Volume Proposal: *Handbook of Japanese Phonetics and Phonology*  

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**Main Goals**  

This volume describes the basic phonetic and phonological structures of modern Japanese with main focus on standard Tokyo Japanese. (The phonetic and phonological properties of some major dialects are dealt with in the Dialect volume.) Its primary goal is to provide a comprehensive overview and descriptive generalizations of major phonetic and phonological phenomena in modern Japanese by reviewing important studies in the fields over the past century. It also presents a summary of interesting questions that remain unsolved in the literature.  

The volume consists of eighteen chapters in addition to an introduction to the whole volume by the volume editor (Part I). The eighteen chapters are grouped into three parts from Part II to Part IV, according to the nature of the phenomena they deal with. Part II consists of five chapters all of which analyze segmental properties of Japanese such as new consonant phonemes, *sokuon* (or geminate obstruents), vowel devoicing and diphthongs. Part III discusses word-level phonetic/phonological phenomena and structures as well as those beyond the word. This includes word accent, various phonological processes characteristic of word formation processes such as *rendaku* (or sequential voicing) and compound accent, as well as prosodic phenomena known as speech rhythm and intonation. Finally, Part IV examines phonetics and phonology in their interface with other subfields of linguistics such as syntax-phonology interface, loanword phonology, corpus and historical linguistics, and L1/L2 research. All six chapters in this part attempt to reveal phonological structures of modern Japanese which would otherwise remain uncovered.  

While providing descriptive generalizations of empirical phonetic/phonological facts, this volume also aims to give an overview of major phonological theories including, but not restricted to, traditional generative phonology, lexical phonology, prosodic morphology, intonational phonology, and the more recent Optimality Theory.  

Each of the eighteen chapters will contain 10,000 to 15,000 words and will be written by one or two authors. All authors have already agreed to contribute to the volume.  

**Timetable**  

December 31, 2012: Deadline for the first drafts  
January—February: Peer Review (each paper by two internal reviewers)  
March—May: Revision by each author  
May 31: Deadline for final papers
Structure of the volume

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Details of Each Chapter

Introduction (Haruo Kubozono)
This introductory chapter provides an overall introduction to the sound system of modern Tokyo Japanese, such as vowel and consonant inventory, accentual patterns, as well as a brief introduction to each topic dealt with in the subsequent chapters. It is also in this chapter that some basic concepts/notions and terminologies that are commonly used in the volume are defined. These include notions such as the mora, the syllable, word accent, and intonation. It also sketches the basic organization of the lexicon of modern Japanese and its lexical categories (i.e. native, Sino-Japanese and foreign words). In addition, this chapter also mentions the division of labor between this phonetics/phonology volume and other volumes that partially overlap, particularly the history and the dialect volumes.

Section 1: Vowel system
Section 2: Consonant system
Section 3: The mora and the syllable
Section 4: Word accent patterns
Section 5: Lexical categories
Chapter 1 Emergence of New Consonant Phonemes (Pinter Gabor)

Although there is no absolute consensus about the history of the Japanese sound system, it is beyond debate that it witnessed a dramatic increase in the number of consonant phonemes over the last thousand years. The present chapter gives an overview of how these consonant phonemes emerged historically in the language, and how these patterns recur in ongoing phonologization processes in modern Japanese. The research shows how vowel-sensitive allophony (e.g., t-ch-ts) and pressure from loanwords play an important role in the development of new phonemes. It also points out how CV restrictions (e.g. *[si]) can fit into a general phonological explanation that incorporates concepts from perceptual and articulatory phonetics.

Section 1: Background
1.1 A brief history of Japanese and its consonant system
1.2 Modern Standard Japanese
1.3 Loanwords and the structure of the lexicon
1.4 Approaches and Explanations

Section 2: Analysis
2.1 Sibilant fricatives (s, sh)
2.2 Non-sibilant fricatives (f, c, h)
2.3 Affricates (ts, t)
2.4 Voicing Asymmetries

Section 3: Summary
3.1 Implication for historical research
3.2 Predictions for ongoing trends
3.3 Interfaces with other problem domains

Section 4: Concluding Remarks

Chapter 2 Phonetics of sokuon, or geminate obstruents (Shigeto Kawahara)

This chapter provides an overview of the phonetic aspects of Japanese obstruent geminates, known as sokuon. This chapter starts by reviewing the phonetic correlates of Japanese geminates. The primarily cue has been taken to be constriction duration, accompanied by various secondary cues. The chapter also compares these features of Japanese geminates with those found in other languages. Then the chapter turns to the effect of manner on geminates, focusing on fricative geminates and voiced geminates. The last topic of the chapter is the perception of geminates, reviewing several perceptual cues for Japanese geminates, again in comparison with other languages. The chapter ends with discussion of topics that need further investigation.

