Methods in Contemporary Linguistics

Trends in Linguistics
Studies and Monographs 247

De Gruyter Mouton

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edited by

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De Gruyter Mouton

ISBN 978-3-11-028466-9
e-ISBN 978-3-11-027568-1
ISSN 1861-4302

Library of Congress Cataloging-in-Publication Data

A CIP catalog record for this book has been applied for at the Library of Congress.

Bibliographic information published by the Deutsche Nationalbibliothek

The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.dnb.de.

Printing: Hubert & Co. GmbH & Co. KG, Göttingen
♾ Printed on acid-free paper

Printed in Germany

www.degruyter.com

IN HONOUR OF IWAR WERLEN

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Introduction

Andrea Ender, Adrian Leemann and Bernhard Wälchli

1. Why this volume on methods and methodology?

Linguistics is all about the study of language.[1] However, in as much as linguists pose different questions about language, they also engage in different processes of inquiry about their subject of study. Linguistic analyses are always shaped by the kind of data used and the assumptions underlying their interpretation, regardless of whether or not this is made explicit by the researcher. This kind of "linguistic relativity" is different from the well-known and much discussed Whorfian relativity principle, which says that "all observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar" (Whorf 1956: 214; see Werlen 1989a, 2002a, 2002b for the history of the idea of linguistic relativity). The "second linguistic relativity principle" alluded to here is not about how language shapes thought and perception, but rather about how linguistic data and methods in linguistics shape linguistic theory. Every linguist's theoretical view on language is affected by the language material they work with, and by the methods they apply.

It is sometimes argued that *methods* (to develop and to apply methods) and *methodology* (to reflect and write about methods) are two completely different things. There is undoubtedly some difference between applying methods and reflecting about methods, but method and methodology go hand in hand, especially if methods and methodology concern the treatment of concrete data in bottom-up rather than top-down methodological approaches. The present volume illustrates this point and insists on the necessity of making the discussion of methods and methodology more explicit across subfields of linguistics. To modify a famous saying by Immanuel Kant, we can say that methodology without developing and applying methods is empty and research without methodological reflection is blind.

Due to different strands of linguistic research and the influence of various neighbouring disciplines, there has been a noticeable growth of linguistic methodology. The importance of methods and methodological concerns has been tackled in various ways in older as well as more recent publications: linguistic methods can be related to the theory of science in general

(Bartschat 1996; Bierwisch 1971; Schecker 1976); they can be investigated with a focus on the dichotomy of quantitative vs. qualitative research, or on either of these approaches (see Litosseliti 2010; Johnson 2008; Rasinger 2008); their investigation can be oriented towards various linguistic subfields, such as applied linguistics (Coffin et al. 2010; Dörnyei 2009), discourse analysis (Wodak and Meyer 2009), sociolinguistics (Milroy and Gordon 2003), field linguistics (Vaux and Cooper 2005), etc.; or they can serve as practical guidelines for students or researchers (Wray and Bloomer 2006).

A volume that focuses on methods and methodological aspects in a variety of linguistic subfields can promote a more profound understanding of contemporary linguistics and the diversity in the scientific study of language. At once, a thorough description of how data has been gathered and analysed illustrates that methodological decisions often cannot be separated from questions of linguistic theory.

Linguistic methodology – like methodology in all sciences – is concerned with the relationship between theory and data. According to Labov's Principles of Linguistic Methodology (1971), methodology is the careful, serious search for error in one's own work, where the best theory is the one that is most easily disconfirmed. This is well in line with Popper's hypothetical-deductive approach in philosophy of science that theory cannot be verified by experience, it can only be falsified or "singled out by means of empirical tests, in a negative sense: *it must be possible for an empirical scientific system to be refuted by experience*" (Popper [1959] 2002: 18). As pointed out by Bisang (2011: 238), generalizations can also be induced from the comparison of data, but the major challenge for falsification in linguistics is reproducibility, since "validity of regularities and generalizations claimed by linguists crucially depends on reproducibility, i.e., on certain factors that are necessary to define a speech situation" (Bisang 2011: 237). Reproducibility in linguistics, however, is limited due to a high amount of variation: "Functional factors create variation via the difficulty of the task faced by the speaker to comply with a large number of rules almost simultaneously...Social factors are responsible for variation because different structures may be associated with different social settings" (Bisang 2011: 240; see also Croft 2000). As shown by Kretzschmar (2009) variation is often underestimated even in linguistic approaches traditionally devoted to variation such as dialectology and sociolinguistics. In the same vein, Werlen (1977: 37) already criticized the assumption of linguistic homogeneity, and underlined that the integration of variation has to be accompanied by the serious search for adequate theories and methods.

Methodological discussion seems to be associated closely to research with empirical focus rather than to theory-centred research. In this connection it is interesting to note that one of the very first paragraphs in John Locke's *Essay Concerning Human Understanding* is titled "Method": "It is therefore worth while to search out the bounds between opinion and knowledge; and examine by what measures, in things whereof we have no certain knowledge, we ought to regulate our assent and moderate our persuasion." (Locke [1690] 1952: 93). Now it is not possible to simply equate empiricism with empirical research and we do not want to claim in any way that rationalism is less methodological than empiricism. It is the status of the data that seems to constitute a major difference between empiricist and rationalist approaches. Whereas in rationalist approaches the theory drives the interpretation of the data, in empiricist approaches generalizations can emerge from the data. Hence, methodology, i.e. concerns about the collection, understanding and analysis of data, is particularly important for empirical research. It is not astonishing, therefore, that all papers in this volume – despite all their differences – can be said to be contributions to empirical linguistics.

All papers in this volume are examples of how specific methods can be applied to answer linguistic research questions. Thereby, the volume is not a theory-driven systematisation of methodological approaches, but a demonstration of the diversity of scientific practices in linguistics. What we deal with here is "bottom-up" methodology rather than "top-down" methodology. Hereby we adopt the approach that explicit reflection on the methods applied in the study of language can deepen our understanding of fundamental concepts in linguistic investigations. As such, contemporary methodology enhances the significance of various processes of scientific inquiry that are unified in their aim to better understand, describe and explain forms and functions of language. In this spirit, the present volume is the product of twenty-five linguists reflecting on their methodological concerns. At this point, we would like to thank forty-four anonymous reviewers, whose rigorousness significantly improved the quality of the volume. The collection of papers demonstrates that reflection on methods is a vital and integral component of original research and thereby overrides negative attitudes towards explicit highlighting of methodological concerns.

2. Issues in attitudes towards methodology

The relevance of explicitness in methodological concerns becomes most apparent when facing positions that are critical towards methodology. However, some words of caution are in order here. First, we want to consider attitudes towards methodology here, not attitudes of researchers in general. The same author can be very explicit about some aspects of methodology without discussing some other methodological aspects in the same work. Second, being explicit about methods and methodology is not tantamount with good methodology. There are many books and articles in linguistics following rigorous methods where methodology is not discussed. In such cases researchers can be aware or non-aware of their methodological approach. Unconscious brilliant methodology is very much the same thing as good intuition, and intuition plays an important and much underestimated role in linguistics as in other disciplines. Researchers can also be aware of their methods without discussing them explicitly. Awareness, explicitness and quality of methods are thus basically three different things. In the following, we simplify a lot by focussing on two negative attitudes towards explicitness of methodology. The names given to these attitudes are our own.

A time-honoured negative approach to methodology can be called "*methodological pessimism*", nicely put into a formula by the Leipzig philologist Gottfried Hermann (1772–1848): „Wer nichts über die Sache versteht, schreibt über die Methode" (Who does not understand the matter, writes about the method) (Koechly 1874).[2] We think that methodological pessimism rests on two misunderstandings: (i) it is possible to do linguistics without method, and (ii) reflection on method is different from doing research. Doing research and reflecting on methods is tightly connected in bottom-up methodology as practiced in this volume. We think that reflection on method is a crucial and integral component of research, especially of innovative research. To make this reflection explicit is particularly important for making approaches more accessible across most different research traditions. Explicit reflection on method can thus foster the mutual understanding of researchers in different linguistic sub-disciplines.

Of course, there may be different opinions about how much energy should be devoted to making methodical reflection explicit. With respect to this question, Miles and Huberman state that "[a]t times it seems as if the competing, often polemical arguments of different schools of thought about how qualitative research should be done properly use more energy than the actual research does" (1994: 2). A stance that seems to be the completely

opposite to methodological pessimism at first glance – "*methodological optimism*" – has in fact quite similar consequences. For methodological optimists, the excessive discussion of methodological aspects will do no harm, but is unnecessary, since researchers will normally do the right things anyway even without amply discussing methods. Methodological optimists have strong confidence in the researchers' right intuitions and in their readers' ability to understand their argument even if it remains partly implicit. Experts know what to do and readers are also experts. However, a possible danger of methodological optimism is secluded research communities, not allowing access to outsiders. A major advantage of explicit methodological discussion is its broader perspective. The present volume unites most different approaches to linguistics which is possible in particular because methodological concerns are made explicit. Explicit methodological discussion is particularly important for general linguistics, which unites all approaches to linguistics.

In this book, published in honour of Iwar Werlen, methodological diversity in linguistics is illustrated with examples that are biased towards Switzerland. Innovative methodological aspects have always played an important role in Swiss linguistics (with the attribute *Swiss* being interpreted geographically, i.e. as standing for 'having worked in Switzerland'). To provide just a few of the less well known examples, first, Louis Gauchat's (1905) findings on variation in the patois of Charmey, based on data from speakers of three different generations – long before variation took centre stage in linguistics – should be mentioned here. With his error analysis of French, Henri Frei (1929) can be called a pioneer of the functionalist approach. Renward Brandstetter (1893, 1903) can be mentioned as one of the first linguists who applied the classical comparative method beyond Indo-European, more specifically to the large Austronesian language family ranging from Malagasy to Maori. As impressive examples of methodological vigorousness in sociolinguistics and dialectology, finally, Erika Werlen's (1984) considerations on speakers' individuality and language attitudes in dialectological methodology and Andres Kristol's (1984) long-term study of language shift in the multilingual village of Bivio in the canton of Grisons can be mentioned. They underline that Iwar Werlen's ambition for innovative and well-considered methods – to be considered in more detail in Section 3 below – can be said to be an integral part of a well-established tradition in Swiss linguistics.

