same dialogue, where one is the authentic version of a part of a spontaneous dialogue and the other is the artificially spliced together version consisting of the corresponding read, isolated utterances occurring in the same order as in the

original conversation. When listening to the artificially spliced together version of such a dialogue, one is struck by the absence of interactive prosody, and the important role of prosody in human spoken interaction becomes apparent, which may otherwise pass unnoticed in the natural, genuine version of the same dialogue.

KIPROS is about how prosody is being used in human spoken interaction. The purpose of the project is to investigate dialogue prosody in a contrastive perspective involving a few European languages that display interesting structural differences from a prosodic point of view: French, Greek and two varieties of Swedish (South and Standard Swedish). The ultimate goal of our research will be the development of a model for French, Greek and Swedish prosody in an interactive perspective. In such a model we will have to relate prosodic properties to suitable interactive categories and on the basis of the analysis propose rules for the generation of prosody in dialogues. The study of interactive prosody will also permit the calibration of our earlier research on prosody.

In our analysis of interactive prosody we will focus our attention particularly on how prosody contributes to the construction of a dialogue and how speakers make it develop through the use of prosodic markers such as particular tonal and temporal patterns. Our interest in the study of dialogue prosody will be both how the speaker uses prosody - accentuation, phrasing, boundary signalling - to make the internal organization of his contributions to the dialogue, and how this is related to the other speaker's contributions, for example how prosody is used in cooperation between speakers, as well as how prosody signals the actual regulation of turns in a dialogue. By analyzing prosody in French, Greek and Swedish dialogues we hope to elucidate the specific character of dialogue in these different cultures but also and most importantly to increase our understanding of the structure and function of prosody in these languages.

The research described here will be primarily basic research, but there are apparent possible applications of this research in language teaching, automatic speech synthesis and recognition as well as in speech therapy.

In the study of prosody in a dialogue perspective we are as phoneticians faced with a number of new problems. The first major concern of the KIPROS project is the choice of suitable tape recorded material for phonetic and acoustic analysis. We are presently searching along the dimension constructed - authentic dialogue; i.e. on the one hand experimentally arranged and more controlled situations, where the topic and the development of the dialogue is predictable to some extent, and on the other hand situations where this is more or less not the case, for example dialogues recorded from radio and TV

programs. The actual choice of dialogue has also to be related to our interest in those dialogues where prosody is expected to play an especially important role for the development of the dialogue.

In the present first period of the project we have been recording and studying different types of dialogue for each of the three languages. We have been doing this in order to explore the field and get an overview and to be able to choose the most interesting types of dialogue for special study. For Greek we started recording a constructed type of dialogue in the laboratory, for Swedish we have been recording a more authentic kind of dialogue from a well known radio program, and for French we have begun studying the most authentic type of dialogue: interviews about more existential topics. Although we start at different points for the three languages, we intend to cover the same dialogue types for French, Greek and Swedish.

The second major concern of the project is the analysis of the recorded material. This phase consists of three different parts: a fairly rough analysis of the structure of the dialogue - we are presently testing different models for dialogue analysis -, a selective prosodic transcription covering those prosodic categories that appear to be relevant for our purpose, and most importantly the qualitative and quantitative study of mainly tonal and temporal patterns from acoustic recordings of F0 and durations. We expect to find a fair degree of variation and optionality among the possible, prosodic markers in interactive speech.

A third important concern of the project will be the task of formulating rules for the use of prosody in spoken interaction. We will test these rules perceptually through editing of the relevant parameters of recorded speech and speech synthesis. By isolating stereotypical patterns of interactive prosody through the use of speech synthesis, we intend to be able to evaluate the optionality and suitability of different prosodic markers for interactive categories. One step in this analysis by synthesis may be the use of stylization of F0 contours for the establishment of the relevant pitch patterns, where the equivalence of F0 contours will be evaluated perceptually. This method has been successfully exploited for the analysis of intonation by the Dutch school (cf. for example 't Hart & Collier 1975).

The three phases of recording, analysis and synthesis occur logically one after the other. In the project work they will recur cyclically. We will actually try to come the third phase - rules and synthesis - fairly soon after having made a careful analysis of a relatively small speech sample. In this way we hope to get an idea rather soon about the degree of success in our analysis of dialogue prosody.

REFERENCES

Bruce G. 1977. Swedish word accents in sentence perspective. Gleerup, Lund

Bruce G. 1985. Structure and functions of prosody. In Guerin & Carré (eds.)
    Proceedings of the French Swedish Seminar on Speech, 549 - 559. Grenoble

Bruce G, & E. Gårding. 1978. A prosodic typology for Swedish dialects. In
    Gårding et al. (eds.) Nordic Prosody, 219 - 228. Department of Linguistics,
    Lund University

Gårding E. 1981. Contrastive prosody: A model and its applications. Studia
    Linguistica 35: 146 - 166

Gårding E. 1982. Swedish Prosody. Phonetica 39, 288 - 301

Gårding E, & G. Bruce. 1981. A presentation of the Lund model for Swedish
    intonation. In Fretheim (ed.) Nordic Prosody II, 33 - 39. Tapir, Trondheim

Gårding E, A. Botinis & P. Touati. 1982. A comparative study of Swedish, Greek
    and French intonation. Working Papers 22, 137 - 152. Department of
    Linguistics, Lund University

Gårding E, M. Lindau, K. Norlin & J.-O. Svantesson. 1986. Final report: Phonetic
    analyses of some non-European languages (LUCLA)

't Hart J, & R. Collier. 1975. Integrating different levels of intonation analysis.
    Journal of Phonetics 3, 235 - 255

Sigurd B. 1986. Computer simulation of dialogue and communication. In
    Karlsson (ed.) Proceedings of the 3rd Conference of Scandinavian
    Computational Linguistics. Department of Linguistics, Helsinki

Söderbergh R, & A.-C. Bredvad-Jensen. 1987. A dialogue model and its
    application in a free play situation. In Lilius & Saari (eds.) The Nordic
    Languages and Modern Linguistics 6. Helsinki University Press

Touati P. 1987. Structures prosodiques du suédois et du français. Lund
    University Press