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What can you do?

Imperative mood in semantic theory

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Preface

The incentive to write a dissertation on the semantics of imperatives was borne from reading the posthumously published book on that subject by Charles Hamblin. After having acquainted myself with the literature on deontic logic, I was under the impression that the predominance of the notion of propositional, or truth conditional, content figured as an obstacle in the discussions there. Hamblin's book integrates typological, grammatical, logical, semantic and philosophical observations and analyses concerning imperatives and thereby it creates a strong case for an approach to semantics in general in which declarative sentences do not form the heart of the theory of meaning. I hope that this thesis helps to further this cause.

Alexander Broadie remarked, and I believe rightly so, that much work on the logic of imperatives has too hastily taken recourse to conventional approaches to logical semantics. I fully agree with his judgement that

[...] the notion of "imperativity" possesses a complexity that can be revealed in significant depth only if a battery of disparate notions is employed, and particularly notions of special relevance to social philosophy and the philosophy of mind. One unfortunate consequence of the determination of philosophers to construct with all speed a logic of imperatives is their tendency to camouflage this complexity instead of displaying it. (Broadie, 1972, page 190)

In complementary fashion, though, I am under the impression that the conceptual analysis of these disparate notions could be improved upon by a more thorough understanding of the semantic complexities of imperatives. It remains to be seen whether I am correct in thinking so.

What shaped the views developed in this thesis most are the discussions with my promotores, Frank Veltman and Martin Stokhof. Their comments always struck a fine balance between inspiring debate on the general ideas and helpful suggestions for improvements of the details. That these discussions did not only greatly improve the result, but that our opinions also seem to have converged, I much value as a compliment.

The text has further benefitted from the generous attention of some other people as well. Darrin Hindsill read an early draft and provided me with many detailed comments, suggestions and corrections. Fabrice Nauze studied the formal semantics of the last two chapters with much precision and helped me to improve upon it considerably. Maarten Cleeren read parts of the thesis in detail and brought to my attention several easily overseen mistakes.

Several people helped me in finding my interests and shaping my thoughts and opinions on various matters throughout the past four years. I should specifically mention Marc Pauly, Tim Fernando, Isabel Txurruka and Carla Umbach. Though not all of the issues that we discussed are directly reflected in the thesis, I thank them for their interest and insightful suggestions. Paul Dekker has been a constant support as a colleague, teacher and friend. From helping me out with typesetting technicalities and correcting spelling mistakes to giving advice on presentations and discussing theoretical issues, his door was always open.

I had the great pleasure to work in a lively and intellectually stimulating environment, the most immediate representatives of this being my office mates Balder ten Cate, Marie Šafářová and Marieke Schouwstra. The lunches, picnics, Friday drinks, various colloquia, reading groups, classes (both as a student and as a teacher) and occasional workshops with the staff and students of the philosophy department, the ILLC and the Dutch graduate school in logic Ozsl were always pleasant and engaging. I learned a lot and I hope I have been able to return the favor. Parts of the material in this thesis has been presented at several conferences, workshops and colloquia. I am grateful for the many helpful comments and suggestions of those audiences.

Lastly, I would like to thank my family and friends for their interest, for their care, and for their continued efforts to seek proximity to my often absent mind.

Amsterdam
April, 2005

Rosja Mastop

In order to say what a meaning *is*,
we may first ask what a meaning *does*,
and then find something that does that.

—David Lewis, *General Semantics*

Introduction

Languages can be used to communicate all sorts of messages. In many philosophical theories of meaning this diversity is seen as a problem to be overcome in order to define a simple and uniform—hence ‘intuitive’—concept of meaning. Often this leads to a distinction between a diverse array of uses (forces, moods) and a single, uniform ‘content’ (proposition) shared by all sentences of the language. This shared content is then the domain of semantics, whereas the diversity of uses is counted as belonging to pragmatics. Belnap (1990) criticizes this practice, analyzing it as involving what he calls the ‘Declarative Fallacy’. This fallacy is to assume, without question, that we can identify in all sentences a content prototypical of declarative sentences: it is a proposition, has a truth value, can be used in inference, and so on. Thus, the difference between, say, interrogatives and declaratives is only that the one is used to *question* the truth of its propositional content, whereas the other is used to *assert* it.

[...] the slogan that meaning is truth conditions is flawed in more than one way, not least because it seems to force us to take the concept of truth much more seriously than we should, nor least because it appears to suggest that our understanding of language results from internalizing the recipes that Tarski invented for the first-order calculus. (Belnap, 1990, page 5)

Belnap rejects this fallacious assumption, encouraging philosophers of language to give equal weight to sentences of all kinds. He claims that there is no single and uniform content to all sentences of a natural language: “Strict avoidance of the Declarative Fallacy [...] requires the recognition that interrogatives and imperatives are not just marked differently from declaratives, but possess fundamentally different underlying content structures”.

As for interrogatives, semantic theories have been developed by semanticists from the 1950s onwards—also by Belnap himself—that attribute semantic values to those sentences different from the values of declaratives. In these theories an interrogative content is the set of its possible answers (cf. Hamblin, 1958). As for imperatives, their contents are still mostly identified with truth conditions. Belnap intends to accommodate this shortcoming by presenting a modal logic of deliberate action sentences,

so-called ‘*stit*-semantics’, which could function as a notion of imperative content. It is my contention that, despite the accuracy of his philosophical analysis, with his semantics Belnap does not adequately answer the challenge he himself puts forward. The main aim of this thesis will therefore be to motivate and develop a semantics of imperatives that does avoid the Declarative Fallacy.

The discussion in philosophy of language concerning the concept meaning of imperative sentences—from Hofstadter and McKinsey (1939) via Hare (1971) to Hamblin (1987)—has fallen silent somewhat in recent years. However, in the linguistic literature the issue has been picked up in several studies from the 1990s onwards. In some of these works a syntactic analysis of imperatives is adopted in which the conversational use (directive illocutionary force, Searle, 1979) is directly encoded in the grammatical form (e.g., Han, 1998). Others have defended a mediating role for semantics: it is not the sentence’s form as such that encodes the conversational use, but the form encodes a specific semantic content and it is due to this specific content that (main clause) imperatives have their particular range of conversational uses (Wilson and Sperber, 1988; Portner, 2003).

To oppose to a strict form-function fit should be justified by showing that imperative sentences can be embedded, have a past tense, or are in some other way capable of being dissociated from their context of utterance. Hence the introduction of a mediating semantic representation must have the function of facilitating a more uniform treatment of embedded and main clause sentences, or past, present and future tense ones. If it is agreed that imperative meaning cannot be dissociated from directive force, as many authors claim (cf. Han, 1998), then there would be no reason for a semantic analysis that separates the two. In view of this, the only issue that has been mentioned in the literature concerns the possibility of embedding imperatives in Korean (Han and Lee, 2002; Pak, 2004).

The semantic approach to imperatives raises an important question: if the conversational function is not grammatically expressed, what *does* constrain those sentences to their directive usage? According to Portner the imperative denotes a property that can only be true of the hearer. It is due to its semantic type that imperatives cannot be used to assert—that would require that they are propositions—and so the only way in which they can be integrated into the discourse context is by being added to the ‘to do list’ of the hearer, which is a set of properties and thus of the appropriate type. The normative role of the to do list on the hearer’s actions is then what accounts for the restriction to directive speech acts. However, it is strange to think that the semantic type of the sentence can determine the illocutionary force. It is not altogether uncommon to utter something that is, semantically speaking, a property and give information with it. In answer to the question what hair color Susan has, one may answer ‘Blond’. This answer denotes a property, but it is unambiguously an informative utterance.

Wilson and Sperber claim that the denotation of an imperative is a ‘complex propositional attitude’ of someone considering the truth of the proposition to be desirable to someone and someone believing this proposition to be a realistic possi-

bility. The different substitutions for the various existential quantifiers in this interpretation yield the diversity of potential illocutionary forces of the imperative, it is claimed. But, even disregarding the adequacy of that prediction, it is not at all made clear why we could not use imperatives to *assert* that the person in question has the desire. It is a simple fact that from no propositional content can it be inferred that the sentence does not have an assertive illocutionary force.

Consequently, the semantic representation has to be more than a proposition if it is to explain why imperatives do not have a descriptive function. If we are to maintain a central role for propositions, then two possibilities suggest themselves. The first option is that the conversational function is indicated by a special marker in the clause. We could represent this idea by an analysis in terms of direct speech “Make this the case: *A*”, with *A* a declarative sentence with truth conditions. The alternative would be an operator over a declarative sentence, systematically transforming the declaratives into imperatives. On this approach the imperatives would be of the form “Make it the case that *A*”. Both ideas have been worked out by McGinn (1977), leading to what is essentially the same semantic analysis. A sentence such as, e.g., ‘Go home’ is interpreted as if it reads ‘Make it the case that you go home’. Of this latter sentence we can say that it is *fulfilled* if and only if ‘You go home’ is true. Apart from a truth valuation we thus need a fulfillment valuation, but the latter is defined in terms of the former so we only need a minimal, if not to say trivial, extension of classical semantics to incorporate imperatives under the general approach.

Unfortunately, this direct speech/operator analysis is not quite accurate. There is a difference between performing the action of going home and making it the case that you do so. This means that the ‘translations’ of imperatives into the operator-declarative format are not completely faithful. Some arguments supporting this claim will be presented in the first chapter. Amongst the types of sentences in which the difference pops up are joint action imperatives and imperatives with quantified subjects. Apart from this, it is also clear that not everything that can be subordinated under the imperative operator, on McGinn’s formulation, makes for a meaningful imperative sentence. Stative facts about the world, as expressed in declaratives such as ‘James has a cat’, can be made the case, but no imperative sentence can ‘command’ that state directly. If anything, a linguistic semantics should explain what can be meaningfully expressed in language, and by what means. So if the translation with the operator is more permitting than imperatives are themselves, then we are still far from having given a ‘semantics of imperatives’.

To include complete declaratives in a semantics of imperatives seems needlessly complicated. Why do we not just say that the addressee fulfills ‘Go home’ by going home? There may well be such a reason for wanting to maintain a central role for truth in a semantics of imperatives that goes beyond an ‘understandable tendency’ (Beardsley, 1944) to use familiar notions to cover what is nowadays still largely unfamiliar ground. This reason is the idea that a truth conditional theory of meaning facilitates a uniform interpretation of terms. Let me make this more precise.

In the framework of Montague grammar (Montague, 1973) two basic semantic

types are allowed: sentences have truth values and so they are of type t ; names are primitive referential expressions and have type e , which is mnemonic for *entity*.¹ The so-called context principle states that “It is enough if the proposition as a whole has a sense, it is this that confers on its parts also their content” (Frege, 1884, page 71). This idea is integrated in Montague grammar by interpreting subsentential expressions as being of derived, functional types. For instance, the meaning of the transitive verb ‘hit’ is a function that takes an entity (the direct object) and returns a new function that takes another entity (the subject) and returns a truth value. In short, the meaning of ‘hit’ is some function of the functional type $\langle e, \langle e, t \rangle \rangle$. When we have thus decomposed the sentence and have given functional denotations to each of its terms, those terms can be used again to construct new sentences by connecting the terms in a different way. This is, in turn, what the principle of compositionality tells us.

McGinn’s imperative mood operator could be integrated in the theory as being of the type $\langle t, f \rangle$: from truth value to ‘fulfillment value’, which would be the type of imperative sentences.² But now, what if imperatives do not even *contain* anything of type t ? In that case we have two options: either we take the imperative mood operator to be a function from properties to fulfillment values, or we say that the verb ‘hit’ has different denotations in imperatives and declaratives respectively. So on the first account the mood operator is of type $\langle \langle e, t \rangle, f \rangle$ and can be phrased as “Make it the case that you are P ”, with P being some property. Though this is by all means possible³, it is rather strange to think that what the verb contributes to the imperative is ‘that which it would contribute if the sentence were a declarative’. In other words, declaratives would confer meaning on their parts, and it is this meaning that those parts confer upon non-declaratives. The context principle only applies to declarative sentences. Other sentences of the language are meaningful only in virtue of the meaningfulness of declaratives.

This is not a very intuitive picture. Can we not imagine a language that would have only imperative sentences? Would we really want to say that even there the words in the sentences owe their meaning to their role in (non-existent) declaratives? The implicit reasoning seems to be that still this is to be preferred over the alternative: that the verb ‘hit’ has two separate meanings, completely independent of one another as far as the semantic theory is concerned. In declaratives it would be a function of the type $\langle e, \langle e, t \rangle \rangle$, in imperatives a function of the type $\langle e, f \rangle$. If so, what would prevent one word to mean, e.g., ‘hit’ in declaratives and ‘read’ in imperatives? We could unify the meanings using the idea from property theory (Chierchia and Turner, 1988) of introducing another primitive type for properties, but that could be contested as an

¹I disregard issues of ‘raising’ here. The argument still goes through when names would be of type $\langle \langle e, t \rangle, t \rangle$.

²I do not mean to suggest by this that all that is needed is the addition of a functional type to the semantics. It is merely adopted for the sake of argument, in order to facilitate a clear comparison between alternative views on the notion of imperative meaning.

³It does have empirical problems. For instance, imperatives with quantified subjects, as in ‘Everybody dance now’, do not fit well in this analysis. See Portner (2003) for a suggestion.

ad hoc solution.

I contend that the dualism in this second option is not implausible at all. Quite the contrary, in fact. A dualistic approach to term interpretation neatly fits with an intuitive and psychologically plausible analysis of the meaning of words. Where declarative sentences are used to refer to events and objects in a perceived or imagined world history, imperative sentences call upon other persons' ability to *engage* the world's future in action. I will point out that this difference between events and actions appears at several places in natural language, as a contrast between a third person, observer perspective and a first person, agent/patient perspective. The action perspective is adopted not only in imperatives, but also in control infinitives (vs. finite 'that' clauses), complements of root modals (vs. epistemic modals), gerunds without a subject, and modal root infinitives. The perspectival distinction necessitates a dichotomy in the ontology, between on the one hand *events* as fragments of history and *objects* occurring therein, and on the other hand *actions* (or experiences) as processes of expanding histories and *persons* performing (undergoing) them.

Using this dualism in the ontology, we can account for the functional diversity of sentences as a consequence of their semantic meaning. If imperatives present an action from the first person point of view, they do not represent anything that can be considered a *description* of the world and so they are not used to assert. On the other hand, declarative sentences represent events so they cannot, in general, be used to command. It is only by expressing an attitude of desire, an intention to retribute disobedience, or simply by stating as an authority that the action will *in fact* be performed, that the declarative sentence can communicate a directive intention. Introducing the 'different underlying content structures' Belnap wrote about thus allows us to do what Portner and Wilson and Sperber could not do: explain the different range of uses of imperatives and declaratives from their semantic contents. To do lists, which Portner associated with imperatives, are populated by actions rather than properties. Worlds, on the other hand, contain events that could be perceived or otherwise understood from a third person point of view. Therefore declaratives describe, whereas imperatives command. The intricate semantic link felt between imperatives and their 'corresponding' declaratives is now no longer a matter of having the same deep structure or propositional content, but it is a consequence of the perspectival tie between actions and events: The performance of a certain action is the expansion of history with a certain event.

The primary goal of this thesis will be to develop an understanding of this 'perspectival dualism' regarding semantic content. Those who want to maintain a universal status of propositions will have to provide a better motivation. Two subsidiary goals should also be introduced here. Firstly, in order to integrate imperative sentences into semantic analysis we will also need to go beyond classical semantic modelling in terms of valuations. Despite my use of a 'fulfillment value' above, merely for the sake of argument, imperative sentences do not have a 'value' of some sort that would make their utterance correct in some situations but not in others. Imperative sentences do not necessarily have preconditions. They are used to expand a 'to do list', as Portner

explains, so they have *postconditions*. Their meaning is constituted by their context *creating* function. Because of this, a dynamic concept of meaning (Veltman, 1996) is necessary in order to assign meanings to imperatives. Where the dynamic semantic framework is still seen by some as no more than an interesting alternative next to classical intensional semantics, I believe that in dealing with imperatives—or in fact all performatives—dynamic semantics is the only way to go.

The second subsidiary goal is to convince the reader that, despite the difficulties in extending semantics in such a way that imperatives fit into the general picture, it is a worthwhile activity to do so. Providing a semantics of imperatives is not just a matter of ‘covering’ some group of furthermore uninteresting sentences. The goal of a semantics of imperatives is not just to ‘have a semantics of imperative sentences’. It is to be able to explain some of their intriguing properties and possibilities and so to have a better understanding of linguistic meaning in general. I mentioned already the discussion in the literature on the possibility of embedding imperatives in Korean. In the third chapter I will argue that in Dutch the imperative displays past tense forms and first and third person forms (so-called ‘hortatives’). Without a semantics that explains what the distinct meaning of imperative sentences actually is, no good explanation is possible of the possibilities and restrictions of those past tense and non-second person constructions. Furthermore, a semantics of imperatives will help in explaining some properties of closely related infinitival constructions like the ones mentioned above already. I hope to convince the reader that these properties, like future orientation and an agent-perspective on the event, are not all immediate consequences of the theories developed for declarative sentences and thus make their analysis highly relevant to the study of other facets of language and meaning, such as tense, aspect and modality. The only thing that stands in the way of such a more balanced role of imperatives in those fields of study is the lack of a clear and well motivated extension and generalization of formal semantic methods to nondeclaratives. This problem is what I hope to have alleviated somewhat with the present study.

With this thesis I therefore hope to contribute to putting an end to the discussion on whether there can be a ‘logic of imperatives’ and whether imperatives have truth values, or what a sentence type operator is. We should not ask how we can analyze natural language in such a way that we are able to interpret it using a limited set of semantic tools. Rather, we should see for what purpose a particular type of sentence may be used and what grammatical complexity and contextual sensitivity it provides to accomplish this. We should then construct an interpretative mechanism that captures precisely this functionality of those sentences. In short, we must ask, not what the language must be like for us to be able to interpret it, but what we must be able to do in order to speak it.

In chapter one I start with a discussion of the literature in philosophy of language on the notion of meaning in relation to that of mood or sentence type. The general tendency to create a dichotomy between content and ‘mood’, in order to sustain a central role for propositions, is criticized. Instead, it is argued, we need a dichotomy

between the meanings of the sentences. Not only is this a conceptually natural view on the meanings of terms, but it also allows for a more natural notion of meaning in which we do not have to dissociate meaning from that which is done with the utterance of the sentence in its context.

