CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

The Cambridge Handbook of Formal Semantics

Formal semantics – the scientific study of meaning in natural language – is one of the most fundamental and longest-established areas of linguistics. This handbook offers a comprehensive yet compact guide to the field, bringing together research from a wide range of world-leading experts. Chapters include coverage of the historical context and foundation of contemporary formal semantics, a survey of the variety of formal/logical approaches to linguistic meaning, and an overview of the major areas of research within current semantic theory, broadly conceived. The handbook also explores the interfaces between semantics and neighbouring disciplines, including research in cognition and computation.

This work will be essential reading for students and researchers working in linguistics, philosophy, psychology, and computer science.

MARIA ALONI and PAUL DEKKER are Assistant Professors at the Institute for Logic, Language and Computation (ILLC) of the University of Amsterdam. Both are leading scholars and researchers in the area of logical semantics, the philosophy of language, and empirical linguistics. Their general interests include the formal semantics and pragmatics of natural language, and more specific subjects such as reference, quantification, indefiniteness, modality, and information structure, and general issues on the syntax–semantics and the semantics–pragmatics interface.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

CAMBRIDGE HANDBOOKS IN LANGUAGE AND LINGUISTICS

Genuinely broad in scope, each handbook in this series provides a complete state-of-the-field overview of a major sub-discipline within language study and research. Grouped into broad thematic areas, the chapters in each volume encompass the most important issues and topics within each subject, offering a coherent picture of the latest theories and findings. Together, the volumes will build into an integrated overview of the discipline in its entirety.

Published titles

The Cambridge Handbook of Phonology, edited by Paul de Lacy
The Cambridge Handbook of Linguistic Code-switching, edited by Barbara E. Bullock and Almeida Jacqueline Toribio
The Cambridge Handbook of Child Language, Second Edition, edited by Edith L. Bavin and Letitia Naigles
The Cambridge Handbook of Endangered Languages, edited by Peter K. Austin and Julia Sallabank
The Cambridge Handbook of Sociolinguistics, edited by Rajend Mesthrie
The Cambridge Handbook of Pragmatics, edited by Keith Allan and Kasia M. Jaszczolt
The Cambridge Handbook of Language Policy, edited by Bernard Spolsky
The Cambridge Handbook of Second Language Acquisition, edited by Julia Herschensohn and Martha Young-Scholten
The Cambridge Handbook of Biolinguistics, edited by Cedric Boeckx and Kleanthes K. Grohmann
The Cambridge Handbook of Generative Syntax, edited by Marcel den Dikken
The Cambridge Handbook of Communication Disorders, edited by Louise Cummings
The Cambridge Handbook of Stylistics, edited by Peter Stockwell and Sara Whiteley
The Cambridge Handbook of Linguistic Anthropology, edited by N.J. Enfield, Paul Kockelman and Jack Sidnell
The Cambridge Handbook of English Corpus Linguistics, edited by Douglas Biber and Randi Reppen
The Cambridge Handbook of Bilingual Processing, edited by John W. Schwieter
The Cambridge Handbook of Learner Corpus Research, edited by Sylviane Granger, Gaëtanelle Gilquin and Fanny Meunier
The Cambridge Handbook of English Historical Linguistics, edited by Merja Kytö and Päivi Pahta
The Cambridge Handbook of Linguistic Multi-competence, edited by Li Wei and Vivian Cook

Forthcoming

The Cambridge Handbook of Historical Syntax, edited by Adam Ledgeway and Ian Roberts
The Cambridge Handbook of Linguistic Typology, edited by Alexandra Y. Aikhenvald and R. M. W. Dixon
The Cambridge Handbook of Morphology, edited by Andrew Hippisley and Greg Stump

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

The Cambridge Handbook of Formal Semantics

Edited by
Maria Aloni and **Paul Dekker**
University of Amsterdam

CAMBRIDGE
UNIVERSITY PRESS

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Shaftesbury Road, Cambridge CB2 8EA, United Kingdom

One Liberty Plaza, 20th Floor, New York, NY 10006, USA

477 Williamstown Road, Port Melbourne, VIC 3207, Australia

314–321, 3rd Floor, Plot 3, Splendor Forum, Jasola District Centre, New Delhi – 110025, India

103 Penang Road, #05–06/07, Visioncrest Commercial, Singapore 238467

Cambridge University Press is part of Cambridge University Press & Assessment, a department of the University of Cambridge.