Section 1: Production of Japanese geminates
1.1 Primary cues
1.2 Secondary cues (Idemaru, Kawahara)
1.3 Search for invariance (Hirata and Whinton, Idemaru and Guion)
1.4 Manner effects

Section 2: Perception of Japanese geminates
   2.1 A survey of perceptual cues
   2.2 Comparison with other languages (Hankamer and Lahiri)

Section 3: Remaining issues
   3.1 Derived geminates vs. underlying geminates
   3.2 Phonetics of emphatic geminates

**Chapter 3 Phonology of sokuon, or geminate obstruents (Itsue Kawagoe)**

This chapter describes sokuon, or geminate consonants in Japanese, focusing on sokuon in loanwords. The first section discusses how sokuon was first seen in the Japanese vocabulary as a sound change caused by the introduction of Chinese loanwords. The second section reviews the distribution of sokuon in the native and Sino vocabularies, and the third its distribution in loanwords from English. In the final section, various phonological analyses of sokuon in English loanwords are presented, from the earliest research to recent Optimality Theoretic approaches.

Section 1: Emergence of sokuon in the Japanese lexicon
Section 2: Sokuon in native and Sino vocabularies
Section 3: Sokuon in loanwords
   3.1 Word-final CVC strings of source words
   3.2 Other strings in source words
Section 4: Phonological analysis of sokuon in loanwords
   4.1 Early research
   4.2 Recent research
   4.3 Optimality Theoretic approaches
Section 5: Residual problems

**Chapter 4 Vowel Devoicing (Masako Fujimoto)**

This chapter describes various aspects of vowel devoicing phenomena in Japanese starting with an overview of the descriptions based on listening inspections in the literature on Japanese linguistics and dialectology, followed by acoustic, physiological, and perceptual studies. In the acoustic studies’ section, factors contributing to vowel devoicing are summarized. The mechanism of vowel devoicing is also discussed with special reference to categorical and gradient natures of devoicing as well as dialectal variability. Devoicing in other languages and L2 learners of Japanese will also be briefly mentioned.

Section 1: General description in Japanese linguistics and dialectology
Section 2: Acoustic studies—Factors contributing to devoicing frequencies—
Section 3: Physiological studies
Section 4: Perceptual studies
Section 5: Mechanism of devoicing
Section 6: Vowel devoicing in other languages and L2 learners
Chapter 5 Vowel Coalescence and Diphthongs (Haruo Kubozono)

In this chapter we will ask the following two questions: (i) what constitutes diphthongs in modern Japanese as against heterosyllabic vowel sequences, and (ii) why and how /ai/ constitutes a stable diphthong, whereas /au/ fails to do so. We will tackle the first question by examining the behavior of various vowel sequences in accent phenomena to show that /ai/, /oi/ and /ui/ are real diphthongs in modern Japanese. As for the second question, we will account for various facts, both synchronic and diachronic, showing that /ai/, /oi/ and /ui/ are stable diphthongs as against /au/, /eu/, /iu/ and other vowel sequences.

Section 1: Lexical strata and frequency
Section 2: Vowel coalescence in history
Section 3: Diphthongs in loanwords
Section 4: Diphthongs in word formation
Section 5: Diphthongs and accent
Section 6: Asymmetry in other phenomena
Section 7: Asymmetry in other languages
Section 8: Phonetic accounts

Chapter 6 Phonological lexicon and mimetic phonology (Akio NASU)

This chapter describes the phonological properties of Japanese lexicon by reviewing some of the research results that have emerged in the last few decades. The Japanese lexicon can be divided into three components, native (Yamato), Sino-Japanese, and loanwords, which differ from each other phonologically. The first half of this chapter discusses the phonological properties of these three components, introducing previous descriptive and theoretical treatments. It focuses in particular on the distribution of voiced obstruents, gemination, post-nasal voicing, and the markedness of singleton [p]. The second half discusses some traits of mimetic words in comparison with the phonological properties observed in the Yamato stratum. While mimetic or sound-symbolic items belong to the native vocabulary, they show some peculiar phonological behavior, including root-initial voicing and unfettered appearance of a singleton [p]. This situation leads to the question of how to develop an appropriate account in terms of constraint-based phonology, in which the phonological lexicon of a language is treated as a set of ranked constraints.