The second chapter addresses the issue of what it means to identify an ‘imperative sentence type’ in a language. Specifically, I contrast the view of generative linguists who introduce the sentence’s functionality in the explanation of its structure with the criticism of Bolinger (1967), who argues that such a methodology constitutes a nonscientific classification of sentences according to function in the analysis. This would stand in the way of taking serious the similarities between sentences of the same surface form but with rather different functions. According to Bolinger the bare infinitival form in English constitutes a sentence type, that has been dubbed the ‘hypothetical’ by some (Jacobs, 1981). In this chapter I object to that analysis. The bare form is a mixed class of sentential constructions that for all sorts of reasons need not have a finite verb. Here the work of Blom (2003) is very insightful. She argues that learning to use finiteness means learning in which contexts a finite verb is needed, rather than learning when a nonfinite verb must be used. However, we can at least partially explain the intuitions of Bolinger and others that there is a commonality among bare form infinitive constructions: in many cases it is due to the first person perspective that the subject is not part of what the sentence represents. Because of this lack of a represented subject, there is also no need for agreement on the verb. This explains why many performative utterances are nonfinite: they concern the interlocutors’ actions and thus allow for the first person perspective.

The third chapter concerns the mentioned pretheoretical classification of sentences in types. Some generative syntacticians have claimed that the imperative by its very nature is a nonfinite and unembeddable construction. Their grammar would necessarily involve reference to their function in conversation and it would not have the syntactic structure needed to dissociate the sentence’s representation from its utterance context. I argue that this is not a reasonable analysis of the semantics of imperatives. This is illustrated by means of a discussion of Dutch. In Dutch we find ‘retrospective’ imperatives (the term is from Bosque, 1980). They are, from the point of view of semantics, past tense and irrealis. Also, Dutch has a grammatical adhortative construction, in which the auxiliary verb ‘laten’ (‘let’) is followed by a nominative subject and an infinitive verb phrase. It is argued that these constructions are best understood as imperatives dissociated from their utterance context, i.e., from the person spoken to. They are no less imperative than, for example, the negative imperatives in English with ‘do’-support. If imperatives can indeed *grammatically* encode semantic complexities, then we certainly need a formal semantics in which those complexities can be accounted for in a systematic fashion.

In the last two chapters I present a formal semantic framework in which the conclusions of the preceding chapters are taken into account. Chapter four focusses on the ‘Ross paradox’ (Ross, 1941) and the related issue of free choice permission (Kamp, 1973). By defining a semantics that captures the function of imperatives, these prob-

lems are naturally resolved. Imperatives lead to expansions of schedules and for these expansions it is required that in the resulting schedules no *quandary* (Hamblin, 1972) arises. So a disjunctive imperative gives us two possible expansions of the schedule, immediately giving rise to a choice between those two. But after the command to do *A* or *B*, a prohibition against *A* would give rise to the *possibility* of a schedule in which *A* is both in- and excluded, which is enough to make the whole discourse incoherent.

The semantic framework of the fourth chapter is developed further in the last chapter. Here an ontological distinction between actions and events is proposed and a semantic analysis of simple and complex imperatives is presented in terms of it. Past tense irrealis imperatives, amongst others, are attributed a compositional semantics. Lastly, some further issues are discussed, including quantifying in, mixed mood sentences, and some more problems are outlined concerning the interpretation of aspect in imperatives.

Non-declarative sentence meaning

A natural first thing to do when thinking about meaning differences between sentence types is to compare example sentences such as the following three.

- (1) a. Mary buys a sports car.
- b. Does Mary buy a sports car?
- c. Mary, buy a sports car!

The common sense conclusion is that these sentences share a common element, something like a picture of Mary buying a sports car, that is asserted in the first sentence, questioned in the second, and commanded in the third. This intuition has been expressed already by Frege (1879), has been turned into a doctrine by Steenius (1967) and can be called the standard theory nowadays. Roughly speaking, it means reading the sentences in (1) as, respectively,

- (2) a. It is the case that Mary buys a sports car.
- b. Is it the case that Mary buys a sports car?
- c. Make it the case that Mary buys a sports car!

But when we want to make this intuition more precise, we run into problems. Pictures lack the syntactic structure of natural language sentences. They are also often more open to interpretation than such syntactically structured sentences are. A grammatical sentence represents a ‘complete thought’, so states our conventional wisdom, and pictures are not complete in that sense. In formal semantics we represent complete thoughts by propositions, i.e., by truth conditions. But if this is to be our understanding of the ‘picture’ content, then it is no longer a ‘common element’. It is equated with the meaning of declarative sentences: *those* have truth conditions. The imperative then contains a truth conditional content. The command in (1-c) is treated as an instruction to make a proposition true. This leads to conceptual and practical problems, as I hope to make clear in this chapter.

As Elizabeth Beardsley wrote already in 1944:¹

In several recent studies of imperative sentences the tendency to assimilate these sentences to indicatives has been marked. Although the desire to substitute a familiar and manageable form of expression for a form new to analysis and in some respects highly puzzling is highly understandable, nevertheless it is very difficult to accept any treatment of imperatives which fails to preserve their distinctive features. In common speech, imperatives are *sui generis*. It seems important to make a determined effort to analyse them as coordinate with, rather than subordinate to, indicatives. (Beardsley, 1944, page 175)

In the first part of this chapter I will try to counter this recurring tendency to seek a truth conditional ‘core’ in nondeclarative sentences. It appears to be motivated by either a mistaken opposition between representationalism about propositions and functionalism concerning moods or by a search for an overly essentialist—representational or pragmatic—theory of meaning. Apart from this, I will criticize the attempts to ‘truth-conditionalizing’ mood by way of reinterpreting nondeclaratives as explicit performatives. The critical discussion in this chapter builds on, and hopefully extends somewhat, the arguments provided in Hamblin (1987), in particular the third chapter, the first sections of Wittgenstein (1953), Beardsley (1944) and McGinn (1977).

After having done this, I will sketch the outlines of an alternative approach that does analyze nondeclaratives as coordinate with declaratives. This means, in the first place, that the notion of truth is placed on a par with comparable notions of fulfillment (for imperatives) and answerhood (for interrogatives) as concepts expressing the rules of the various language games that we play with our language. Moreover, this notion of fulfillment is not to be analyzed in terms of truth conditions itself, i.e., what must be true for the imperative to be fulfilled, but it is understood in a direct connection to agency, i.e. what must be *done* for the imperative to be fulfilled. This last step means that ‘truth’ does not play any role in the interpretation of imperative sentences. That fact raises a fundamental issue for a theory of meaning in general, namely regarding the status of the so-called context principle, that will be addressed towards the end of the chapter.

One remark must be made in advance: I will assume for the remainder of this chapter that we can identify such a thing as the ‘imperative sentence type’. By this I mean a syntactically and/or semantically definable class of sentences of which all members share an interpretation of being some kind of instigation from the speaker to the hearer to perform some action. Depending on various factors, including stress, intonation, punctuation, choice of words, social standing and more, this instigation may be more precisely classified as being a command, suggestion, request, advice, permission, or yet something else. This assumption is nothing other than Hare’s (1971) notion of ‘command’ or Broadie’s (1972) ‘imperations’. It will be subject to more scrutiny in subsequent chapters.

¹A closely similar argument was presented by Aldrich (1943).

1.1 Truth-conditionalizing mood

In his William James Lectures (1962), Austin points out that philosophers have often been preoccupied with sentences that can be said to have a truth value, sentences which he calls ‘constatives’. He shows that there are many more sentences in natural language that do not have a truth value. These are ‘performatives’. Their meanings are determined by the actions that are performed by uttering them. The fact that such sentences do not have a truth value and do not constitute a *description* of what is done by uttering them Austin regards as “need[ing] argument no more than that ‘damn’ is not true or false” (page 6).

Performatives can be categorized further into those that are and those that are not explicit about the communicative act that is performed by uttering them. As for commands, this means that we may distinguish between (3-a) and (3-b).

- (3) a. Shut the door.
b. I order you to shut the door.

Both are performative, but the latter is an ‘explicit performative’, because its main verb explicitly indicates what the speaker is doing when uttering the sentence. There are sometimes practical reasons for using explicit performatives: if the sentence does not explicitly (lexically) indicate what the speaker is doing, then the utterance may fail to communicate the message to its audience.

‘I order you to shut the door’ would be an explicit performative utterance, whereas ‘Shut the door’ would not—that is simply a ‘primary’ performative utterance or whatever we like to call it. In using the imperative we may be ordering you to shut the door, but it just isn’t made clear whether we are ordering you or inciting you or tempting you or one or another of many other subtly different acts which, in an unsophisticated primitive language, are very likely not discriminated. (Austin, 1979, page 244)

He then goes on to point out that there are many other ways in which a speaker can make it plain which action is being performed, such as by means of intonation, gestures and the like.

Apart from being the source of an extensive body of literature on ‘speech act theory’, Austin’s ideas have been built on also by linguists working in the transformational grammar tradition. However, there the distinction between explicit and primary performatives has been reversed. According to Ross (1970) a simple (constative) declarative sentence must be analyzed syntactically as having a deep structure performative main clause. This means that (4-a) is analyzed as having the underlying grammar of (4-b).²

- (4) a. The dog barked.

²Within the theory of transformational grammar this notion of a ‘deep structure’ is claimed to have a concrete psychological significance. However, I do not wish to discuss this point at the moment.

- b. I say to you that the dog barked.

Ross' claim that the two sentences have the same deep structure implies that in the case of (4-a) the entire main clause has been 'deleted'. He presents several arguments to show that a higher clause must be stipulated, and that its subject, verb and direct object must be 'I' 'say' and 'you' respectively. To give just one example, one of these arguments is the fact that reflexive pronouns can in general not occur in a clause if they do not refer back to the subject of the higher clause, but that the first person is an apparent exception to that rule.

- (5) a. *As for herself, she will not be joining the team.
 b. Helen has decided that, as for herself, she will not be joining the team.
 c. As for myself, I will not be joining the team.

To incorporate (5-c) under the general rule, Ross proposes that, in deep structure, it has an implicit higher clause with the speaker as its subject. This would be true under the performative analysis. Ross mentions as an alternative possible account, that the antecedent of 'myself' is not really a syntactic argument, but present "in the air" in the utterance context. He suggests that there are not many differences between such a pragmatic analysis and the performative hypothesis. Both would be able to explain the observations.

Ross' arguments have been criticized on empirical grounds by a number of fellow transformational grammarians—Katz (1977) provides some arguments and references—but they can be, and indeed have been, objected to on conceptual grounds. These reasons have been explained by Lewis (1972). Lewis connects Ross' performative analysis to semantics. He attempts to extend the truth conditional semantics of natural language so as to capture also the meanings of non-declarative sentences. An imperative sentence like 'Go' has a deep structure 'I order you to go' and this latter sentence is true iff the speaker is, when uttering it, ordering the hearer to go. Though this means that the truth conditions are almost trivially fulfilled, still they can be called the meaning of the sentence. (Clearly, at this point Austin's ideas have been completely turned around: the relation between the primary and explicit performatives is seen as an argument in favor of treating imperatives as constatives.)

However, as Lewis points out, applying Ross' theory to the semantics of declaratives would be devastating for the truth conditional theory of meaning altogether. Suppose that (6-a) would in deep structure actually be the same as (6-b), then (a) would be true if the speaker merely uttered it sincerely.

- (6) a. The world is flat.
 b. I say to you that the world is flat.

Lewis does not want to go this far, and preserves the performative transformations to the non-declaratives.

If someone says 'I declare that the earth is flat' (sincerely, not play-acting, etc.) I

claim that he has spoken truly: he does indeed so declare. I claim this not only for the sake of my theory but as a point of common sense. Yet one might be tempted to say that he has spoken falsely, because the sentence embedded in his performative—the content of his declaration, the belief he avows—is false. Hence I do not propose to take ordinary declaratives as paraphrased performatives (as proposed in Ross, 1970) because that would get their truth conditions wrong. (Lewis, 1972, pages 210 – 211)

As for declaratives, Lewis' proposal can be considered as one way of working out the pragmatic analysis that was mentioned by Ross.

If the empirical arguments Ross gave are not enough reason for Lewis to accept the performative analysis, we may wonder why such arguments would be found sufficient for non-declaratives. Moreover, it will be difficult to find such arguments at all, if they are not to presuppose from the start that imperative sentences have a truth conditional interpretation, given the principle of transformational grammar that transformations be 'meaning preserving'.³ Such an assumption would trivialize the whole endeavor, because Lewis intends the performative analysis to show that non-declaratives have a truth conditional meaning.

The attractiveness of the performative analysis is based entirely on the idea that, when imperatives can be understood as explicit performatives, they can consequently be given a truth conditional interpretation. But even if, *pace* Austin, performatives can still be called true or false—for instance when the priest says "I hereby declare you husband and wife", and someone objects "No in fact you didn't, because you forgot an essential part of the ceremony"—with primary performatives the story is different. To respond to "Go home, Larry" with "No, in fact you didn't (order that)" is incoherent even in the most farfetched scenarios. And if the (in)coherence of such responses is not a criterion for determining whether or not a sentence has a truth value, then what is?

Explicit performatives are in a sense ambiguous between a declarative, truth conditional interpretation, and a non-declarative, performative one. Austin calls upon the latter reading to put them on a par with non-declarative 'primary performatives'. Lewis and others must assume the former, in order for their reductions to have a point. But the important point is that the remote availability of a truth conditional interpretation is exactly what explicit performatives do not share with the primary ones. It is for this reason that no analysis that reveals a 'hidden' structure in impera-

³Lewis tries to circumvent this issue by pointing to the fact that transformations need not be *truth* preserving:

- (i) a. I am talking in trochaic hexameter.
- b. In hexameter trochaic I am talking.

The above two sentences 'obviously' have the same deep structure, but (b) is true when uttered with correct accenting, whereas (a) is then always false. Still, this does not explain how within the context of transformational grammar it could be established that imperatives have the same meaning as certain declarative sentences, without presupposing that they have a truth conditional meaning.

tives, which are, after all, primary performatives *par excellence*, could ever make them be interpreted as truth value bearing.

It may be mentioned here that Chomsky (1975) proposed an alternative deep structure for imperatives, consisting of a deleted subject 'you' and auxiliary such as 'will' or 'must'.⁴ The auxiliary is deleted in the imperative transformation and optionally the subject is deleted as well. Supporting the stipulation of this auxiliary is the fact that the imperative is incompatible with adverbs like 'yesterday', supporting the subject 'you' the fact that only second person reflexives can occur in imperatives. Later on, Katz and Postal (1964) further extended the argument: the auxiliary has to be 'will', because this is the only auxiliary that can occur in tags following the imperative. Their examples are,

- (7) a. Go home, will you!
 b. *Go home, did you!
 c. *Go home, must he!

For the same reasons I mentioned for the performative analysis, this analysis, too, attributes a truth conditional meaning to imperatives. It is exactly in the sense that 'you will/must go home' is a paraphrase of an imperative that it has a performative reading. Responding to a demonstration of some revolutionary new method for predicting human behavior, one can say "I am convinced by the proof: you will leave in five minutes", but not with the same meaning "I am convinced by the proof: leave in five minutes".

To avoid these problems Katz and Postal (1964) proposed that the construction 'you will VP' is formally ambiguous: it is either a declarative or a request. In the latter case, they proposed, there is an abstract morpheme *I* in the sentence that allows for the auxiliary-subject deletion proposed by Chomsky. This morpheme *I* contributes the reading of the sentence *as* a request.⁵ Katz (1977) develops this idea further into the idea of a proposition having two layers: the content layer and the speech act layer. The *I* morpheme contributes only to this latter layer, thus avoiding some of the problems of Ross' performative analysis. We do not have to say that the declarative sentence actually is an explicit performative, or claim that the imperative is an explicit

⁴Though published only in 1975, it was written and circulated some twenty years earlier, around the same time when Austin gave his William James lectures.

⁵In Dutch this distinction between assertive and performative uses of modality can be made explicit with the help of modal particles. There is a clear difference between:

- (i) a. Wie zal ik uitnodigen? (De tijd zal het leren.)
 Who will I invite? (Time will tell.)
 b. Wie zal ik eens uitnodigen? (Doe maar een voorstel.)
 Who shall I invite? (Make a proposal.)

With the unstressed particle 'eens' the sentence only has a performative meaning of pondering the issue whom to invite. Without the particle the sentence could in principle also be used to ask who the speaker will *actually* invite.

performative.

Perhaps this account avoids calling imperative sentences true or false, but it is unclear what exactly is the ‘information’ carried by the morpheme, and what is the sentence in abstraction of this morpheme. Katz and Postal are led to make a distinction between propositional type and propositional content. The first characterizes the conversational function of the sentence, the second is a constant element in declarative sentences and their non-declarative ‘counterparts’. Let me now move on to a discussion on that line of reasoning.

1.2 The mood-radical theory of sentence type meaning

Basics of the mood-radical theory

The idea that different sentence types could perhaps be understood in terms of operators over propositions dates back at least to Frege (1879). His well-known judgement stroke \vdash ⁶ was introduced to distinguish the thought from its assertion. The thought can be merely entertained, or it can be asserted as being true. Those sentences that are not used to assert anything express the thought with a different purpose.

An interrogative sentence and an assertoric one contain the same thought; but the assertoric sentence contains something else as well, namely assertion. The interrogative sentence contains something more too, namely a request. Therefore two things must be distinguished in an assertoric sentence: the content, which it has in common with the corresponding propositional question; and assertion. The former is the thought, or at least contains the thought. So it is possible to express a thought without laying it down as true. The two things are so closely joined in an assertoric sentence that it is easy to overlook the separability. Consequently we distinguish:

1. the grasp of a thought—thinking,
2. the acknowledgement of the truth of a thought—the act of judgement,
3. the manifestation of this judgement—assertion.

(Frege, 1918, page 62)

This idea has been adopted by many authors in the hope of thereby tackling the problem of nondeclarative sentence meaning. However, thoughts are not linguistic entities as such and so this shared ‘content’ is recast in semantic terms as the proposition, that is, truth conditional content.

The first formal proposals along these lines were made by Jorgensen (1938) and Hofstadter and McKinsey (1939). The latter introduced sentences of the form $!S$, where S is a declarative sentence. Their running example of such a sentence is (8-a),

⁶To be more precise, the judgement stroke is the vertical line in the \vdash and the content stroke is the horizontal line. So ‘ $-A$ ’ is the thought A as entertained, and ‘ $\vdash A$ ’ is the thought A as judged true.

formed on the basis of the declarative (8-b) by means of the operator “Let it be the case that”.

- (8) a. Let it be the case that the place 3 is red.
b. The place 3 is red.

Hofstadter and McKinsey restricted themselves to these ‘impersonal’ imperatives which they called *fiats*. They introduced an extension of propositional logic that includes connectives between fiats. In this logic it could be proven that all complex fiats are equivalent to a fiat built from a (complex) declarative sentence. In this sense, the special imperative connectives were logically speaking redundant.⁷

Stenius (1967) brought the idea of a distinction between propositional content and sentential mood to the attention of philosophers of language again. According to Stenius, a (natural language) sentence consists of a *mood* and a *sentence radical*. The latter is understood as a ‘that’-clause, with truth conditional content, and closely related to the picture theory of meaning (Wittgenstein, 1922). The mood, however, is not a part of the content of the sentence, but expresses the role of the sentence in a language game. That is to say, to each mood corresponds a general rule governing its usage. For the indicative and imperative mood these rules are, respectively,

- Produce a sentence in the indicative mood only if its sentence-radical is true;
- React to a sentence in the imperative mood by making the sentence-radical true.