3. Iwar Werlen's approach to method and methodology

As different questions about languages, their structures and usages call for the application of different methods, the breadth of linguistic interests shapes the richness of the methodological experiences of a researcher. Therefore, a linguist like Iwar Werlen with a research agenda comprising dialectology (Werlen 1976, 1980, 1983a, 1985a, 1986a, 2005a), sociolinguistics with a main focus on the German-speaking part of Switzerland (Werlen 1988a, 1993a, 2004), multilingualism (Lüdi and Werlen 2005; Werlen 2007; Werlen, Rosenberger, and Baumgartner 2011), conversation analysis (Werlen 1979, 2001, 2006), the theory of rituals (Werlen 1983b, 1987, 1994), linguistic relativity (Werlen 1989a, 2002a, 2005b), studies on the languages of the Philippines (Werlen 1993b, 1996a, 1996b), onomastics (Werlen 2008, 2010a), and modality (Werlen 1982, 1993b; Bader, Werlen, and Wymann 1994) can resort to a large inventory of methods and a rich experience with methodological questions. He does not take an "instrumental" stance by reducing the methodological concerns to 'what works' (Angouri 2010: 31), but is constantly involved in philosophical and theoretical debates related to the methodological choices that he makes. This section is not intended to provide a comprehensive overview of methods in Iwar Werlen's oeuvre, but a descriptive selection of methodological issues in his major fields of interest which exemplifies his distinct awareness of methodological concerns.

An aspiration for convergence of dialectological and linguistic approaches is present in his early studies on the dialect of Brig in the Valais (Werlen 1976, 1977). Iwar Werlen believed that dialectological work can profit from the explication of various phenomena by the integration of linguistic theory, and linguistics can enlarge its horizon and refine its theories with respect to language variation. He criticized the assumption of linguistic homogeneity and urges for a more serious investigation of variation accompanied by the search for adequate theories and methods (Werlen 1976: 37). He tackled issues on variation and its internal structure that are still of importance more than thirty years later, by stating that "it does not seem plausible to me that language should be a homogeneous system: this calls even more for an explanation than the per se a lot more plausible assumption that there is relative chaos in the language" (*Es scheint mir nicht so sehr plausibel, daß die Sprache ein homogenes System bildet: das scheint mir sogar sehr viel mehr der Erklärung wert als die an sich viel plausiblere Annahme, daß man es in der Sprache mit einem relativen Chaos zu tun hat.*) (Werlen 1977: 353, translated by the authors).

His emphasis on sociolinguistic issues can be illustrated with two examples. In the KISS study (*Kommunikation in einer Schweizer Stadt, communication in a Swiss city*), which was carried out in the framework of interpretative sociolinguistics, it is shown how the implementation of the theoretical concept of communication culture is methodologically problematic (Lieverscheidt et al. 1989, 1995; Werlen and Lieverscheidt 1989; Werlen 1989b, 1992, 1995). As only communicative behaviour is observable, this can serve as the basis for the underlying rules. By observing participants and conducting interviews and audio-recordings at different public places (hair studios, community centre, etc.), the different communication cultures in a Swiss City are reconstructed. In doing so, a distinction is made between descriptive parameters of communication cultures and interpretative means. The investigation of language biographies of second-generation immigrants (Werlen 1986b, 2002c) is an example of sociolinguistic research where interviews provide the majority of data. These interviews are not only analysed with respect to the content of the narratives (social data, academic achievement, acquisition of the different languages, functions of the languages involved, language loyalty, bilingualism and language competence), but also as the medium of data collection itself, which means that the interview is considered in more general terms as constituting a social event.

Identifying and analysing the logic of ritual communication, Iwar Werlen resorts to corpus data (Werlen 1983b) and speech data from church services, radio shows or doctor–patient-interactions (Werlen 1987, 1996c). In his investigation of how people deal with different everyday life experiences in speech in highly diverse contexts such as celebrating the holy mass and getting over a personal failure in a game show, he studies the role of language in human action and defines the linguist's primary role as that of an observer for the purpose of reconstruction. He conceives of the work of a linguist as being descriptive, not prescriptive (Werlen 1988b: 79). The linguistic elements under scrutiny with respect to the interaction of language and ritual cover the areas of modal verbs (Werlen 1983a) and particles (Werlen 1983b).

The project about second dialect acquisition by people moving between different parts of the Alemannic-speaking region of Switzerland is shaped by the fusion of dialectological and sociolinguistic issues. The data combines interviews and elicited production data with analyses of the social network. How people produce a specific dialect feature in free and in prompted speech, and how consistent they are, is taken to reveal how much they have acquired of their second surrounding dialect, and how this dialect

behaviour eventually relates to their social networks and other variables (Werlen et al. 2002; Matter and Werlen 2002).

Overall, Iwar Werlen's approach to language focuses on the use and function of linguistic means, be it the analyses of particles in Swiss German dialects, showing that they fulfil a ritual function (Werlen 1983b), or the analysis of modality as the ways speakers express (un)certainty about the content of an utterance (Werlen 1985b). This becomes most obvious in the study of multilingualism in society as well as in individual speakers (Werlen, Tunger, and Frei 2010), and when dealing with the linguistic competence of individual speakers (Werlen and Zimmermann 1996; Werlen 2010b).

4. The structure of this volume

The volume at hand takes the methodological breadth of Iwar Werlen's work as an inspiration and tries to replicate it – in that the contributors of this volume were selected as representatives of coming from diverse methodological backgrounds. It is divided into five sections: core domains, cross-linguistic and language-internal diversity, dynamic language, writing, and a section entitled "language, space and society".

By *Core Domains* we mean the domains traditionally taught first in linguistic introductions, viz. phonetics, phonology, morphology, syntax, semantics, and pragmatics. We do not mean, however, that these domains are treated in a traditional fashion in this volume; rather, all chapters deviate from the research prototype in these fields in one or several respects. Siebenhaar and Leemann attend to methodological reflections on the phonetics–phonology interface in the domain of intonation. Can phonetics clearly be delimited from phonology? Siebenhaar and Leemann corroborate their line of argument with examples retrieved from a corpus of natural Swiss German speech. Schmid, in a similar vein, discusses phonetic and phonological approaches to speech rhythm in Italo-Romance dialects. Morphology is covered in a contribution by Wälchli, entitled *Indirect measurement in morphological typology*. Wälchli critically assesses the extent to which indirect methods – as frequently applied in the natural sciences – could be useful in morphological studies. Next, Bucheli Berger, Glaser, and Seiler address conceptual and practical aspects of examining syntactic structures in the context of dialect geographical research. Van der Auwera and Diewald survey methods that are currently used in the study of modality, such as conceptual analysis, typology, and monolingual and parallel

corpus linguistics. The first section concludes with a contribution by Ender and Wälchli, who assess the creation of making a festschrift and shed light on this process from the perspective of Iwar Werlen's definition of the ritual as an expressive institutionalized action or sequence of actions (Werlen 1984: 81).

Section two of this volume includes contributions collected under the guise of *Cross-Linguistic and Language-Internal Diversity*. The articles tap into typology, multilingualism, koineisation, and second language acquisition. Zúñiga addresses the relationship between language documentation and linguistic typology. Berthele explains the epistemological and methodological debates in multilingual research designs. Reflections on methods in dialect contact research, e.g. in the context of linguistic accommodation or second dialect acquisition, is addressed in Britain's contribution. Ender addresses the question of how second language learners deal with variation in their everyday input by highlighting some of the methodological challenges that emerge in this new line of research. Finally, von Waldenfels rounds off this second section with a discussion and illustration of methodological benefits and pitfalls of research based on parallel corpora; at the same time, he compares these aspects with the usefulness and drawbacks of translated language.

Section three, entitled *Dynamic Language*, goes beyond classic sociolinguistic areas of research and proceeds with methodologies applied in historical linguistics as well as in psycholinguistics. However, we do not claim that only these approaches to linguistics are dynamic. Many other papers in this volume reflect various aspects of dynamicity in linguistics. This section embraces dynamic language both in a diachronic and in a procedural performance perspective. Busse's *Historical text analysis: Underlying parameters and methodological procedures* introduces historical aspects of corpus linguistics while focussing on methodological and interpretative issues. Writing from a historical linguists' point of view, Bielmeier evaluates the traditional historical-comparative method and examines how it can be successfully applied beyond Indo-European languages to varieties of Tibetan, usually referred to as "Tibetan dialects". The next contribution in this section is van Driem's *Etyma, shouldered adzes and molecular variants*, which reflects on the usefulness of an interdisciplinary approach towards historical linguistic reconstruction. Vorwerg, finally, evaluates experimental approaches and the experiment itself towards the examination of language processing.

The fourth section carries the title *Writing* and includes two rather different contributions. Perrin addresses media discourse, where news items are generated, from a production perspective. More specifically, he dis-

cusses the application of Dynamic Systems Theory to the field of news-writing. By the same token, Boyes Braem discusses methodological issues encountered by signed language linguists which arise due to production and perception differences in visual/corporal modality of spoken and signed languages.

The final, fifth, section incorporates topics that revolve around *Language, Space and Society*. De Stefani proposes an interactional approach towards studying place names, by observing how they are used in naturally occurring conversations, thus connecting traditional onomastics with interaction studies. Grünert analyses the applicability of the territoriality principle on the example of the smallest of the four national languages of Switzerland, Romansh, placing the discussion in a legal context, thus relating linguistics and law. The volume concludes with a contribution by Lüdi, Höchle, and Yanaprasart, who address the status and use of English in Switzerland, with a particular focus on workplace communication. Methodologically, this contribution combines different approaches to the investigation of the use of English in Switzerland and collects attitudes towards its use.

All these contributions place emphasis on methodology as an integral part of any innovative research in contemporary linguistics. As each paper is embedded in concrete linguistic research questions, the volume as a whole follows a bottom-up approach to methods and their status in contemporary linguistics. The collection of articles illustrates the diversity in the study of language in linguistic sub-disciplines and thereby strives to promote a more global understanding of linguistic investigation.

Notes

1. We would like to thank Walter Bisang, Volker Gast, and Bruno Moretti for many useful comments.
2. We are grateful to Toon van Hal and Johan van der Auwera for having pointed out the history of the saying to us.

