Methods in prosody: A Romance language perspective

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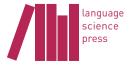Editors: Doris Mücke, Taehong Cho

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6. Feldhausen, Ingo & Fliessbach, Jan & Maria del Mar Vanrell (Eds.). Methods in prosody: A Romance language perspective.

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Contents

Contents

Introduction

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The field of prosody research belongs to those linguistic disciplines that have developed rapidly in recent decades. This is mainly due to the appreciation it has received in theoretical studies of grammar, but also to the technological revolution that has resulted in the widespread availability of software dedicated to conducting analyses and calculating statistics. All stages of experimental work have been affected: data collection, data processing, acoustical and statistical analysis, as well as the development of stimuli for perceptual experiments. Carefully controlled methodologies have become a standard in linguistic research for gathering empirical evidence and their development plays an increasing role in Romance linguistics. The same holds for corpus research, where large speech databases are used to investigate prosody and automatic tools are applied for analyzing the data. A number of recent publications document these developments and show how these fields of research are becoming ever more dynamic and innovative (see, e.g., Sudhoff et al. 2006; Cohn et al. 2012; Durand et al. 2014).

With the proliferation of methodological options and the emergence of research traditions defined not only by their object of interest, but also by their methodological choices (e.g. *Laboratory Phonology* or *Corpus Linguistics*), making reasoned methodological decisions is becoming an increasingly difficult task. Yet only detailed descriptions of problems encountered in the investigation of specific phenomena can provide the practical advice needed to avoid difficulties

before they arise. Thus, the goal of this book is to encourage the reader to pause for a moment and to reflect on (some of) the methods used in our field.

While the existing volumes on methodological reflections address this issue either from a general point of view by considering different linguistic subdisciplines (e.g. Ender et al. 2012; Podesva & Sharma 2013) or by dealing with specific methodological approaches in the entire field of phonology, including prosody (e.g. Cohn et al. 2012; Nguyen & Adda-Decker 2013; Durand et al. 2014), the present book concentrates specifically on methods in prosody and intonation research. Consequently, the book has parallels with the seminal volume by Sudhoff et al. (2006). In contrast to that book, however, the present volume concentrates on Romance languages and languages in contact with Romance languages (Catalan, Italian, Portuguese, Spanish, and Quechua) – thus languages that play an important role in prosody research. Furthermore, it includes some of the latest developments in the field. Finally, the present volume embraces contributions that evaluate specific methods both with and without the presentation of new data.

Pausing and carrying out methodological reflections is an important step in scientific research and the relevance of that issue in prosody research can be seen – apart from the present volume – in the increasing number of papers (e.g. Niebuhr & Michaud 2015; Cole & Shattuck-Hufnagel 2016), conference sessions, or summer schools dedicated to that issue (e.g. Aix-en-Provence 2016[1], Vienna 2016[2]). This book is based on the session *Methods in empirical prosody research* from the 34th Romanistentag, the biannual conference of the German Association of Romance Philologists (Deutscher Romanistenverband, DRV) held between July 26th–29th, 2015 in Mannheim (Germany). The session was organized by Ingo Feldhausen, Uli Reich, and Maria del Mar Vanrell. The seven double-blind peer reviewed contributions to this volume represent a selection from the talks given at this session and bring together some of the most distinguished researchers of prosody working on Romance languages, united in the attempt to place methodological reflections at the center of their respective chapter, while also providing insight into the current state of the research projects that apply these methods.

The methodological paradigms covered in this book include the study of prosody with large corpora and spontaneous speech employing different approaches, more controlled prosodic analyses, and questions of prosodic data collection, manipulation and elicitation. The book consists of three different parts, which in

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[1]Aix-en-Provence (France): Aix Summer School on Prosody 2016: "Methods in Prosody and Intonation Research: Data, Theories, Transcription". https://aixprosody2016.weebly.com.

[2]Vienna (Austria): Sommerschule des Deutschen Romanistenverbandes 2016: "Gesprochene Sprache in der Romania: Von der Theorie zur Empirie". https://romanistik2016.univie.ac.at/.

turn are organized into different chapters. The first part of the book is entitled *Large corpora and spontaneous speech* and consists of those papers mainly dealing with these aspects of prosody research. The second part, *Approaches to prosodic analysis*, comprises those chapters addressing different considerations relevant in analyzing prosodic data (e.g. the combination of production and perception experiments, the role of phonetic analyses or multimodal analyses). The third part is entitled *Elicitation methods* and focuses on the critical assessment of current elicitation methods. A detailed appreciation and overview of the three parts of the book and the different chapters is given in the guest foreword by Pilar Prieto.