As for the sentence radical, it remains somewhat unclear how we are to understand the relationship between indicative mood and proposition. On the one hand, the proposition p is equated with the indicative sentence $I(p)$ that has the propositional content p . The sentence radical is written as (p) , which, I take it, is intended as indicating that it is ‘in need of an operator’. On the other hand, Stenius distinguishes between the *descriptive* truth value of a sentence radical (the semantic notion of truth) and the *modal* truth of an indicative sentence, which concerns its proper usage (an ordinary language conception of ‘truth’).

Stenius draws the terminology of mood and sentence radical from a footnote in Wittgenstein’s *Philosophical Investigations*.

Imagine a picture representing a boxer in a particular stance. Now, this picture can be used to tell someone how he should stand, should hold himself; or how he should not hold himself; or how a particular man did stand in such-and-such a place; and so on. One might (using the language of chemistry) call this picture a proposition-radical. This will be how Frege thought of the “assumption”.
(Wittgenstein, 1953, note to §22)

⁷Or, as Hamblin (1987) puts it: “In effect, all that is necessary to construct a logic of fiats is to get a good book on the logic of indicatives and inscribe an exclamation mark on its title-page.”

It is somewhat unclear from all this whether the sentence radical would itself be a self-standing declarative sentence or not. The chemical analogy suggests the latter: the mood operator is needed to turn the sentence radical into a full fledged sentence. Steenius makes a distinction between propositional and modal truth. The first is merely a characterization of the pictorial content of the sentence, the latter is intended to capture the ordinary language conception of truth as applying to a statement made in discourse. This is the judgement that the picture is a correct representation of the way things actually are in the world.

Similar ideas have been presented by Searle (1969) and Hare (1949). In Searle's terminology, the imperative sentence is analyzed as a proposition used with directive illocutionary force. Hare distinguishes the descriptor and the dictator of the sentence (in his 1970 article on the topic, he uses the terms 'phrastic' and 'neustic' for these two aspects of the sentence respectively). On the basis of these three best known formulations of what appears to be basically the same idea, there have been many debates about what precisely these notions of sentence radical (proposition, phrastic) and mood (illocutionary force, neustic) should be taken to be. I will not, and cannot, attempt a complete analysis of all the different views on the matter at this point. Instead, I will restrict myself to three intuitively appealing conceptions of what the sentence radical could be. Based on the above discussion, they may be thought of as something like pictures, gerundive nouns, or declarative sentences. By restricting myself to these three options I do not mean to suggest that all such theories about 'what propositions are', involving complex concepts of mental processes and notions of conceptual 'content', can be reduced to either one of these three simple, sensory or linguistic objects. What I do mean is that, whatever comes out of those theories, a sentence radical is going to have properties closely corresponding to those of either pictures, gerunds, or declarative sentences: either something sensory, or something referential, or something which is truth bearing. As I hope to show, none of those attempts of understanding the mood-radical theory works. No reduction of sentence types to a single underlying representational core suffices.

Sentence radicals as pictures

Let us first investigate the first option, that a sentence radical is something like a picture—a photo, let us say, of Cassius Clay in the ring in a defensive pose. Now consider someone holding this photo in the air and saying:

- (9) a. ?This is true.
b. This is Cassius Clay
c. This was Cassius Clay's usual defensive pose.
d. This is Cassius Clay defending himself.
e. ?This is that Cassius Clay defended himself.

The picture cannot be used as a judgement, as is seen from (a) and (e), but it can perfectly well be used in the role of a proper noun (b), or property (c), or even in

the role of a complex nominal (d). The picture functions as a noun phrase, not as a sentential clause.

Concerning this point, Wittgenstein stated already in his *Tractatus*, that “the sentence is a picture of its state of affairs, only in so far as it is logically articulated” (1922, §4.032). The picture in his picture theory is modelled after sentences, and must be similarly understood. The picture is not an object but a structural relation between elements (‘names’), i.e., a fact.⁸ In short, the idea of a picture in the *Tractatus* is quite different from the perceptual notion of a ‘sense datum’. The sentence as a picture is a grammatical structure.

On occasion we use images as messages without any further structure. We can install a convention that in traffic anyone who approaches a red light has to come to a halt before the white line and wait until the light switches to green. The red and green lights do not have the grammatical structure of an imperative sentence. However, natural language is of course not conventional in this sense. What we are after is an understanding of natural language meaning as a meaning that is understood in terms of the grammatical composition of words and their meaning.

Perhaps it is believed that we can understand semantic relations between sentences of different types in terms of the incompatibility of the images which they represent. If so, then the question is what makes such images incompatible? It is impossible that Bill is both a bachelor and married, but how does this show in an incompatibility of *images*? Certainly two such images can be *physically* superimposed, though it makes for an image that is not an image of anything that makes sense to us. This shows that it is not the image as such that constitutes the content of the sentence, but the possibility of that image representing something that could actually be the case in the world, i.e., its truth conditions. Then the sentence radical is no longer a picture in a graphical sense of the word, but a truth conditional content. This idea is discussed later on. First, I will consider the possibility that the sentence radical is something like a gerundive phrase.

Sentence radicals as gerundives

Both Beardsley (1944) and Hare (1949) propose that the common content of imperatives and declaratives is a gerundive phrase.

“Shut the door at time t ” and “You shut the door at time t ” apply two different semantical functions to the event designated by the gerundive phrase “your shutting the door at time t ”. One orders your shutting the door at time t , and the other predicates this same event. (Beardsley, 1944, page 180)

This raises a question similar to the one above: how do we understand the meaning of a gerundive phrase compositionally, as a grammatical combination of the words ‘you’ ‘shut’ and ‘door’? It appears that the gerunds refer to events, but how is such

⁸See also Stokhof (2002) for an extensive discussion of Wittgenstein’s notion of pictures in the *Tractatus*.

a relation of reference established, if not via the truth conditions (or ‘satisfaction conditions’) of declarative (or imperative) sentences?

In many event semantic theories events are considered to be particulars (Davidson, 1980). But of course that does not mean that the relationship between the gerund and the event it denotes is one of ‘naming’. That relationship is established by the judgement that the event is one in which you shut the door. It is the truth of that judgement, I contend, that makes the gerundive form of that sentence ‘refer’ to the event particular, rather than the other way around.

Very commonly people say such things as “Raising implies moving” or “Participation implies graduation”. These are then clearly examples of entailment relations between gerunds and nouns. But what makes the entailments valid? I would say it is because you cannot perform the one action without performing the second, or the first cannot take place without the second taking place. So, for instance, there is only a contradiction in the conjunctive property ‘sitting and standing’ insofar as it is supposed to apply to one and the same person at one and the same time, in one and the same world, and so on. In formal semantics it is easy to define an entailment relation on the level of properties, but this is done using lambda abstraction and so it is defined on the basis of the primitive types *e* (for entities) and *t* (for truth values). The claim that we can *make sense* of entailment relations between properties must therefore be distinguished from the claim that entailment relations between sentences are made sense of only *in terms of* entailment relations between properties. If gerundives and properties are to function as sentence radicals, then the entailment relation between properties has to be *conceptually primitive*. It is in this sense that I consider the entailments Hare proposes to be problematic.

Both Beardsley and Hare claim that the sentential connectives of propositional logic can be given a sense already at the level of gerunds.

“Or” and “and” connect gerundive phrases in their original meanings, and sentences only secondarily, after the semantical functions have been applied. The truth functional interpretation of “or” and “and” used in the calculus of indicatives need not be disturbed by this analysis, however.

[...]

The constant “not” can be treated in essentially the same fashion as “and” and “or”. “Do not come with me!”, *e.g.*, orders your not coming with me. (Beardsley, 1944, page 182)

Similarly, Hare claims that there are valid inferences between nominals but it is not at all clear what their semantics would be. The following is an example of such an inference from Hare (1949).

	Use of axe or saw by you shortly
	No use of axe by you shortly
	Ergo: Use of saw by you shortly

Hare calls these nominal constructions ‘descriptors’. This suggests that they are thought of as having truth conditional content. If so, then the only difference between them and ordinary declarative sentences is syntactical. Again here the point seems to be that, from the perspective of formal semantics, these inferences are certainly sensible as abstractions from the entailment relations between sentences, but it is a different matter if it is supposed that those entailment relations between sentences are to be understood in terms of the valid inferences between nominals. Such a perspective forces us to depart from the idea of entailment as ‘truth preservation’ or anything even remotely like that.

Apart from this conceptual problem with the gerund/nominal approach to sentence radicals, there is also a linguistic reason for thinking that gerunds are not the level at which we will gain the desired unity of sentence meaning. Lakoff (1972) discusses the contrast between the following two sentences.

- (10) a. I enjoyed playing the piano.
b. I enjoyed my playing the piano.

As Lakoff observes, in the former example the speaker is commenting on the activity, the joy of being *engaged* in it; in the second example the speaker is commenting on the piano playing as an *observer*. In this case the results of the activity are being enjoyed.

We have to consider the possibility that the attempted reduction of the content of imperatives and declaratives to gerundives only leads to a new opposition between senses, now a contrast between action-gerunds and event-gerunds. What imperatives command is the action of playing the piano (at time t), whereas declaratives describe the event of my playing the piano (at time t).

This is not merely a pragmatic difference, as Lakoff explains. In intensional contexts where the speaker dreams he is somebody else, the observer perspective of the event gerund allows for a counterpart-reading in which the speaker is not equivalent to the observer. For instance:

- (11) I dreamt that I was Bill and attended one of my piano concerts. I enjoyed my playing the piano.

Moreover, Lakoff points out that the following is not a contradiction.

- (12) I wanted to be president, but I didn’t want myself to be president.

Thus, it appears that the gerund-approach to sentence radicals does not bring us any closer to a sentence type uniform conception of meaning. In fact it only introduces new problems, because it is not at all clear how we could define the meanings of the connectives in terms of the gerunds directly, without a detour via sentences.

Sentence radicals as truth conditional content

Stenius identifies the sentence radical with the proposition. By this he means that which we use in propositional logic, i.e., something that has a truth value. This view also raises some problems. First of all, it is not at all clear why we would need a mood operator to turn a proposition into a declarative sentence. One need only utter the sentence radical to make a statement. If the proposition is true so is the statement, if the proposition is false the statement is also false. What more could we need to assert? We can even turn this point around and ask: how could a proposition have a truth value if it were not in virtue of the possibility to make a statement by it that would under certain circumstances be true, and not under others? The concept of ‘modal’ truth⁹ is not only obsolete, it cannot be distinct from descriptive truth if we are to make sense of the latter.

At this point we may still choose to conflate these two notions of truth without thereby rendering the mood-radical theory pointless. We could discard the declarative mood operator while holding on to the operators for non-declarative sentence moods. Stenius himself suggests this much, by writing both p and $I(p)$ for the proposition p in the indicative mood. The sentence radical is then something that can occur stand-alone, as a declarative sentence, and embedded under a mood operator.¹⁰ One such mood operator is the indicative, in which case the meaning remains the same (it is the operator of identity). Another mood operator is the declarative, in which case the meaning of the sentence is that it functions as an alternative use of the truth conditional content of the embedded declarative.

If we propose to understand the imperative mood in this way, we need to say what such an operator is and what it is supposed to do. Clearly it cannot simply be an intensional operator, like modal operators in possible worlds semantics (Kripke, 1963), because those only transform statements about the actual world into statements about alternative possible worlds.¹¹ Given that imperatives are not themselves statements the imperative operator has to account for the fact that imperative sentences do not have truth values.

An often presented idea is that the imperative operator is something like a phrase ‘Let it be the case that A ’ (Hofstadter and McKinsey, 1939; Stenius, 1967), ‘Make it the case that A ’ (McGinn, 1977), or ‘See to it that A ’ (Belnap, 1990).¹² As such,

⁹Recall that this is Stenius’ term for the notion of truth as it applies to a sentence in the indicative mood. He distinguishes it from ‘descriptive truth’ which concerns the truth conditional content of a sentence radical.

¹⁰In fact, this is precisely what Lewis (1972) does in the context of the performative analysis.

¹¹Natural language modal auxiliaries can often be used in reasonable paraphrases of imperatives, but only when we give those modal auxiliaries a performative, rather than intensional declarative interpretation; cf. the previous section.

¹²Belnap does not really commit to a mood-radical theory. He presents a modal logic for sentences of the form ‘ α sees to it that A ’, where α is some agent (Belnap, 1991) and suggests that those sentences correspond in meaning to imperatives of the form ‘ α , see to it that A !’. On the basis of the thesis that all imperatives can be cast in this form, he concludes that a study of the logical semantics of imperatives

these expressions do not yet show what is the mood and what is the sentence radical. Stenius insists that the radical is a ‘that’-clause. McGinn points out that it is not entirely clear how to extend a Tarski-style semantic theory, which ascribes truth to *sentences*, to such ‘that’-clauses. This problem can be framed in the following way: if truth is a property of sentences as they are used in a language game (i.e., truth in the sense of modal truth), then it does not apply to ‘that’-clauses, because those are not commonly used in natural language to make statements. So if, as I argued above, the distinction between modal and descriptive truth cannot be upheld, then truth, as a predicate, applies primarily to declarative sentences. It can be extended to ‘that’-clauses in a derivative sense at best.

McGinn thus prefers an analysis of the above mentioned mood-radical expressions in which the radical is the declarative sentence A and the mood is the entire phrase, including “that”, preceding it. The mood expression can be treated either as a main clause imperative with demonstrative reference to an utterance of the declarative sentence radical, or as a unary operator over such a sentence radical, much like the way, e.g., negation is standardly defined. Given that McGinn claims that both approaches are equally satisfactory and amount to what is basically the same analysis, I will restrict myself to the latter approach since it avoids having to discuss demonstrative reference. Under the operator theory, the meaning definition of an imperative sentence may now be formulated by defining the predicate ‘Fulfilled’ (instead of True) by equivalences such as the following.

Fulfilled (\ulcorner Make it the case that $A\urcorner$ at t) \equiv It is made the case that $\ulcorner A\urcorner$ is true at t .

Because the Fulfilled predicate is defined in terms of the Truth predicate, all we need in order to deal with sentence radicals is a truth definition.

All sentences with the imperative mood operator are of course English imperatives, but vice versa not all English imperative sentences are of that form. Because of that, what McGinn presents does not yet constitute a theory of meaning for imperative sentences. In order to achieve such a theory he still has to provide a systematic translation of all natural language imperatives into the mood-radical format. One example McGinn uses is the imperative “Shut the door”. He connects it to the sentence radical “The door is shut”, but it remains unclear why the radical should not be, say, “You shut the door”. Furthermore, not to all sentence radicals A corresponds a natural language imperative. The sentence “The door is open” can be used as a radical in an imperative sentence, but the state of affairs of the door being open cannot itself be commanded. Only the *action* of opening the door, or closing it, or leaving it open, etc. can be subject to command. These linguistic properties of natural language

can be restricted to a study of those forms. Nevertheless, Belnap does not develop a formal semantic analysis of imperatives proper.

Amongst these mood-radical approaches I also count theories in which actions are defined as labelled state transitions, with the labels being propositions. That is, the action of seeing to it that A is a function from states to states, where the result state is one in which A is true. Cf. Segerberg (1989) and van Eijck (2000).

imperatives—amongst others, the restriction to an agentive verb and a subject who is being addressed by the speaker—are not accounted for by McGinn’s theory.

Belnap attempts to explain those facts. He proposes the following thesis: a sentence A , declarative or imperative, is said to be ‘agentive in α ’ iff A is logically equivalent to the sentence ‘ α sees to it that A ’. Belnap then claims that all imperatives are agentive in α , where α is the addressee/subject of A . In other words, if the equivalence does not hold for A , then A is not a meaningful imperative. In this way, Belnap can account for the linguistic constraints on natural language imperatives by giving a semantics only for the ‘sees to it that’ constructions. This mood operator is then treated as a modal operator, defined in terms of an intensional semantics (Belnap, 1991). Again, this does not solve the problem, because that which stands in the scope of the modal operator, underneath the ‘that’-clause, is always a declarative sentence. So Belnap still owes us a systematic translation of imperatives to declarative sentence radicals. But, clearly, on his account the imperative “Shut the door” will have to correspond to a mood-radical construction in which the radical is of the form “You shut the door”, rather than the declarative McGinn uses, i.e., “The door is shut”. Only the former can be said to be agentive in ‘you’.

My objection to this formulation of the mood-radical theory is therefore not that it would be problematic as such, given the constraints laid out by a reasonable theory of meaning. McGinn and Belnap are careful to avoid any inconsistencies with the main ideas underlying semantic theory in the tradition of Tarski and Davidson. What both authors do assume, though, is that the action commanded by means of the imperative is equivalent in all relevant respects to the action of taking steps to ensure the result of the action or, alternatively, the action of ensuring the performance of one’s own action. For their analysis to be accurate it is required that we can identify the action of shutting the door with the action of making it the case that the door is shut, or with the action of making it the case that you shut the door. There are several reasons to doubt that this is correct.

For starters, the phrasing that some authors choose for the mood, such as Belnap’s ‘see to it that’, introduce intentionality into the meaning of imperatives where this is not always appropriate. Saying that someone saw to it that he or she stepped on your toes is definitely not the same as saying that someone stepped on your toes. Perhaps the phrase McGinn chooses, ‘make it the case that’, does not to the same extent imply wilful and deliberate action, but there still appears to be a difference between stepping on someone’s toes and making it the case that you do so. For one thing, are the following imperatives really equivalent to their ‘make it the case that’ translations?

- (13)
- a. Do absolutely nothing.
 - b. Let yourself go.
 - c. Act erratically.
 - d. Don’t influence the future.
 - e. Let them find out the truth on their own.

Another case where this difference shows up is with joint action. Take for instance the imperative in (14), uttered, let us say, by the employer of both John and the addressee of the utterance.

(14) Bring that piano here with John. I already sent him over.

We are then supposed to translate it as “Make it the case that you bring that piano here with John”, meaning that the addressee is given a responsibility for the situation that together with John he brings the piano here. Now we must ask: is the addressee of (14) supposed to make it the case *on his own* that he brings the piano to the speaker together with John, or is he supposed to make it the case, *together with John*, to bring the piano? The second clause in (14) suggests that it is the latter: the addressee need not see to it that John will help in performing the action. It is the *performance* of the joint action that is commanded, and this action is one in which John is also involved. Adding an implicit ‘make it the case that’ to the imperative would make all imperatives into imputations of personal responsibility, even if we do not feel that such individual responsibilities are intended.

The case is even stronger when we consider quantified imperative subjects. For example, (15) is to be translated as (16-a), not as (16-b).

(15) Everybody clap your hands.

- (16) a. Make it the case that everybody claps his or her hands.
b. Everybody make it the case that you claps your hands.

From this it follows that a mood-radical theory will at least not be able to relegate the study of quantification to sentence radicals.