References

Angouri, Jo
2010 Quantitative, qualitative or both? Combining methods in linguistic research. In *Research methods in linguistics*. Litosseliti, Lia (ed.), 29–46. London: Continuum.

Bader, Thomas, Iwar Werlen, and Adrian Wymann
1994 *Towards a Typology of Modality*. Bern: Institut für Sprachwissenschaft (Arbeitspapiere des Instituts für Sprachwissenschaft, 32).

Bartschat, Brigitte
1996 *Methoden der Sprachwissenschaft: von Hermann Paul bis Noam Chomsky*. Berlin: Erich Schmidt Verlag.

Bierwisch, Manfred
1971 *Modern linguistics: its development, methods and problems*. The Hague: Mouton.

Bisang, Walter
2011 Variation and reproducibility in linguistics. In *Linguistic universals and language variation*, Peter Siemund (ed.), 237–263. (Trends in Linguistics. Studies and monographs; 231) Berlin: de Gruyter.

Brandstetter, Renward
1893 Die Beziehung des Malagasy zum Malaiischen. In *Festschrift zur Eröffnung des neuen (Luzerner) Kantonsschulgebäudes 1893*, 65–107. Luzern: Räber. also as MPF II. translated to english by R. Baron, Tananarivo 1894/95.
1903 *Auslaut und Inlaut im Indogermanischen und Malaio-Polynesischen.* Opstellen, geschreven ter eere van Dr. H. Kern: 349–351. Leiden: Brill.

Coffin, Caroline, Theresa M. Lillis, and Kieran O'Halloran
2010 *Applied linguistics methods: a reader: systemic functional linguistics, critical discourse analysis and ethnography*. London: Routledge.

Croft, William
2000 *Explaining Language Change. An Evolutionary Approach*. Edinburgh: Pearson Education.

Dörnyei, Zoltán
2009 *Research methods in applied linguistics: quantitative, qualitative, and mixed methodologies*. Oxford: Oxford University Press.

Gauchat, Louis
1905 L'unité phonétique dans le patois d'une commune. In *Aus romanischen Sprachen und Literaturen. Festschrift Heinrich Morf zur Feier seiner fünfundzwanzigjährigen Lehrtätigkeit.* Bovet, Ernest, Ernst Brugger, Wilhelm Degen et al. (eds.), 175–232. Niemeyer: Halle (Saale).

Frei, Henri
1929 *La grammaire des fautes*. Paris: Librairie Paul Geuthner, Genève [etc.]: Librairie Kundig [etc.].

Johnson, Keith
2008 *Quantitative methods in linguistics*. Malden, Mass.: Blackwell.

Koechly, Hermann
1974 *Gottfried Hermann. Zu seinem hundertjährigen Geburtstage.* Heidelberg: Carl Winter.

Kretzschmar, William
2009 *The Linguistics of Speech*. Cambridge: Cambridge University Press.

Kristol, Andres Max
1984 *Sprachkontakt und Mehrsprachigkeit in Bivio (Graubünden): linguistische Bestandesaufnahme in einer siebensprachigen Dorfgemeinschaft.* Bern: Francke.

Labov, William
1971 Some principles of linguistic methodology. *Language in Society* 1: 97–120.

Lieverscheidt, Esther, Werlen Iwar, Adrian Wymann and Hansmartin Zimmermann
1989 Salongespräche – Kommunikationen beim Coiffeur. In *Dialoganalyse II*. Bd. 1. Edda Weigand, and Franz Hundsnurscher (eds.), 361–381. Tübingen: Niemeyer.
1995 Konzeption und Ergebnisse des Projekts "Kommunikationskulturen in einer Schweizer Stadt". In *Verbale Kommunikation in der Stadt*. Iwar Werlen (ed.), 1997–226. Tübingen: Gunter Narr.

Litosseliti, Lia (ed.)
2010 *Research methods in linguistics*. London: Continuum.

Locke, John
1952 *An Essay Concerning Human Understanding*. In *Great books of the western world* 35, Robert Maynard Hutchins (ed.), 93–395. Chicago/London/Toronto: William Benton: Encyclopædia Britannica. Reprinted from the edition collated and annotated by Alexander Campbell Fraser. Oxford: Oxford University Press, 1894. Original edition, London: 1690.

Lüdi, Georges, and Iwar Werlen
2005 *Sprachenlandschaft in der Schweiz = Le paysage linguistique en Suisse = Paesaggio linguistico in Svizzera.* Neuchâtel, Bundesamt für Statistik (Eidgenössische Volkszählung 2000).
Matter, Marc, and Iwar Werlen
2002 Z Bäärn bi-n-i gääre. Walliser in Bern. In *Alemannisch im Sprachvergleich. Beiträge zur 14. Arbeitstagung für alemannische Dialektologie in Männedorf (Zürich) vom 16.–18. 9. 2002*. Elvira Glaser et al. (eds.), 263–280. Stuttgart: Steiner. (ZDL-Beihefte, 129).
Miles, Matthew B., and A. Michael Huberman
1994 *Qualitative Data Analysis*. 2nd Edition. Thousand Oakes. California: Sage.
Milroy, Lesley, and Matthew Gordon
2003 *Sociolinguistics. Method and Interpretation*. Malden: Blackwell.
Popper, Karl
2002 *The Logic of Scientific Discovery*. London: Routledge Classics. [Original [1959] version: 1935. *Logik der Forschung*. Wien: Springer].
Rasinger, Sebastian M.
2008 *Quantitative research in linguistics: an introduction*. London: Continuum.
Schecker, Michael
1976 *Methodologie der Sprachwissenschaft*. Hamburg: Hoffmann und Campe.
Vaux, Bert, and Justin Cooper
2005 *Introduction to linguistic field methods*. 3rd printing. München: LINCOM Europa.
Werlen, Erika
1984 *Studien zur Datenerhebung in der Dialektologie*. Wiesbaden: Steiner.
Werlen, Iwar
1976 *Zur Phonologie der Mundart von Brig*. Bern: Institut für Sprachwissenschaft der Universität Bern (Arbeitspapier des Instituts für Sprachwissenschaft, 14).
1977 *Lautstrukturen des Dialekts von Brig im schweizerischen Kanton Wallis*. Wiesbaden: Steiner (Beihefte der Zeitschrift für Dialektologie und Linguistik, 23).
1979 Konversationsrituale. In *Arbeiten zur Konversationsanalyse*. Jürgen Dittmann (ed.), 144–175. Tübingen: Niemeyer.
1980 *R* im Schweizerdeutschen. *Zeitschrift für Dialektologie und Linguistik* 47: 52–76.

1982 *Über Modalitäten in natürlichen Sprachen*. Bern, Institut für Sprachwissenschaft der Universität Bern (Arbeitspapiere des Instituts für Sprachwissenschaft, 19).

1983a Velarisierung (Gutturalisierung). In *Dialektologie. Ein Handbuch zur deutschen und allgemeinen Dialektforschung*. 2 volumes. Besch, Werner et al. (eds.), 1130–1136, volume 2. Berlin: de Gruyter.

1983b Vermeidungsritual und Höflichkeit – Zu einigen Formen konventionalisierter indirekter Sprechakte im Deutschen. *Deutsche Sprache* 3: 193–218.

1984 *Ritual und Sprache – Zum Verhältnis von Sprechen und Handeln in Ritualen*. Tübingen: Narr.

1985a Zur Einschätzung von schweizerdeutschen Dialekten. In *Probleme der schweizerischen Dialektologie. 2. Kolloquium der Schweizerischen geisteswissenschaftlichen Gesellschaft*, Werlen, Iwar (ed.), 195–266. Freiburg, Schweiz: Ed. universitaires.

1985b *Gebrauch und Bedeutung der Modalverben in alemannischen Dialekten*. Stuttgart: Steiner (Beihefte der Zeitschrift für Dialektologie und Linguistik, 49).

1986a Dialektsprechen in mehrdialektalen Gesellschaften am Beispiel des südlichen Deutschland und der deutschen Schweiz. In *Kontroversen, alte u. neue: Akten d. 7. Internat. Germanisten-Kongresses*, *Göttingen*, volume 4. Schöne, Albrecht (ed.): 279–299. Tübingen: Max Niemeyer.

1986b *Sprachbiographien von Ausländern der zweiten Generation. Arbeitsbericht zu einem soziolinguistischen Projekt*. unter Mitarbeit von M. Bähler, F. Roncoroni-Waser, Z. Penner, R. Piva, L. Seethaler. Bern: Institut für Sprachwissenschaft der Universität Bern (Arbeitspapiere des Instituts für Sprachwissenschaft, 20).

1987 Die "Logik" ritueller Kommunikation. *Zeitschrift für Literaturwissenschaft und Linguistik* 65: 41–81.

1988a Swiss German Dialects and Swiss standard High German. Linguistic variation in dialogues among (native) speakers of Swiss German dialects. In *Variation and Convergence*. Auer, Peter, and Aldo di Luzio (eds.), 94–124. Berlin: de Gruyter.

1988b Linguistische Analyse von Gottesdiensten. *Liturgisches Jahrbuch. Vierteljahreshefte für Fragen des Gottesdienstes* 38(2): 79–93.

1989a *Sprache, Mensch und Welt. Geschichte und Bedeutung des Prinzips der sprachlichen Relativität.* Darmstadt: Wissenschaftliche Buchgesellschaft (Reihe Erträge der Forschung).

1989b Kommunikationskulturen in einer Schweizer Stadt. Bericht über ein Projekt des Nationalen Forschungsprogramms 21 "Kulturelle Vielfalt und nationale Identität". *Bulletin de la Commission Interuniversitaire Suisse de Linguistique Appliquée*, 50: 66–74.

1992 *"...mit denen reden wir nicht": Schweigen und Reden im Quartier*. Basel: Helbing und Lichtenhahn.

1993a Soziolinguistik der Schweiz – Schweizer Soziolinguistik. Zur Einführung. In *Schweizer Soziolinguistik – Soziolinguistik der Schweiz*. Werlen, Iwar (ed.), 7–15. Neuchâtel: Institut de linguistique de l'Université de Neuchâtel. (Bulletin CILA, 58)

1993b Grammatikalisierung des Modalitätsausdrucks am Beispiel des Tagalogs. *Acta romanica basiliensia* 1: 283–298.