We share the University's mission to contribute to society through the pursuit of education, learning and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781107028395

© Cambridge University Press & Assessment 2016

This publication is in copyright. Subject to statutory exception and to the provisions of relevant collective licensing agreements, no reproduction of any part may take place without the written permission of Cambridge University Press & Assessment.

First published 2016
First paperback edition 2020

A catalogue record for this publication is available from the British Library

ISBN 978-1-107-02839-5 Hardback
ISBN 978-1-108-74433-1 Paperback

Cambridge University Press & Assessment has no responsibility for the persistence or accuracy of URLs for external or third-party internet websites referred to in this publication and does not guarantee that any content on such websites is, or will remain, accurate or appropriate.

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE

Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Contents

List of figures *page* vii
List of tables viii
List of contributors ix
Preface xi

Part I The landscape of formal semantics

1 Formal semantics *Barbara H. Partee* 3
2 Lexical semantics *James Pustejovsky* 33
3 Sentential semantics *Peter Pagin* 65
4 Discourse semantics *Nicholas Asher* 106
5 Semantics of dialogue *Jonathan Ginzburg* 130

Part II Theory of reference and quantification

6 Reference *Paul Dekker and Thomas Ede Zimmermann* 173
7 Generalized quantifiers *Dag Westerståhl* 206
8 Indefinites *Adrian Brasoveanu and Donka F. Farkas* 238
9 Plurality *Rick Nouwen* 267
10 Genericity *Ariel Cohen* 285

Part III Temporal and aspectual ontology and other semantic structures

11 Tense *Atle Grønn and Arnim von Stechow* 313
12 Aspect *Susan Rothstein* 342
13 Mereology *Lucas Champollion and Manfred Krifka* 369
14 Vagueness *Hans Kamp and Galit W. Sassoon* 389
15 Modification *Louise McNally* 442

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Part IV Intensionality and force

16 Negation *Henriëtte de Swart* 467
17 Conditionals *Paul Egré and Mikaël Cozic* 490
18 Modality *Lisa Matthewson* 525
19 Questions *Paul Dekker, Maria Aloni, and Jeroen Groenendijk* 560
20 Imperatives *Paul Portner* 593

Part V The interfaces

21 The syntax–semantics interface *Manfred Sailer* 629
22 The semantics–pragmatics interface *Philippe Schlenker* 664
23 Information structure *Enric Vallduví* 728
24 Semantics and cognition *Giosuè Baggio, Keith Stenning and Michiel van Lambalgen* 756
25 Semantics and computation *Matthew Stone* 775

Bibliography 801
Index 916

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Figures

2.1	Fragment of a type hierarchy	*page* 61
3.1	Analysis trees for example (16)	83
7.1	A model of type ⟨1, 1⟩	215
7.2	Two models of type ⟨1, 1⟩	216
7.3	*square*(Q)	218
9.1	A depiction of the complete atomic join semi-lattice with *a*, *b* and *c* as the atomic elements	271
11.1	Tense architecture	331
13.1	Lattices	375
13.2	Cumulative and quantized sets	379
16.1	Square of oppositions for first-order quantifiers	469
19.1	Propositions expressed by examples (43)–(47)	589
22.1	Middle Kleene truth tables (propositional case)	714
22.2	Potts' analysis of *Lance, the cyclist*	717
24.1	ERPs elicited by the noun in neutral, anomalous and coercing sentences	763
24.2	ERPs elicited by the noun and the verb in neutral and disabling sentences	765