Thirdly, the definition of fulfillment in terms of truth implies that we can substitute each expression in an imperative by an extensionally equivalent one. Then, if it so happens in the world (future) that Ortcutt is the tallest spy tomorrow, if I command John to be the tallest spy tomorrow I could say:

(17) Be Ortcutt tomorrow.

On McGinn’s view this sentence would have the same fulfillment value, hence the same *meaning*, as the command to John to be the tallest spy tomorrow. It appears that imperatives constitute oblique contexts. To explain this fact we would need to make the mood element part of the representation, just like this is done in modal logic. But that cannot be done under Stenius’ approach, which interprets the mood purely pragmatically and the radical purely representationally. Belnap does not have the same problem, because his phrase ‘ α sees to it that A ’ is an intensional operator.

Lastly, we should consider imperative sentences that are used to give permission. If we look at the sentence (18), it has a reading in which the addressee is merely presented with the *option* of taking a cookie, without any instigation of the speaker that the action be carried out.

(18) Have a cookie, go ahead.

This reading is lost on the mood-radical translations suggested by McGinn and Belnap. That is all the more clear when we consider giving permission with imperative sentences containing the tag ‘if you wish’. The sentence in (19) is translated as (20-a), not as (20-b). Note that the latter sentence is fulfilled if the addressee makes it the case that he or she does not wish to have a cookie.

(19) Have a cookie, if you wish.

- (20) a. If you wish to have a cookie, make it the case that you have a cookie.
b. Make it the case that if you wish to have a cookie you have a cookie.

As a result, we have to say what the meaning is of sentences with a declarative conditional protasis and an imperative apodosis. So, apart from quantification, also conditional clauses cannot be dealt with in terms of sentence radicals alone.

Summarizing the above remarks, it is crucial for the mood-radical analysis to provide a precise account of the relationship between natural language imperatives and declarative sentence radicals. It has been shown that the translations into the mood-radical format yield several problems that all seem to be based on the fact that performing an action is not the same as enforcing the truth of a proposition. Let me close this discussion with a more principled objection by Beardsley, directed at Hofstadter and McKinsey’s variant of the mood-radical theory.

An imperative, then, is for Hofstadter and McKinsey a part of syntax-language, ordering something *about* an indicative. This analysis is open to two serious objections. In the first place, it treats indicatives as more fundamental, more elementary, units of language than imperatives, although there seems to be nothing in our common usage of the two moods which warrants such a subordination of the one to the other. Secondly, ordinary imperatives are not about other sentences, whether these are indicatives or imperatives. It is very difficult to accept an analysis which relegates all imperatives to syntax-language, for ordinary imperatives constitute as direct and unified a part of object-language as any expression we have. When I ask John to shut the door, I am not talking about letting a sentence be true, though undeniably the action is carried out when and only when a certain sentence is true. (Beardsley, 1944, page 177)

Distinguishing mood from content

The mood-radical theory is often associated with Wittgenstein in view of his earlier picture theory and his later introduction of the term ‘sentence radical’. But in fact he did not hold this view, certainly not in his later writings, arguably also not in the early work. An often quoted passage suggests otherwise.

The proposition *shows* how things stand, *if* it is true. And it *says*, that they do so stand. (Wittgenstein, 1922, §4.022)

This seems to imply that there are two acts, one of showing the truth conditions, and one of saying that those conditions are met. Stenius argues that on the picture theory of meaning it cannot be explained that the sentence says that it is true.

The picture theory of sentence meaning can explain in what way a sentence *shows* how things stand if it is true. But it cannot explain how it manages to *say* that they do so stand. For from the fact that a sentence shows how things stand if true, it does not follow that it says that they stand so. (Stenius, 1967, page 256)

I believe this reasoning is mistaken. There are not two separate things a sentence does: showing a picture, which belongs to semantics, and saying that the world is like that, which belongs to the language game. Rather, it is in virtue of the fact that the sentence has a truth value that it shows something, i.e., what it would mean for it to be true. Vice versa, the sentence “mirrors” a possible state of affairs and it is because of this that it has a truth value: truth is nothing more than the correspondence between the sentence and the actual state of affairs. In other words, the showing and saying are two sides of the same coin.

It is important to note at this point that the sentence cannot show its truth conditions from the ‘mirroring’ relation between sentence and state of affairs alone. As Wittgenstein explains, a negated sentence does not show a different state of affairs from the sentence it negates. They both show one and the same state of affairs, but the one says that the corresponding state of affairs does exist, whereas the other says that it does not exist. They occupy a different location in ‘logical space’.

One could say, the denial is already related to the logical place determined by the proposition that is denied.

The denying proposition determines a logical place other than does the proposition denied.

The denying proposition determines a logical place, with the help of the logical place of the proposition denied, by saying that it lies outside the latter place.

That one can deny again the denied proposition, shows that what is denied is already a proposition and not merely the preliminary to a proposition. (Wittgenstein, 1922, §4.0641)

In this respect sentences show more than just the picture. The negation $\neg p$ shows that it contradicts the sentence p . Every sentence has a “logical structure” surrounding it (§3.42) which is part of that which the sentence shows us. This is not something of a picture combining the signs \neg and p , but it is an expression of the logical *relation* that exists between the sentences p and $\neg p$. The logical structure thus shown is the ‘inferential network’ of the sentences of the propositional calculus. In this way, e.g., the contradiction $p \wedge \neg p$ shows of itself that it is false (§4.461).

What does this little exegesis tell us? The idea that the sentence also shows the way it is connected to other sentences is an element of holism in the *Tractatus*’ theory of

meaning that is not taken into account by mood-radical theorists. What the sentence $p \wedge q$ shows, is that it entails the assertion of p and that it entails the assertion of q . What $\neg p$ shows is that it denies the assertion of p . Conceived in this manner, the idea of showing is in fact closer to the suggestion of, e.g., Dummett (1991) that the meaning of a logical connective is its role in inference: the introduction and elimination rules from natural deduction. However, inference is a practice, a language game, just like the ones Stenius proposes for mood. This forces the question: why call the meaning-relation between a sentence and its negation a matter of semantics, and the meaning-relation between a declarative and an imperative a matter, not of semantics, but of 'language games'? The rules that define the meaning of the moods, mentioned earlier, could also be presented for negation and other logical connectives.

- Produce the negation of a sentence in the indicative mood only if the sentence is false;
- React to the negation of a sentence in the imperative mood by refraining from reacting to it in the way one has to react to the sentence.

Formulating the rules for the appropriate usage of sentences of various kinds helps to clarify what exactly is meant by the claim that the sentence 'shows' its relation to other sentences. It means that the above rules are part of the *content* of sentences, those rules are *shown* in the sentences and part of semantics. As a matter of fact, many authors have suggested that we understand the meaning of atomic sentences and their parts in the same way. On that view, sometimes called 'inferentialism', what the sentence 'John is a bachelor' shows is that it denies that John is married.¹³

If we take the imperative sentence as commanding the picture, the imperative mood stands *next* to logical operators such as negation. If we would want the imperative mood to also range over complex sentences, which is what Hofstadter and McKinsey proposed, then it must command the locations in logical space of those sentences. But what, if anything, would that mean? If, on the other hand, we identify the content of imperatives with their pictures, then little is gained with the mood-radical theory, because still all the 'logical' operators and connectives for imperatives (prohibitions, conjunctions) have to be constructed anew.

Hamblin (1971) has proposed to bring semantics and the study of the rules of discourse together on one level of semantic analysis. We may introduce a set of normative constraints on discourse, with a language containing propositional formulae as well as interrogatives and other types of speech acts. (In his 1987 book, Hamblin integrates imperatives in the general approach.) The entailment relations between sentences with propositional connectives are part of those normative constraints. We can then *reconstruct* a possible worlds semantics from the set of admissible discourses, if we restrict ourselves to just the declaratives. However, if we would want to give a representational semantics for more than just declaratives, we would presumably end up with something richer than possible worlds semantics.

¹³Brandom (1994) presents a detailed defense of inferentialism as a theory of meaning stated in terms of the rules of permissible language use.

The possibility of this reversal is an indication of the plausibility of a theory of linguistic meaning at variance with that usually adopted by structural linguists, namely, a theory in which the pattern of the occurrence of the smaller linguistic units such as words is regarded as accidental and irrelevant, and the pattern of the use of the larger units in the social process of communication becomes paramount. (Hamblin, 1971, page 132)

Observe that at this point we have still assumed the picture theory as providing us with uniform meanings of the atomic declaratives and imperatives. The point was, rather, that those pictures as such do not constitute a semantic theory. They do not tell us what the logical relations are between sentences, they do not provide us with a compositional theory of how the meanings of the complex sentences depend on the meanings of their components. A semantic theory must not give us pictures, but it has to represent the ‘logical space’ in which complex sentences are connected to one another. However, once it is clear that a semantic theory must represent the semantic *relations*, the big contrast between ‘mood’ and ‘content’ is lost: both are interpreted in terms of the rules that allow the use of some construction in a particular context (viz., introduction rules) and the rules of how to continue from that point onwards (viz., elimination rules).

Different content structures

Still, the question has not been raised whether or not it is *correct* to suppose that the linguistic atoms, the primary declaratives and imperatives, can be interpreted uniformly in terms of pictures. It has only been accepted up to now for the sake of argument. But there are good reasons—and we have already seen some of them—to think otherwise. In the section on gerundives it was pointed out that the absence of a subject can have consequences for the meaning of the gerund. It suggests that, like the mood contrast between declaratives and imperatives, we similarly have a contrast between event-gerunds and action-gerunds. Furthermore, some arguments were presented that cast doubts on the identification of imperatives with propositions: imperatives are directed at the future; they do not contain a subject in all cases; in case a subject is present it points to the addressee of the utterance; in general it requires an agentive verb. These properties suggest that the difference between imperatives and declaratives is also a difference in content, not just a difference in force.

In this context another observation must be made, concerning the embedding of non-declaratives and their interpretation in terms of force. Pendlebury (1986) argues that mood cannot be given a purely pragmatic definition. His argument is based mainly on the idea that interrogatives and imperatives can also be subordinated.¹⁴

(21) Rick knows whether Sam will play it again.

¹⁴The question whether imperatives can be subordinated is largely a matter of definition. Pendlebury refers to Huntley (1984), who argues that control infinitives are the ‘embedded counterparts’ of imperatives. More on this in the next chapter.

(22) Did Rick say that Ilsa told Sam to play it again?

If the sentence in the subordinate context lacks conversational force, then in virtue of the mood-radical theory as conceived by Stenius, these subordinate clauses should all contribute the same thing to the main clause: the picture. But of course they do not. The sentence in (21) does not mean the same as the one in (23), as was already observed by, amongst others, Groenendijk and Stokhof (1984).

(23) Rick knows that Sam will play it again.

The same goes for control infinitives and relative clauses.

- (24) a. Rick knows to bring the wine to the party.
b. Rick knows that he is bringing the wine to the party.

If we think of the subordinate clauses as showing but not asserting or commanding the picture, then clearly mood is more than a difference in force. Imperative and declarative sentences simply *show different things*.¹⁵

In short, as Belnap (1990, page 5) puts it: “interrogatives and imperatives are not just marked differently from declaratives, but possess fundamentally different underlying content structures.” This can be understood to mean that the picture shown by an imperative sentence is different from that shown by a declarative sentence. This ‘imperative picture’ is shared by the subjectless gerunds and control infinitives as well. Wittgenstein (1953, §519) suggests that the imperative is a picture of the action which is undertaken (and must be undertaken) afterwards. And, in fact, even Frege himself claimed that imperatives do not contain thoughts.

We should not wish to deny sense to a command, but this sense is not such that the question of truth can arise for it. Therefore I shall not call the sense of a command a thought. Sentences expressing wishes or requests are ruled out in the same way. Only those sentences in which we communicate or assert something come into the question. (Frege, 1918, page 62)

Of course it is somewhat strange to deny commands a communicative function. But more important is the idea that commands do not contain thoughts (propositional content) like declarative sentences do. It is unfortunate that since the work done by Frege and Wittgenstein little or no investigation has been carried out into the difference in content between declaratives and imperatives.

So why not let the picture in the imperative be ‘Go home’? The grammar of an imperative would be nothing other than this construction, interpreted by the rule that ‘Go home’ is fulfilled iff the addressee goes home? There is a deeper motivation for attempting to avoid this, that will be discussed next.

¹⁵This does not exclude that we think of moods as operators that take a sentence radical and each transform it into a sentence in the respective mood. This is also precisely what Pendlebury himself proposes. However, it remains unclear in his article what exactly are the “objects” to which moods correspond, and what is the semantics of sentence radicals.

1.3 Semantics for different moods

The conclusions from the preceding discussions can be summarized as follows: mood is not a function from one basic meaning entity (viz., a proposition) to a derived one.

$$\begin{array}{lcl} \text{imperative} & \neq & \text{declarative} + \textit{mood} \\ \text{declarative} & \neq & \text{imperative} + \textit{mood} \\ \text{declarative} & \neq & \text{picture} + \textit{mood} \\ \text{imperative} & \neq & \text{picture} + \textit{mood} \end{array}$$

In the next chapter I will provide arguments against the second possibility.

First it was argued that the difference in function between constatives (declaratives) and primary performatives (such as imperatives) is significant for what we can call the meaning of the respective types of sentences. Imperative sentences are not syntactic variants of any type of constative sentence. Truth values can only be attributed to sentences that are reasonably called ‘true’ or ‘false’ in at least some contexts. This is not the case for imperatives. There are, of course, some finite sentential constructions that have uses similar to imperatives, but that does not get us any further: it is precisely in this respect that truth conditional semantics is not able to account for the full range of meanings of such finite constructions, and for which it needs a theory of (indirect) speech acts. Imperatives *only* have such non-declarative meanings and therefore they cannot be captured in truth conditional semantics at all.

Second, the idea that truth conditional semantics could be kept as a mood independent representational core was criticized. In particular, it is not at all clear what such a moodless content could be: it is not a picture, properly speaking, and equating it with gerunds or declarative sentences is not good enough either. Not only is the opposition between a pragmatic theory of mood and a representational theory of content a false opposition, but the uniformity at the representational level it aims to safeguard is not plausible anyway. The picture common to sentences of different types can only be an *abstraction* away from the differences between those sentences. That is, the best we could hope for as a relationship between moods is as follows:

$$\text{declarative} - \textit{mood} \stackrel{?}{\cong} \text{picture} \stackrel{?}{\cong} \text{imperative} - \textit{mood}$$

However, even if this would be a correct description of the relationship, it is clear that we do not gain any uniformity at the level of semantic theory. What we assign meanings to are the sentences, with their moods. The picture can only be understood *in terms of* those meanings, so we will still have to analyze those meanings separately.

This conclusion appears to be an unwelcome one. Unwelcome, because a consequence is that we do not have at our disposal a shared content with which we can guarantee a uniform interpretation of terms and logical operators. For instance, if it is correct that quantifiers like ‘every’ and logical operators such as negation cannot be dealt with on the level of a sentence type uniform truth conditional content, then we run the risk that we will have to provide two *separate* analyses of the meanings of

those quantifiers and operators. To repeat an earlier example, what the word ‘every’ contributes to the meaning of (25) cannot be explained solely in terms of the state of affairs resulting from complying with the command.¹⁶

(25) Everybody get yourself a dance partner.

If this quantifier then has to be given a separate analysis, how can we explain that it is the very same word that contributes the meaning of a universal quantifier in declaratives? The issue does not stop there. Consider the verb ‘hit’. If the meaning imperative ‘John, hit Bill’ (with ‘John’ a vocative) does not involve the proposition that John hits Bill, then what ensures that the verb has the same meaning in both sentences? At least in standard Montague grammar the verb would denote a function of the type $\langle e, \langle e, t \rangle \rangle$, i.e., a function that takes one argument of type e (entity) and returns a function that takes another argument of type e and returns a truth value (type t). So if the meaning of imperative sentences does not involve any entity of type t , then why would the same function be contributed by that verb in an imperative sentence?

It is not as such inconsistent to claim that it does. The meanings of the words in imperatives would then be analyzed as ‘that which it would contribute to the meaning of a declarative’. Whereas in declaratives those words together compose an object with the semantic type of a truth value, in imperatives they would contribute the same meanings but the overall semantic type of the sentence would be different. I presume that we then have to stipulate some mood element in the semantic composition of imperatives that contributes a function from something in the type hierarchy of entities and truth values to some ‘imperative meaning type’, say, a ‘fulfillment value’. So ‘hit’ would denote some function of the type $\langle e, \langle e, t \rangle \rangle$ and ‘Bill’ an entity of type e . The mood element would then presumably be of the type $\langle \langle e, t \rangle, f \rangle$, with f the type of fulfillment values. So it takes the property of hitting Bill, i.e., the set of entities for which it is true that they hit Bill, and it returns a fulfillment value (whatever that may mean).¹⁷

This approach might be considered plausible in the sense that it ensures a unique semantic meaning to words, but it is also odd for a different reason. What it implies is that the words have a meaning solely in virtue of their use in declaratives. This is most clear when we consider the possibility of a language that has only imperative sentences. In such a language, would we still want to say that it is their contribution to the meaning of declarative sentences that gives the words their meanings?

¹⁶It has been argued convincingly that these quantifier words are a genuine part of the imperative sentence, not vocative constructions. For one thing, in (25) the reflexive can be a third person pronoun such as ‘himself’ (Beukema and Coopmans, 1989). This would not be possible if the word ‘everybody’ were vocative, separated from the main clause by a comma. Further arguments supporting the claim that these determiner phrases are not vocatives will be presented in §3.3.

¹⁷Here we also run in to the problem that model-theoretic semantics is designed for sentences used to describe the world: the verb in an imperative does not ‘denote’ a set of objects for which something ‘holds’. More on this below.

Frege's context principle states that "It is enough if the proposition as a whole has a sense, it is this that confers on its parts also their content" (Frege, 1884, page 71). This principle is sometimes explained as a statement that the meanings of words are learned via their role in sentences. It contrasts with the principle of compositionality, which is supposed to explain the possibility of *creating* new sentences by means of new combinations of the 'old' words (see, amongst others, Rott, 2000). In view of these two principles, the above account of word meaning states that we only acquire word meanings from declaratives, though we can use those meanings to create sentences of all moods.

McGinn admits that this is odd. His reductionist analysis is only a "more or less ingenious employment of the concept of truth" in order to deal with languages that do have both imperative and declarative sentences. He motivates his choice for upholding such a reductionism on the basis of three requirements on an adequate semantic theory. They are:

1. the theory assigns a meaning to every sentence of the language;
2. it does so by assigning meanings to the primitive parts of the sentence, and by showing how the meaning of a sentence depends on the meanings of those parts;
3. it fulfills the second requirement in a systematic and uniform way.

My concern here is with the third requirement. McGinn claims that it is this requirement that necessitates using one central concept in the entire semantic theory.