Lastly, we, the editors, would like to thank several people who have helped and supported us in creating the present volume. First, we are highly indebted to Pilar Prieto for her comments and recommendations, and most importantly for her foreword that adds a magnificent finishing touch to this collective piece of work. We also extend our gratitude to each participant and contributor of the above-mentioned session at the congress of the German Association of Romance Philologists as well as to the authors of the individual chapters. Uli Reich deserves special mention and gratitude for his co-participation in the organization of the congress session, his relentless and fundamental logistical support, and his insightful advice on many different occasions. We also want to thank the anonymous reviewers whose critical, valuable, and insightful comments have helped to improve the present volume: Mathieu Avanzi, Stefan Baumann, Elisabeth Delais-Roussarie, Andreas Dufter, Wendy Elvira-García, Eduardo García-Fernandez, Nicholas Henriksen, José Ignacio Hualde, Conxita Lleó, Judith Meinschaefer, Trudel Meisenburg, Antje Muntendam, Oliver Niebuhr and Paul Warren. Next, we would like to thank our student assistants Julia Otto and Magalí del Valle Bertola for their different kind of help and support. Our gratitude also goes to the series editors of *Studies in Laboratory Phonology* for their interest in our volume and for providing constructive criticism and sound advice during the publication process. Furthermore, we are in debt to Sebastian Nordhoff and Felix Kopecky for their patient help with the details of producing the final manuscript and to Adrien Barbaresi, Amir Ghorbanpour, Andreas Hölzl, Daniela Kolbe-Hanna, Eleni Koutso, Audrey MacDougall, Hella Olbertz, Brett Reynolds, Aysel Saricaoglu, and Jeroen van de Weijer for proofreading.

Finally, we hope that the various contributions and the breadth of topics they deal with make the present volume a source of inspiration and insight for the linguistic research community and help to highlight the importance of profound methodological reflections.

References

Cohn, Abigail C., Cécile Fougeron & Marie K. Huffman (eds.). 2012. *The Oxford Handbook of Laboratory Phonology* (Oxford Handbooks in Linguistics). Oxford: Oxford University Press.

Cole, Jennifer & Stefanie Shattuck-Hufnagel. 2016. New Methods for Prosodic Transcription: Capturing Variability as a Source of Information. *Laboratory Phonology* 7(1). DOI:10.5334/labphon.29

Durand, Jacques, Ulrike Gut & Gjert Kristoffersen (eds.). 2014. *The Oxford Handbook of Corpus Phonology*. 1. ed. (Oxford Handbooks in Linguistics). Oxford: Oxford University Press.

Ender, Andrea, Adrian Leemann & Bernhard Wälchli (eds.). 2012. *Methods in Contemporary Linguistics*. Vol. 247 (Trends in Linguistics. Studies and Monographs /TiLSM). Berlin: De Gruyter.

Nguyen, Noël & Martine Adda-Decker. 2013. *Méthodes et outils pour l'analyse phonétique des grands corpus oraux* (Traité IC2 Cognition et traitement de l'information). Paris: Hermès Science Publications.

Niebuhr, Oliver & Alexis Michaud. 2015. Speech data acquisition: The underestimated challenge. *KALIPHO – Kieler Arbeiten zur Linguistik und Phonetik* 3. 1–42.

Podesva, Robert J. & Devyani Sharma (eds.). 2013. *Research methods in linguistics*. Cambridge: Cambridge University Press.

Prieto, Pilar. 2018. Foreword. In Ingo Feldhausen, Jan Fliessbach & Maria del Mar Vanrell (eds.), *Methods in prosody: A Romance language perspective* (Studies in Laboratory Phonology), vii–xiii. Berlin: Language Science Press.

Sudhoff, Stefan, Denisa Lenertova, Roland Meyer, Sandra Pappert, Petra Augurzky, Ina Mleinek, Nicole Richter & Johannes Schließer (eds.). 2006. *Methods in empirical prosody research*. Vol. 3 (Language, Context, and Cognition). Berlin & New York: Walter de Gruyter.