Section 1: Introduction
Section 2: Lexical strata
Section 3: Phonology of Japanese lexicon
Section 4: Mimetic phonology
Section 5: Conclusion
Chapter 7 Word formation and phonological processes (Junko Ito & Armin Mester)
The goal of this chapter is to summarize the phonological research on word formation in Japanese. The chapter will deal with the major types of word formation (compounding, etc.) and then focus on prosodic-templatic formations (truncations, blendings, etc.). Besides laying out the main rules and generalizations, with an emphasis on phonological patterns and prosodic constraints, it will both summarize previous work and sketch new developments. In particular, it will highlight both the way general phonological theory has informed the analysis of Japanese word formation in the past, and the way phonological studies of Japanese word formation types have contributed to the general theory of prosodic phonology and morphology.

Section 1: Introduction
Section 2: Major types of word formation
  2.1 Derivation and inflection
  2.2 Compounding*
Section 3: Truncations and other templatic processes
  3.1 Word clippings
  3.2 Compound clippings (pokemon type, keetai type)
  3.3 Blending
  3.4 Language games (Zuuzya-go, etc.)
  3.5 Alphabetic acronyms
Section 4: Conclusion
  *With reference to the rendaku chapter by Tim Vance and the accent chapter by Ito & Mester.

Chapter 8 Rendaku (Tim Vance)
The term rendaku refers to a set of pervasive morphophonemic alternations in modern Japanese, and the phenomenon has become widely known to linguists around the world in recent decades. An affected morpheme has one allomorph beginning with a voiceless obstruent and another allomorph (the voiced or rendaku allomorph) that appears, at least sometimes, non-word-initially, as in /tori/ ‘bird’ and /oya+gori/ ‘parent bird’. No over-arching generalization accounts for when rendaku voicing occurs and when it does not, and many individual vocabulary items can occur either with or without the voicing. However, the likelihood of rendaku voicing is influenced by a number of well-known factors, and the behavior of speakers on experimental tasks indicates that tendencies in the existing vocabulary affect their responses.

Section 1: The rendaku alternations in modern Japanese
Section 2: The historical development of rendaku
Section 3: Lyman’s Law
Section 4: rendaku and morphological/semantic structure
Section 5: rendaku and vocabulary strata
Section 6: theoretical treatments of rendaku
Section 7: psycholinguistic studies of rendaku
Chapter 9 Phonetics of word accent (Takahito Shinya)
In the first section I focus on early studies, especially those conducted in Japan, that address questions still controversial even today, including those of Shin Kawakami’s “jun akusento” (secondary accent) and Miyoko Sugito’s “ososagari” (delayed peak). In the second section I look at the recent experimental studies dealing with long-standing issues from the viewpoints of both production and perception, such as delayed peak, downstep, muscular activities of word accent, finally-accented vs. unaccented words, pitch accent vs. stress accent, and accentual prominence. Finally in the third section, I raise future research questions on the production and perception of Japanese word accent.

Section 1: Past
   1.1 Groundwork on Japanese word accent
   1.2 Issues unresolved
Section 2: Present
   2.1 Delayed peak
   2.2 Finally-accented vs. unaccented
   2.3 Accenual prominence
   2.4 Stress accent vs. pitch accent
   2.5 Muscular activities
   2.6 Downstep
Section 3: Future
   3.1 Issues on production
   3.2 Issues on perception

Chapter 10 Phonology and typology of word accent (Junko Ito & Armin Mester)
This chapter has two goals: First, it will present an overview of the different analyses of word accent in Standard (Tokyo) Japanese that have been proposed, covering the main rules and known generalizations. This overview will cover both traditional works and analyses in various frameworks of modern Linguistics, and will also address some of the main kinds of variation found in the accent systems of Japanese dialects. Secondly, an attempt will be made to consolidate the main strands of past work, and to lay a comprehensive basis for future contributions, by synthesizing some of the central ideas in the different traditions of analysis into a new and comprehensive analytical framework within Optimality Theory that can capture the typology of Japanese pitch accent systems in an illuminating way.

