Phonological Tone

From physiology and acoustics to patterning across languages, tone is one of the fundamental constructs in human languages and also among the hardest to apprehend. Drawing upon a large number of languages around the world, this volume explores the concept of tone, from its physical properties of articulation and acoustics to its manifestation in phonology. It is designed as a comprehensive study accessible to the novice and useful for the expert; each chapter covers a particular aspect of tone in increasing depth and complexity, weaving together key concepts and theories that provide complementary or competing accounts of tone’s phonological intricacies. In the process, we uncover the underlying laws and principles that inform today’s understanding of the subject to form a more synthesized view that also allows us to explore the relation of tone to other important areas of humanity such as literature, history, music and cognition.

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KEY TOPICS IN PHONOLOGY

Key Topics in Phonology focuses on the main topics of study in phonology today. It consists of accessible yet challenging accounts of the most important issues, concepts and phenomena to consider when examining the sound structure of language. Some topics have been the subject of phonological study for many years and are re-examined in this series in light of new developments in the field; others are issues of growing importance that have not so far been given a sustained treatment. Written by leading experts and designed to bridge the gap between textbooks and primary literature, the books in this series can either be used on courses and seminars, or as one-stop, succinct guides to a particular topic for individual students and researchers. Each book includes useful suggestions for further reading, discussion questions and a helpful glossary.

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Intonation and Prosodic Structure by Caroline Féry
Phonological Tone by Lian-Hee Wee
Phonological Tone

LIAN-HEE WEE

Hong Kong Baptist University
To Shiao-wei Tham, who introduced me to linguistics, 
and the teachers whose lessons I’ll never forget.
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Preface

Like other volumes in this series, this is intended as a compact, one-stop readable reference on its topic, in this case, the study of tone in the field of phonology. It is not a textbook, a book-length treatment on a specific aspect of tone, or an indexed set of topics to be used like a small handbook or encyclopedia. As a research monograph, this work weaves together different strands of phonological understanding from new fieldwork data, as well as improved studies in phonetics, historical linguistics, dialectology and even cognition. Unlike earlier works on this subject, a common thread runs through the chapters in this volume as we move into the 2020s connecting the various areas of tonological studies that might not have been obvious before. Thus, this volume supplements landmark precedent works such as Yip (2002), Chen (2000), van der Hulst & Snider (1993) and Fromkin (1978), among many others, by drawing upon their insights and by connecting them to research that came after them.

Juxtaposition of the many different strands of research is something not often found in books on tonological research, and I hope that this approach will facilitate dialogue between tonologists of different persuasions: theoretical, phonetic, dialectological, historical and, possibly, cognitive. The dangers of designing such a volume are obvious: inadequate treatment of each of the subfields or foci so disparate that the topics fail to combine into a coherent reading. Where possible, I have tried to explain the connections and to make explicit the areas where our understanding must remain open to review and revision. For example, although I offer the Obligatory Contour Principle (OCP) as a universal and important force in tone alternations in Chapter 4, non-OCP analyses are also considered in view of where OCP might have fallen short. Ultimately, the chapter provides a taxonomy of tone sandhi types that is offered as an invitation for sandhi enthusiasts to find what might be a better, all-encompassing
theory. Similarly, the optimality theoretic (OT) analyses offered in Chapter 5 are tempered by opaque phenomena of various types. Such a presentation creates an air of uncertainty in our understanding, but at least there will be no false sense of security.