Foreword

Pilar Prieto

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In the last few decades, language researchers have highlighted the pivotal role of prosody in language production and language comprehension, showing the tight links between prosody and other language components such as syntax and pragmatics. First and foremost, prosody in spoken language reflects the "organizational structure of speech" (Beckman 1996). Speakers use it to separate speech into chunks of information, or prosodic constituents, thus helping listeners to parse discourse into meaningful syntactic units and sending signals about when to take turns in conversational exchanges. Secondly, prosody plays a key role in pragmatic communication. Prosodic and intonational patterns express a broad variety of communicative meanings, ranging from speech act information (assertion, question, request, etc.) and information status (given vs. new information, broad focus vs. narrow focus, contrast) to knowledge state (or epistemic position of the speaker with respect to the information exchange), affective state, and politeness (Gussenhoven 2004; Ladd 2008; Nespor & Vogel 2007; see Prieto 2015 for a review).

Speech prosody nowadays constitutes an active interdisciplinary research area which has drawn insights from different disciplines (like semantics, pragmatics, syntax, language typology, and language processing) and a variety of methodologies, including psycholinguistic and computational modeling. Given this broad spectrum, carrying out research in prosody now requires a high level of interdisciplinary awareness. It is for this reason that we welcome the initiative taken by three young but highly accomplished researchers, Ingo Feldhausen, Jan Fliessbach, and Maria del Mar Vanrell to compile a book about current research methods in prosody from a Romance perspective. The immediate aim is to offer in one volume a representative set of prosodic investigations on Romance languages which use diverse methods and data sources. However, taken as a whole, the interdisciplinary and critical perspective collectively represented here also reflects

the methodological challenges currently facing the field of prosody. As we will see below, those challenges include the need to develop more ecologically valid research methods for data elicitation, the use of triangulation methods for analyzing and interpreting quantitative findings, the complementary phonetic and phonological analyses, and, above all, the integration of experimental and computational methods into prosodic studies.

Methods in prosody: A Romance language perspective is made up of seven chapters, which are grouped to form the three parts of the book, each one centered around a particular topic. The first part focuses on the need to devote more research to the automatic prosodic analysis of large-speech corpora, including different speech styles such as spontaneous speech and dialogues. The second part highlights the importance of taking into account the various complementary levels of prosodic analysis, such as multimodal analysis, phonetic and acoustically-based labeling systems of intonation, prosodic prominence, and prosodic phrasing, as well as perception-based analyses of prosody. The third and final part of the book deals with data elicitation methods and points to the need for more refined elicitation methods to incorporate more ecologically-valid data and triangulation methods, as well as perceptual validation methods. In the short reviews that follow, I will try to highlight the particular issue that each chapter raises but also note the special insights that respective authors offer to the field as a whole.

Under the subheading *Large corpora and spontaneous speech*, the first part of the book (Chapters 1 and 2) deals with the still undervalued application of automatic prosodic annotation tools to large oral databases, as well as the analysis of spontaneous speech for the study of prosody. As is well known, the various syntactic and semantico-pragmatic functions of prosody are manifested through the acoustic realization of prosody by means of prosodic phrasal grouping (via phrasal intonation markers), intonational prominence, and intonational modulations. Recent technological developments have greatly facilitated data collection, leading to the creation of freely accessible, large-scale audio and video corpora for various languages, such as *Glissando* for Spanish and Catalan, which constitute a potential goldmine of information on prosodic production. Similarly, acoustic/phonetic tools such as Praat (see Boersma & Weenink 2017) have had a profound impact on our ability to measure and analyze prosodic data.

In **Chapter 1**, entitled "Using large corpora and computational tools to describe prosody: An exciting challenge for the future with some (important) pending problems to solve", J. M. Garrido describes a set of tools that can take audio speech data and automatically output full orthographic and prosodic transcriptions of the audio content and then segment and align them at phoneme, sylla-

ble, word, and intonational phrase levels. The author explains a set of tools that range from automatic orthographic transcription of oral corpora, as well as tools that perform automatic transcription and word segmentation, as well as prosodic segmentation and prosodic transcription. Though many of the tools have been specifically developed for Romance languages (Catalan, French, Portuguese, and Spanish in particular), some of them have been extended to other languages. Garrido also reviews the results of pitch analysis experiments performed on large corpora.

