# THE Syllable in Optimality Theory

Edited by
Caroline Féry
and
Ruben van de Vijver

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**CAROLINE FÉRY**
University of Potsdam, Germany

**RUBEN VAN DE VIJVER**
University of Potsdam, Germany



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# Preface

This book presents 15 chapters that are all concerned with the role of the syllable in Optimality Theory. The idea for this book arose during a conference with the same theme held from June 30 to July 2, 1998 in Tübingen, Germany. During this conference it was felt that a book about the role of the syllable in a relatively new theory of grammar was necessary. Apart from the participants of the conference a number of phonologists were invited to contribute to the book to do justice to the many different aspects of the syllable.

The financial support of the Deutsche Forschungsgemeinschaft and the Seminar für Sprachwissenschaft at the University of Tübingen, which made the conference possible, is gratefully acknowledged.

We want to thank Christine Bartels sincerely for her help and encouragement. Many thanks are also due to Kay Steinmetz and Helen Wheeler.

Regine Eckardt made the illustrations, sacrificing much of her free time. Her efforts are greatly appreciated by the editors.

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Caroline Féry
Ruben van de Vijver

**The Syllable in Optimality Theory**

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# Contributors

*Juliette Blevins* Department of Linguistics, University of Luton

*Young-mee Yu Cho* Department of Asian Languages and Cultures, Rutgers University

*Stuart Davis* Department of Linguistics, Indiana University

*Caroline Féry* Institut für Linguistik/Allgemeine Sprachwissenschaft, Universität Potsdam

*Antony Dubach Green* Institut für Linguistik/Allgemeine Sprachwissenschaft, Universität Potsdam

*Junko Ito* Department of Linguistics, University of California, Santa Cruz

*Tracy Holloway King* NLTT/ISTL, Xerox PARC, Palo Alto, California

*Paul Kiparsky* Department of Linguistics, Stanford University

*Haruo Kubozono* Department of Linguistics, Kobe University

*John J. McCarthy* Department of Linguistics, University of Massachusetts, Amherst

*Armin Mester* Department of Linguistics, University of California, Santa Cruz

*Frida Morelli* Department of Linguistics, University of Maryland

*Marc van Oostendorp* Meertens Instituut

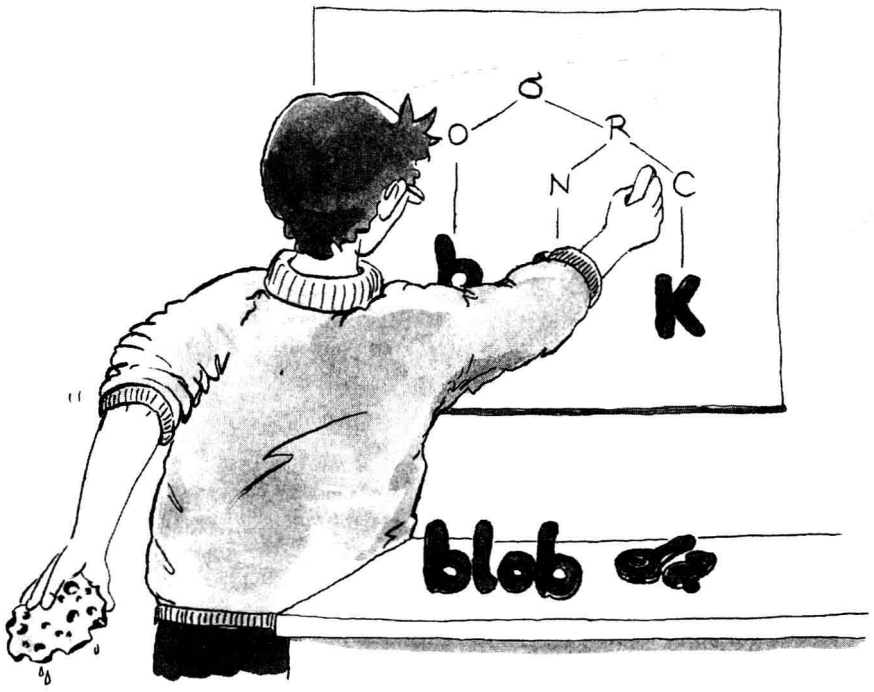
*Ruben van de Vijver* Institut für Linguistik/Allgemeine Sprachwissenschaft, Universität Potsdam