Since, as Davidson argued, *truth* seems the concept best fitted to meeting these adequacy conditions on semantic theories, we do well to try to make it plausible that, even in the presence of sentences to which the concept seems inapplicable, it can retain its central position. For if such sentences were to prove recalcitrant to Davidson's style of semantics, we would be obliged to acknowledge a basic inadequacy in the programme. (McGinn, 1977, page 302)

But why is this so? The idea that a semantic theory has to assign meanings to the primitive elements of the language in a systematic and uniform way appears to be based on the reasoning that, if it that would not be the case, we could not learn the language. That is to say, the third requirement is that the semantic theory be plausible with respect to the *cognitive* capacities of the users of the language. I claim that to meet this requirement we do not need to assume a central role for the concept of truth. Moreover, *not* assigning a central role to that concept will allow us to formulate a semantic theory in which imperative sentences can also bear content on their parts.

As the examples at the beginning of this chapter were intended to show, there is a strong feeling that there are correspondences between sentences of different moods. To repeat those examples here, the idea is that (26-a) and (26-b) are about 'the same thing', i.e., the situation, or event, of Mary buying a sports car.

- (26) a. Mary buys a sports car.
 b. Mary, buy a sports car!

This, I believe, is not entirely accurate. The declarative certainly is about that event. We can, as a matter of speech, imagine being present when the deal is being made, watching Mary buying the sports car. However, the imperative content is not quite the same. What it is about is not some event that we can imagine perceiving, being present at the scene. It is something we can imagine *doing*: buying a sports car. This involves performing certain actions: making the deal, paying the sum of money, obtaining the car keys. Importantly, in this understanding of the action, the *agent* is nowhere part of what is imagined, contrary to what was the case for the declarative content. It is not *with* the eyes, but *through* the eyes that we imagine the action. This lack of a represented agent is, I claim, what is needed in order to explain the difference in semantic properties of imperative and declarative subjects, respectively. Consequently, on this view there is no common entity or situation that imperatives and declaratives are about. So what does the ‘correspondence’ between (26-a) and (26-b) amount to, really? It is based on a *perspectival* contrast between the two types of sentences. What is from one perspective a performable action is from another perspective an observable event. The first perspective is that of the agent, before (i.e., considering or intending) or during the performance of the action, the second perspective is that of an observer, during or after (i.e., remembering) the event of the action being performed by the agent. The idea of a correspondence between the imperative and declarative sentences is based on the ability to understand that these contents are merely different in perspective. Note that, apart from the difference in the status of the agent in these perspectives, also the temporal perspective is different. This will help to explain the so-called ‘future orientation’ of imperative sentences.

This ‘perspectival dualism’ is, I contend, a plausible assumption about the cognitive capacities of the users of natural language. That is, it is reasonable to suppose that in general one has to have the capacity to distinguish between these perspectives, and relate them, in order to be able to master the language. Learning, e.g., to walk is not a matter of being given an instruction manual that tells you which muscles to contract and which to release and in what order. It is by observing others doing it, and attempting to copy their behavior. So what I observe as I see someone else walk is not just a path of some objects through my visual field, it is also something that I understand as the performance of an action that I might, in principle, perform as well. Strictly speaking, the verb ‘walk’ has two different senses: that of an observable pattern of movements and that of a motor skill. It is not a matter of semantics to identify the two senses simply because people are in general capable of understanding them as perspectivally linked. All we can do within semantics is conclude that, because it is reasonable to suppose that a capable language user will be able to learn the word as having those two senses, we are free to assign those two senses to that one word.¹⁸

¹⁸Empirical evidence that seems to support this view is the research on ‘mirror neurons’ by Riz-

Fulfillment conditions

The above proposal does not solve all problems, of course. One question that needs to be answered is how to integrate the proposed dualism in the semantics. Another important question is how to give performatives a place in semantics. Introducing a new concept like 'Fulfilled' (McGinn, 1977) does not suffice. The meaning of an imperative is not to say that some action is performed but to order the performance of the action. Attempts to define the speaker attitudes with which imperative sentences may be used (Searle, 1969; Wilson and Sperber, 1988) is an interesting and useful activity, but it is not the same as giving the meaning of those sentences. Uttering an imperative sentence is not to assert that one has this attitude or to merely express that attitude (desire or intention to punish upon non-compliance). The difference between imperatives and optatives is exactly this.

Interrogative sentences have been associated with answerhood conditions, so we could say that imperative sentences similarly have fulfillment conditions. However, two things must be kept in mind here. First of all, fulfillment cannot be understood as a relation between imperatives and declaratives: fulfilling an imperative means performing an action. The action is the appropriate response. The result of the action will be that some sentence will be true (the sentence stating that the addressee of the imperative has performed the commanded action), but it is not this truth that has been commanded (see also Beardsley, 1944, page 178). Second of all, fulfillment conditions do not describe the conditions for appropriate usage of imperatives. In this sense fulfillment, like answerhood, requires a different take on model-theoretic semantics. Modelling truth conditions is done by saying what the different possible worlds are and what is true in each of them. Then we can say whether or not a sentence correctly describes the world in which it is uttered by checking whether or not the sentence is true in the world. Fulfillment provides no such concept of a model that explains when the imperative is used correctly or not. Imperatives have *postconditions*, declaratives *preconditions*. This difference between pre- and postconditions is what Searle (1979) calls the *direction of fit* of the speech act. A declarative sentence has a 'word-to-world' direction of fit (the words must be made to fit the world), whereas interrogatives and imperatives have a 'world-to-word' direction of fit (the world must be made to fit the words).

Classical model-theoretic semantics is organized for sentences with a word-to-world direction of fit. So if we are to develop a semantics for imperatives, it will have to depart from that classical semantic picture. Somehow the relation between the imperative (or interrogative) sentence and the response that follows it must become

zolatti and Craighero (2004). They show that in monkey brains certain neurons are triggered both by performing an action and by the observation of someone else performing the action. The research shows that those neurons are only activated when the action is 'understood' as such by the monkey. Furthermore, Tomasello (1999) argues that the development of cognitive capacities of linguistic understanding in humans and monkeys is driven by the young child's ability to engage with others in 'joint attentional scenes' and by learning to reflect on its own actions via these interactions.

internal to the semantics itself. Groenendijk (1999) has done this for interrogatives by combining the answerhood condition semantics of Groenendijk and Stokhof (1984) with the update semantics of Veltman (1996). The first interprets interrogatives as a *partition* of a domain of possible worlds into equivalence classes of those worlds for which the answer to the question is the same. For instance, the question “Does Meredith have a sister?” leads to a bipartition of the worlds where Meredith does have a sister and the set of worlds in which she does not. Update semantics interprets sentences as functions that change the conversational context. Thus a declarative sentence “Meredith has a sister” is interpreted as a function that adds to any information state the information that Meredith has a sister. Groenendijk combines the two ideas by letting interrogatives *raise* issues by creating partitions and declaratives *resolve* issues by providing information about which partition contains the actual world. The update semantics ‘grounds’ the partition semantics of questions in the language game, by presenting the logical relations between interrogatives and declaratives as a consequence of the rules of language use that give the meaning to the respective moods, in the sense of Stenius’ proposal. The partitions do not describe conditions under which the questions are legitimate, but they *create* the conditions under which declarative sentences are *relevant*. Interrogatives thus have postconditions in the form of relevant information. The postconditions of imperatives are the actions that are permissible after they have been uttered. Permissibility is the imperative analogue to the interrogative’s relevance.

1.4 Concluding remarks

In this chapter I argued mainly against the attempts in philosophy of language to reduce the meaning of imperatives to that of declaratives. Such reductions either falsely reanalyze imperatives as declaratives (explicit performatives or modal declaratives), or they create a false opposition between force and content. The mood is seen as an operator over a content that is uniform over sentence types. However, there is no strict distinction possible between mood and content, because logic is *always* about the practices in which sentences are related to each other in a normative sense. Furthermore, content is not uniform across sentence types. Imperatives command actions to addressees, whereas declaratives predicate properties of objects. This is a concrete content distinction that reappears in gerunds and (non)finiteness of clausal complements.

It should be noted that this argument was directed against overly generalized semantic theories, not so much against syntactic theories that do the same. Even if imperatives are not differentiated from declaratives by means of a force parameter of some sort, that does not exclude that they can be treated as such in syntax. Languages may (and do) have imperative morphemes that indicate that the sentence is in the imperative mood. However, the argument in this chapter opposes to the suggestion of several authors that this morpheme contributes an illocutionary force operator to

the sentence that, without the imperative marker, would just be a nonveridical proposition (Han, 1998). The imperative *is* not a directly used proposition so, whatever the syntax may be, it does not contribute nonveridical propositions. And if we do not find an imperative marker we need not presuppose that there is one that is unexpressed. The imperative is not imperative in virtue of an operator over something non-imperative. It may well be that some element communicates a certain illocutionary force, but it is not *necessary* that such an element is present in order for the sentence to 'become' imperative.

At the start of this chapter I mentioned the assumption that there is such a thing as 'the imperative' as a sentence type. From a typological point of view this assumption is warranted (Palmer, 2001; Xrakovskij, 2001), but language-internally there is sometimes a reason for doubt. In particular for English, with its rather poor morphology, it is doubtful whether we can speak of such a thing as the imperative in the first place. This issue is addressed in the next chapter.

The infinitive as a sentence type

In what sense does English have an imperative sentence type? Basic imperative sentences are simple verb phrases.

(1) Go home.

Other imperatives have distinctive properties, such as a third person subject or 'do'-support.

(2) Everybody go home.

(3) Don't you be having no more of 'em bagels now, son.

There is some intuitive appeal to group the above three examples as instances of the 'imperative sentence type', but is there any theoretical motivation for doing so? If there exists such a sentence type, is that a syntactic, semantic or pragmatic notion? On the one hand, it is strange to think that it would be a (purely) syntactic concept, looking at (1). What about that sentence indicating that it is imperative? In English nonfinite verb phrases can also be used with a purely conditional meaning, not something we would naturally call 'imperative'.

(4) Go home now and you will miss the best party ever.

On the other hand, if we would claim that the imperative is a pragmatic notion, we might have to classify sentences like (5) and (6) as belonging to that same group.

(5) If you don't give me back my spectacles, I will call my mommy.

(6) Would you mind not whistling? I am trying to read this book.

These sentences are most naturally understood as, respectively, declarative and interrogative sentences.

Portner (2003) proposes that the imperative sentence type has to be understood as a semantic notion. It is the compositional meaning of the sentence that determines it as having the prototypical imperative force. According to Portner, (1) denotes a property that can only be true of the hearer and, because of that, it is restricted to the directive function of imperative sentences. I agree that the most plausible notion of ‘imperative sentence’ is indeed a semantic one. It is not what Portner proposes, because I do not see an intuitive motivation for why something of the type $\langle e, t \rangle$ could only have a directive conversational function. Instead, the semantic meaning of an imperative is what I claimed it is in the previous chapter: a representation as an *action*, which is concretely different from the way declaratives represent *events*. Moreover, the conversational function of ‘updating a schedule’ is part of that semantic meaning, i.e., part of the concept of ‘imperative sentence’, not a pragmatic consequence to be explained from it.

This argument will be developed in this chapter and in the next one. In the next chapter I will present an objection to a pragmatic definition of imperatives, on the basis of the observation that some constructions in Dutch ought to be classified as imperative even though they are not used for directive speech acts in a narrow sense. With the present chapter I aim to show that a purely syntactic definition of imperatives is not justified. The idea of a purely syntactic analysis of the English imperative has led to a number of different approaches. On the one hand, some have attempted to identify (1) as unambiguously imperative on formal grounds. Those proposals necessitate making assumptions about the ‘deep structure’ underlying the surface grammatical construction. Alternatively, some authors have proposed taking the surface structure for granted and they have sought a common ground between all sentences of that surface form. The consequence of this latter approach is that it inevitably leads to classifying the imperative as belonging to a wider class of sentences. Basically, it involves all bare form, infinitival constructions. Attempts at finding a common denominator for this class of sentences in terms of a notional category of ‘hypotheticals’, with a common semantic or pragmatic function, fail. Though that does not, as such, imply that the grouping of all bare form constructions is incorrect, I will give some reasons, based on the work of Blom (2003), for why we should analyze the bare form as semantically speaking a mixed set. From that I conclude that the attempts at a syntactic notion of imperative sentence type do not succeed. They either require that we speculatively presuppose a semantic or pragmatic notion of imperative meaning or force to be encoded in the grammar, or else we end up with a class of sentences that brings us no further to explaining the ‘intuitive appeal’ mentioned at the start of this chapter.

To make this point, I will first explain the deep structure proposal and Bolinger’s (1967) objection to it. Then I will discuss at length the attempts, following Bolinger, at defining a semantic concept that would unify all instances of the bare form in English. I conclude that these attempts fail and will try to provide an explanation for

why this is so. This explanation involves a study of root infinitives and the acquisition of finiteness (Blom, 2003) and the semantics of control infinitives (Stowell, 1982).

2.1 Bolinger vs Katz & Postal on the bare form

One way of understanding the performative analysis (Ross, 1968; Lewis, 1972) is as an attempt to motivate a syntactic definition of sentence types, by postulating a deep structure that unambiguously identifies each sentence as belonging to one such a type. Katz and Postal (1964) make a different proposal, though in the same spirit. They claim that (1) is in deep structure “you will go home”. Furthermore, it contains an ‘abstract morpheme’ *I* (for ‘imperative’) that identifies the sentence as being used with a directive intention. It is due to this *I* that we can delete the auxiliary and, optionally, the subject along with it. The arguments they give for this covert presence of ‘you’ and ‘will’ are the restrictions of reflexives and tags in imperatives.

- (7) Go home, will you/*should they.
 (8) Wash yourself/*himself before dinner.

So both Ross and Katz and Postal propose a syntactic concept of sentence type by postulating a deep structure identifying structure in *all* sentences intuitively belonging to that type. In both cases this deep structure element is supposed to be a direct encoding of the conversational function of being a directive speech act.

This analysis was rejected by Bolinger (1967).¹ He objected to the practice in transformational grammar to introduce deep structure material to account for empirical data, concentrating his objections on the arguments of Postal (1964).² Bolinger presented some arguments showing that Postal’s judgements are not correct. In the first place, the restriction to ‘you’ in the tag is in general correct, apart from interrogatives such as (9).

- (9) Eat the meat, will she? – I’ll fix her!

However, the claimed restriction to ‘yourself’ as a reflexive pronoun is not empirically adequate. Not only if we include echo questions (10), but also with announcements (11).

- (10) A: Don’t kill yourself.
 B: Don’t kill myself! Why should I?
 (11) Whoever wants to dance get himself a partner and let’s begin.

Furthermore, the auxiliaries in imperative tags need not be ‘will’.

¹A later version of that paper was published as the fourth chapter of Bolinger (1977).

²Those arguments are virtually the same as those used by Katz and Postal (1964). However, because Bolinger focusses on Postal’s article, I will do so as well.

- (12) a. Come down quietly, can't you?
 b. Do come over tomorrow, won't you?
 c. Be nice to him, would you?
 d. Let me help you, may I?

The last of these is perhaps not imperative, strictly speaking (see §3.3). Either way, 'will' in these tags is not so much expressive of future tense, but rather it makes for a request for *willingness*: Notice the similarity between the tags 'if you will', and 'if you would be so kind'.

Bolinger's general conclusion was that the proposed deep structure was the result of the presupposition that all of these simple verb phrase constructions are imperative sentences, with an imperatival force. Under that assumption, Postal restricted himself to just those example sentences that clearly do have such an imperatival force, which ultimately explains why he only found examples that were restricted to 'will you' tags. Instead, according to Bolinger, the clause type we are dealing with has to be taken for what it appears to be on the surface: a simple, uninflected verb phrase, possibly with a subject. Bolinger went on to discuss the range of uses that are connected with this form, which is much broader than merely the directive speech acts. Let me list this range of uses here.

The uses of the bare form in English

Imperatives A first point regarding the uses of bare infinitives is concerned with those clauses we would classify as imperatives. As has been pointed out by Hamblin (1987), imperatives differ widely in their interpretation. They can be commands, requests, permissions, warnings, advice, suggestions, and more. Hamblin classifies them into two groups: those that are *wilful* and those that are *accountable*. The first type includes commands, requests and other uses that are based on a desire of the speaker. They do not stand in any need of explanation or justification, but are simply to be complied with (or not). The second type contains advice, warning and related forms. These imperatives do imply that there is a reason for compliance, typically that the addressee is presumed to benefit from compliance him- or herself.

- (13) a. Hand me that knife, please.
 b. Get the hell of my property!
- (14) a. Watch out for that knife.
 b. Do come in!

Optatives The following examples are taken from Schmerling (1982) and Wilson and Sperber (1988).

- (15) a. Please be out.
 b. Don't have made things worse.
 c. Let them have survived.

Some authors have viewed these constructions as imperatives. However, there are some clear indications that they should not be classified as such. They can only be uttered in the absence of the person talked about, they can only be used as a kind of prayer. Also, the sentence in these uses lacks any form of directive force: it is not a command, request, advice, permission or proposal. Consequently, the verb need not have an 'agentive' interpretation, but they do lack a real past tense and they are future oriented as well: the speaker hopes that it *will turn out to be the case* that the subject did not have an accident.

Hortatives Some authors, especially typologists, would distinguish imperatives from hortatives (or 'adhortatives' or 'exhortatives'), such as:

- (16) a. Let's go.
b. Let's have a party.

Here the subject is first person plural: *I + you*, never *I + (s)he*. They are normally considered to be proposals for joint action. In this respect they differ from the more explicit 'Let us', that can also be used to express a command.

- (17) Let us leave in peace!

The difference can be made overt by considering the possible tags that can be used on them. If the tag could be 'shall we?' it is a proposal or suggestion, if the tag is 'will you?' we are dealing with a directive.

Exclamatives Some types of exclamatives similarly make use of the non-finite verb form. The first is an example from Bolinger (1977).

- (18) John be a liar? – Impossible.
(19) Harry marry Barry? – Never!

Notice that exclamatives always have an overt subject.

Instruction sentences Sadock (1974) discusses instructions in some detail. He notices that instruction sentences have different transformation and deletion rules. According to Sadock, of the following examples only the (a) sentences have both an instruction and a request reading. The (b) sentences are only instructions.³

- (20) a. Keep this thing out of the reach of children.
b. Keep out of the reach of children.
(21) a. Remove the lid carefully.
b. Carefully remove the lid.

³The object drop in the first of these can be used with real directive force. For a study of object drop in Dutch imperatives, see Visser (1996).

- (22) a. Hold the deck in the left hand and deal three cards to each player.
 b. Holding the deck in the left hand, deal three cards to each player.

This list can be expanded further with the following contrasts:

- (23) Using a soft bristle brush or a vacuum, carefully remove any foreign matter.
 (24) a. Remove the lid carefully, if you are going to do it at all.
 b. ?Carefully remove the lid, if you are going to do it at all.

Instructions may contain NPIs and instructions cannot be hypothetical. Schmerling (1982) furthermore observes that indefinite subjects lead to an instruction interpretation, whereas 'you' as a subject yields an imperative interpretation. A definite article in the subject noun phrase is odd, if not ungrammatical.

- (25) a. Slower traffic keep right.
 b. ?The slower traffic keep right.
 c. You slower traffic keep right.