Chapter 2 shows how spontaneous conversation can be used to uncover intonational patterns reflecting topic and focus functions. In "The intonation of pronominal subjects in Porteño Spanish: an analysis of spontaneous speech", A. Pešková examines the intonational realizations of pronominal subjects in Buenos Aires Spanish using a corpus of spontaneous conversational speech and shows that while intonational differences characterize the distinction between focused and topicalized pronominal subjects, this is not the case for the distinction between different types of topics. The analysis presented nicely combines a phonological analysis of the data using the autosegmental Sp_ToBI prosodic labeling methodology with an acoustic-phonetic analysis of the target pronouns. The author uses this twofold strategy to argue that both spontaneous speech and experimental laboratory database techniques are indispensable for the study of linguistic prosody.

Under the heading *Approaches to prosodic analysis*, the second part of the book (Chapters 3–5) covers important issues including the importance of recognizing the multimodal – that is, verbal but also gestural – nature of communication, and the desirability of looking at both perception and production in the analysis of intonation and prosodic prominence.

Research in the last few decades has highlighted the importance of visual information in linguistic communication, but more work needs to be carried out within the domain of what is now known as *visual prosody*. **Chapter 3**, entitled "Multimodal analyses of audio-visual information: Some methods and issues in prosody research", represents a good step in this direction. The author, B. Gili Fivela, nicely reviews the methods which have been used to perform multimodal analyses of audio-visual speech materials, focusing especially on linguistic distinctions conveyed by prosody (e.g., prosodic focus, sentence modality). The paper discusses a set of methods used to analyze articulatory kinematic data and speech-accompanying gestures (like head movements and facial expressions) across different sentence types, using examples from the literature mainly on Italian and other Romance languages. A good assessment of the pros and cons

of articulatory and visual analysis methods of speech data is presented. The author highlights the fact that multimodal analysis of audio-visual information has helped researchers to characterize various aspects of linguistic prosody and that it is a necessary tool to provide a comprehensive analysis of prosody in communication.

An analysis of prosodic prominence can reveal important information about under-described languages. In **Chapter 4**, entitled "The Realizational Coefficient: Devising a method for empirically determining prominent positions in Conchucos Quechua", T. Buchholz and U. Reich reveal how they went about describing prosodic prominence in this Central Quechua dialect using a methodology based on acoustic measurements of duration, pitch, and intensity. From these acoustic patterns, they obtained an overall realizational value which they label the "Realizational Coefficient" by calculating the ratio of syllable duration, mean F0, pitch range, and intensity of one syllable with respect to its adjacent syllables. This calculation expresses a measure of the relative realizational strength of one syllable over others, which can be helpful in describing prominence patterns in languages that have yet to be fully analyzed.

Perceptual measures can be crucial in identifying contrastive patterns in intonational phonology. **Chapter 5**, entitled "On the role of prosody in disambiguating wh-exclamatives and wh-interrogatives in Cosenza Italian", O. Kellert, D. Panizza, and C. Petrone investigate the role of prenuclear and nuclear prosodic features in the perceptual identification of these structures in this Romance variety. A two-alternative forced-choice identification task together with reaction time measures were employed to test the listeners' ability to distinguish between the two types of sentences. While the results support the hypothesis that the most important prosodic cues for sentence-type disambiguation are located at the end of the utterance, the fact that duration patterns in initial and mid-sentence positions regions significantly predicted reaction times strongly suggests that prenuclear regions are actively exploited by listeners. The chapter also discusses why online measures like reaction times should be preferred to offline measures like gating responses. Importantly, the combination of identification tasks together with reaction times allows for an assessment of not only accuracy in prosodic disambiguating but also the time location of the processing difficulties.

The third part of the book includes two chapters (6 and 7) which deal with **elicitation methods** that can be used to collect speech data. A variety of such elicitation methods have been used in the field of prosody, with some of them like the Discourse Completion Task proving particularly useful. Although the relative advantages and disadvantages of these elicitation methods have received

some attention in the literature, a systematic critical assessment of their relative efficacy and ecological validity is thus far lacking. The two articles here constitute a first step in this direction.

One of the goals of intonational phonology is to be able to identify the distinctive pitch patterns in a given language in relation to systematic pragmatic differences like speech act differences, focus categories, etc. In **Chapter 6**, entitled "The Discourse Completion Task in Romance prosody research: Status quo and outlook", M. M. Vanrell, I. Feldhausen, and L. Astruc superbly describe and critically assess the strengths and weaknesses of the Discourse Completion Task elicitation methodology, which has been extensively applied in research on Romance prosody in the last two decades. Their overall assessment of the method as a data collection instrument is positive. Among other things, they point to a set of important strengths like time-efficiency, the ease with which pragmatic and contextual factors can be controlled for, and the feasibility of using the task with illiterate or elderly participants. Among its weaknesses, they point out factors such as the dependency of the results on the initial set of discourses and also on the importance of contextual information. To address these weaknesses, the authors propose a set of modifications to the method centered around carefully crafting the context scenarios for each of the situations in order to better elicit specific speech acts and foster participant engagement. These reflections point to not only the practical need to refine this popular tool but also the need for ongoing research on data elicitation methods.

