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What this book is about and how to use it

1.1 The proper treatment of quantification in ordinary Human

In *The proper treatment of quantification in ordinary English* Montague sets forth his goal as follows:[1]

> "The aim of this paper is to present in a rigorous way the syntax and semantics of a certain fragment of a certain dialect of English. For expository purposes the fragment has been made as simple and restricted as it can be while accommodating all the more puzzling cases of quantification and reference with which I am acquainted." (Montague 1974a: 247)

The goal of this book is to survey a good chunk of the research that has been directed at Montague's puzzles and their natural extensions in the past 35 years. The survey has a dual focus. One is on how the understanding of "quantification" and "quantifier" has been changing over time. The way I see it, we have witnessed three main stages of research:

Grand uniformity (the 1970s and 1980s)
Foundational work that affords a uniform treatment of initially disparate-looking phenomena: generalized quantifiers for all noun phrases, a kind-based treatment of existential and generic readings of bare plurals, etc.

Diversity (the 1980s and 1990s)
Dynamic semantics for definites and indefinites, choice-functional indefinites vs. others, the differential behavior of quantifiers

Internal composition (from 2000 on)
Quantifier-phrase-internal and, most recently, quantifier-word-internal compositionality

The other focus is on the core notion of scope and its implementation in several varieties of generative syntax and categorial grammar. We may disagree about what the best syntax is, but any serious attempt at compositionality must be built on a credible syntax. It is important to see that at least the core ideas can be implemented in various different ways.

Montague's puzzles include the interaction of quantifier phrases among themselves and with intensional predicates, and the binding of pronouns by quantifiers. We will not attempt to cover the research on intensionality, save for a brief discussion in **§5.7**, although Chapter 3 takes up quantification over individuals vs. worlds and times. Another major self-imposed limitation has been to set aside quantificational binding (see **§2.3.3**).

The structure of the discussion is as follows.

Chapters 2 through 4 offer an introduction to generalized quantifiers, with an eye on the implications for scope and the syntax/semantics interface, non-nominal domains of quantification, and on semantic properties that turn out to be significant for empirical work. These chapters do not attempt to rehash what existing excellent introductions do (see some recommended readings in **§2.1**); they attempt to give a picture that cannot be found elsewhere.

Chapters 5 and 6 pull together some of the questions and data that led to the major transformation in how we approach "quantifiers" and "scope". (The transformation explains why this introduction does not start with a substantial definition of "quantification" – there is no need to set up a strawman and fight with it throughout the book.)

Chapters 7 through 10 discuss some of the issues that have been in the focus of much research: existential scope, distributivity, numeral indefinites, and modified numeral expressions. Here a major limitation is that the discussion of plural noun phrases (especially of collective readings) is kept to the minimum.

Chapter 11 surveys recent approaches to the syntax of clause-internal scope, with special attention to how they account for the diversity of scopal behavior. Chapter 12 pulls together the even more recent work on the internal structure of universal quantifiers – quantifier phrases as well as quantifier words.

The last four chapters survey more controversial and more preliminary ideas than the ones preceding them. Seeing that this is a research survey, not a textbook, it hopes to stimulate further work by giving a sense of where we actually are.

Throughout the book I attempt to link up the results of serious semantics and serious syntax. Occasionally I am mainly talking to the semanticist or to the syntactician, but my hope is that many readers will put themselves in the shoes of both.

Although a great many formal semanticists are native speakers of languages other than English, the bulk of our efforts has been directed at

analyzing English or, sometimes, at disguising research on another language as work on English. This survey makes an attempt to bring multiple languages to bear on the questions under discussion, or at least to point out the existence of some high-quality literature on various languages. I am definitely not doing as good a job as I would like to, simply because I have not processed all this literature in sufficient depth.