Conditions Bare infinitives are often used in conjunctions with declaratives, where they play a purely subordinating role. Bolinger calls these uses *conditions*.

- (26) a. Give him a toy and he is busy for hours.
 b. Let him go unpunished now and he will not have learned anything.

In some cases, where 'will' is used in the second conjunct, the infinitive may be either a command or a mere instruction. The use of certain particles, such as 'please', 'now' and 'just', is a clear way of distinguishing requests from pure conditional interpretations (see also Takahashi, 1995). As Bolinger (1977) points out, affirmative 'do' is another example of this.

- (27) a. Just listen, and you will understand.
 b. Be patient, won't you, and you'll make the basketball team.
 c. Please do your homework and you'll get a good grade.
 d. Do come in and I'll make you a nice cappuccino.

Han (1998) mentions some compelling reasons to classify condition sentences differently from imperatives. Conditions can contain NPIs such as 'any', unlike simple imperatives, and they do not contain quantified subjects or 'don't' negations.⁴

- (28) a. Come any closer and I'll shoot.
 b. *Everybody come to the party and she will be happy.
 c. *Don't worry so much, and you'll be happier.

⁴The observation concerning NPIs goes back to at least Davies (1986). See also Clark (1993) for a more extensive discussion of condition sentences, and also §5.7 in this thesis.

Finally, an observation by Bolinger that connects these bare infinitives to imperatives is the lack of past tense, seen even in past contexts (examples taken from Takahashi, 1995):

- (29) a. In those days Tim was always hungry. Give him a few dollars, and he was happy.
 b. A: How was the party?
 B: Turn up yesterday and you'd have had a real shock.

Embedded clauses The bare form is not only used in main clauses such as imperatives and seeming main clauses such as conditions, but they are also used in embedded contexts. Declarative sentences are normally associated with finite 'that'-complements of certain verbs. Infinitive complements, such as control infinitives and what some authors describe as subjunctives (Portner, 1997), could similarly be associated with the main clause bare form.

- (30) a. I think that John has met Mary before.
 b. I hope to see Mary again sometime.
 c. I demand that she come here at once.

Huntley (1982) suggests that embedded control infinitives are the "embedded counterparts of imperatives". Finite 'that'-complements are selected by most epistemic and doxastic attitude verbs. The infinitive complements on the other hand, are selected by buletic, deontic and similar attitude verbs, what Farkas (1992) calls 'weak intensional predicates'.⁵

Apart from their non-veridicality, especially control infinitives as in (30-b) show some striking similarities with the main clause bare infinitives. One such property is future orientation (Stowell, 1982, examples from Ter Meulen 1990, Portner, 1997):

- (31) I want you to go home tomorrow/#yesterday.
 (32) a. Mary began to eat her pizza.
 b. #Mary stopped to eat her pizza.

Only those verbs take infinitive complements that present the action as something being initiated, lying in the future of the reference time. The example (32-b) can be interpreted as saying that Mary was, e.g., talking and then stopped talking *in order to* eat her pizza (giving it again a future orientation).

⁵However, generalizations are very difficult to make here. For example, as Quer (2001) convincingly shows, the subjunctive in Romance languages cannot be identified with any specific semantic criterion such as non-veridicality or non-epistemic context. It is used in all kinds of subordinate clauses that somehow 'shift' away from the main clause interpretative context. If correct, these observations go against some of the analyses of Farkas and of Portner (1997) of such non-finite or subjunctive complements.

The bare form under ‘that’ is often considered to be a subjunctive of some kind. Quer (2001) terms it an ‘intensional subjunctive’. Portner (1997) uses the phrase ‘mandative subjunctive’. This form does not necessarily have the same future orientation as control infinitives do, but it is restricted to deontic and buletic intensional context and does not give rise to a veridicality presupposition either.

Sometimes infinitives with the ‘action marker’ *to* are used as main clauses, in which case they invariably have a non-declarative interpretation.

(33) Oh to someday meet her!

More on these subordinate infinitives later on in this chapter.

2.2 The Hypothetical

Bolinger argues in favor of a unified semantics of the bare infinitive. In his 1977 book he defends the dictum of ‘one meaning, one form’: that we use one and the same form for all these uses strongly suggests that they are semantically related in some sense. The diversity of uses of the bare form is therefore to be explained, not in terms of homonymy, but as the result of “intersections with other systems,” by which he means contextual information and various ways of expressing one’s attitude such as intonation, particles and tags. The argument against homonymy consists of two observations. One is that one bare infinitive can get all those different readings on the basis of only a difference in intonation and that these readings ‘feel’ like merely a matter of degree. The other observation is that with homonymy one may easily create a pun by drawing on both meanings, but this never happens with the readings of bare infinitives. Bolinger writes (page 173): “The common ground is the bare infinitive with a meaning of hypothesis.” By this he means that a proposition is expressed, but not as true, false, probable, unlikely or anything like that. It is merely presented for the hearer’s consideration.

The idea that the bare form uses are somehow explained by bringing them together under the heading of ‘hypothesis’ has been further developed by, amongst others, Jacobs (1981) and Davies (1986). Jacobs coined the term ‘hypotheticality’ for this. Whereas a declarative involves one or more truth value claims a hypothetical merely “conceptualizes a situation”. Or, as Davies (page 48) puts it: “The contrast, I suggest, is quite simply that while a declarative sentence asserts a proposition, an imperative sentence merely presents one”.

I want to argue that this idea, and the various attempts to make it more precise, are mistaken. It wrongfully supposes that we can subtract the assertive function from a main clause declarative sentence and still maintain a truth conditional content. Since some authors do seem to suppose that this is possible, and have even attempted to formalize the idea, I will risk laboring this issue by providing a detailed criticism of it.

Huntley

Huntley (1984) is perhaps most explicit about how we are to make sense of Bolinger's proposal. He aims specifically at a semantic theory for infinitival complements, and wants to explain imperatives in terms of that theory. In both of the following sentences the complementizer phrase presents a situation of some sort, but the effect on the overall interpretation is quite different.

- (34) a. Joe insisted that Bill finishes dinner by 10.00.
 b. Joe insisted that Bill finish dinner by 10.00.

The finite complement suggests that there is some concrete event (or events) of Bill finishing dinner that the speaker can refer to, whereas the infinitive complement merely projects such an event into the undecided future.

In order to account for this difference, Huntley adopts the categorial grammar framework of Montague (1973), in which there may be different syntactic categories corresponding to the same semantic type. Huntley proposes to distinguish between three such grammatical types of clauses, all subcategories of the semantic type of propositions. The first consists of 'proto-sentences' of type *t* such as

- (35) he_1 be happy

that have a subject and a verb but no tense or mood. Of the second type *t'* are control infinitives like

- (36) to_1 be happy

that are obtained by replacing the subject by the infinitive complementizer 'to', which is therefore of type *t'/t*. (The pronoun's subscript is kept to allow for control of the infinitive.) The finite clauses are of type *t''*.

- (37) he_1 is happy

Tense, modal auxiliaries and the indicative mood (subject-verb agreement) are operators of type *t''/t*, comparable to indexical adverbials 'now' and 'actually'.

Huntley (1984) claims that imperatives, as well as the other bare form constructions mentioned by Bolinger and others, belong to the type *t* of 'proto-sentences' that do not have the finiteness of declarative sentences. This non-finiteness is explained in terms of the distinction made by Lewis (1972; 1980) between *context* and *index*.⁶ Let me briefly point out what this difference is.

Sentences depend for their interpretation on the context of utterance. What the declarative sentence asserts depends on the context in which it is uttered. But what

⁶Lewis (1980), unlike in 1972, uses double indexing (distinguishing context from index). Though Huntley only refers to the earlier essay, it appears that the later version is what he has in mind. This distinction between context and index is also essentially the same as the one Kaplan (1989) makes by introducing the concepts of *character* and *content*.

this interpretation then gives us is an *intension*, that is, a function from *indices* to truth values. It says not only what the truth value of the sentence is in case the index corresponds to the actual context of utterance, but also what its value would be if the index were different. This idea of ‘if the index would be different’ is understood in the following way. We look at certain aspects of the context—say, the speaker, hearer, time of utterance, and world—and call this list of items the ‘index of the context’ i_c . Then we can think of all other possible indices i' : all other possible combinations of a speaker, hearer, time of utterance and world. Now we can say what the truth value of the sentence would have been if the context would have been ‘shifted’ by replacing the actual speaker, hearer, time and world by those alternative ones. This alternative context, resulting from the shift, is also called the ‘context of reference’. The interpretation of the sentence in the utterance context is then a function that assigns to all of those indices a truth value. The notation is now as follows: $V_c^\varphi(i)$ stands for the value of φ as uttered in c , for index i . Since we think of the index of the context as ‘mirroring’ the context of utterance, V^φ can be written for $V_c^\varphi(i_c)$.

So the intension, the valuation per possible index, is dependent on the actual utterance context. This can also be seen in a different way. The intension associated with the sentence “I am hungry” can be understood as a valuation that associates with every time-world index the value ‘true’ iff I (the author) am hungry in that world at that time. Thus, the context first assigns a denotation to the indexical expression ‘I’ and then we give an intension for the sentence. Several operators in natural language are interpreted as index *shifters*. Examples are tense and modality. A past tense sentence “I was hungry” is true in index i iff there is some index i' , such that the time in i' is earlier than in i , and in that index i' the speaker in i is hungry. Present tense is seen as an unshifted default tense, past and future tense are seen as shifters.

Let me get back to Huntley’s proposal. According to Huntley, imperative sentences are non-finite, by which he means that they are tenseless and moodless. These notions are, in turn, explained using the intensional semantics of Lewis.

Thus, where tense is deictic, locating states of affairs in time relative to *this time* (i.e. time of utterance) or some specified reference time which is in turn located relative to the time of utterance, an intension is assigned to tensed sentences, which determines truth-values for them at each index, only relative to the contextually determined time of utterance. Tenseless sentences by contrast are assigned an intension which is constant across contexts, not varying with the time of utterance, provided that there are no other time-deictic elements (e.g. temporal adverbs) in the sentences. (Huntley, 1984, page 119)

The intension of a tensed sentence is the assignment of a truth value to that sentence for each index i , though what the intension is depends on the context of utterance. Hence it may be that, if the context of utterance is c the sentence is true at i , whereas if it is c' it is false at i . Tensed sentences are in this sense ‘sensitive’ to the time parameter of the index of the context, tenseless sentences are not. Moodlessness is explained analogously. The nonfinite sentence “John be happy” has the same propositional content as the sentence “John is happy”, but with the nonfinite one it remains

unclear whether it is *actually* true and *when* it is so. It is this lack of context sensitivity that is supposed to account for the impossibility to make assertions with nonfinite sentences.

A declarative represents a situation (truly or falsely) as obtaining in this world (the actual world) by indexically identifying this world as the world at which the sentence is to be evaluated. An imperative involves no such indexical reference to a world. It *will* have a truth value at whichever of the worlds in the set of possible worlds *is* the actual world, but the fact that it does not indexically specify such a world permits it to represent a situation being merely envisaged as a possibility with no commitment as to whether it obtains, in past, present or future, in *this* world. [...] it is this feature which makes it inappropriate to characterize imperatives as ‘true’ or ‘false’ (i.e. true or false at this world). (Huntley, 1984, page 122)

It is rather strange to think one can ‘abstract’ away from the context of utterance. One can hardly deny being the speaker, or that the time is as it is at the moment of speaking, or that the actual world is where you live. *Shifting* away from the context of utterance is possible, but that means that you imagine shifting to some possible context of reference *from the perspective of* your actual context of utterance.

Perhaps it is possible that a speaker would choose with his or her utterance not to make it explicit that it is a claim to be evaluated relative to the index of the context. If so, then clearly the speaker could not use the utterance to make an assertion. But what remains unclear is how the uttered sentence then still has a truth value. What is the truth value of “John be happy” here and now? Is it true if John is happy here and now, or if he is happy in a short notice, after some appropriate action has been undertaken, or when John is happy in an ideal world, or a likely one? If Huntley is right in claiming that the utterer of a nonfinite sentence does not express that the sentence is true iff it is true at the index of the context (making it into an assertion), then the meaning of such a nonfinite sentence cannot be an intension in the first place.

Put differently, a sentence for which it is not clear how it is evaluated relative to the index of the context cannot have a truth value in an index *simpliciter*. It only acquires a truth value anywhere after it has been specified how it is actually evaluated in the index of the context.⁷ This specification may be done by some superordinate index shifting operator or by pragmatic inference, but when such an evaluation has been provided, the sentence will denote an intension. That is to say, it will have a truth value in any possible index. But then, if it does, it is indistinguishable from an ordinary declarative sentence as far as semantics goes. It may well be that nonfinite clauses are in a sense semantically incomplete, but to make imperatives, alongside nonfinite clauses, functionally dependent on a specification of a distinguished index is not to propose a ‘semantics of imperatives’. In order to do so, the theory still has to

⁷For each context, in fact.

explain how a main clause imperative can have a conversational function other than stating that something is true.

Huntley intends to explain the observation that imperative sentences do not have an assertive function even though they have a truth conditional content on the assumption that imperative sentences leave ‘open’ what the intended index is. As a consequence, they would denote meanings that remain ‘hanging in the air’, so to speak. However, on a closer inspection, imperatives do not lack any such specificity. To be more precise, an imperative sentence is as much tied to the index of the context as a declarative sentence is. A (resultative) stative imperative sentence cannot reasonably be understood as being concerned with the actual time of utterance, so it has to be expressly shifted to some later time of reference, obligatorily marking an index-shift.

- (38) a. #Be standing at the gate.
b. Be standing at the gate when the car arrives.

The same goes, in fact, for root infinitives:⁸

- (39) a. #Terug zijn.
Back be-INF
‘Be back.’
b. Terug zijn voordat de volgende lezing begint.
Back be-INF before the next lecture begin-3sg
‘Be back before the next lecture begins.’

These constraints are hard to explain if the imperative were semantically a free floating intension. Moreover, there are certain forms of progressive imperatives that are only possible if the reference time is really present, not future or past (Williams, 2001).

- (40) a. Come on. Let’s be going.
b. #Let’s be going to a free jazz concert tomorrow.

Imperatives neither allow for modal subordination, which means that they do not pick up the preceding modal context, witness (41).

- (41) a. Suppose we would have moved to Australia. Visit your neighbors there and half a day would be gone.
b. Suppose we would have moved to Australia. #Visit your neighbors there.

From this example the contrast between a main clause imperative and a subordinate infinitive construction is clear. The main clause imperative does not allow for modal subordination. It has to be evaluated with respect to the actual world (whatever such an evaluation may be). In this sense imperatives are just as tied to the index of the context as declaratives are: if you want to command something for an index other

⁸Examples from Dutch, INF stands for infinitive.

than that of the context, you need to make this explicit in your utterance.

Nevertheless, many authors have adopted views on the imperative and infinitives similar to that of Huntley. Not only Bolinger, Jacobs and Davies in their rather informal characterizations of the hypothetical sentence type, but also in a more formal setting by Schmerling (1982), Portner (1997), Platzack and Rosengren (1998) and Han (1999b). Schmerling and Platzack and Rosengren adopt something quite like Huntley's analysis⁹, Portner and Han each develop a formal semantic theory for imperatives based on the idea that the imperative is a proposition with a truth value but without an assertive function. Han compares the imperative with the protasis of a conditional sentence. An imperative denotes a set of possible worlds: those worlds in which the proposition is true and which are deontically optimal (maximally satisfy one's obligations). However, this set of worlds is not 'the worlds where the imperative is true' or anything like this. Rather, the *value* of the imperative is this set. It is completely unclear to me what it means to value a main clause sentence as being a set of worlds, if that is supposed to account for the fact that those sentences do not have truth values. Portner develops his theory within the framework of situation semantics (Kratzer, 1989), where a proposition is a set of 'partial situations' and where we have a part-of relation between such situations. Portner distinguishes between two types of propositions: those that denote only maximal situations, i.e., worlds, and those that denote only partial situations (not worlds). For reasons that are not clear to me, only the former type of propositions can be asserted. The partial situation-propositions do have truth values, but they cannot properly be called 'true' or 'false'. This distinction between 'true' in formal semantics and 'true' as something that applies to assertions alone is entirely ad hoc and lacks any explanation whatsoever.¹⁰

These authors all seem to have in mind that the nonfinite sentence shows us a picture, a possible state of affairs, without asserting it. The nonfinite sentence "Bruno be sitting on a chair" contains the verb 'be', but not in its finite form nor supported by an auxiliary. The idea then appears to be that the sentence does show a picture,

⁹Platzack and Rosengren do not refer to Huntley, but what they describe informally is virtually the same idea. The only difference is that Platzack and Rosengren assume an imperative mood marker in the syntax, expressing deontic obligation. The difference between an imperative "Go home!" and a deontic modal statement "You ought to go home" would be that the former expresses a deontic attitude towards the statement that there exists a going-home event, whereas the deontic statement asserts that there exists such an event for which the deontic attitude is valid. This contrast does not seem to be an adequate representation of the natural language difference as I understand it.

¹⁰At one point Portner writes:

As pointed out by an anonymous reviewer, assigning truth conditions to an imperative might lead one to expect that it could be judged true or false. I believe that the solution to why it cannot be requires a better understanding of the relation between semantics and pragmatics, in particular speech act theory, than we currently have. (Portner, 1997, page 107, note 23)

It is my intention with the formal analysis in the last two chapters to accommodate precisely this need.

but the predication relation remains ‘hanging in the air’. The sentence calls Bruno to mind, we can close our eyes and picture him sitting on a chair. But the important point here is, that such a response of picturing Bruno sitting is not what we *mean* by the sentence. If we do not close our eyes and picture Bruno, or if we picture him standing up, we do not deny the sentence or refuse to comply with it.

To conclude, we may think of nonfinite clauses as calling pictures to mind without purpose or without being a ‘complete thought’. But if we do so, then we cannot consider this calling to mind the ‘meaning of the nonfinite clause’ either. Meaning, it was argued in the previous chapter, is tied to an idea of relationships between sentences: the rules of the language game. The relationship between the nonfinite sentence and the mental act of picturing something is certainly not a rule of any ordinary language game (cf. Wittgenstein, 1953, §6). This is not to say that the ‘hypotheticals’ do not, perhaps, share certain grammatical and semantical features, but they do not all have the same meaning. Thus, if the imperative in English cannot be distinguished grammatically from other bare form constructions, we should not conclude that an imperative in fact only calls to mind the idea of complying. The only conclusion possible is that there is no grammatical imperative in English and the act of instructing a person to perform some action is achieved by means of more than grammar alone.

Schmerling

Given Huntley’s proposal there are no constraints whatsoever on the use of infinitive clauses and so it overgenerates. Moreover, it does not adequately explain the inapplicability of ‘truth’ to those clauses. Basically, the way it connects infinitives to finite clauses is itself again a variant of the mood-radical theory, the only difference being that in this case the mood operator is a deictic expression. We must wonder: do the examples of nonfinite clauses Huntley discusses really express the ‘complete thoughts’ that Frege associated with sentences? And is it really enough to distinguish between infinitives and finite clauses in the way he does to explain the intuitive difference between finite and non-finite complements? Compare the sentences in (42).