Continuing with the quest for distinctive pitch patterns, in **Chapter 7**, entitled "Describing the intonation of speech acts in Brazilian Portuguese: methodological aspects", J. Moraes and A. Rilliard assess the results of applying to a set of Portuguese data a production/perceptual methodology initially proposed by the Dutch School of prosody. The paper describes how systematic modifications of pitch contours using resynthesis techniques influence how Brazilian Portuguese listeners interpret seven speech acts. The authors also look into the well-known phenomenon of inter-speaker variability in terms of interpreting prosody and attempt to define what is universally acceptable and unacceptable across speakers in terms of various prosodic parameters. Perceptual validation of these data show on the one hand the greater importance of pitch in comparison to duration or intensity patterns in conveying prosodic distinctions in Portuguese and on the other the importance of pitch-scaling patterns, specifically the need for three pitch levels (instead of two) for the intonational phonology of speech acts in this language.

Taken as a whole, this volume will be of interest to those scholars and students of prosody and linguistics interested in broadening their knowledge about current empirical methods. It also brings us a step forward in our assessment of the variety of methods currently in use for prosodic analysis. One inescapable conclusion to be drawn from all this work is that prosodic analysis is closely intertwined with many other systems of language, including pragmatic knowledge, and that mastery of a variety of complementary methods is of vital importance for prosody researchers. Though the multidisciplinary approach reflected in this volume has already yielded a significant body of essential information regarding the use and assessment of a variety of methods in the field of prosody there is still a need for an overarching theory that can not only encompass and explain perception and production patterns — which have traditionally been studied separately — but also take into account the complex relationships between prosodic abilities and other linguistic, communicative, and cognitive skills. For example, though sometimes neglected, prosody is a robust cue for the conveyance of essential pragmatic information in communication exchanges. As we have noted above, given the range of fields involved in such an endeavor, this goal calls for a high level of interdisciplinary awareness.

There are also methodological challenges ahead, including the need to find more ecologically valid research methods that can combine experimental and computational methods in future studies (see Prieto 2012 for a review). To illustrate this, for both perception and comprehension, behavioral data should be complemented by ERP and fMRI studies for a fuller picture of how the human brain produces and processes prosodic features. Recent technological developments will greatly facilitate this kind of endeavor and will have a profound impact on our ability to measure and analyze prosodic data. This combination of high quality recorded corpora and tools that automatically code acoustic cues has proved invaluable to research and must be further exploited, for it has huge potential to yield important results. This volume can therefore be read as both a snapshot of the current state-of-the-art in prosodic analysis but also a signpost for future directions in prosodic research.

References

Beckman, Mary E. 1996. The Parsing of Prosody. *Language and Cognitive Processes* 11(1-2). 17–68.   DOI:10.1080/016909696387213

Boersma, Paul & David Weenink. 2017. *Praat: Doing phonetics by computer [Computer program].* Version 6.0.30. http://www.praat.org/.

Gussenhoven, Carlos. 2004. *The phonology of tone and intonation.* Cambridge: Cambridge University Press.

Ladd, D. Robert. 2008. *Intonational phonology.* 2nd edition. Cambridge: Cambridge University Press.

Nespor, Marina & Irene Vogel. 2007. *Prosodic phonology.* Vol. 28 (Studies in Generative Grammar). Berlin: Mouton de Gruyter.

Prieto, Pilar. 2012. Experimental methods and paradigms for prosodic analysis. In Abigail C. Cohn, Cécile Fougeron & Marie K. Huffman (eds.), *The Oxford Handbook of Laboratory Phonology* (Oxford Handbooks in Linguistics), 528–538. Oxford: Oxford University Press.

Prieto, Pilar. 2015. Intonational meaning. *Wiley Interdisciplinary Reviews: Cognitive science* 6(4). 371–381.   DOI:10.1002/wcs.1352

Part I

Large corpora and spontaneous speech