THE MODAL FUTURE

It is commonly assumed that we conceive of the past and the future as symmetrical. In this book, Fabrizio Cariani develops a new theory of future-directed discourse and thought – one that shows our linguistic and philosophical conceptions of the past and future are, in fact, fundamentally different. Future thought and talk, Cariani suggests, are best understood in terms of a systematic analogy with counterfactual thought and talk, rather than as just mirror images of the past. Cariani makes this case by developing detailed formal semantic theories as well as by advancing less technical views about the nature of future-directed judgment and prediction. His book addresses, in a thought-provoking way, several important debates in contemporary philosophy, and his synthesis of parallel threads of research will benefit scholars in the philosophy of language, metaphysics, epistemology, linguistics, and cognitive science.

FABRIZIO CARIANI is Associate Professor of Philosophy at University of Maryland, College Park. He has published extensively in the areas of philosophy of language, epistemology, and logic. He is an editor for the journal *Philosopher's Imprint.*

THE MODAL FUTURE

A Theory of Future-Directed Thought and Talk

FABRIZIO CARIANI
University of Maryland, College Park

CAMBRIDGE
UNIVERSITY PRESS

CAMBRIDGE
UNIVERSITY PRESS

University Printing House, Cambridge CB2 8BS, 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

79 Anson Road, #06–04/06, Singapore 079906

Cambridge University Press is part of the University of Cambridge.

It furthers the University's mission by disseminating knowledge in the pursuit of education, learning, and research at the highest international levels of excellence.

www.cambridge.org
Information on this title: www.cambridge.org/9781108474771
DOI: 10.1017/9781108668514

First published 2021

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

ISBN 978-1-108-47477-1 Hardback

To my parents Patrizia and Walter and my brother Edoardo.

Contents

Figures

Preface

I would not have had the competence to write this book without sustained intellectual dealings with colleagues and mentors. John MacFarlane directed my PhD thesis in 2009. Although the thesis itself was about something else, it was John's work that got me started thinking about future discourse already back in 2004. Some of my 2004 discussions with (then-fellow-grad-student) Mike Caie still resonate in these pages. I didn't have much of a project, however, until I started discussing this material with Paolo Santorio a decade later in 2014. At this time, I had convinced myself that future discourse had a modal component, but I was struggling with how to square that with some very simple observations philosophers had been accumulating about the temporal aspect of its meaning. Paolo suggested the broad idea of mimicking Stalnaker's account of conditionals in the semantics of *will*, and then together we worked on making this work. This became "*Will* Done Better" – a paper we both regard as one of our respective bests, and one of the centerpieces of the theory in this book. Mike Caie also commented on an early version of "*Will* Done Better" at the Central APA in 2016. Meanwhile, at every conference I attended, I seemed to run into Simon Goldstein. I don't know anybody who enjoys talking philosophy as much as Simon does, which makes talking philosophy with him just as enjoyable. This project is the happy beneficiary of Simon's generosity with his time and his endless stream of thoughts.

I started giving talks about this project in the fall of 2014. There's a lot of audiences to thank, but here they are. Before joining forces with Santorio, I spoke on these subjects at the 2014 Philosophy of Language and Linguistics Conference in Dubrovnik; the Fourth Parma Workshop in Semantics; the University of Chicago, Linguistics and Philosophy Workshop; the nonstandard modals workshop at the University of Leeds (where Santorio and I started talking about collaborating); University of St. Andrews, Arché Center; and the Linguistics and Philosophy Working Group at the University of Michigan. In collaboration with Santorio,

I spoke at the 2015 meeting of the Australasian Association of Philosophy (I was heavily jet-lagged and had an audience of three – not my best performance!); the LENLS 12, Tokyo, Japan; the University of Chicago, Workshop on Nonveridical Expressions and Subjectivity in Language; the 2015 Amsterdam Colloquium; and the 2016 Central APA, Chicago. After wrapping up "*Will* Done Better," I started giving talks with an eye toward this book. For that period, I thank audiences at the New York Philosophy of Language Discussion Group; the 2016 meeting of the Italian Society for Analytic Philosophy; the philosophy colloquium at the University of Illinois, Chicago; an impromptu talk at King's College in London; the Hans Kamp seminar at the University of Texas at Austin (and specifically I thank Josh Dever for inviting me and flooding me with useful feedback over the course of two talks); a workshop on the Philosophy of Information at Shanghai University; the philosophy colloquium at the University of North Carolina, Chapel Hill; more philosophy colloquia, at Northern Illinois University, at the University of Maryland College Park, and at Tufts University; the final round of talks at a symposium on future-directed assertions at the 2019 Pacific Meeting of the APA in Vancouver (where David Boylan delivered incisive and helpful comments); the 2019 PRIN conference in Venice; the Logic of Conceivability group and the 2019 Amsterdam Colloquium; and the Jowett Society in Oxford, where I spoke on February 29, 2020. Three weeks later we couldn't fly across the Atlantic anymore, but I still managed to get valuable feedback at a virtual philosophy of language work-in-progress group, organized by Ginger Schultheis and Matt Mandelkern.