- (42) a. It is depressing for Sally to actually, right now have to stay inside while the sun is shining.
 b. It is depressing that Sally actually, right now has to stay inside while the sun is shining.

The difference between (42-a) and (42-b) cannot be only a matter of deixis. The first sentence concerns something that depresses Sally, whereas in the second sentence it is the speaker who is depressed. At least this shows that there is more to be explained by a semantic theory of nonfiniteness. More on this in §2.4.

Schmerling (1982) agrees with Huntley on the categorial approach to clause types, but she attempts to give more specific content to the distinction between declarative and imperative-like clauses (roughly Huntley’s proto-sentences). The imperative sub-

ject, even a third person one, is always interpreted deictically.

(43) Somebody open the window.

But instead of proposing a functional, pragmatic explanation of this feature, she argues we should turn the picture around: it is not because the sentence has a directive interpretation that the subject is interpreted deictically, but it is because the subject is interpreted deictically that the sentence gets a directive interpretation. Under this reversed analysis the imperative becomes but one member of a much larger class of sentences amongst which are also hortatory subjunctives such as the following.

(44) The Lord be praised.

(45) God save the Queen.

The common denominator between all these clauses is that the speaker somehow intends to change the world by making the utterance. Schmerling's definition of the meaning of imperative-like clauses is that:¹¹

The uttering of a (categorical) imperative is an attempt thereby to bring about a state of affairs in which the proposition expressed by the imperative is true.
(Schmerling, 1982, page 212)

This meaning reflects a "primitive instinctive feeling that a person can use magic to control the world around him". Those attempts can vary from ordinary directives to hortatory subjunctive prayers and from requests to 'hocus-pocus' sentences such as (46), wishes like (47) and healing-commands like (48).

(46) Start (dammit)!

(47) Sleep well.

(48) Walk!

We may perhaps reformulate this idea by saying that the distinction between the interpretations of finite declaratives and these 'categorical imperatives' is their respective directions of fit. But it remains unclear as to what status this difference has: it is not, strictly speaking, a matter of semantics since the clause differentiation is assumed to be a purely syntactic matter, both clause types consist of expressions of the propositional type. Like Huntley, Schmerling seems to assume that the lack of tense or mood prevents the imperative sentences from being used to assert, even though they do denote truth values. But the lack of world and time deixis is not enough to explain the reversal of direction of fit.

I agree with Schmerling that the difference between ordinary imperatives and e.g. hortatory subjunctives is a matter of the way the subject is interpreted but, contrary

¹¹'Categorical imperative' is Schmerling's term for what I call, with Bolinger, the bare (infinitival) form.

to her proposal, I take this difference to be a *semantic* fact. It is again the distinction between a first and a third person perspective on actions that we are dealing with. The fact that the subject of hortatory subjunctives is interpreted as referring to an object in the world, rather than as an individual in the domain of discourse means that these clauses as a whole are concerned with *events*, spatio-temporal parts of an observed or desired world. The addressee interpretation of imperative subjects on the other hand leads to an interpretation in which the verb phrase points to a (potential) *action* of the addressee. This means that the imperative has a directive interpretation, whereas the subjunctives are interpreted as expressive of a desire, i.e., as optatives. That both clauses thus have a world-to-word direction of fit does not mean that they have the same semantic content, let alone that this meaning can be understood in terms of a declarative proposition. The reasons for this have been supplied in the previous chapter.¹²

Wilson and Sperber

A third proposal to mention in this context is the one presented by Wilson and Sperber (1988). They claim that with Schmerling's definition we cannot explain the interpretation of 'accountable' imperatives including permission and advice (49), non-literal imperatives such as threats (50) or 'reluctant' imperatives (51):

- (49) Help yourselves to some cookies.
 (50) Go on. Throw it. Just you dare.
 (51) A: Can I open the window?
 B: Oh, open it, then.

I am not completely convinced that this is indeed a shortcoming of her theory. Accountable imperatives are usually, if not always, uttered only when the speaker has made up his or her mind that the action should happen. The first of these examples expresses an *instigation*. The second is a non-literal usage that can be adequately dealt with in terms of implicatures (Grice, 1975): the speaker indicates that he or she is just waiting for an excuse to respond, perhaps even violently so. The third example is, though reluctant, still a directive. In analogy to Schmerling's discussion, we may think of the magician who gives in to his nagging visiting cousin who wants to see a rabbit come out of the hat: "Oh, alright then. Hocus pocus, rabbit appear!" But perhaps advice is the most compelling case: if someone asks for directions to the Central Station and you reply with a sequence of instruction sentences this arguably does not constitute an attempt to change the world by making the hearer perform those actions.

Wilson and Sperber claim that a more permitting definition of imperative meaning is needed. The link between a clause type and the range of illocutionary forces

¹²More on this in §3.3.

it can express is mediated by a ‘complex propositional attitude’. Regarding imperatives, in all cases a desire of *someone* is involved, but not in all cases this someone is the speaker. It can be the addressee, or perhaps even some other person not present when the utterance is made. Furthermore, in some cases the content of the sentence is assumed to be realizable and in other cases it is not. These parameters generate the range of potential illocutionary forces. This way, Wilson and Sperber claim, advice can be incorporated in the range of possible forces: an imperative is an advice when the proposition is considered to be realizable and desirable for the hearer.

Here again, the confusion is to think that the combination of a truth conditional description of the world in combination with a range of desire and belief attitude parameters constitutes a ‘sentence meaning’. One may call upon the fact that optatives and imperatives share a world-to-word direction of fit, or that they both presuppose some kind of desire of someone, but that does not make them mean the same.

But if someone wished to say: “There is something common to all these constructions—namely the disjunction of all their common properties”—I should reply: No you are only playing with words. One might as well say: “Something runs though the whole thread—namely the continuous overlapping of those fibres”. (Wittgenstein, 1953, §67)

Apart from this, it could be said that even Wilson and Sperber’s proposal is not general enough. The definitions that give the bare infinitive clause type more content suppose that in all cases some desire is involved, but real instruction sentences are neutral in this respect. Giving directions to the Central Station does not really imply semantically that the addressee *wants* to go there. And other cases are perhaps even more clear. A travel guide may have to take a random choice: “Let’s take the left road”. Or take Sadock’s example (22-b) repeated here:

(22-b) Holding the deck in the left hand, deal three cards to each player.

Directives are different from desire expressives in an essential way. An expression of desire of someone does not imply any command that the action be performed and neither does a directive imply any kind of desire of any person whatsoever.

The hypothetical is not a sentence type

Where does all this leave us? Bolinger’s criticism of the transformational grammar approach was certainly not completely unjustified. The ease with which people introduced abstract morphemes or hidden features in order to constrain the data set to a semantically homogeneous class only obstructs the search for an explanation of the peculiar range of meanings the bare form in English has. The imperative meaning results from more than the grammatical form alone. Discourse particles, intonation, tags and the like, all contribute in establishing this meaning, or so it seems. To take all of this as part of the grammar so as to say that there exists a grammatical imperative in English is circular.

On the positive side of Bolinger's view, I conclude that the bare form as such does not correspond to any natural semantic concept. Such a common semantic concept would be needed if we were to argue that the intuitive idea of an 'imperative sentence type' is mistaken. However, we need not conclude from this that Bolinger and others were completely mistaken in grouping the bare form constructions together into one class. There may be other reasons for their common properties, as observed in §2.1. Below I will present a possible explanation for those common properties, based on the work of Blom (2003). What they share, I suggest, is their lack of finiteness and, consequently, their lack of a declarative function. Those infinitives that do have a declarative function are quite different from the performatively used infinitives, not just semantically, but also with respect to their syntax. Note that the argument is not meant as a direct proof of the correctness of this suggestion. It is merely intended as an illustration of a (closely) connected issue, giving the idea some initial plausibility.

2.3 Learning finiteness

In the studies mentioned in the previous section, the analysis was restricted to looking at the English bare stem/infinitive forms and their readings, and come up with a semantic explanation. This procedure is somewhat naive, because it does not, or only to a very limited degree, *contrast* the studied clauses with possible alternatives. That is to say, to properly explain the phenomena encountered one has to compare the data with e.g. children's use of the bare stem, to see how this non-declarativeness of bare infinitives arises, or contrast it with other languages, where root infinitives (supposedly) display quite different characteristics. Or contrast the different ways of expressing something in a language and explaining why one finds so many of the one form and not the other. In short, why do people use this form *rather than another one*?

Root infinitives (RIs) play an important role in studies of early language acquisition, as is shown by the large number of recent studies, such as Radford (1990) and Wexler (1994). It has been observed that whereas infinitives in adult language often have a future oriented, 'modal' meaning, in early child language there is a stage in which infinitives are used in a much wider range of situations next to finite sentences. This contrast allows us to ask why such a restriction develops in the course of language learning.

Here, I want to discuss a study of language learning and root infinitives. The first is an empirically motivated claim by Blom (2003), that root infinitives do not form a semantically homogeneous set, but rather that they are the heterogeneous complement, of finite clauses. I will explain that this analysis fits with the distinction between the 'event' and 'action' perspectives that I proposed in the previous chapter. Given that distinction, it is plausible to assume that a descriptive sentence requires a subject and an agreeing verb, whereas for proposals, instructions and the like a subject is not needed, and so in those sentences the verb can remain nonfinite.

Modal reference effect and eventivity constraint

The observation that root infinitives are used in many languages, not only by young children but also by adults, has been made by researchers of language acquisition as well. Focussing on Dutch, here are some examples (taken from Blom, 2002 and Blom and Wijnen, 2000), first some utterances by children, second some examples from adult uses of RIs.¹³

- (52) a. vrachtwagen emmer doen.
truck bucket do-INF
'Put the truck in the bucket.'
- b. ah, mij bril vallen.
ah, my glasses fall-INF
'ah. my glasses have fallen.'
- c. in soel zitten.
in chair sit-INF
'[I want to] sit in the chair.'
- (53) a. Hier geen fietsen plaatsen.
Here no bicycles place-INF
'Do not place bicycles here.'
- b. Buiten een sigaretje roken?
Outside a sigaret smoke-INF
'Shall we smoke a sigaret outside?'
- c. Even washandje pakken.
PART wash.cloth-DIM get-INF
'Let me just get a wash cloth.'
- d. Jan met mijn zus trouwen? Dat nooit!
John with my sister marry-INF That never
'John marry my sister? Never!'
- e. Tring tring tring, dus ik opendoen.
Ring ring ring, so I open-do-INF
'Ring ring ring, so I open the door.'

The children, at this stage of linguistic development, use RIs for declarative (b) and nondeclarative (a,c) meanings. The adult infinitives are mostly restricted to non-declarative meanings, such as directives (a), proposals (b), expressions of intention (c), exclamatives (d), but they can be used to describe a course of action in narrative discourse as well (e).

The observation that adult RIs have a modal, or future oriented, interpretation dates back to van Ginneken (1917). Hoekstra and Hyams (1998), who come to the same finding via a collection of corpus studies (available via the CHILDES corpus) for various languages, name it the *Modal Reference Effect*: "with overwhelming fre-

¹³PART stands for particle, INF for infinitive, DIM for diminutive.

quency, root infinitives get a modal meaning.” The ‘modal meaning’ is not explained in much detail, it is related to a feature [-realized]. A related observation is, that in the vast majority of root infinitives the verb is eventive (stage-level), cf. Wijnen (1998).

As can be seen from the contrast between child and adult examples, this connection between root infinitives and modality is established in the course of linguistic maturation. Different theories have been developed to explain the emergence of this modal reference effect. Some assume that there is a covert modality in adult root infinitives (Boser et al., 1992), others argue that in the developmental stage where root infinitives are optional for the child, the syntactic structure is *truncated* and lacks higher clausal layers (Rizzi, 1994).

Hoekstra and Hyams center their proposal around their observation of one apparent cross linguistic difference: though root infinitives occur in English as well, they completely lack the modal reference effect and eventivity constraint. Their explanation for this difference is in terms of the infinitival morphology on the verb. This morphology, in Dutch a suffix ‘-en’, is what carries the meaning of ‘not (yet) being realized’, in the form of the [-realized] feature, and this is what is being learned by children in the optional infinitive stage. English does not have any infinitival morphology and, consequently, it does not display the modal reference effect either. Only the infinitive marker ‘to’ carries ‘unrealized’ meaning.

Blom on children’s root infinitives

The proposal of Hoekstra and Hyams shares an idea with the theories that assume a hidden auxiliary in root infinitives. Namely, that the infinitive itself carries a modal meaning. Two interesting points of criticism come from the PhD thesis of Blom (2003). The contrast between English and other RI languages rests on a methodological problem of statistical analysis. And the modality of RIs can be explained indirectly by a preference for finite clauses in non-modal cases.

Firstly, she undermines the claim that there is a difference between root infinitives in Dutch and English. Blom discusses the contrastive data of Hoekstra and Hyams, and shows that the observed difference may have a quite different origin. Because in Dutch the infinitive is verb final and finite clauses are verb second, root infinitives can be singled out irrespective of the agreement morphology on the verb. This is not the case for English. The only forms that are identified as English RIs in the statistical analyses are third person forms, since only in these cases one can distinguish the finite clauses, with affix ‘-s’ on the verb, from RIs, with only the verb stem. If we restrict ourselves to the third person forms in Dutch as well, the modal reference effect drops out completely. This is because children use the modal RIs mostly performatively with respect to themselves (their intentions) or others present (commanding or requesting), so mostly in case of first or second person.

Furthermore, both in Dutch and English, children of this young age freely alternate between overtly realizing the finite affix and not doing so.

- (54) a. Dese hoor- \emptyset niet daar.
This belong not there
'This one does not belong there.'
- b. Hij zeg- \emptyset toettoet.
He say toottoot
'He says toottoot.'
- (55) a. Mommy sit- \emptyset on the couch.
b. Doggie bark- \emptyset .

In English the difference between such finite clauses and RIs is not visible. This makes the English data very difficult to compare to the Dutch, where the RIs are so clearly distinct from the finite clauses. Blom speaks of a *heterogeneous set effect*: the set of clauses that are classified as RIs in English are a mixed set of finite and non-finite forms. This makes the formulation of hypotheses for English root infinitives problematic. With this criticism Blom effectively neutralizes the findings supporting the claim by Hoekstra and Hyams that the infinitive morphology expresses irrealis.

Blom suggests that we turn the picture around. The development of young children learning the adult language is not one of learning the 'meaning of the root infinitive'. Rather, they gradually acquire finiteness as a grammatical category. The Modal Reference Effect can be explained as an indirect result of the preference for finiteness in case the sentences is about a real and completed event. Due to this preference the relative frequency of modal RIs *vis a vis* nonmodal ones increases, what Blom calls a 'modal shift'.

I brief, my claim is that the modal shift in root infinitives can be explained as the effect of root infinitives being 'pushed out' by sentences containing verb forms that are semantically more specified than infinitives. [...] Basically, the idea is that finite clauses take over at the expense of root infinitives. According to this scenario, the modal shift takes place because present tense finite clauses are earlier productive than modal finite clauses. By effect, non-modal present tense root infinitives are used relatively less often than modal root infinitives. Hence, root infinitives display a modal shift. (Blom, 2003, pages 192 – 193)

This hypothesis is supported by a study of the development of six Dutch children, showing how the modal shift occurs in tandem with the grammaticalization of finiteness.

Blom also discusses subject drop in finite and nonfinite clauses. She convincingly shows that children are not from the start equipped with the principle that all sentences must contain a subject (the so-called Extended Projection Principle). Though children drop the subject in contexts in which it is permissible in the adult language as well, they clearly overgeneralize. When inflection is acquired, subject drop in RIs increases, whereas in finite clauses it decreases. Blom does not connect these observations about subject drop with the modal shift, apart from explaining both in terms of the development of finiteness. However, from my proposal concerning the semantics of imperatives and declaratives such a connection may well be established.

Recall that in the previous chapter I argued that imperatives present an action from a first person point of view, as something the interpreter can imagine doing or undergoing. From this perspective the interpreter need not conceptualize the performer of the action. This is contrasted with the point of view of the observer of an event, who always observes the agent performing the action.

Finiteness can be seen as related to the fact that describing an event means taking the third person perspective and thus involves describing an agent. I suggest that it is this choice for perspective that is behind the grammaticalization of finiteness. The verb agreement is syntactically speaking anaphoric to the subject. Given this suggestion, the modal shift indicates that RIs are used with a first person perspective relatively more often. Since from this perspective the agent need not be represented as a part of the action being performed, there is also no need for grammaticalizing its position in the clause. In general, adult modal root infinitives do not even allow for a subject.

- (56) a. (*Jij) even opletten nou.
 You just pay.attention now
 ‘Pay attention now.’
 b. (*Ik) snel nog even een broodje halen.
 I quickly PART PART a sandwich-DIM get-INF
 ‘Let me just quickly get a sandwich.’

Nonmodal RIs in adult Dutch are possible, but they are more common with a subject. These exceptions occur in the same contexts that license fronting the finite verb, historical present and even dropping the verb altogether.

- (57) Komt Jan gisteren lunchen, blijkt ik ineens zonder
 Come-3sg John yesterday lunch-INF appear-1sg I suddenly without
 brood te zitten. Hij zich maar verontschuldigen. En ik dus
 bread to sit-INF He himself PART apologize-INF And I therefore
 naar de bakker. (etc.)
 to the baker (etc.)
 ‘John comes by to have lunch yesterday, and then I find out that I am out of
 bread. He kept apologizing. And so I go to the bakery. (etc.)’

Here the nonfinite verb is permitted for a different reason, it seems. The sentence does describe an event from the third person point of view, but in spite of that no verb agreement is needed.

This brief discussion is no more than a first indication of the way the perspectival dualism of the first chapter may be used to further improve our understanding of the phenomenon of finiteness. At least it can be said to support the view, defended by Blom, that the set of RIs in Dutch form a (semantically) heterogeneous set.

2.4 Control infinitives

On the basis of this view on root infinitives, a semantic analysis of embedded non-finite clauses suggests itself as well. Some verbs take only gerundive complements, other verbs take only infinitives and yet other verbs take both types of complement.

- (58) I imagined (John) hosting a talk show.
 (59) The priest wants (Mary) to stay at home.
 (60) a. I remember (Mary) sitting on a bench in the park.
 b. Joe remembered (*Sally) to bring the wine to the party.

According to Government-and-Binding theory (cf. Chomsky, 1981), in all of these cases the subject is syntactically present in the embedded nonfinite clause, regardless of whether or not it is overtly realized. In case no overt subject is present, it is an empty category pronoun PRO that occupies the subject position.

- (61) a. John_i expects [PRO_i to graduate].
 b. Jenny_i remembered [PRO_i bringing the wine].

The empty infinitive subject is also present in case of object control.

- (62) Sally persuaded her son_i [PRO_i to buy the camera].