1994 *Ritual und Sprache. Zum Verhältnis von Sprechen und Handeln in Ritualen*. Tübingen: Narr.

1996a Ausbau von Nationalsprachen. In *Kontaktlinguistik: ein internationales Handbuch zeitgenössischer Forschung = Contact linguistics: an international handbook of contemporary research = Linguistique de contact: manuel international des recherches contemporaines*. Hans Goebl et al. (eds.), 893–902. Volume 1. Berlin: Walter de Gruyter. (Handbücher zur Sprach- und Kommunikationswissenschaft, 12).

1996b Kontrastive Lexikologie: Tagalog–Deutsch. *Lexicographica. Series maior* 66: 24–38.

1996c "aber immerhin...": Enttäuschung und Trost – zur kommunikativen Bewältigung des Scheiterns in einem Radiospiel. In *Norm, Moral und Didaktik – die Linguistik und ihre Schmuddelkinder : eine Aufforderung zur Diskussion*. Peyer, Ann und Paul R. Portmann (eds.), 133–160. Tübingen: Max Niemeyer Verlag.

2001 Rituelle Muster in Gesprächen. In *Text- und Gesprächslinguistik. Ein internationales Handbuch zeitgenössischer Forschung = Linguistics of text and conversation: an international handbook of contemporary research.* Brinker, Klaus et al. (eds.), 1263–1278. Berlin: Walter de Gruyter (Handbücher zur Sprach- und Kommunikationswissenschaft, 16).

2002a *Sprachliche Relativität: eine problemorientierte Einführung*. Tübingen: A. Francke Verlag.

2002b Das Worten der Welt. In *Lexikologie: ein internationales Handbuch zur Natur und Struktur von Wörtern und Wortschätzen = Lexikology: an international handbook on the nature and structure of words and vocabularies* (Handbücher zur Sprach- und Kommunikationswissenschaft, 21), Cruse, Alan et al. (eds.), 380–391. Berlin: de Gruyter.

2002c Sprachbiographien: wie italienische Migrantinnen und Migranten der zweiten Generation in der deutschen Schweiz ihr Sprachleben sehen. *Bulletin suisse de linguistique appliquée* 76: 57–77.

2004 Domäne / Domain. In *Sociolinguistics – Soziolinguistik. An International Handbook of the Science of Language and Society. Ein internationales Handbuch zur Wissenschaft von Sprache und Gesellschaft.* 2nd completely revised and extended edition. Ammon,

Ulrich, Norbert Dittmar, Klaus J. Mattheier, Peter Trudgill (eds.), 335–341. Vol 1.1. Berlin, New York: de Gruyter.

2005a Von Brig nach Bern – Dialektloyalität und Dialektanpassung bei Oberwalliser Migrierenden in Bern. In *Moderne Dialekte – Neue Dialektologie. Akten des 1. Kongresses der Internationalen Gesellschaft für Dialektologie des Deutschen (IGDD) am Forschungsinstitut für deutsche Sprache „Deutscher Sprachatlas" der Philipps-Universität Marburg vom 5. bis 8. März 2003*. Eggers, Eckhart, Jüregen E. Schmidt, and Dieter Stellmacher (eds.), 375–404. München: Steiner (ZDL-Beihefte, 130).

2005b Linguistische Relativität – Linguistic Relativity. In *Sociolinguistics – Soziolinguistik. An International Handbook of the Science of Language and Society. Ein internationales Handbuch zur Wissenschaft von Sprache und Gesellschaft.* 2nd completely revised and extended edition. Ammon, Ulrich, Norbert Dittmar, Klaus J. Mattheier, Peter Trudgill (eds.), 1426–1435, vol 2. Berlin, New York: de Gruyter. (Handbücher zur Sprach- und Kommunikationswissenschaft, 3).

2006 Formulierungen von Normen kommunikativen Handelns in Biel/Bienne. In *Le projet bil.bienne – bilinguisme à bienne * kommunikation in biel*. Elmiger, Daniel, and Sarah-Jane Conrad (eds.), 87–109, TRANEL (Travaux neuchâtelois de linguistique) 43.

2007 Receptive Multilingualism in Switzerland and the Case of Biel/Bienne. In *Receptive Multilingualism. Linguistic analyses, language policies and didactic concepts*. Ten Thije, Jan D. , and Ludger Zeevaert (eds.), 137–158. Amsterdam, Philadelphia: John Benjamins (Hamburg Studies in Multilingualism, 6).

2008 Die Grundwörter der Oberwalliser Gipfelnamen. In *Chomolangma, Demawend und Kasbek. Festschrift für Roland Bielmeier zu seinem 65. Geburtstag*. Huber, Brigitte et al. (eds.), 577–614. Halle, Saale, IITBS (Beiträge zur Zentralasienforschung, 12).

2010a Historische Kontaktonomastik – das Beispiel des westlichen Teils des Bezirkes Leuk im Wallis. In *Alemannische Dialektologie. Wege in die Zukunft. Beiträge zur 16. Arbeitstagung für alemannische Dialektologie in Freiburg/Fribourg vom 07.–10.09.2008*. Christen, Helen, et al. (eds.), 359–373. Wiesbaden: Steiner (ZDL-Beihefte, 141).

2010b Flüssiges Sprechen vortäuschen: Wiederholungen als Technik zur Erzeugung flüssigen Sprechens bei Sprecherinnen von Deutsch als L2. In Plurilinguisme, Mehrsprachigkeit, Plurilingualism, Festschrift pour Georges Lüdi. Mondada, Lorenza, and Simona Pekarek-Doehler (eds.), 179–195. Tübingen: Francke.

Werlen, Iwar (ed.)
1985 *Probleme der schweizerischen Dialektologie. 2. Kolloquium der Schweiz. Geisteswissenschaftlichen Gesellschaft, 1978 = Problèmes de la dialectologie suisse. 2e Colloque de la Société suisse des sciences humaines, 1978*. Freiburg, Schweiz, Ed. Universitaires.
1995 *Verbale Kommunikation in der Stadt*. Tübingen: Gunter Narr.
Werlen, Iwar, Barbara Buri, Marc Matter, and Johanna Ziberi
2002 *Projekt Üsserschwyz. Dialektanpassung und Dialektloyalität von Oberwalliser Migranten.* Bern: Institut für Sprachwissenschaft (Arbeitspapiere des Instituts für Sprachwissenschaft, 39).
Werlen, Iwar, and Esther Lieverscheidt
1989 Formulating affiliation to social minority groups. *Multilingua* 8: 37–56.
Werlen, Iwar, Lukas Rosenberger, and Jachin Baumgartner
2011 *Sprachkompetenzen der erwachsenen Bevölkerung in der Schweiz*. Zürich: Seismo.
Werlen, Iwar, Verena Tunger, and Ursula Frei
2010 *Der zweisprachige Kanton Wallis = Le Valais bilingue*. Visp: Rotten Verlag; Sierre: Éds. Monographic.
Werlen, Iwar, and Hansmartin Zimmermann
1996 La formulation de problemes de compétence dans une langue (quasi) étrangere à partir de récits d'histoires: approche comparative entre élèves suisses alémaniques et étrangers. *Aile* 7: 35–69.
Whorf, Benjamin Lee
1956 *Language, Thought and Reality. Selected Writings of Benjamin Lee Whorf.* Edited and with an introduction by John B. Carroll. Boston: Technology Press of M.I.T., New York: John Wiley & Sons, London: Chapman & Hall.
Wodak, Ruth, and Michael Meyer
2009 *Methods for Critical Discourse Analysis*. Los Angeles: Sage.
Wray, Alison, and Aileen Bloomer
2006 *Projects in linguistics: a practical guide to researching language*. 2nd edition. London: Hodder Arnold.

Part I: Core domains: From phonetics to pragmatics

Methodological reflections on the phonetic–phonological continuum, illustrated on the prosody of Swiss German dialects

Beat Siebenhaar and Adrian Leemann

1. Introduction

Since Trubetzkoy (1939) we discriminate between phonetics and phonology, where phonology categorically interprets language-specific continuous acoustic signals and thereby conceptually separates between a component of meaning and the stream of speech, which both are correlated in a second step. Today, the allegedly obvious separation is being questioned on a number of levels. This softening of what used to be formerly rigid boundaries between phonetics and phonology is particularly prevalent in a description of prosody (cf. Byrd and Choi 2010: 32).

In the context of intonation research, this uneasy connection between phonetics and phonology is hinted at in Bolinger (1972). He notes that the phonetic representation of intonation, for instance, cannot simply be determined by considering grammatical, phonological, aspects of sentences, as illustrated in the infamous "Accent is predictable (if you're a mindreader)" *Language* article. What Bolinger is referring to is the then becoming dominant school of thought of metrical phonology, where prominence is understood as an abstract feature that can be derived from the metrical strength of syllables (Liberman and Prince 1977). This framework was adopted by Pierrehumbert (1980) who formulates an autosegmental-metrical approach towards intonation, where key syllables in utterances are described as discrete tones. This system has been formalized in the ToBI transcription system. The underlying assumption is that the temporal coordination of fundamental frequency and phonetic segments is highly rule-governed, where the highs and lows of the fundamental frequency (*f0)* contour predictably line up with metrically strong syllables (Pierrehumbert 1980). Yet, there are studies that insinuate otherwise. Kochanski et al. (2005) as well as Silipo and Greenberg (2000) re-address the role of stress, i.e. metrically strong syllables, in predicting *f0* by analyzing a corpus of spontaneous speech in British and American English. The studies conclude that metrically strong

syllables are exceptionally marked with loudness, duration, and distinct spectral tilt – not necessarily *f0* movements.