There are some specific individuals in these talks who made comments that impacted the way I thought about these topics. Other individuals were simply kind enough to listen to me talk and then point me in useful directions. I tried to keep a running tab of these comments. I am sure I inadvertently left someone out and I am sure some people have forgotten we talked because it's been so long. But here's the list: Maria Aloni, Sam Alxatib, Sara Aronowitz, David Beaver, Harjit Bhogal, Andrea Bianchi, Justin Bledin, Kyle Blumberg, Daniel Bonevac, David Boylan, Sam Carter, Lucas Champollion, Ivano Ciardelli, Sam Cumming, Josh Dever, Aaron Doliana, Kevin Dorst, Daniel Drucker, Julien Dutant, Kenny Easwaran, Branden Fitelson, Melissa Fusco, Anastasia Giannakidou, Michael Glanzberg, Sandy Goldberg, Jeremy Goodman, Valentine Hacquard, John Hawthorne, Ben Holguin, Jeff Horty, Nick Huggett, Megan Hyska, Hans Kamp, Magdalena Kaufmann, Stefan Kaufmann, Chris Kennedy, Jeff King, Justin Khoo, Peter Klecha, Arc Kocurek, Natasha Korotkova,

Angelika Kratzer, Steven Kuhn, Jennifer Lackey, Maria Lasonen-Aarnio, Harvey Lederman, Nicholas Leonard, Matt Mandelkern, Alda Mari, Dean McHugh, Eleonora Montuschi, Sebastiano Moruzzi, Sarah Moss, Shyam Nair, Dilip Ninan, Carlotta Pavese, Paul Portner, Geoff Pynn, Brian Rabern, Baron Reed, Jessica Rett, Georges Rey, Lance Rips, Gillian Russell, Alessio Santelli, Anders Schoubye, Ginger Schultheis, James Shaw, Patrick Shireff, Vesela Simeonova, Giuseppe Spolaore, Shawn Standefer, Isidora Stojanovic, Una Stojnic, Mack Sullivan, Eric Swanson, Rich Thomason, Mike Titelbaum, Patrick Todd, Stephen Torre, Alexis Wellwood, Malte Willer, Alexander Williams, Robbie Williams, Alex Worsnip, Seth Yalcin, Igor Yanovich, Zhuoye Zhao, Sandro Zucchi. What can I say? If I failed, it's not because my interlocutors lacked in distinction, sharpness, or goodwill.

Three graduate seminars I taught at Northwestern were critical in shaping and sharpening my views on these topics. These were "Future Contingents" (Fall 2015), "Counterfactuals and Probability" (Spring 2018), and "The Modal Future" (Fall 2019). I want to thank the students in these seminars for their contributions: Andrés Abugattas, Beth Barker, John Beverley, Gretchen Ellefson, Nathaly Garcia, Andy Hull, Nate Lauffer, Whitney Lilly, Matthew Myers, Carry Osborne, Spencer Paulson, Kathryn Pogin, Ben Reuveni, Daniel Skibra, and Jon Vandenburgh. Additionally, John Beverley and Nate Lauffer also served as RAs, assisting me in preparing the final manuscript. In the nick of time, two virtual reading groups pointed out typos and some important mistakes (their members are already thanked in the previous paragraph).

Some of the research for this book happened concurrently with, and was presented with the support of, my New Directions Fellowship from the Mellon Foundation. While the New Directions helped me acquire new skills that are not very much on display here, themes from what I was learning have made their way through much of the book, and especially in Part V. I am grateful for the time away from teaching that the New Directions support afforded me.

At some point in 2016, I mentioned to my dentist, Dr. Leonard, that I was working on a book. He must keep a diary with interesting facts about his patients, because at every visit thereafter he'd ask me how far along my book was. The answer wasn't always the one *I* wanted to hear or utter. Anyway, 10% of what spurred me to finish the book is so I didn't have to feel like a fraud when talking to Dr. Leonard. He's getting a free copy.