1.2 How to use this book

This is not a textbook. Many things follow from this. It does not single out one theory and endow the reader with a working knowledge of it. It selects a story-line and shows what a relatively wide range of literature has to say about it. Although some formalization is offered, the discussion is kept as informal as possible, to maintain readability and to remain neutral as to technicalities. Sometimes it does not make sense to avoid the formalism; if the reader feels that a part is too difficult, they should breeze through it and rest assured that they will be able to pick up the thread afterwards.

The endnotes typically supply further important empirical or formal detail. Their contents are an integral part of the text, at least for some readers. They are relegated to note status to avoid disrupting the train of thought in the main text. The best thing is to keep a bookmark at the notes and consult them systematically.

The chapters and sections address theoretical issues, rather than descriptive topics, whenever possible. For this reason the discussion is somewhat fragmented and repetitive: a particular descriptive topic and a particular piece of work may be relevant for various different questions. So one descriptive topic may be discussed in many places in the book, and different claims made in one and the same piece of work may be brought to bear on various different issues. Usually there are pointers to the other relevant sections and occasionally brief summaries are given of what has already been said; the reader is encouraged to also make good use of the index. A certain amount of repetition is necessary in any case, because not every reader will want to go through the whole book. No issue or piece of work is discussed completely. It is assumed that the reader will go on to consult some of the literature surveyed herein.

The publisher and the author were unanimous in wanting a slender volume, so a certain amount of background is presupposed. For the basics I recommend the syntax and semantics chapters of the twelve-author textbook Fromkin (2000). A good thorough introduction to syntax is Koopman, Sportiche and Stabler (to appear). For formal foundations, the ideal background is a combination of Gamut (1991) and Chapters 2, 6, and 7 of Landman (1991). For lighter fare, use Allwood et al. (1977) and Szabolcsi (1997d). It will be extremely helpful if the reader is comfortable with

λ's. For a boost I recommend Chris Barker's famed Lambda Tutorial, `http://homepages.nyu.edu/~cb125/Lambda/`.

Where appropriate the text will point to handbook articles or textbooks, or to original works that have acquired comparable status, for background on the topic under discussion. To draw the reader's attention to these items the authors' names appear in small capitals.

1.3 Notation and terminology

As Montague (1974a,b) points out, the syntax of the object language may be directly interpreted in models, or translation into a suitably rich logical language may induce a model-theoretic interpretation for the object-language syntax. Montague uses the translation strategy; Heim and Kratzer (1998) use direct interpretation. The present book follows the translation strategy, because it makes it much easier to calculate with somewhat complex expressions. The reader should be aware of the following: (i) Expressions are translated into a logical language; the λ-operator for example is not used as part of the English meta-language; (ii) Square brackets indicating scope are not abandoned in favor of right-unbounded dots; (iii) The domain of quantification is either not indicated or its type appears as an index on the prefix. For example:

Heim and Kratzer: $\lambda x \in D \,.\, P(x) = 1$
this book: $\lambda x_e[P(x)]$

Following current syntactic practice we refer to syntactic units like *every dragon* as "quantifier phrases", "noun phrases", "DPs", or "QPs". The label "NP" is reserved for the complement of the determiner, as in the schematic form *every NP*. Notice that "NP" is not short for "noun phrase": *every dragon* is a noun phrase but *dragon* is a NP.

Plain italics, as in *every dragon*, indicate a mention of a natural-language expression. Adding a prime (in the text or in numbered examples), as in *every dragon*$'$, signifies both the counterpart of a natural-language expression in the syntax of some logical language, and the interpretation (denotation, meaning) of the expression. This convention allows us to avoid clumsy things like $[\![\textit{every dragon}]\!]^{M,g}$. Although the convention is obviously sloppy and can be seen as complicit in promoting the confusion of logical syntax with model theoretic semantics, if the reader bears the distinction in mind it will always be clear which of the two things we are talking about in a given context.

Sometimes the interpretation of a linguistic example is prefixed with ok or #. Such annotation indicates that the example is acceptable or unacceptable on the given interpretation, and that no claim is being made as to whether the example has other interpretations.

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