Over the past three decades, temporal aspects, too, aroused the curiosity of linguistic research. With the greater part of actual research we analyze durations of segments within the acoustic signal; an alternative acces - articulatory phonology (Browman and Goldstein 1992) – observes gestures of the articulatory tract. The distinction of long and short (and over-long, where they exist) vowels and consonants was discovered long before linguistics as subject proper was established. This phonological distinction is thus reflected in the orthography of languages which feature quantity distinction. The phonetic gradual change of duration only became evident with acoustic measurements based on visualization of speech. The phonetic lengthening and shortening processes were mainly focused with the interest on the technological representation of speech in speech synthesis and speech recognition systems. As is the case with intonation, the marking of stress, accents, and phrase boundaries is particularly interesting. The appreciation of these concepts is to a large extent dependent on the phonological system of the language in question, which is assumed to be categorical, while the phonetics of an utterance are conceived of as being gradient. The argumentation is similar for intonation and timing: Continuous changes of fundamental frequency are – in the actually most respected theory – categorized into high and low tones, which are tied to accented syllables and phrase boundaries, followed by an unspecified interpolation that subsequently applies. The same holds for timing, where gradient changes of segment durations are categorized as short and long (and where they exist over-long) sounds, and also applies to accents and phrase boundaries. The other way around, the categorical phrase boundaries and accents are represented in continuous duration changes. The relation between these gradient changes in *f0* and duration and the underlying phonological categories is still unclear. Yet, to this day, it is not entirely straightforward, how these phonological categories are represented in prosody. Both, phonetic and phonological research converge in the typological discussion of rhythm of languages (Ramus et al. 1999, Low et al. 2000).

These considerations suggest that there is more to describing and understanding *f0* and temporal patterns than considering categorical, metrical, i.e. phonological, aspects of sentences. By means of examples of the Bernese "Quantitative Approaches to Geolinguistics of Swiss German Prosody" corpus, we illustrate the problematic interplay between phonetics and phonology in the context of prosody. After overviewing key concepts of proso-

dy and a short description of the data, we will show that creating a corpus of spontaneous speech already brings with it many decisions located at the boundaries of phonetics and phonology. In the second part, which addresses temporal aspects of prosody, the phonological classification of long and short vowels as well as the phonetic correlate of phrase boundaries are put into question. In a third part, evidence is presented which underlines the detachment of stress from *f0* movements. Thereby, the central phonological and ultimately methodological assumption that underlying stress patterns predict *f0* movements is put into question. A phonetic intonation model, which allows one to bypass this assumption of *f0* prediction, the Fujisaki, or Command-Response model (Fujisaki and Hirose 1982) model, is presented and its application on the current set of data is illustrated.

2. Key concepts

Before jumping into the relevant topics at hand, key concepts of intonation research, prominence, stress, and the modeling of intonation are touched upon so as to lay the theoretical groundwork for the subsequent presentation of Swiss German intonational and temporal data and the discussion thereof.

2.1. Prominence

Prominence on the word level frequently denotes word accent or lexical accent. The acoustic correlates of prominence are intricate and seem to be language-dependent, and most importantly, it is sensible to differentiate between production and perception: In prominence production, the most critical indicator for varieties of English, for instance, is duration, followed by intensity and, least importantly *f0*. In prominence perception, however, *f0* occupies a more critical role (see Kochanski et al. 2005). Not all languages mark prominence concurrently with the above-mentioned parameters in prominence production. French, for example, shows reduced correlation of these parameters. Vaissière (1983: 66) even claims that

> it is possible that specific interrelations between the three suprasegmental features (*f0*, duration, and intensity) [...] are the most salient characteristics differentiating between languages, dialects and individual ways of speaking. If this is true, most of the existing descriptions of prosodic systems [...] are

> incomplete, since they describe only one parameter at the time. (Vaissière 1983: 66)

As will be shown below, it seems that particularly the Alpine dialects under scrutiny exhibit a somewhat different suprasegmental code as opposed to Midland dialects.

2.2. Stress

Stress is a highly intangible prosodic feature (Lehiste 1970: 106). Stress and accent are often used interchangeably, which adds to the terminological confusion. Stress is governed by the lexicon of a language (as in Englisch or German) or by rules (as Finnish where stress is always on the first syllable) and is marked by prominence. Syllables that carry stress are perceived as more salient. Stress is assigned according to strong and weak syllables, a notion that grew out of metrical phonology (see Liberman and Prince 1977). In this framework, prominence is understood as an abstract feature, which derives from the metrical strength of syllables, consequently, the interconnectedness between stress and prominence. However, prominence is not necessarily lexical stress but it can also be associated with boundary marking.

2.3. Modeling prosody

Intonation models can generally be categorized into more concrete or more abstract approaches (cf. Cutler and Ladd 1983: 2ff.). The former category is frequently referred to as phonetic models, the latter as phonological models of intonation. The two approaches differ vastly with regard to the degree of abstractness postulated of the prosodic representation.

The abstract take towards intonation analyzes the prosodic structure and its relation to phonology and other aspects of grammar so as to generate an inventory of abstract categories, eventually creating a formalization of intonational function and form. By the formulation of rules, the phonological, symbolic approach transposes the abstract phonological description of intonation contours into its concrete phonetic form. Basically, *f0* contours are understood as the addition of atomistic local events: pitch accents on the one hand, and boundary tones on the other (cf. Pierrehumbert 1980). Most importantly for the present paper, much of the work in intonational phonology implicitly presupposes that prominence is first and foremost a function of *f0*. Ladd (2006: 48–49), for example, states that

> A pitch accent may be defined as a local feature of a pitch contour – usually, but not invariably a *pitch change*, and often involving a local minimum or maximum – which signals that the syllable with which it is associated is *prominent* in the utterance. [...] If a word is prominent in a sentence, this prominence is realized as a pitch accent on the "stressed" syllable of the word (Ladd 2006: 48–49).

On corpora of different varieties of English, Kochanski et al. (2005), Silipo and Greenberg (2000), demonstrate that many prominent syllables do display high pitch, yet, many non-prominent syllables follow the same pattern. They conclude that "prominence and pitch movements should be treated as largely independent and equally important variables" (Kochanski et al. 2005: 1052).

In the phonetic approach, claims are made about the concrete, close-to-the-signal phonetic form of intonation. Intonation is understood as the addition of multiple components, consisting of baselines, globally declining phrase components, and local word accents (cf. Öhman 1968, Fujisaki and Hirose 1982). It is the realization of intonation that represents the primary scientific goal. *f0* contours can be modeled blindly, i.e. without, in a first step, taking into account whether *f0* contours are anchored with stressed syllables or not. In a second step, *f0* excursions can be associated with the segmental level. This procedure allows one to deduce the effect of metrical stress on actual *f0* movements.

Timing, on the other hand, has received less attention in prosodic research, except for the quantity opposition on the segmental level, because it is not as functionally loaded as *f0* and it is often regarded as a corollary of *f0*. Therefore, the modeling of segment duration is normally rule-based and more often than not explored in the context of data-driven statistical models for speech-synthesis-systems. In these models, duration changes are usually derived from phonological components such as stress, accent, phrase boundaries, as well as the surrounding segments and the position of the segments within larger entities (foot, word, phrase). Moreover, speaking style, focus and speech rate, which are out of the scope of phonology, are integrated into these models (cf. Klatt 1976, Siebenhaar et al. 2001, van Santen 1998). In many instances, these temporal aspects are directly linked to intonation; yet, as mentioned above, prominence can be marked without *f0*-changes. Nevertheless, there are no genuine linguistic models for timing that function independent of intonation. In this sense, analyzing temporal aspects of spontaneous speech is by itself a methodological approach on prosody that goes beyond the actual intonation-only analyses. Moreover, respecting time as a linguistic phenomenon – articulating a linguistic unit is

intrinsically temporal – opens a view on linguistics, which are not only based on a graphic symbolization of language.

3. Data

The goal of the empirical study was to find prosodic differences between four Swiss German dialects, where the term dialect is used in the German sense of a geographically defined variety. It is only since the end of the twentieth century, that the focus of research in prosody moves from standard languages to regional and dialectal variation. That shift towards dialectal speech implies a revision of the empirical basis from laboratory, word or phrase list data, to data that is based on spontaneous, natural speech (cf. Bucheli Berger, Glaser, and Seiler, present volume, for a syntactic desription of natural speech Swiss German dialects, and Schmid, present volume, for a rhythmic description of Italian dialects). The focus of our analyses lies on an acoustic description, i.e. on a phonetic analysis, of these four dialects. Results of these analyses are published in Leemann (2012), Leemann and Siebenhaar (2007, 2008a, 2008b, 2010). In the present contribution, the center of interest lies not on the data analysis per se; instead, the data are used to illustrate the practical and theoretical problems at the interface between phonetics and phonology.

The data consist of approximately two hours of spontaneous speech. Forty subjects aged twenty from four different dialect regions of German-speaking Switzerland were interviewed. All four dialects belong to the Alemannic dialect family. Speakers (5 females and 5 males per dialect) from two Alpine varieties, Valais (VS) and Grisons (GR), and two Midland dialects, Bern (BE) and Zurich (ZH) were recorded in spontaneous interviews. Approximately three minutes per speaker were manually labeled on a segmental and syllabic level and analyzed for temporal aspects. *f0* contours were explored using the Fujisaki intonation model.

4. Phonetics and phonology in data preparation

In the first steps of data preparation, it becomes obvious that phonetics and phonology can hardly be separated and are co-dependent. This intimate link between phonetics and phonology affects the decision-making process of

an empirical study that aims to explore prosodic differences between dialects – this aspect shall be discussed in this section.

For the analysis of the prosodic aspects, segments of the interviews had to be isolated and labeled. This labeling itself requires decisions on behalf of the labelers which are guided by phonetic and phonological considerations. Even the prosodic level, which in fact represents the dependent variable to be investigated, influences the decisions. To begin with, the basic segments that are to be analyzed had to be decided on. Most linguistic analyses on prosody focusing on intonation choose the syllable as basic unit. However, whether onset, nucleus and coda are equally affected by stress or speech rate changes seems to be language dependent (Barry et al. 2007). Moreover, while the nucleus is more or less unambiguously defined in phonetics as the most sonorant or most articulatorily open gesture between two less sonorant or more closer parts, the definition of the syllable in phonology seems to be an issue of much more controversy. In German, for instance, consonant clusters and schwa deletion characterize the discussion if there are syllabic consonants or if consonants have to be described as extrasyllabic. This is especially relevant if one considers the south German schwa deletion in prefixes (*Gschpängscht* < *Gespenst* 'ghost'). Considering this background, we opt for a segmentation level narrower than the syllable. This level is closer to the phone/phoneme as the basic prosodic unit. The syllable is a derived category based on the sonority hierarchy. For the analysis of *f0*, however, the syllable was chosen as the appropriate unit. The syllable represents the structural anchor point for abstract prosodic features, such as tone or stress, for example.