I am also grateful to Hilary Gaskin in her role as philosophy editor at Cambridge University Press for her relentless professionalism and clear-headed stewardship of the project, as well as to Hal Churchman for his

work as editorial assistant. I am grateful to Jill Hobbs for her expert copyediting work, which greatly improved the systematicity and clarity of my writing.

I started thinking about future thought and talk in the summer of 2014 – when my older daughter, Iris, was just weeks old. In 2018, our family welcomed another girl to the family, Vera. The personal story of the composition of this book is the story of my learning how to reconcile my work obligations with my desire to be around my family. The thing I will remember the most from this time is the baseline of happiness and gratitude that these girls, as well as my spouse Angeline, have filled my life with.

The book is dedicated to my parents, Patrizia and Walter, and to my brother, Edoardo. My becoming a researcher on the other side of the Atlantic depended in large part on their support, guidance, and companionship.

Conventions and Abbreviations

- Sans-serif letters 'A', 'B', 'C', etc. are metalinguistic variables ranging over sentences (and other sentence-like syntactic objects).
- Bold letters '**A**', '**B**', '**C**', etc. are metalinguistic variables ranging over unstructured propositions (typically sets of possible worlds but occasionally also objects of different type).
- Within the same stretch of discourse these variables can be linked, so that **A** is the unstructured proposition associated with A; **B** is the unstructured proposition associated with B; and so on.
- This typographic convention is extended by analogy to other applications. Thus, I use '*f*' as an object-language variable ranging over modal bases and '**f**' as a metalinguistic variable to denote its value (a function).
- Italics are used throughout to mention bits of language, such as the sentence *I am sitting*. They are also used, sparingly, for emphasis.
- Within italics and mathematical environments, corner quotes are invisible. Corner quotes are made visible if and only if they are needed outside such environments.
- When possible, without confusion, some elements that would add weight to the notation without aiding clarity are omitted (but always with commentary in the text).

Introduction

Meet Shiny. Shiny is a standard 25-cent coin with a heads and a tails side. I am about to flip Shiny in a setup that, to the best of my knowledge and ability, is fair. My due diligence included measuring Shiny's relevant physical properties as well as the external properties of the setup, to ensure that the conditions of the flip are as fair as possible. Prior to the official flip, I ran a few thousand tests and documented that Shiny landed heads about half of the time. While I don't know for certain that Shiny will land heads, I can reasonably express a degree of confidence – plausibly around 50%.

Now meet Bright, a much older coin. Bright was flipped in 1961 by then-president John F. Kennedy in the Oval Office as he was waiting for some crucial intelligence to come in. To the best of my knowledge, the setup surrounding Bright's toss was also fair. No one else saw Bright's toss, and Kennedy only had time to mark on his diary that he flipped the coin – not how it landed. I don't know for certain that Bright landed heads. But I can reasonably express a degree of confidence. How much confidence? Plausibly, somewhere around 50%.

How similar are these cases? When we think about the future and the past, we can take one of two opposing perspectives. We might emphasize the similarities and come to view future and past as symmetric timelines stretching on the opposite sides of the present. My ignorance about how Shiny will land is of the same sort as my ignorance about how Bright landed. Both states of ignorance concern events that I do not have immediate access to. In cases like Bright's toss, my beliefs will typically be based on whatever traces her toss left in the present. In cases like Shiny's toss, I will typically rely on presently accessible facts that are of causal relevance.

But we might also emphasize the differences. We intuitively view the future as open, both in the sense that it does not appear settled to us and in the sense that it is, or appears to be, the arena in which we exercise our agency. This contrasts with the past, which is settled and not a reasonable target for agency. These intuitive differences come into sharper focus when

we consider some other asymmetries between past and future: I can try to rig Shiny's toss so that it lands heads, but I cannot rig Bright's toss. Admittedly, it may not be entirely clear what these intuitions amount to, but there is no denying that we have them.

It is not just that there are two perspectives, symmetric and asymmetric, with respect to one type of fact. There are several independent dimensions along which we might consider whether past and future are symmetric. The apparent asymmetry in openness of the future is one such dimension, but we can easily produce others without leaving the domain of metaphysics. Do laws of nature discriminate between past and future or are they symmetric? Do past individuals and events have the same ontological status as future individuals and events? These questions are largely independent of each other: One can consistently believe, say, that past and future are ontologically symmetric, and that the laws of nature are asymmetric. In cases where there are entailments and exclusions between answers, they are subtle and require careful scrutiny.