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Tables

11.1	The interpretation of complex tenses	*page* 328
13.1	Correspondences between CEM and set theory	374
17.1	Three-valued material conditional (left) vs. De Finetti's (right)	511
17.2	Overview of the frameworks/inference schemata discussed	523
18.1	Gitksan modal system	536
18.2	Traditional vs. new classifications of (modes of projection of) conversational backgrounds	539
18.3	A three-way categorization of conversational backgrounds	541
18.4	Hypothetical modal system of the root domain: predicted to exist under Nauze's (2008) typology (Vander Klok, 2013, p. 18)	558

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Contributors

Maria Aloni, Assistant Professor of Logic and Language, University of Amsterdam
Nicholas Asher, Professor of Linguistics and Philosophy, Université Paul Sabatier
Giosuè Baggio, Associate Professor, Norwegian University of Science and Technology
Adrian Brasoveanu, Associate Professor of Linguistics, University of California at Santa Cruz
Lucas Champollion, Assistant Professor of Linguistics, New York University
Ariel Cohen, Associate Professor of Linguistics, Ben-Gurion University of the Negev
Mikaël Cozic, Assistant Professor of Philosophy of Science, Université Paris-Est and Institut Universitaire de France
Paul Dekker, Assistant Professor of Logic and Language, University of Amsterdam
Paul Egré, CNRS Research Fellow, Institut Jean-Nicod; Associate Professor of Logic and Philosophy, Ecole Normale Supérieure
Donka Farkas, Professor of Linguistics, University of California at Santa Cruz
Jonathan Ginzburg, Professor of Linguistics, Université Paris-Diderot
Jeroen Groenendijk, Professor of Logic and Language, University of Amsterdam
Atle Grønn, Professor of Russian Linguistics, University of Oslo
Hans Kamp, Professor of Formal Logics and Philosophy of Language, Universität Stuttgart
Manfred Krifka, Professor of General Linguistics, Humboldt-Universität zu Berlin
Michiel van Lambalgen, Professor of Logic and Cognition, University of Amsterdam
Lisa Matthewson, Professor of Linguistics, University of British Columbia

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Louise McNally, Professor of Linguistics, Universitat Pompeu Fabra
Rick Nouwen, Associate Professor of Linguistics, Utrecht University
Peter Pagin, Professor of Theoretical Philosophy, Stockholm University
Barbara Partee, Distinguished University Professor Emerita of Linguistics and Philosophy, University of Massachusetts, Amherst
Paul Portner, Professor of Linguistics, Georgetown University
James Pustejovsky, Professor of Computer Science, Brandeis University
Susan Rothstein, Professor of Linguistics, Bar-Ilan University
Manfred Sailer, Professor of Linguistics, Johann Wolfgang Goethe-Universität Frankfurt
Galit W. Sassoon, Senior Lecturer in Language and Cognition, Bar-Ilan University
Philippe Schlenker, Director Research, Institut Jean-Nicod, CNRS; Global Distinguished Professor of Linguistics, New York University
Arnim von Stechow, Professor of General and Theoretical Linguistics, Eberhard Karls Universität Tübingen
Keith Stenning, Professor of Informatics, University of Edinburgh
Matthew Stone, Professor of Computer Science, Rutgers University
Henriëtte de Swart, Professor of French Linguistics and Semantics, Utrecht University
Enric Vallduví, Associate Professor in Translation and Language Science, Universitat Pompeu Fabra
Dag Westerståhl, Professor of Theoretical Philosophy and Logic, Stockholm University
Thomas Ede Zimmermann, Professor of Formal Semantics, Johann Wolfgang Goethe-Universität Frankfurt

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

Preface

Humans characteristically use language, and a characteristic feature of the use of language is that it is meaningful. Semantics is the study of meaning, of the structural ways in which it is realized in natural language, and of the formal logical properties of these structures. The area of formal semantics finds its roots in logic and the philosophy of language and mind, but it has also become deeply entrenched in linguistics and the cognitive sciences.