The segmentation follows a top-down approach, from utterance to phrase and phone, and bottom-up from phones to utterances. The practically justified combination of the two approaches allows for a distinction in ambiguous cases. However, in spontaneous speech, only the definition of "utterance" is not problematic itself, while the definitions of the other units are questionable. The utterance is a speech unit that is pragmatically separated by the question of the interviewer on the left and by the end of the sound chain on the right, the latter of which is generally given by the speaker himself/herself, as the interviewers usually did not intervene. The segmentation of the utterance into phrases poses a greater problem, as the definition of "phrase" can be grounded in grammatical, semantic, pragmatic and prosodic features. With many discontinuities and hesitations, spontaneous speech often disregards syntactical shapeliness (cf. Bucheli Berger, Glaser, and Seiler, present volume), so that pragmatic (conversational) and

semantic aspects of sense units are attributed greater significance. As prosody represents the focus of the current study, prosodic features attributed to phrase boundaries such as pitch changes, final lengthening, pauses and changes of voice quality (Cruttenden 1997) should ideally not affect the decision. However, given the interrelation of the afore-mentioned aspects, the decision as to where to place the phrase boundary is more often than not opaque. None of the mentioned criteria are separately unambiguous, but the interplay between them provides an inter-individually comprehensible decision on where to set a phrase boundary: In the recording of interactive spontaneous speech, perception is where all aspects meet (cf. Gilles 2005: 42–45). Thus, the decision as to where a phrase boundary is labeled is ultimately a pragmatic decision of the investigator based on perception, whether a sense unit was terminated, whether a grammatical unit was terminated, whether the interviewer intervened and so forth. To some extent, the decisions were cross-checked with the project members.

The labeling of the segments is tedious as well. To begin with, it is difficult to say if the labeling is a phonetic or a phonological procedure: In order to define the duration of a sound, the sound must be brought in relation with an independent dimension. This dimension can be the canonical phonological representation. The systematic reductions of spontaneous speech, however, strongly obscure a canonical representation. Let us exemplify this with a word that is often used on different levels of reduction. The full form of *eigentlich* 'actually' in Bern is [ˈɛɪ̯g̊əlɪx], with a variant closer to the standard German [ˈɛɪ̯g̊ətlɪx]. *Eigentlich* is often used as a discourse particle, which is subject to, sometimes quite rigorous, reductions. In this use, the first step of reduction is the loss of the accent [ɛɪ̯g̊əlɪx]. Centralization of the unstressed [ɪ] follows: [ɛɪ̯g̊ələx]. In a next step, the central schwa is syncopated: [ɛɪ̯g̊ləx]; the [l] disappears [ɛɪ̯g̊əx], the schwa of the last syllable is syncopized:[ɛɪ̯g̊x], the complex coda is reduced to a simple fricative [ɛɪ̯x], the diphthong is monophthongized [ɛx] and finally reduced to a schwa [əx]. These reductions are critical complications for the transcription process but even more so, they exacerbate a systematic segmentation of the signal. While the transcription suggests a stepwise reduction, the acoustic signal shows a gradual reduction of the duration and quality of the individual sounds due to the gestural reduction. Thus, labeling, which is based on acoustic features, has to set clear-cut boundaries in the continuum, where one sound can be shadowed by another. It must be emphasized at this point that a highly precise labeling is crucial for the temporal analysis. The calculation of the mean duration of a sound class relies entirely on the labeling

thereof. Let us go back to *eigentlich,* which, too, illustrates this problem. In order to calculate the mean duration of schwa, the question poses itself as to which form, which schwas, need to be included. Is it only the schwa of the medial syllable in the full form [ˈɛɪ̯g̊əlɪx / ˈɛɪ̯g̊ətlɪx] or also the schwa resulting from the reduction of the unstressed [ɪ] in the form [ɛɪ̯g̊ələx] or can it also be the schwa of the fully reduced form [əx]? In our project, we decided to take into account all forms; hence all the mentioned reduction forms are accepted as forms of the lexicon. However, the reductions are marked, so that in a second analysis, one could return to the original forms and consider the reductions separately.

As the definition of phonemes is to a great extent based on word phonology, only the schwas in the full form are regarded as schwa-phonemes. The other schwas result from regular phonological processes and therefore do not represent phonemes proper. From a prosodic point of view, all the schwas in the systematic reduction forms can be regarded as representations of the other (full) phonemes from which the concrete realizations can be measured.

The discussion of the problems in data preparation, exemplified with defining phrase boundaries and transcription, shows that the boundary between decisions based on phonetics and decisions based phonology cannot be drawn strictly. The border proves to be rather a continuum where methodological reflections in the perspective of the goal of a specific project have a great impact on the concrete decisions. Furthermore, it is confirmed once again that, on the one hand, the phonetic continuum can hardly be transferred to a phonological classification and, on the other, that a classification of data of spontaneous speech is hardly possible on a purely phonetic ground.

5. Temporal aspects

5.1. Duration of schwa

One of the central questions that follows from the previous example is whether the phonetic realizations of the schwa phoneme in the narrower sense and the schwas in the broader sense – including reduced variants – behave differently in the timing domain. It turns out that for three of the four dialects, schwas resulting from vowel reductions are shorter than schwas representing phonological schwas in the former, narrower sense.

For the VS dialect, however, schwa phonemes and schwas resulting from reductions are of the same duration. From this we conclude that the four dialects under scrutiny exhibit different strategies of reduction, one that keeps vowel duration more constant (VS) while the others show more variable vowel duration (BE, ZH, GR).

5.2. Stress and focus

As is the case for standard German, Swiss German dialects show lexical stress too. In our data, stress and narrow focus is marked. Narrow focus was marked according to aspects of givenness of information, contrasting information, as well as emphasizing information during the course of the interview. With only few exceptions, there are only stressed syllables that are focused. For all dialects, vowels in focused syllables are significantly longer than those in non-focused but word-stressed syllables, which are again significantly longer than those in unstressed syllables and schwas. The same can be said of consonants; yet, these differences are not always significant. In the context of timing, pragmatic focus and the phonological stressed–unstressed dimension are well reflected in phonetic duration differences. As it has been shown for the schwa reductions, the difference between focused, stressed and unstressed segments is more distinct in BE, GR, ZH than in VS.

5.3. Quantity and phrase final lengthening

The German phoneme system distinguishes short and long vowels. Yet, except for /a~a:/ and /ɛ~ɛ:/ the quantity contrast entails an opposition of tenseness. Therefore, some grammars (e.g. Duden 2005: 26) abandon the opposition in quantity in favor of an opposition in tenseness (/a~ɑ/ and /ɛ~æ/). In contrast to standard German, most Swiss German dialects (and all four dialects discussed here) demonstrate a quantitative distinction of long and short vowels while vowel quality remains the same (*ĝi:ĝələ : ĝiĝələ* ‘to play the violin : to giggle’, *þe:t* : *þet* ‘flower bed : bed’). Swiss German dialects also have a quantity distinction of obstruents (*vaḍə : vatə* ‘calf : cotton wool’; cf. Fleischer and Schmid 2006 for the Zurich dialect). Willi (1996) has shown that the opposition between fortis and lenis plosives in Zurich German is not a distinction achieved through voicing but through consonantal duration. This distinction in duration is also substantiated for the Thurgovian dialect by Kraehenmann (2003), who conceives of the long

and short obstruents terminologically as singletons and geminates. From this we assume, that the distinction of long and short segments should be preserved in all phrase positions. Short segments may not be lengthened, or long segments shortened, so much as to cause perceptual ambiguity at the segmental level. Looking at the long and short vowels in our data, the claim that long and short vowels are always distinct cannot be maintained fully. Phrase-final lengthening affects vowel duration to such an extent, that short vowels in phrase-final syllables exhibit the same length as long vowels in phrase-medial syllables. Figure 1 shows the typical distinction of long and short vowels in phrase-medial and phrase-final syllables, here in the VS data, which are representative of all dialect groups except for the non-accented vowels in GR. The first and penultimate syllables are not taken into account because they show an intermediate duration. Figure 1 indicates that short vowels are on average shorter than long vowels. Yet, the short vowels of the ultimate syllables (u) of a phrase show the same length as the long vowels in phrase-medial syllables (m). From this we conclude that final lengthening, a prosodic feature of phrasing, affects vowel quantity in such a way that the segmental, phonological distinction is no longer maintained over the different position. When we compare the left and the right figure, it is apparent that short vowels are lengthened if they do bear lexical stress. Long vowels are much less affected by stress; stressed and unstressed long vowels are not significantly different. Yet in all four dialects, phrase-final lengthening affects unstressed syllables more than stressed syllables, as they are as long or even longer than the stressed syllables in the same position. Moreover, the figure indicates a high variation that for stressed syllables 8.7% of all mid phrasal short vowels are longer than the mean duration of the mid phrasal long vowels, and more than 4.1% of the long mid phrase vowels are shorter than the mean of the mid phrasal short vowels. The numbers remain at the same level if one only considers long /a:/ and short /a/, which eliminates inter-vowel distinctions.

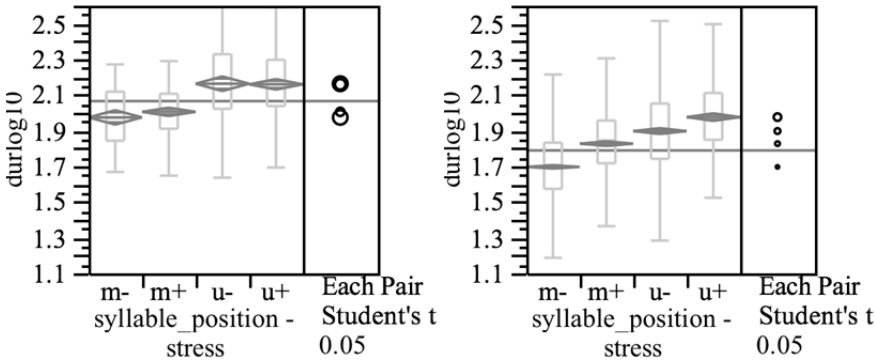

Figure 1. Box plot of duration and confidence intervals of long vowels (left) and short vowels (right) in phrase-medial (m) and ultimate (u) position, stressed (+) and unstressed (-). The overlapping circles on the right of the figure show that the difference of stressed and unstressed long vowels is not significant.