The crucial observation that sparks this book is that some dimensions of potential asymmetry arise outside the domain of metaphysics. Specifically, there are important asymmetries that pertain to how we think and talk about the future. The story of Shiny and Bright illustrated some respects in which belief formation and evidence might be asymmetric in this way. Here are some others: Does our linguistic system treat past and future as mirror images of each other? Do we bring to bear the same cognitive resources in thinking about the past as we do in thinking about the future?

These linguistic, cognitive, and epistemological questions are the central points of focus in this book. I argue that there are important cognitive and linguistic asymmetries between past and future. Moreover, I argue that these linguistic and cognitive asymmetries are largely independent of the traditional metaphysical symmetries.[1] Even if we were to accept that past and future are symmetric in every metaphysical respect, we would still have to accept that they are not symmetric in terms of how we think and talk about them. As in the metaphysical case, most of these questions are not automatically settled by one's stance on the others. But even so, my answers to the linguistic and cognitive symmetry questions impose constraints on the answer to the metaphysical ones. A lot of the interest of what is to come, I hope, will consist in exploring the connecting threads.

[1] I am fascinated, however, by attempts such as Albert's (2000, chapter 6) idea that we can explain some central asymmetries of knowledge in terms of fundamental physical facts. The level of analysis of the present book is very different from Albert's discussion, but some of the same questions drive my inquiry.

The overarching theme of the book is the thesis that thought and talk about the future are *modal*. The linguistic aspect of this thesis is that the meanings and content of future-directed claims, such as *the water will boil*, are best understood in terms of a fundamental parallel with counterfactual claims, such as *the water would have boiled if you had turned on the stove*. My defense of this claim builds on work I did with Paolo Santorio (Cariani and Santorio, 2017, 2018), as well as on a strong tradition in linguistics. The contrasting view, which I reject, understands future-directed thought and talk as being an extended parallel with past-directed thought and talk.

However, my research with Santorio is not merely a replication of the extant insights from linguistics. We found that nearly all of the developments of the modal future hypothesis in linguistics were problematic, often for reasons that are clearly developed in the parallel philosophy literature. Broadly speaking, these problems emerge from methodological blindspots in both semantics and epistemology, and ultimately from a lack of integration between them. As I view it, semantics – our best body of theories of linguistic meaning – is part of a philosophically integrated theory of information and inquiry. As such, semantics is subject to cognitive and epistemological constraints: When we compare semantic theories, we must keep an eye on how they interface with cognitive and epistemological matters. Conversely, choosing the best theory of rational credence and rational action might depend on questions of semantics. Because this integrated view is somewhat heretical, let me consider some powerful illustrations of these dependencies.

An underappreciated passage in Stalnaker's seminal discussion of counterfactual conditionals illustrates how semantics might be subject to epistemological constraints. Here is Stalnaker:

> [M]any counterfactuals seem to be synthetic, and contingent, statements about unrealized possibilities. But contingent statements must be capable of confirmation by empirical evidence, and the investigator can gather evidence only in the actual world. How are conditionals which are both empirical and contrary-to-fact possible at all? How do we learn about possible worlds, and where are the facts (or counterfacts) which make counterfactuals true? (Stalnaker, 1968, pp. 29–30)

Stalnaker's solution to this problem involves modeling the semantics of counterfactuals in terms of similarity to the actual world. When one acquires evidence that bears on which world is actual, one also acquires evidence that bears on which worlds are *similar* to the actual world. What matters to my present point is not so much Stalnaker's particular solution, but the methodology behind it. He is saying that an adequate semantics for

counterfactuals should speak, to some degree, to epistemological questions, and hence that epistemology constrains semantics.

There are also constraints that run in the opposite direction. I offer two examples. Consider first the Bayesian epistemologist's assumption that rational agents ought to assign credence 1 to all logical truths. Under this assumption, semantics evidently constrains the theory of rational credence. There would be a tension between claiming that A is a logical truth and claiming that it is rational to assign intermediate credence to its content. Now, that Bayesian assumption is itself controversial. Strictly, speaking, probability theory only requires that rational agents assign credence 1 to Boolean tautologies (a modest subset of the set of all logical truths). Some theorists (Garber, 1983) even leverage the difference between Boolean tautologies and necessary truths more generally into a Bayesian solution to the problem of logical omniscience. However, the fact that the assumption is disputed does not disarm the argument: It is hard to find a plausible philosophical stance from which it's okay to require rational agents to assign credence 1 to tautologies, while allowing them to have intermediate credence in other kinds of *logical* truths. (This is compatible with relying on Garber's approach when it comes to uncertainty about mathematical truths, if those are nonlogical, or about other kinds of necessary truths.)