Section 1: Word accent in Japanese and its analysis
   1.1 Rules and generalizations in Standard Japanese (compound accent, recessive and dominant affixes, etc.): an overview of past research
   1.2 The main lines of variation in the Japanese dialects
Section 2: The typology of Japanese word accent systems
   2.1 Formal analysis
Chapter 11 Rhythm, mora-timing (Takashi Otake)
The quest for linguistic rhythm was originally motivated by auditory impressions of stress- and syllable timing. Afterward, mora-timing was added as the third rhythmic category. Although a number of studies have examined the durational properties during the past decades, no complete evidence has been reported. Mora-timing may be best described by incorporating both phonological and durational properties of morae. This view is probably most appropriate because mora-timing emerged as a subcategory of syllable-timing as heavy syllables in a mora-timed language are decomposed into two independent units. That is, having the phonological knowledge within heavy syllables is the essential condition for mora-timing. Today, there is enough evidence in favor of this view in the fields of poetry and language games, phonology, psycholinguistics and literacy both in Japan and abroad. This article reexamines how morae have been dealt in these areas as well as in acoustic phonetics.

Section 1: overview of mora-timing in phonetics for the past decades
Section 2: morae in poetry and language games
Section 3: morae in phonological theory (Moraic theory)
Section 4: linguistic rhythm and a segmentation unit in spontaneous speech
Section 5: morae in phonological awareness and language development
Section 6: Summary

Chapter 12 Intonation (Yosuke Igarashi)
This chapter presents an overview of Japanese intonational structure, describing the fundamentals of Japanese intonation, such as the organization of prosodic phrasing, phrase-boundary pitch movements, and several different prosodic mechanisms for marking some constituents as having prominence. The chapter is intended not as a mere review of the currently standard Beckman-Pierrehumbert model of Japanese intonation but rather as a discussion of why the standard model is as it is today and of what controversy exists in it. It also shows how controversial issues are handled by other (less known) frameworks of Japanese intonation.

Section 1: Introduction
Section 2: Major questions about intonation
Section 3: Prosodic phrasing
Section 4: Prosodic marking of prominence
Section 5: Phrase-final pitch movements
Section 6: Phrase-initial pitch movements
Section 7: Prosodic hierarchy
Section 8: Conclusion

Chapter 13 Syntax-phonology interface (Shinichiro Ishihara)
This chapter surveys theoretical and empirical issues related to the syntax–prosody interface in
(Tokyo) Japanese. This area of study is often discussed from two different perspectives: the phonological perspective (how prosody reflects syntactic branching and information structure) and the syntactic perspective (how prosody is correlated with syntactic phenomena such as word order alternation and scope-taking). The chapter will first discuss the development of the former perspective in the literature (Section 2 & 3). Two major issues will be reviewed in turn: (i) prosodic realization of syntactic branching (syntax–prosody mapping) and (ii) prosodic realization of focus (information structure–prosody mapping). The remainder of the chapter (Section 4) discusses the syntactic perspective on prosodic information. Several (apparently) syntactic phenomena will be introduced in which prosody plays a crucial role (wh- and yes/no-interrogatives, semantic intervention effects, syntactic disambiguation in sentence processing, etc.). Section 5 summarizes the chapter.

Section 1: Introduction
Section 2: Syntax–Prosody Mapping
  2.1 Earlier work
  2.2 Recent work
  2.3 Remaining issues
Section 3: Information Structure–Prosody Mapping
  3.1 Earlier work
  3.2 Recent work
  3.3 Remaining issues
Section 4: Syntactic phenomena affected by prosody
Section 5: Conclusion

Chapter 14 Loanword Phonology (Haruo Kubozono)
This chapter describes various aspects of loanword phonology in modern Japanese with focus on the two fundamental questions of loanword phonology in general: (i) where does loanword phonology come from, and (ii) what does it tell us about the structure of the host language, i.e. Japanese. The processes and phenomena to be discussed include vowel epenthesis, consonant epenthesis and glide formation, asymmetry between /ai/ and /au/, syllable weight, accent, and truncation. These processes reveal the basic nature of Japanese phonology. For example, an examination of the loanword accent rule reveals that it is a rule of accented native words in general and resembles the Latin accent rule.