With the rapid ballooning in the mass of extant research, a compact volume such as this must necessarily make difficult choices on what to include. Data-wise, this volume takes a two-prong approach. On the one hand, it inherits classic data from previous studies. On the other hand, it features more recent discoveries reported in quality research dissertations, important conference proceedings and fieldwork studies. Sources too antiquated or too recent are likely to be obscure, and URLs, where available, are provided in addition to bibliographical information. In all cases, the author has tried to provide the fullest picture of the data possible within the constraints of space. Another special feature of this volume is its presentation of historical material so that the reader can see how certain modern concepts have evolved, not just out of the genius of a few linguists but as a continued collaborative effort across time and space. For example, tonologists tend to present studies on tone representation only in terms of theoretical studies that begin in the 1960s (Wang 1967, Woo 1969 and later works). However, experts have been working on that in modern China since the 1920s, the ancient Thais since the thirteenth century, and the ancient Chinese since the fifth century! In writing a new volume on phonological tone, it is perhaps time also to remember the old that has fallen by the wayside.

As a volume in the Key Topics series, this work can potentially be used as a textbook for advanced undergraduate classes or early postgraduate classes in the area of tone. To facilitate such usage, the volume offers Discussion Questions to encourage independent exploration. The Discussion Questions may look like exercises, but they are in fact real problems that might threaten the analytical views presented in the volume. As such, they are intended as germinates for research, potentially suitable as term papers or something larger, depending on the student’s take. For those among us not used to exploration in a labyrinth, this volume is going to lead to a swimming headache and a deep sense of insecurity, because every piece of “knowledge” is so tentative. In the end, one should not claim to have obtained any conclusive “knowledge of phonological tone” at all, other than a sense of the many issues surrounding the concept. My hope is that the student reader will feel armed with the arsenal of theoretical understanding built by wise phonologists past and
present, and then be driven by the insecurities of our limitations to dig deeper and further through new angles of thought, innovative methods of experimentation and fresh approaches in field studies.

Different phonologists at different times have found their way into the fascinating area of tonology. This book is my take in constructing what I hope is a scenic route toward understanding phonological tone. Chapter 1 begins with figuring out why one should believe that there is such a thing as tone at all. In the past, this was motivated simply by providing minimal pairs where pitch/fundamental frequency (F0) is arguably contrastive. However, such an approach oversimplifies the argument for tone, because F0 is also an acoustic correlate of stress, and tone has other articulatory/acoustic correlates. In Vietnamese for example, phonation comes into play as well. This chapter introduces some rudimentary concepts in the description and notation of tone in relation to both phonetic properties and phonological contrasts, paving the way for phonological exploration of the topic.

Chapter 2 addresses the phonological units that are thought to be associated with tone. Traditionally, tone is assumed to be part of a syllable and serves to provide contrast, particularly lexical or word-level contrast. However, a comparison of patterns in various languages will reveal that tone-bearing units may include a range of linguistic entities ranging from segments, syllables, feet and words to even larger domains such as phrases. Further, tones can float and thus vary in their choice of association. All these factors lead us to the idea that tones are autosegments, i.e. autonomous phonological units independent of the segments through which the phonetic properties of a tone are manifest. Autosegmentality thus offers a unified study of pitch-related phenomena across lexical and post-lexical levels. This enables the integration of studies on tone and intonation through autosegmentality, a position that has been gaining acceptance since the 2000s.

Chapter 3 looks into the components that make up tone: register, contour and features. The chapter begins with the stirrings of antiquity in tonal representation, before leading to data from fieldwork studies. These became the foundations of modern tone notation, which in turn precipitated a theory of features. Exactly what features are involved would depend on one’s theory, but the general idea is that one must capture the shape of the tone (level, rising, falling, dipping or peaking) as well as the number of levels of contrast across the tones in a given language. These two properties are best captured in terms of register and contour. Register
provides information on the pitch range within which a given tone is articulated; contour provides a description of the shape. In principle, one can use the same set of features for both register and contour, so that [high] register indicates that the tone contour is articulated in the upper half of the pitch range, whereas [high] contour indicates that the shape is a high flat tone corresponding to the register in which it is articulated. Contoured pitch profiles can then be described in terms of a concatenation of features. In practice, however, some linguists might use different notations to distinguish register and contour for clarity of exposition. With tone features (for register and for contour alike), the chapter moves on to discuss the geometry of how the features are organized to make tone. A number of different models are available in the literature, although consensus appears to be shifting toward a model where register and contour are two separate constituents that together comprise a tone. Drawing on Chapter 2, it can be seen that the tone, with its complex structure, is nonetheless an autosegment that can be associated with different TBUs such as the syllable, foot or phrase. This conception provides a way of understanding tone terraces in which a string of syllables appears to exhibit the confinements of pitch range akin to registers.