As a second example, consider principles that connect beliefs about chance and subjective credences, such as Lewis's (1986b) *Principal Principle*. According to the Principal Principle, one's credence in chancy propositions ought to align with one's credences about what the chances are. It is standard to think that the bearers of chance are propositions, not sentences. It would be implausible to claim that some sentence failed to express a proposition, but it still made sense to say that it had an objective chance.[2] At the same time, our intuitions about the chance of propositions are mediated by their linguistic forms. When I reflect on my credence that the coin will land heads, I think about the chances of a proposition through the medium of a sentence that expresses it. Semantic verdicts about which propositions are expressed by a sentence are of direct relevance to the theory of rational credence.

[2] Nonfactualists about conditionals tend to make this kind of move for subjective credence. They claim that there are senses of "credence" in which we can meaningfully have credence in sentences that do not have truth-conditions. For instance, they claim that the subjective credence in a conditional merely registers its degree of acceptability, which needn't be equal to its probability of truth. I submit that this kind of view is a nonstarter for objective chance.

These reflections support a two-way interaction between semantics and epistemology. That relation might in fact be three-way: A similar case can be made for the relation between semantics and cognition, but I'll save it for later in the book.

In calling the belief in these connections "heretical," I do not mean to suggest that I am alone in advocating this integrated approach. Though there is plenty of pushback, there is a growing movement in this direction.[3] But I went ahead with this sermon on behalf of theoretical integration, because I have not yet seen anyone else commit it to print, and because conversations suggest to me that there is fundamental disagreement between us integrationists and large groups of semanticists and epistemologists.

As a result of this broad perspective, the inquiry in this book is unapologetically interdisciplinary. This is fitting to the topic. As my students would put it, philosophers have puzzled about the semantic status of future-talk literally for millennia. Research on this topic grew enormously during the Middle Ages, where it got connected to questions concerning divine omniscience (Normore, 1982; Øhrstrøm, 2009). Many centuries later, it received a further jolt as part of the development of modern logic in the twentieth century (Prior, 1957, 1967, 1976; Łukasiewicz, 1970; Thomason, 1970). At the same time, the study of tense and aspect, and more generally of the devices that language recruits to allow us to talk about nonpresent events and states, is also a prominent area of research in both syntax and semantics. Given the level of specialization within each of these literature threads, it is unsurprising that the philosophical track and the linguistic track have proceeded in relative isolation from each other. Moreover, even when we do not altogether ignore each other (which fortunately happens less and less), it can be difficult for the two-way interaction between philosophy and linguistics to proceed smoothly, given our different canons, assumptions, argumentative standards, and backgrounds. An important part of the project of this book is to reach a view about future discourse that is as much as possible informed by *both* philosophical and linguistic theorizing, mending inconsistencies between the traditions when they arise.

[3] It is impossible to compile an exhaustive list. This integrated approach seems transparent to me in the works of Robert Stalnaker. But here are some recent works that have influenced me, from authors whom I claim as fellow-travelers (and hopefully they agree with the characterization): Boylan (in press a, b); Goldstein (in press a); Lassiter (2011, 2017); Mandelkern (2018); Mandelkern et al. (2017); Moss (2013, 2015, 2018); Todd and Rabern (in press), Santorio (2017, in press); and Schulz (2014, 2017).

When I started writing this book, the mission I gave to myself was to write "Lewis's *Counterfactuals* but for future discourse." At some point, that model broke. *Counterfactuals* begins with a bang: The first chapter tells us all the fundamentals of Lewis's theory. In the present case, before I could start developing my own proposal, I needed to set up my opponents and, more importantly, to introduce some foundational material.

Accordingly, Part I of the book develops one of my main polemical target, the *symmetric paradigm*. This is the view that the meanings of future and past tenses are mirror images of each other. Chapter 1 sets up the view, and Chapter 2 summarizes some important research that shows how the linguistic thesis that future- and past-directed discourse are symmetric might be available to someone who thought that future and past are *metaphysically asymmetric*. In essence, part I is a very opinionated review of the literature: It is the background I normally would presuppose in a specialist article, except this time I get to tell that background story in my preferred way. Readers who are familiar with the relevant literature might just skim it to get a sense of the notation I use and to take note of those places where my terminology and framework are not canonical.