*Caroline R. Wiltshire* Program in Linguistics, University of Florida, Gainesville

*Draga Zec* Department of Linguistics, Cornell University

PART ONE

# INTRODUCTION



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# Overview

*Caroline Féry and Ruben van de Vijver*

The syllable has (nearly) always played a central role in phonological theory, but with the recent advent of Optimality Theory (OT), its role has become crucial. The first papers on OT, as well as numerous papers written since, are based on the syllable. It is no exaggeration to say that syllabification has played a pivotal role in establishing OT and, in turn, that OT has contributed to our understanding of the role of the syllable, since many issues concerning this prosodic constituent have been reconsidered in the light of this theory (McCarthy and Prince 1993, Prince and Smolensky 1993). The present book provides insights into the syllable and into OT in three respects. First, it underlines the continuing interest in the syllable. Second, it shows that OT is capable of providing answers to old issues that have been problematic in procedural analyses, as well as shedding light on new issues and giving fresh perspectives. Third, the syllable helps reveal and solve problems within OT. Several aspects of syllabification have proved hard to solve within OT and have forced phonologists to come up with original solutions.

The first section of this introduction gives an overview of the three issues just mentioned. Since it is impossible to give a detailed account of all the numerous aspects of the syllable that phonologists are concerned with, we focus on the points that we consider as central in the volume. In the second section, we concentrate on the individual chapters and offer summaries of their contents.

## 1.1. The Central Role of the Syllable in Phonology

In the seventies, several phonologists, such as Vennemann (1974), Hooper (1976), and Kahn (1976), proposed including the syllable as a prosodic unit in generative phonological theory. The relevance of the syllable for linguistic theory has increased ever since. The syllable is connected with both segmental

Many thanks to Kirsten Brock, Gisbert Fanselow, and Ede Zimmermann for helpful comments.

and suprasegmental levels. It allows a succinct formulation of many phonological generalizations (see Blevins 1995 for a summary of the role played by the syllable in phonological theory). Let us briefly illustrate these observations.

The connection with segments is apparent in various processes, such as the well-known glottalization of voiceless stops in the coda of English syllables or the aspiration of the same voiceless stops in the onset of (stressed) syllables. The first [t] in the English word *Atlanta* is glottalized; [p] in *applause* is aspirated. In both words stress is on the second syllable. Words may start with [pl], such as in *play*, but no word starts with [tl]. An intuitive way to describe the distribution of the glottalization and aspiration of stops is to say that syllable-initial stops are aspirated while syllable-final stops are glottalized. The consonant cluster [pl] in *applause* is syllable-initial, while [t] in *Atlanta* is syllable-final. It is much more difficult to formulate the distribution of aspiration and glottalization if no reference is made to the syllable. The distribution of aspiration must be expressed by a statement along the following lines: before stressed vowels voiceless stops are aspirated if they are word-initial or are part of a possible word-initial consonant cluster.

At higher prosodic levels, syllable shape determines which syllables are most likely to be stressed in many languages: heavy syllables are more prone to be stressed than light ones. In Latin, for example, stress is on the penultimate syllable if it contains a long vowel (*amíicus* 'friend') or a closed syllable (*agénda* 'things that have to be done'). If the penultimate syllable has a short vowel, stress is on the antepenultimate syllable (*Cícero* name). Both long vowels and closed syllables have a branching rhyme and differ in this respect from syllables with just a short vowel in their nuclei. Syllables with a branching rhyme are called heavy and those with a nonbranching rhyme are light. Thus, the stress distribution can be stated in the following terms: stress is on the penultimate syllable if it is heavy; otherwise it is on the antepenultimate syllable. Again, a formulation of the distribution of stress without the aid of the syllable would fail to point out the structural equality of syllables with long vowels and closed syllables in Latin.