5.4. Degree and extent of phrase final lengthening

Phrase-final lengthening has been documented in many studies covering numerous languages but the degree and extent of lengthening varies between languages (cf. Fletcher 2010: 540). Our project shows that the degree and extent of phrase-final lengthening even varies within the selected Alemannic dialect group. Figure 2 shows the duration of schwas that are phonologically represented as such in different positions in the phrase for the ZH and the VS dialect. If we compare only schwas, there is no interference from different vowel qualities, quantities, and stress and we can analyze the 'pure' influence of the position of a syllable in a phrase on the duration of the vowel. The figures reveal that phrase-final lengthening is much more distinct in ZH than in VS. On the one hand, the lengthening is more prominent in phrase-final syllables, on the other hand, its effect on penultimate syllables is clearly evident. Moreover, phrase boundaries are also marked with a phrase-initial lengthening in ZH, while this is not the case for VS. The two other dialects (BE and GR) behave along the lines of the ZH dialect.

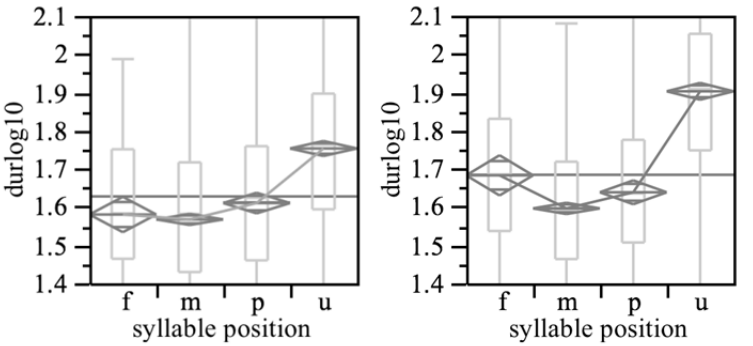

Figure 2. Box plot of duration and confidence intervals of phonological schwas in first (f), medial (m), penultimate (p) and ultimate (u) syllables of phrases in the ZH dialect (left) and the VS dialect (right).

Despite the different characteristics of phrase-final lengthening (and the additional phrase-initial lengthening), the connection between temporal changes and perceptual structuring of utterances is clearly visible for both dialects. A phonological interpretation of the phonetic continuum seems thus appropriate. It should be noted, though, that the statistical dispersion in each position is very high, which points to the fact that the duration of an individual sound cannot unambiguously be interpreted and connected to a certain position of the syllable in the phrase. Even in the ZH variant, where we encounter a very distinct phrase final-lengthening, 8% of all schwas in mid-phrase position are longer than the mean of the schwas in phrase-final position; in return, 8 % of all schwas in phrase-final position are shorter than the mean of the mid-phrase schwas. For VS, this value even amounts to 20%.

6. Intonation

6.1. Methods

The methodological framework chosen to analyze *f0* contours in the present contribution is somewhat unorthodox. We do not follow the dominant autosegmental phonology metholodogy (Goldsmith 1976, Liberman and Prince 1977) and the derived transcription system therefrom, i.e. ToBI (Pierrehumbert 1980). Given the distinct dialectal diversity of German-speaking Switzerland, it is considered appropriate to apply a model that has the ability to detect phonetic details with great specificity. These objective

measures can then serve as the basis for phonological interpretations. Further methodological concerns as to the reasons for opting for a phonetic intonation model will be illustrated in Section 7. Intonation contours are therefore explored using the Fujisaki, i.e. the Command-Response model.

The Command-Response Model is hierarchically structured and formulated as a linear model. As input signals, the model receives phrase commands (PCs) in the form of impulse functions and accent commands (ACs) in the form of rectangular functions. The output signals of the two mechanisms are added onto the smallest asymptotic value (Fb) of the *f0* contour to be generated. For analysis purposes, the model decomposes the *f0* contour into a set of components from which timing and frequency information can be estimated. The PC can be applied for a description of the global declination tendency of *f0*. The AC is understood as a device for marking segments more *f0*-prominent on the local level. *f0* contours in our data were analyzed by means of Mixdorff's FujiParaEditor (2012). The *f0* behavior in each of the afore-mentioned variables was analyzed using parametric and non-parametric statistical tests against the background of detecting dialect-specific as well as cross-dialectal differences. Dialect-specific multiple linear regression models were generated, which allow for a distillation of the relative contribution of independent variables towards explaining *f0* variability in a given parameter in a specific dialect.

In the subsequent presentation of the results, a particular focus will be placed on how the variable stress does – or does not – affect *f0* behavior. This variable deserves particular attention since, as mentioned and criticized earlier, the methodological framework of intonational phonology implicitly assumes that *f0* modulations occur on or in the vicinity of stressed syllables.

6.2. Distribution of stressed syllables in accent commands

Most ACs contain only one syllable with lexical stress. 15% of all ACs incorporate two or more stressed syllables. Interestingly, however, more than a third of all accents do not contain any stressed syllables at all. This finding is congruent with the insights put forth by Kochanski et al. (2005) and Silipo and Greenberg (2000). A great number of unstressed syllables in their corpus of spontaneous speech are marked with distinct *f0* movements. This finding corroborates the meaningfulness of treating *f0* and stress as separate variables.

Secondly, this result may further serve as evidence of what is frequently found in the literature on both Swiss German (see Hegetschweiler 1978: 24) as well as Swiss High German intonation (Ulbrich 2005: 320): Swiss German default accents often demonstrate a low *f0* in an otherwise stressed syllable, and a high *f0* in subsequent, otherwise unstressed syllables. This delay in pitch movement with regard to stress has been observed particularly for the Alpine varieties. In the ToBI framework, such accents can be labeled as L*+ H (cf. Fitzpatrick-Cole 1999).

6.3. Amplitude of stressed syllables in accent commands

Overall, we find the highest amplitudes in ACs that contain one or more stressed syllables. If the AC does not contain any stressed syllables, it is generally lower in amplitude. This finding underlines the phenomenon that, in the stream of speech, metrical stress can cause higher *f0* excursions, and is congruent with the vast amount of literature on acoustic correlates of stress in German (see for example Isačenko and Schädlich 1966). If we take into consideration the findings put forth at 6.2, we can conclude that even though *f0* excursions may be caused by stressed syllables, this needs not necessarily be the case. What seems to be happening, however, is that *f0* excursions that are caused by stressed syllables are higher in amplitude than *f0* excursions for ACs without stress. In other words, metrical stress does not have to be accompanied by local *f0* movements (accent commands), but if it is, stress seems to cause distinctly higher AC amplitudes.

All dialects exhibit roughly the same proportions of ACs with 0 stressed syllables, yet, we find that the differences in amplitude between ACs with 0 stress and ACs with 1 or more stressed syllables are more distinct for the Midland varieties than the Alpine varieties. We find a striking North-South divide with the Alpine varieties showing similar amplitudes for all AC types, regardless of whether the AC contains no or several stressed syllables. This ties in with Wipf's (1910: 22) observation on VS Swiss German that unstressed syllables can also carry higher tones, as well as Meinherz' (1920: 38ff.) remark that weak syllables in the Grison dialect often carry higher pitch accent than highly dynamic ones. In comparison, we observe a distinct difference between no stress ACs (low amplitude ACs) and ACs with one or more stressed syllables (much higher amplitudes) for the Midland varieties. Put differently, the contribution of metrical stress to AC amplitude seems to occupy a more critical role in the Midland varieties, particularly in the BE variety.

6.4. Effect of stress in multiple linear regression models

The most striking differences between the Alpine and Midland groups are found in the relative weight of the *linguistic* predictors in the *AC amplitude* models, including the predictor *stress*. Figure 3 shows the radar charts illustrating the multiple linear regressions (MLRs) calculated on each dialects' speakers' AC amplitudes.

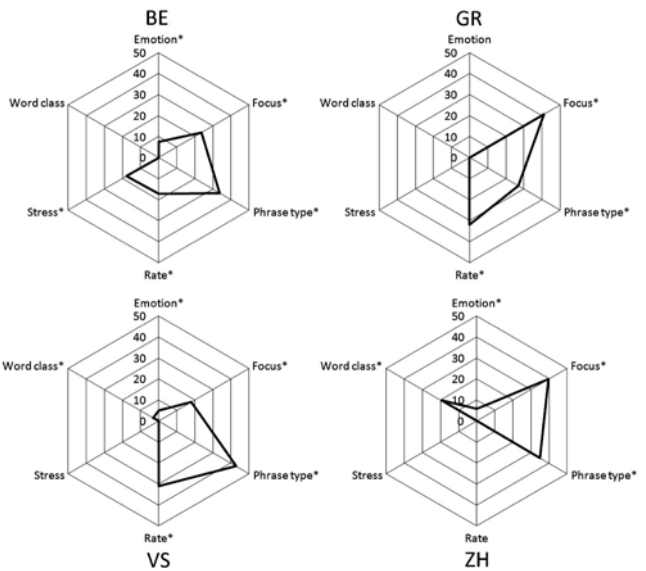

Figure 3. Radar chart illustration of MLR of AC amplitudes for all four dialects (From: Leemann 2012. Reprinted with kind permission from John Benjamins Publishing Company, Amsterdam/Philadelphia).

The variables taken into consideration in this MLR are emotion (5 levels – neutral, bored, angry, happy, sad), focus (2 levels – no focus / focus), phrase type (3 levels – continuing, terminating, question), articulation rate (speaker specific in syllables / second), stress (2 levels – stress / no stress), and word class (2 levels – lexical / grammatical). The MLRs in Figure 3 points to the fact that stress, as a linguistic predictor, bears little power in *f0* movement prediction in all dialects, except for the BE dialect (adjusted $R^2 = .13$; $F(14, 2537) = 29$, $p < .0001$). In the ZH dialect, *stress* proves to be a highly significant predictor in bivariate tests; in the generated models, however, stress just fell short of reaching significant levels.