Part II runs through the themes of Cariani and Santorio (2018) at a more deliberate pace. Chapter 3 introduces the linguistic case for the thesis that predictive expressions, such as *will*, are modals. Chapter 4 reproduces the key arguments we relied on in Cariani and Santorio (2018) against the thesis that if *will* is a modal, it must be a *quantificational* modal. Chapter 5 introduces the theory that Santorio and myself advocated to make sense of the idea that there are non-quantificational modals. I refer to this theory as *selection semantics*, because the formal presentation of the theory appeals to selection functions, roughly in analogy with Stalnaker's model of theoretic analysis of conditionals.

There are many ways of developing the selection semantics insight, and many bells and whistles we might add to the basic presentation of the theory. Part III goes beyond the theory of Cariani and Santorio (2018) in three respects. Chapter 6 discusses how *will* interacts semantically with other modals and specifically with possibility modals. Along the way, it fixes some problems with the basic semantics of Chapter 5. Chapter 7 adds on a different module to the account of Cariani and Santorio (2018). In that work, we largely punted on the question of why, if predictive expressions are modal, they help us make claims about the future. In this chapter, I develop a semantic framework inspired by Condoravdi's work on the future orientation of modals (Condoravdi, 2002). The elevator pitch for this view is that sentences such as *she will win* get to be about the future in

the same way in which sentences such as *she might win* get to be about the future. Chapter 8 targets the interaction between *if* and *will*. Here I discuss what sorts of truth-conditions my theory predicts for *will*-conditionals as well as how the theory might be generalized beyond those.

Part IV shifts gears, turning to the pragmatics of future discourse. There is a long-standing concern that the idea that the future is open might be in conflict with the claim that it is normatively permissible to make assertions about the future. Some theorists even suggest that people never make assertions about the future. According to them, people engage in an assertion-like speech act that goes by the name of "prediction." Chapter 9 clears the ground by developing a comprehensive theory of the speech act of prediction and of its relation to assertion. It immediately follows from this discussion that some predictions also are assertions about the future. Chapter 9 also works as a self-standing discussion and indeed it is an expansion and reelaboration of Cariani (2020). With that work in place, Chapter 10 moves on to the apparent conflict between the idea that the future is open and the observation that future contingents are generally assertible. These conflicts are sometimes referred to as the "assertion problem." I argue that there are many versions of the assertion problem – and so that the label "assertion problem" is a misnomer. I go on to develop a few of them in detail. In Chapter 11, I argue that addressing the assertion problem might force us to revise the way we think about what it is for the future to be open. There are non-epistemic ways of thinking about the openness of the future that can defuse the standard problems connecting openness and the norms of assertion. More specifically I argue that, despite some bad press, a *Thin Red Line* metaphysics might be our best chance of making objective sense of the idea that the future is open while also making sense of future-directed discourse. In this chapter I endorse, for the sake of argument, the contention that it is metaphysically indeterminate which world is actual, although it is determinate that there is an actual world (Hirsch, 2006; Barnes and Cameron, 2009, 2011). The chapter aims to contribute a model of linguistic context to go with it.

Part V drops the theme of the openness of the future and moves on to future cognition and future epistemology. Chapter 12 discusses the cognitive faculties that people seem to recruit in making judgments about the future. Several theorists have suggested that a distinctive mechanism by which we make counterfactual judgments is "mental simulation" (see Kahneman and Tversky, 1982; for a recent discussion in the philosophy literature, see Williamson, 2008). In this chapter, I consider what that claim of distinctness might amount to and how it might generalize to

future-directed discourse. I observe an important limitation of that extension: Future-directed judgments rely just as much on imaginative faculties such as mental simulation as they do on our inferential ones. I conclude that what is special about future-directed judgments is that they create the default expectation that they are based on indirect evidence, in a sense the chapter makes more precise. This idea is applied in Chapter 13 to some puzzles about the future stemming from the work of Ninan (2014, unpublished manuscript). Ninan's striking puzzle suggests that future-directed knowledge seems to be cheaper than past-directed knowledge. Chapter 13 explores what this debate looks like from the perspective of my theory of future-directed content and judgment, along the way developing an account of one of the key pieces of evidence for the modality of *will*, from Chapter 3.

There are a few paths through the book that involve less commitment than reading it from cover to cover. Part III is the most specialized – and in fact the most technically specialized – part of the book; there is a coherent sub-book that just omits it. At the opposite end, there is a sub-book in formal semantics that runs from Part I to Part III. Chapters 9, 12, and 13 are self-standing, as is the combination of Chapters 10 and 11 and Part II taken as a whole.