To sum up, the syllable allows the formulation of generalizations both at the segmental level and at higher prosodic levels, which are awkward to express without referring to this constituent. Of primary concern for the goals of this book, however, is the way OT can be used to account for different aspects of syllabification and, conversely, how different aspects of syllabification tell us more about OT.

### 1.1.1 How OT Sheds Light on the Syllable

With the recent rise of OT, the theoretical emphasis has shifted away from representations and toward constraints and their interactions. One of the main

insights of OT is that markedness generalizations, as expressed in the form of constraints on surface forms, are part of phonological theory in the most direct way. These constraints are grounded in phonetics: they are justified by general considerations of acoustics or articulation. These constraints conflict with faithfulness constraints. An example is hiatus avoidance. Hiatus is the phonetic result of the immediate adjacency of vocalic syllable peaks. In languages that resolve hiatus, resolution can be attained by different means, such as insertion of a consonant between the two vowels, glide formation, deletion of one of the vowels with or without compensatory lengthening, and so on. OT assumes that a constraint against hiatus (*HIATUS) is part of Universal Grammar and thus that such a constraint is part of the grammar of every language. However, the way in which individual languages choose to resolve hiatus depends on the ranking of this markedness constraint with respect to faithfulness constraints. Languages that do not resolve hiatus have high-ranking faithfulness constraints on the vowels involved in the hiatus, whereas languages that eliminate hiatus rank the relevant faithfulness constraints lower than the constraint against hiatus. In other words, typological variation is the direct consequence of the interaction of constraints. The result of different interactions can be summed up with the help of (a simplified account of) three languages. In Hawaiian, hiatus is freely allowed; in German and French, it is not or at least not in all morphosyntactic and/or prosodic environments. In Hawaiian, the markedness constraint *HIATUS is ranked below all other constraints; in German and French, *HIATUS is high ranking. In German, hiatus is resolved by inserting a glottal stop as the onset of the second syllable (*Beamte* 'civil servant' is realized as [bəʔamtə]), whereas in French, the first vowel of a two-vowel sequence is deleted in a Det + N context (*le amour* 'the love' is [lamuʀ]). In terms of constraint interaction, the difference between the three languages is expressed in the following way. In Hawaiian, *HIATUS is ranked below constraints prohibiting consonant epenthesis (called DEP(C)) and vowel deletion (MAX(V)), as in (1a). In German, where a consonant is inserted to avoid hiatus, both MAX(V) and *HIATUS are higher ranking than DEP(C), as shown in (1b). Hiatus must be avoided, but vowels may not be deleted. In French, hiatus is avoided as well, but in this language it is better to delete a vowel than to epenthesize a consonant. This is expressed by ranking both DEP(C) and *HIATUS above MAX(V), as in (1c).

(1) a. Ranking in Hawaiian: hiatus is allowed.
MAX(V), DEP(C) >> *HIATUS

b. Ranking in German: hiatus is avoided by inserting a consonant.
MAX(V), *HIATUS >> DEP(C)

c. Ranking in French: hiatus is avoided by deleting a vowel.
DEP(C), *HIATUS >> MAX(V)

In the older derivational approach to phonology, hiatus resolution takes the form of (ordered) rules whose common purpose is not deducible from the rules themselves. This hidden common goal of different kinds of processes has been called "the conspiracy of the rules" by Kenstowicz and Kisseberth (1977). Compare the rules in (2), which have the effect that a glottal stop is inserted between two vowels (in German) or that a vowel is deleted (in French). From the format of the rules, it must be interpreted as a coincidence that vowel deletion in one language and consonant epenthesis in another both lead to the elimination of hiatus.

(2) Derivational rules
   a. Consonant epenthesis (German)
      Ø _ C / V _ V
   b. Vowel deletion (French)
      V _ Ø / _ V

Although both rules result in the avoidance of a sequence of two heterosyllabic vowels, this outcome is not immediately apparent from the rules themselves. The target, avoidance of hiatus, is not mentioned in the rules, whereas in OT it is a direct component of the constraints.