Chapter 4 looks into the phenomenon of tone alternation to raise the question of their phonetic or phonological natures, making a distinction between what is part of the physiology and what is part of the abstract mental system. Distinguishing the two is not straightforward, although, where possible, a phonetic solution is favored as the null hypothesis, since that is directly grounded on physiology and avoids postulation of abstract phonological entities. However, there are cases where a phonetic solution is clearly inadequate, especially when the result of tone alternation does not always favor phonetic ease (articulatory or even perceptory). Phonological explanations would thereby have to be evoked. The chapter ends with a set of tone alternation phenomena that a tonologist might face, leading to the phonological explorations of the following chapter.

Chapter 5 expounds on possible underlying phonological explanations of tone alternation patterns. It is largely set within an OT framework because of the framework’s explicit requirement to account for patterns across languages using the same set of “universal” constraints. This does not commit one to being an OTist, but it does prize efforts to explain tone patterns using the same
Preface

linguistic principles (that is, the typology of languages) over language-specific rules that are repetitive across languages.

The preceding chapters focus almost exclusively on tone as an autonomous unit. Chapter 6 trains its sights on tone through interaction with other aspects of phonology. It looks at such effects with segments as well as with prosody. In both cases, it turns out that modern synchronic patterns are mirrored in diachronic processes of **TONOGENESIS**. The chapter ends with a discussion on the relation of tone and prosody, exploring in particular how tone behaviors correlate with prosodic prominences, as well as the possibility that tone might be used for poetic meter. The study of tone within the boundaries of linguistics ends here, and Chapter 7 brings us to the threshold to glimpse the cognitive aspects of tone.

Chapter 7 ventures beyond linguistics to look at cognitive aspects of tone. In particular, this chapter explains how one must be wary of drawing a simplistic and direct correlation between tone and music, even though a study of the tone–music interface is a worthy one. It turns out that, while there is no musical advantage to speakers of languages where tone is lexically contrastive, tone is processed in the brain in intricate ways that researchers are only beginning to understand. It appears that the auditory cortex must sort out when pitch information is linguistic and then trigger activity accordingly in relevant parts of the brain. As far as acquisition of tone is concerned, research appears to have been narrowly focused on Standard Chinese (a Han language), presumably because of market forces. Thus ends the seven-chaptered journey in this exploration of tone. It begins with the phonetic properties of tone, moving on to tone’s autosegmentality, its internal compositionality and its phonological analysis. From there, the exploration of tone moves into a discussion of its interaction with other aspects of phonology and its genesis, before ending further afield in the areas of music and cognition.

This book does not assume that the reader has any prior knowledge of tone, but it does require the reader to have had some exposure to phonetic and phonological training, particularly the ability to read phonetic symbols. The reader should also be familiar with linguistic concepts such as syllables, stems and affixes and basic word classes such as nouns, verbs and adjectives. Some basic music education would also come in handy. Throughout the volume, the first occurrence of any term explained in the glossary will be in **SMALL CAPS**. Languages mentioned in this book are also included in a language index.
Writing a book like this presents the challenge of dealing with too many possibilities, and I can only provide a much smaller coverage of the myriad data that has fascinated so many linguists before (and, with hope, after) me. This is not to say that this book does not have a central set of theses. Through the chapters, the book hopes to make a case (i) for tone as a phonological concept that is best viewed as autosegmental and that may associate with various types of TBUs, (ii) for the importance of also studying the physical phonetic correlates without which phonological tone cannot be manifested and (iii) for a place for the study of tone among the cognitive sciences.
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