Section 1: Vowel epenthesis and vowel harmony
Section 2: Consonant epenthesis and glide formation
Section 3: /ai/-/au/ asymmetry
Section 4: Consonant gemination
Section 5: Syllable weight
Section 6: Accent
Section 7: Truncation
Chapter 15 Historical Phonology (Tomoaki Takayama)

Historical studies of the Japanese language provide rich resources that are significant and useful for understanding the structure of modern Japanese. The Japanese language is attested back to the eighth century with a large amount of written records and dialectal information, although historical linguistic research faces many challenges. The extensive literature on Japanese historical phonology is not well known to linguists except for specialists in the history of Japanese. This chapter reviews the results and the points of controversy that have emerged from studies in the last few decades with main focus on the question of what historical studies reveal about the structure of modern Japanese.

Section 1: Introduction
Section 2: Discussions on the reconstruction of consonantal system
Section 3: Discussions on vowels
Section 4: Tone (Accent)
Section 5: Phonological issues on the duality of Old Japanese
Section 6: Topics on Sino-Japanese
Section 7: Conclusion

Chapter 16 Corpus-based phonetics and phonology (Kikuo Maekawa)

The main purpose of this chapter is to examine how corpus-based quantitative studies can contribute to the better understanding of the phonetic/phonological structure of modern Japanese. After a retrospective survey of the history of speech corpus development and corpus-based analyses in the fields of phonetics and speech processing, we will describe the Corpus of Spontaneous Japanese (CSJ), which is the most representative speech corpus of the present-day spoken Japanese with respect to the corpus size, richness of annotation, and the degree of dissemination to the research communities. We will then consider several cases showing how CSJ can be applied to the quantitative study of speech processing and phonetics of spontaneous speech. We will conclude the chapter with some prospective discussions of the coming development of corpus-based phonetics in Japan and the world.

Section 1: Early corpus-based studies
  1.1 Phonetics
  1.2 Speech processing
Section 2: Currently available speech resources
  2.1 ASJ database
  2.2 ATR database
  2.3 NTT database
  2.4 CSJ
Section 3: Application of the CSJ
  3.1 Application to ASR
3.2 Application to phonetics

Section 4: Discussions and conclusion

Chapter 17 L1 phonology: Phonological development (Mitsuhiko Ota)

The purpose of this chapter is twofold. First, it presents an overview of descriptive findings on the phonological acquisition of Japanese as a native language. Drawing on classic as well as more recent developmental work, the chapter will exemplify how children exposed to Japanese acquire various aspects of its phonology, including segmental contrasts, durational contrasts, alternations, morphophonemic processes, word segmentation and pitch phonology. Second, it discusses the implications of these findings for our understanding of the phonological structure of Japanese, general phonological theory as well as models of phonological development. The chapter concludes with suggestions for future directions.

Section 1: The past and the present: What do we know and what does it mean?
   1.1 Descriptive findings
   1.2 Theoretical implications

Section 2: The future: What do we need to know?

Chapter 18 L2 phonetics and phonology (Yukari Hirata)

This chapter introduces research in phonetic and phonological aspects of Japanese as learned by non-native speakers of Japanese, and contextualizes it in a broader field of second language (L2) speech acquisition. The first two sections introduce extant research in elements of Japanese speech sounds that are difficult for learners to produce and perceive, e.g., phonemic length contrasts of vowels and consonants, pitch accent, and other segmental contrasts. The next section introduces extant theories of L2 speech acquisition, in which various factors predict degrees of success in L2 acquisition, and reviews studies exploring different types of training and multimodal learning methods to enable learners to acquire difficult L2 speech sounds. The final section discusses areas of L2 Japanese that need investigations in the future.

Section 1: Introduction to research in Japanese as a second language (L2)
Section 2: Acquisition of prosody
   2.1 Mora-timing: phonemic length contrasts
   2.2 Pitch accent
   2.3 Sentential intonation
Section 3: Acquisition of segments
   3.1 Voice onset time and voicing contrasts
   3.2 Fricative versus affricate contrasts
   3.3 Alveolar versus alveopalatal affricate contrasts
   3.4 Tap
Section 4: Theories of L2 speech acquisition
   4.1 Extant theories
   4.2 Factors affecting L2 speech acquisition
   4.3 Training and technology
4.4 Multimodal learning

Section 5: Future studies