Syllable typology can also be elegantly accounted for in OT. It has been repeatedly observed that all languages have syllables of the form CV but not necessarily other forms (Jakobson 1962, Prince and Smolensky 1993, Blevins 1995), which follows from certain typological generalizations. First, if a language has syllables without onsets (V), it also has syllables with onsets (CV). Second, if a language has closed syllables (CVC), it also has open ones (CV). Furthermore, if a language has syllables with complex onsets (CCV), it also has CV syllables. And finally, if a language has syllables with complex codas (CVCC), it also has CVC syllables and therefore also CV ones. These generalizations can be accounted for by constraint interaction between markedness and faithfulness constraints. The markedness constraint ONSET requires that syllables have onsets, and NOCODA prohibits codas. Faithfulness constraints, such as the ones used for hiatus, state that underlying material must be parsed as such. As shown, there are at least two kinds of faithfulness constraints, one against epenthesis (DEP) and one against deletion (MAX). These two constraints are joined together here under the cover term FAITH. Consider several rankings standing for different types of languages in (3)–(5). In the first Tableau 1 in (3) the markedness constraints dominate the faithfulness constraints. Whatever the input, if the constraints are ranked as shown, the language allows only the most unmarked CV syllables to emerge as optimal.

(3) Tableau 1: ONSET, NOCODA >> FAITH (No epenthesis, no deletion)

| /cv/ | ONSET | NOCODA | FAITH |
|---|---|---|---|
| ☞ cv | | | |
| cvc | | *! | * |
| v | *! | | * |
| /cvc/ | | | |
| ☞ cv | | | * |
| cvc | | *! | |
| v | *! | | * |
| /v/ | | | |
| ☞ cv | | | * |
| cvc | | *! | * |
| v | *! | | |
| /vc/ | | | |
| ☞ cv | | | * |
| cvc | | *! | * |
| v | *! | | * |

If FAITH is ranked above NOCODA but below ONSET, as in (4), the language has the syllable types that win in this tableau. The ranking in (4) allows both CV and CVC syllables.

(4) Tableau 2: ONSET >> FAITH >> NOCODA

| /cv/ | ONSET | FAITH | NOCODA |
|---|---|---|---|
| ☞ cv | | | |
| cvc | | *! | * |
| v | *! | * | |
| /cvc/ | | | |
| cv | | *! | |
| ☞ cvc | | | * |
| v | *! | * | |
| /v/ | | | |
| ☞ cv | | * | |
| cvc | | * | *! |
| v | *! | | |
| /vc/ | | | |
| cv | | **! | |
| ☞ cvc | | * | |
| v | *! | * | |

In (5) the consequences of the ranking FAITH >> ONSET >> NOCODA are illustrated. This ranking allows the syllable types CV, CVC, V, and VC.

(5) Tableau 3: FAITH >> ONSET >> NOCODA

| /cv/ | FAITH | ONSET | NOCODA |
|---|---|---|---|
| ☞ cv | | | |
| cvc | *! | | * |
| v | *! | * | |
| /cvc/ | | | |
| cv | *! | | |
| ☞ cvc | | | * |
| v | *!* | * | |
| /v/ | | | |
| cv | *! | | |
| cvc | *!* | | * |
| ☞ v | | * | |
| /vc/ | | | |
| cv | *!* | | |
| cvc | *! | | * |
| v | *! | * | |
| ☞ vc | | * | * |

The tableaux in (3)–(5) illustrate that all languages, irrespective of their constraint ranking, allow CV syllables. More complex types of syllables, in contrast, are only allowed in some constraint rankings.

The ability of OT to explain typological patterns as a result of the interaction of markedness and faithfulness constraints is the core of the theory, and it is to a great extent responsible for its success.

### 1.1.2 How the Syllable Sheds Light on OT

As mentioned in section 1.1, syllable structure has played a prominent role in the conception and development of OT, not only because it can neatly illustrate simple factorial typologies, but also because it involves different interacting modules, such as segments, sonority, moras, syllabification, edges, and stress.

There are, however, cases in which constraints on surface structure do not seem to make the right predictions. For example, certain types of alternations involving syllable structure are not recoverable from surface forms alone but seem to need an intermediate form between input and output to which both