An explanation as to the GR speakers' low sensitivity to lexical stress may lie in the GR speakers' contact with Romansh and Italian, two Romance languages also spoken in the canton of GR. Italian shows penultimate and antepenultimate stress and exhibits right-headed rhythmic groups frequently featuring low-high *f0* movements (see Hirst and Di Cristo 1998: 24, Rossi 1998: 220). Romansh, too, exhibits lexical accents in word-final or penultimate position (see Cavigelli 1969). Since in most Germanic languages, feet are left-headed, while Italian and Romansh are right-headed, one may speculate that the Grisons dialect can be regarded as a mix-version of these two stress systems. Note, also, that Grisons varieties frequently feature the archaic feature of non-reduced word-final syllables, which may too, add to distinct *f0* modulations in unstressed syllables. One may conclude from this is that if the Grisons, over centuries, alternatively incorporated both rhythmic group patterns, it could be hypothesized that stress will eventually lose importance, since stress is no longer perceived as discrete. Therefore, we hypothesize that the generally devalued variable stress in the Grisons dialect is likely to have little effect on the variance of *f0* contours.

As for the VS speakers' low sensitivity towards stress, illustrated in Figure 3, the same arguments as put forth for the GR's low sensitivity towards stress may apply. French (and Franco-Provencal), with which the VS speakers are in contact in the West, is a language in which the prominence markers *loudness*, *duration*, and *fundamental frequency* are correlated only little. These prominence marking parameters are set according to the first and the last syllable of the word: the first syllable normally shows a rise in *f0*, while the word-final syllable may exhibit a variety of prominence contrasts, frequently, however, a rise in *f0* (see Welby 2006). The exposition of the Valais dialect to the prominence systems of French may over centuries have led to an interesting mix. This language contact may have contributed to complex and somewhat unpredictable *f0* variability that Wipf (1910) alludes to. In addition, Valais varieties, too, commonly feature the archaic feature of non-reduced word-final syllables. These may too contribute to distinct *f0* modulations in unstressed syllables.

We can conjure alternate interpretations concerning the distinct difference between Alpine and Midland dialect behavior. Exploring language and migration history may provide one way of tapping into these differences. Given the mountainous terrain, Alpine varieties may have served as linguistic refuges over the past centuries and - in that sense - may represent what Johanna Nichols (1993) refers to as residual zones. Here, the highest Alemannic varieties were preserved, retaining what are now described as

archaic features. On a segmental level, these differences can be reconstructed in part (Wiesinger 1983: 829, Hotzenköcherle 1984). However, a historical reconstruction of prosodic – particularly intonational – features is an impossible endeavor given the apparent lack of audio data from past centuries.

7. Discussion

During the prosodic analysis of spontaneous speech, one faces many challenges that cannot be solved on phonetic or phonological grounds alone, because phonetics and phonology are closely interrelated. The transcription as well as the segmentation processes themselves do not allow for an analysis of purely phonological entities – since we are given only a purely phonetic realization in the signal of which a phonological representation has to be abstracted. This basic phonetic realization contains reductions of sounds, coarticulation, allegro forms, language change and linguistic variation. It is these phenomena which do not allow for a uniform phonological representation of words, of sounds, and of phrases. Phonetic considerations, perception, semantics and syntax intervene when it comes to defining the basic units of the analysis. Even prosody itself cannot be excluded in defining phrase boundaries, for example, and if we do include prosodic cues in our definition of phrase boundaries, it is not clear if there is a phonological or a phonetic view on it. The dichotomous view on phonetics and on prosody is fuzzy, to say the least. Decisions in data preparation are therefore methodologically highly relevant and, accordingly, must be stated very clearly.

Evidence from a large corpus of Swiss German dialectal speech underlines the detachment of phonologically defined stress from phonetic parameters as segment duration and intonation – which is particularly true in the context of spontaneous speech. In the temporal domain the phonological distinction of stressed and unstressed syllables is at least partially reflected in phonetic duration, albeit with a great variance, so that a direct link of stress and duration cannot be made, especially because the position in the phrase – beside others not mentioned here (cf. van Santen 1998) – affects segment duration and interferes with stress. However, phonologically short segments are lengthened by stress while phonologically long vowels show little or no effect of stress on duration.

Results from the present study highlighted the benefits of conceiving of intonation as a matter of degree rather than a binary feature. In the au-

tosegmental framework it is not the aim to capture continuous *f0*-movements that signal prominence. It is not clear whether ToBI (Silverman et al. 1992, Grice and Baumann 2002 for German) is intended to provide phonetic transcriptions of intonation, phonological transcription, or possibly neither of the two (Grabe 1998). Taylor (2000: 1709) critically indicates that "there has been no evidence to show that there are strict boundaries between intonational units which signal abrupt changes in meaning". He continues to say that if intonational sound *SA* gives rise to meaning *MA* and sound *SB* gives rise to meaning *MB*, then a sound half-way between *SA* and *SB* can certainly give rise to a meaning somewhere between *MA* and *MB* (ibid.). Along these lines Fox (2000) adds:

> [T]he continuous phonetic scale is reflected in a parallel continuous scale of meaning. It is therefore difficult to identify on the basis of the criterion of distinctiveness of meaning a restricted number of phonologically distinct entities which underlie the very large number of occurring manifestations (Fox 2000: 275).

Methodologically, then, the use of a quantitative phonetic model, which allows one to model every *f0* movement, regardless of where stress is located in the segmental string, seems more optimal. For the temporal aspect, the phonological claim is the same, and here, the traditional phonological distinctions are by and large found in the data. However, the duration of a particular sound is very variable, so that also in timing an unambiguous attribution of a duration pattern to a stress value or to a specific syllable position within the phrase is not possible.

Furthermore, opting for a quantitative account of prosodic features of Swiss German constitutes a significant contrast to a majority of intonation studies working in abstract and symbolic frameworks. Here, the first methodological step consists of analyzing and parametrizing the *f0* contour. Only in a second step we establish the linguistic analysis of these mathematical parameters and their relation to the individual segments. This provides innovative insight into dialectal *f0* contours that is not conceivable with symbolic, syntactic, or functional conversational analytical analyses. Hence, the findings in the current study can complement, specify, and support existing findings on *f0* patterns and on statements on temporal aspects of Swiss German. In addition, even minor differences in *f0* realizations and in durational relations, albeit on a subphonemic level, may in the end prove to be perceptually relevant for a cross-dialectal comparison – as it has been attested for the segmental level (cf. Haas 1978). The different temporal and intonational patterns in marking phrase boundaries will most probably not

be of phonological difference. Nevertheless, they show different prosodic models, which may potentially mark different functions. Apart from a contingent differentiation in meaning within a dialect these differences characterize each dialect with a specific sound that is perceived and stereotypically attributed (Leemann and Siebenhaar 2008b, Zimmermann 1998). This perceptual finesse should make us cautious about phonological preconceptions of prosodic entities, since they imply distinct boundaries, where we still have to find them. To accept a blurred distinction between phonology and phonetics may help us facing prosodic diversity in a multi-layered dialect area without blinkers and illusions, which opens the path to new methodological approaches.

References

Barry, William, Bistra Andreeva, and Ingmar Steiner
2007 The phonetic exponency of phrasal accentuation in French and German. In *Interspeech 2007*. Antwerpen: 1010–1013.

Bolinger, Dwight
1972 Accent is predictable (if you're a mind-reader). *Language* 48: 633–44.

Browman, Catherine P., and Louis Goldstein
1992 Articulatory Phonology: An Overview. *Phonetica* 49: 155–180.

Byrd, Dani, and Susie Choi
2010 At the juncture of prosody, phonology, and phonetics – The interaction of phrasal and syllable structure in shaping the timing of consonant gestures. In *Papers in Laboratory Phonology 10*, Cécile Fougeron et al. (eds.), 31–60. Berlin: Mouton de Gruyter.

Cavigelli, Pieder
1969 *Die Germanisierung von Bonaduz in geschichtlicher und sprachlicher Schau*. Frauenfeld: Huber.

Cruttenden, Alan
1997 *Intonation*. Cambridge: Cambridge University Press.

Cutler, Anne, and D. Robert Ladd
1983 *Prosody: models and measurements*. Berlin: Springer.

DUDEN
2005 *4. Grammatik*. 7th *Edition*. Mannheim, Leipzig, Wien, Zürich: Dudenverlag.

Fitzpatrick-Cole, Jennifer
1999 The alpine intonation of Bern Swiss German. In *Proceedings of the XIVth International Congress of the Phonetic Sciences (ICPhS)*, San Francisco: 941–944.
Fleischer, Jürg, and Stephan Schmid
2006 Zurich German. *Journal of the International Phonetic Association* 36 (2): 243–253.
Fletcher, Janet
2010 The Prosody of Speech: Timing and Rhythm. In *The Handbook of Phonetic Sciences, Second Edition*, William J. Hardcastle, John Laver, and Fiona E. Gibbon (eds.), 524–602. Oxford: Blackwell.
Fox, Anthony
2000 *Prosodic Features and Prosodic Structure. The Phonology of Suprasegmentals*. Oxford: Oxford University Press.
Fujisaki, Hiroya, and Keikichi Hirose
1982 Modeling the dynamic characteristics of voice fundamental frequency with applications to analysis and synthesis of intonation. In *Preprints of the Working Group on Intonation. 13th International Congress of Linguistics,* Tokyo: 57–70.
Gilles, Peter
2005 *Regionale Prosodie im Deutschen. Variabilität der Intonation von Abschluss und Weiterweisung*. Berlin/New York: de Gruyter.
Goldsmith, John
1976 *Autosegmental and Metrical Phonology*. New York: Garland.
Grabe, Esther
1998 Comparative Intonational Phonology: English and German. PhD Thesis. Wageningen: Ponsen en Looien.
Grice, Martine, and Stefan Baumann
2002 Deutsche Intonation und GToBI. *Linguistische Berichte* 191: 267–298.
Haas, Walter
1978 *Sprachwandel und Sprachgeographie. Untersuchungen zur Struktur der Dialektverschiedenheit am Beispiele der schweizerdeutschen Vokalsysteme.* Wiesbaden: Steiner.
Hegetschweiler, Peter
1978 Comparing Native English Intonation and English Intonation of Swiss Germans. Unpublished MA thesis, University of Zürich.
Hotzenköcherle, Rudolf
1984 *Die Sprachlandschaften der Schweiz*. Aarau, Frankfurt, Salzburg: Sauerländer.