This *Cambridge Handbook of Formal Semantics* constitutes a comprehensive guide to contemporary formal semantics, and it provides, among other things, a historical context and foundation of the field, a survey of the variety of formal/logical approaches to linguistic meaning, an overview of the major areas of research within current semantic theory, and a presentation of the interfaces between semantics and other domains of linguistic inquiry, broadly conceived.

This handbook is intended for everyone interested in the understanding of meaning. It presents a broad view of the semantics and logic of natural language and, as a helpful tool, of the logical languages employed.

The twenty-five chapters constituting this handbook have been grouped together into five major parts, and we hope the handbook can thus be seen to cover, in a systematic and transparent way, both the broad and the varied scope of the domain as well as the width and variety of the perspectives adopted. The contributions are subsumed under the following headings:

I The landscape of formal semantics.
II Theory of reference and quantification.
III Temporal and aspectual ontology and other semantic structures.
IV Intensionality and force.
V The interfaces.

The first and the last parts are more of a methodological or programmatic nature. The first part gives a general sketch of the frameworks in and perspectives from which semantic research is conducted. The last part focuses

© in this web service Cambridge University Press & Assessment www.cambridge.org

CAMBRIDGE
Cambridge University Press & Assessment
978-1-107-02839-5 — The Cambridge Handbook of Formal Semantics
Edited by Maria Aloni , Paul Dekker
Frontmatter
More Information

on the intimate and intrinsic relationships with bordering academic disciplines. The three middle parts are concerned with more or less established major domains of linguistic research: the nominal domain (Part II) and the verbal or predicative domain (Part III). Both domains are studied with logical and (natural language) ontological interests. Part IV gives an overview of the various moods and modalities in language, ranging from negation, to modals, questions and other moods.

All contributors to the handbook are senior researchers working in logic and linguistics who are widely recognised as experts on the topics assigned to them. All contributions have been thoroughly reviewed by expert colleagues.

This handbook is aimed at graduate and PhD students, but it is also meant for a wider audience, and hopes to serve as a manual and source book for senior lecturers and researchers alike. All five parts center around formal semantic issues but are intended to be of interest to linguists in general, descriptive semanticists, philosophers of language, and those who work on dialogue systems, cognitive grammar, and computation.

This work is intended to document the background and development of the main currents in formal semantics. It is not intended as a textbook, although the individual chapters may figure well in introductory and advanced courses, supplying required overviews and suggestions for further reading. For more detailed introductions to the various frameworks and formalisms, we are confident that readers can find their way among a wealth of standard textbooks. (The following list is incomplete.) G. Chierchia and S. McConnell-Ginet, *Meaning and Grammar* (1990), L. T. F. Gamut, *Logic, Language and Meaning* (1991), A. Kratzer and I. Heim, *Semantics in Generative Grammar* (1998), S. Löbner, *Understanding Semantics* (2002), B. Partee, A. ter Meulen, and R. Wall, *Mathematical Methods in Linguistics* (1990), W. Sternefeld and T. E. Zimmermann, *Introduction to Semantics* (2013), Y. Winter, *Elements of Formal Semantics* (2015).

A handbook like this would of course not have been possible without the help of the publisher, and we would like to thank especially Helen Barton for her continuous support during the lengthy process. Peter van Ormondt has proven extremely valuable as the technical editor, who, it must be emphasized, also contributed his valuable expertise on substantial matters. All of this is greatly appreciated. We are also very grateful to the reviewers of the individual chapters, whom we would have liked to list if the reviews had not been done anonymously. Their acute and timely comments have surely increased the value of the various contributions even more. Lastly, we would like to thank the individual and collective authors, for enabling us to make this broad subject, with the help of their expertise, views, and findings, accessible to a wide audience.

Maria Aloni
Paul Dekker
Amsterdam

© in this web service Cambridge University Press & Assessment www.cambridge.org