If this were correct, then apparently the effect of an overt subject would be entirely a matter of syntax, not semantics. Stowell (1982) proposes an explanation of the semantic differences between overt and covert subjects in terms of GB theory.

According to Stowell, infinitives, unlike gerunds, have a complementizer position. This complementizer position is either occupied by 'for' or by an empty category. Tense operators may appear in the complementizer position and in infinitives this operator is that of unrealized tense, i.e., future orientation. This accounts for the fact that infinitives present the action as something that has not yet been performed at the time of reference of the main clause. In contrast, gerundive complements receive a temporal interpretation depending on the semantics of the embedding verb. In (61-b), for instance, bringing the wine is previous to the remembering because this is what it means to remember. In some cases the complementizer position cannot be present in the infinitive, for reasons of case assignment. This is so when the infinitive has a lexical, rather than empty, subject. The theory of government requires that in those situations the complementizer position cannot be present because it would intervene in the case assignment by the main clause verb. In these situations the unrealized tense is lost and the temporal interpretation of the infinitive depends on the meaning of the main clause verb, as in the case of gerunds.

- (63) a. I remember John to be the smartest.
 b. Jane showed the solution to be trivial.
 c. I expect John to win the race.

Note that these are not instances of object control, but involve an infinitive with lexical subject. In (63-a) the time of being the smartest is past of the remembering, due to the semantics of the verb ‘remember’. In (63-b) the tense of the infinitive is present, in (63-c) it is future, in both cases for similar semantic reasons. Stowell also correctly predicts that with a lexical complementizer ‘for’ the unrealized tense is *always* expressed.

(64) I wished for the train to depart as scheduled.

Effectively, Stowell connects the unrealized tense to subjectless and ‘for’ infinitives. In view of the distinction between actions and events as proposed in the previous chapter, there appears to be no real motivation for the assumption that every clause must have a subject. If we view an action ‘through the eyes’ rather than with the eyes, the agent is not semantically represented and so there is no principled reason why it would have to be grammatically present. In terms of this distinction, then, the infinitives without an (overt) subject would be unambiguously interpreted as representing actions, explaining the future orientation as an effect of this semantic analysis. With an overt subject the infinitive could be understood to denote an event, i.e., something that is part of a (possible) world, resulting in a disappearance of the future orientation. This would not only give an explanation of the observations above, but it would also give us a way of understanding Lakoff’s (1972) contrast, repeated here.

(65) a. I enjoyed playing the piano.
b. I enjoyed my playing the piano.

Without a subject, the gerund is interpreted as the action *performed* by the speaker. When a subject is present the interpretation is that of, e.g., listening to a recording of one’s own playing. This contrast is difficult to account for with Stowell’s theory, since gerunds are supposed not to have a complementizer position and so there is no obvious explanation of the semantic shift that the presence of the subject enforces.

As for the ‘for’ complementizer, it seems that this phrase introduces the ‘subject’ of the infinitive as a perspective under which we are to view the infinitive as representing a capability. That is to say, it is a capability *for that subject*. The ‘for X’ phrase thus marks a perspective shift from a default or contextually understood point of view (typically the subject of the embedding clause) to some other point of view.

(66) a. It is difficult to memorize the names of all the other children in kindergarten.
b. It is difficult for Junior to memorize the names of all the other children in kindergarten.

In (66-a) what is difficult is the act of memorizing the names and for whom it is difficult depends on the context: it may be for the speaker, or for the hearer, or perhaps it is generally so. What is said to be difficult in (66-b) is not the event of Junior memorizing all those names, from the same point of view as in (66-a), but rather it

is the same act of memorizing, now conceived as something that Junior would have to do. This suggests that, at least for semantics, the ‘for X’ phrases can be treated as *operators* over an infinitive denoting an action. This operator shifts the perspective under which the infinitive is evaluated. In this sense the ‘for X’ phrase is actually closer to an intensional operator as in modal or tense logic (e.g., Blackburn, de Rijke, and Venema, 2001). So, using these ideas, we can explain the future orientation phenomenon without the need for postulating an unexpressed subject or an unexpressed tense marker in infinitives. This does not exclude that there are other, syntactic reasons for assuming the existence of such covert material in the clause, but semantics does not provide such a reason.

Like in the case of root infinitives, there need not be a common semantics of infinitives. Seemingly, the observations follow if we assume that a subject is obligatory when the event perspective is adopted. As far as the above discussion goes, nonfinite clauses do not have to share a common semantic element, in order for the distribution of finite and nonfinite clauses to receive an explanation. There may be all sorts of reasons—semantic, syntactic, or historical—for why some embedded clause in some sentence is nonfinite.

2.5 Concluding remarks

In one respect Bolinger, Huntley and others were right: it is a mistake to think that there is such a thing as ‘that which nonfiniteness contributes to the meaning of the sentence’. Rather, the aim should be to explain what finiteness contributes. Nevertheless, the mistake they make is, that the nonfinite clause is then assumed to have a uniform semantics of a finite clause minus that which finiteness contributes. This ‘nonfinite proposition’, or ‘hypothetical’, cannot be given a proper semantics, since it lacks a uniform conversational function.

If we assume that describing a situation (declarative mood) requires the event perspective, where the performer of the action is present in the representation, and we assume that this, in turn, requires that the sentence has to have a subject that denotes an element of the described situation, then we can conclude that declarative sentences will in principle be finite. The second requirement can be overridden in some narrative contexts, as has been seen in §2.3. When the action perspective is adopted, for whatever reason, then there is *prima facie* no semantic reason for an overt subject. If there is one, it usually marks a perspective shift, like the ‘for X’ phrases in infinitives. In chapters three and five I will apply this analysis of the infinitive subject to imperative subjects as well.

Bolinger’s dictum of ‘one form, one meaning’ presupposes, unjustly, that semantics adheres to grammar alone. There is some commonality between the various uses of the bare form in English, but this commonality is not a basic sentence type. It is not a hypothetical proposition that is ‘dressed up’, so to speak, by the “intersections with other systems” such as intonation and various features of the utterance

context. What it is, is not more than a *trait* shared by those meanings, i.e., the internal perspective with which the speaker presents his or her message. For some of the constructions included amongst the hypotheticals it may even be doubted whether they even have this trait, or are simply nonfinite for completely independent reasons. The straightforward conclusion is therefore that English (surface) grammar does not as such provide enough information to attach a semantic interpretation to all of its clauses. To identify some utterance as being an ‘imperative’ sentence it is required that we know more about it than its surface grammar. So, in answer to the question we started out with, whatever is meant by ‘the imperative sentence type’, it is not a purely syntactic notion.

Lastly, then, all of this discussion on infinitives does not imply that the imperative has to be a nonfinite clause in Huntley’s sense. That is, it has not yet been established that imperatives are, for any semantic or pragmatic reason, tenseless and moodless clauses. Some authors have claimed that this is the case, not just for English but generally so. Something in the syntax or semantics of imperatives would prevent them from expressing tense or mood information (Han, 1998; Platzack and Rosengren, 1998). This issue will be the topic of the next chapter.

Perspective shifts in imperatives

According to Sadock and Zwicky (1985, page 155) a sentence type is a “coincidence of grammatical structure and conventional conversational use”. On this definition, it appears, the members of a sentence type must share a common function. The authors make it clear what they mean by this: a common *prima facie* illocutionary force. The notion of illocutionary force is adopted from (Austin, 1962; Searle, 1969). It refers to the act the utterer of the sentence performs in uttering the sentence: what it means to utter the sentence given the conventions underlying our conversational practices. A clear and common example from English is the fact that a verb-subject ordering in combination with a rising intonation at the end of the sentence invariably expresses yes-no questions.

- (1) a. Are you leaving?
- b. Did you paint the boat house already?

Naturally such sentences can be used to convey other messages than requesting factual information. For example, (1-b) can be used as a reminder of an earlier promise, especially when it is common knowledge that the addressee did not paint the boat house yet. The relevant point is, though, that these sentences are by their very form constrained to a particular range of uses, and if we are to explain their less common functions we have to employ reasoning that starts from the assumption that they have some ‘basic’ conversational function. So the interpretation of (1-b) as a reminder requires that we first assign it a meaning as a request for factual information. Another example of a conversational function that is expressed by a specific construction in English is the ‘expressive’ speech act function. Such speech acts can be performed by means of a sentence starting with ‘how’ and followed by an adverb, with subject-verb ordering, or by means of a sentence starting with ‘what’ and an indefinite and the same subject-verb ordering.

- (2) a. How nice he is!

- b. What a nice guy he is!

These sentences can only be used as ‘expressives’ in the terminology of Searle (1979).

If the conversational function is supposed to be an illocutionary force that operates on a semantic content, as it is under Searle’s analysis, then it is unclear how semantic properties of the sentence could influence its conversational function. For example, an interrogative or declarative sentence containing a past tense verb would simply be a question or assertion, respectively, about something in the past. This is correct in most cases, but not always.

- (3) a. Lever jij de opgaven volgende week in?
Hand you the exercises next week in
‘Will you hand in the exercises next week?’
b. Leverde jij de opgaven volgende week in?
Handed you the exercises next week in
‘Were you handing in the exercises next week?’

In this case the tense is not something that modifies the content of the utterance, but it modifies the speech act. In (2-a) the question concerns the alternatives that are available at the speech time (when the hearer could hand in the exercises), so that the sentence can be used to make a suggestion for choosing one of those alternatives. In contrast, (2-b) does not have to do with the alternatives now that some past handing in is chosen, but it concerns the alternative that was selected in the past. So both are interrogatives that ask for confirmation or agreement, the former has a function of proposing something and the latter has a function of asking for a reminder. It is clear from (2-b) that the sentence does not modify the propositional content: the handing in of the exercises is not something that is itself a past event, as can be seen from the temporal qualification ‘next week’.

With the next example, assume the following context. Patrick is leaving the house. He has just closed the door behind him. Mary saw John talk to Patrick just before he left. She asks John where Patrick is going. Now John responds with (4).

- (4) Patrick ging nog even boodschappen doen. Hij zal zo terug
Patrick went PART PART grocery.shopping do-INF He will shortly back
zijn.
be-INF
‘Patrick is just going to do some grocery shopping. He will be back shortly.’

Here, again, the tense does not function as a temporal location of the event of grocery shopping. It is used to signal the fact that the information being provided with the utterance has been acquired earlier. That is to say, the past tense indicates that the utterance is a reportative statement.

So in both examples the tense modifies the speech act, rather than modifying the content. It is not clear how this is possible, supposing that tense were a purely se-

semantic operator and ‘sentence type’ a purely pragmatic one. Apart from tense, other reasons have been presented for why we are to understand the notion of interrogative sentence as a semantic, rather than as a pragmatic, category. The most important of those reasons is the fact that embedded ‘wh-’ clauses have a semantic content that is essentially the same as what such clauses contribute in root contexts (Groenendijk and Stokhof, 1984). This warrants the claim that ‘wh’ clauses in embedded contexts contribute a semantic content of interrogatives (i.e., answerhood conditions), even though they obviously do not contribute the illocutionary force of a question in such contexts. Similarly, the use of declarative meanings embedded under the complementizer ‘that’ presents a motivation for the development of a semantics of declaratives (i.e., truth conditional semantics) that does not identify the meaning of such sentences with their use in root contexts (i.e., assertion). In this light, the most prominent question we have to ask is: do we have any reason to distinguish between the meaning of imperatives and their conventional conversational use as directive speech acts?

Some people have given a negative answer to this question. As Han (1999a) points out, referring to Frege (1884), force cannot be embedded under semantic operators. So if the imperative is a signaller of directive illocutionary force, then the imperative cannot be embedded. This, Han claims, is indeed the case.

- (5) a. *Hans empfiehlt, daß Du nicht zu aufdringlich sei. (German)
 Hans suggests that you not too pushy be-2sg.IMP
 ‘Hans suggests that you not be too pushy.’
- b. *Pido que habla-le. (Spanish)
 ask that talk-2sg.IMP-her/him
 ‘I ask that you talk to her/him.’
- c. *O Yannis se dietakse grapse. (Modern Greek)
 the Yannis you ordered-2sg write-2sg.IMP
 ‘Yannis ordered you to write.’

Imperative sentences do have an irrealis feature that they share with (certain types of) infinitival and subjunctive clauses, but what distinguishes imperatives from those clauses, according to Han, is a directive illocutionary force feature that is syntactically encoded. This means that it is grammatically excluded that, e.g., tense would affect the conversational function of the sentence in the way described above. Apart from Han, many other syntacticians in the generative tradition (e.g., Platzack and Rosen-gren, 1998, Bennis, 2001) have adopted an analysis of the imperative in which an imperative feature is hosted by the complementizer/force phrase.¹

Portner (2003) has objected to this idea of a syntactic expression of force. On his view, semantics mediates between form and function. The sentence has a meaning that belongs to a certain semantic type and it is this type that determines what role

¹Rizzi, 1995 proposes that the complementizer position in the clause is a functional projection of the sentence’s conversational force.

the sentence will play in discourse. A declarative sentence denotes a proposition, an interrogative denotes a set of propositions (the set of possible answers) and an imperative denotes a property. Because of this, declaratives will expand the ‘common ground’ of shared and public information, interrogatives expand the ‘question set’ of discourse topics, and imperatives expand the ‘to do list’ that assigns to each person a set of required properties. In each case it is due to the fact that the sentence has the appropriate semantic type that it operates on the relevant discourse parameter. Portner also explains why a mediating semantics is needed. He discusses Korean, in which imperatives can be embedded. In those contexts the subject of the imperative is interpreted, not as the addressee of the utterance, but as the addressee of the reported imperative speech act (Pak, 2004). So, the main clause can create a context of reference, distinct from the context of utterance, such that the imperative is interpreted relative to that context of reference. As was already mentioned, if the imperative would encode an illocutionary force, it could not be detached from the context of utterance in this manner.

I do not see how the semantic type of a property could determine the discourse function of imperatives. It seems to me that we do need the action/event contrast that I have propounded in the previous two chapters, in combination with an update semantics in which the imperative denotes the *operation* of adding the action to a to do list. More on these issues in the next two chapters. But apart from these objections, I agree that a mediating semantic denotation is needed to give a uniform semantics of the imperative. Specifically, I will argue that Dutch has a past tense imperative in which the tense interacts with the sentence type in a way closely similar to the examples mentioned above. Furthermore, Dutch has a ‘hortative’ construction that is best understood as an embedding of the imperative meaning under a context shifting function. In order to account for these facts about Dutch, we will need to understand the imperative as a *semantic* category, rather than as a direct expression of directive illocutionary force.

Below I will first discuss some of the issues in syntactic theory that have led some authors to postulate the illocutionary force feature. I will explain that there is no consensus in the field concerning this qualification of the imperative sentence type as a characterization of directive force. Alternative accounts that treat the imperative verb as expressing mood, rather than force, have been proposed as well. So for the moment there is as yet no real reason to assume that we have to adopt the pragmatic definition of imperatives. After having made this point, I will discuss the Dutch data, contrasting it with English.

3.1 The imperative as a nonfinite clause type

The idea that imperative sentences are nonfinite clauses has recently found protagonists in Platzack and Rosengren (1998). Like Huntley (1984), they propose that finiteness contributes deixis to the semantics of the clause. Unlike Huntley, they

develop this idea in the framework of minimalist syntax. Based on the work of Rizzi (1995), the left periphery is analyzed as a 'split C-domain' containing a 'lower C' associated with the expression of finiteness of a clause, and a 'higher C', also dubbed the Force Phrase, where complementizers and sentence type indicators are located. This Force Phrase position attracts complementizers 'that' and 'wh' elements by hosting sentence type features [-wh] and [+wh] respectively. Similarly, the verb in V1 root clauses is assumed to be located in this position as well, attracted by comparable features, such as [imp] for imperatives.

Platzack and Rosengren (1998) claim that at least all Germanic imperatives are nonfinite. Specifically, imperatives are assumed not to realize a tense or mood projection, which in turn would make it impossible for them to contain a lower C, i.e., a finiteness phrase.² This finiteness phrase is normally occupied by the finite sentential subject. So if imperatives lack this position, a determiner phrase cannot be raised to this position to play the role of the subject. Platzack and Rosengren use this conclusion to explain some of the syntactic and semantic properties of the imperative subject, such as its optionality and the fact that it cannot be used to talk *about* a person, but only to talk *to* someone. Regarding this latter point, Platzack and Rosengren adopt a theory of the semantics of non-finiteness quite similar to that of Huntley (1984). Finiteness means locating the event presented by the verb phrase relative to the utterance situation. When a sentence does not have this property it cannot be grounded temporally or intensionally: "the addressee does not have to do any calculation regarding the actual situation to understand what the speaker intends to express" (page 199). Reference to objects, i.e. to talk about something, is only possible in finite sentences, where³

the subject is given a value with respect to the actual world, the time line, and the here and now of the speaker. In the imperative clause, on the other hand, where Mood, Tense, and Finiteness are lacking, there is no similar anchoring of ImpNP: the speaker is just addressing the addressee, in order to associate him or her with the most prominent argument of the verb, thereby setting a norm related to the addressee with respect to the existence of the event referred to by the proposition. (Platzack and Rosengren, 1998, page 200)

Apart from this semantic theory, the alleged nonfiniteness of imperatives has been utilized in explanations of some other grammatical properties of these sentences cross-linguistically. The most frequently discussed issue is the possibility of using negation in imperatives (and, if so, its grammatical position). I will only present a brief sketch of this issue.

In Italian and Spanish imperatives cannot be negated. One has to use 'suppletive

²Fin^o is assumed to attract a feature [finite], hosted in the tense and mood projections. If the verb does not realize a tense or mood projection, there could also not be a finiteness phrase, because the mentioned feature could not be checked.

³ImpNP is the imperative subject.

imperative' forms to express prohibition.⁴

- (6) a. *_iNo lee lo! (Spanish, imperative)
 Not read-2sg.IMP it
 'Don't read it!'
 b. _iNo lo leas! (subjunctive)
 Not it read-2sg-SUBJ
 'Don't read it!'
- (7) a. *Non telefonale! (Italian, imperative)
 Not call.IMP-her
 'Don't call her!'
 b. Non telefonarle! (infinitive)
 Not call-INF-her
 'Don't call her!'

Zanuttini (1997) explains this impossibility in terms of the nonfiniteness of imperatives.⁵ Romance languages mostly have preverbal negative markers. Zanuttini hypothesizes that those markers take a mood phrase as their complement. Imperatives, lacking finiteness, are not marked for mood, so the negative marker cannot be used either. In effect, the preverbal Italian negation is only applicable to finite clauses.⁶

Suppletive imperatives—root infinitives and subjunctives—also host the imperative feature. It is checked by the infinitive verb in the positive cases and by the negation in negative cases. As a consequence, the negative suppletive imperatives must have a mood phrase. Zanuttini's hypothesis is, with Kayne (1992), that infinitival negative commands in Italian contain a covert modal auxiliary. Supporting this idea is the fact that some dialects have an overt modal that occurs only in negative suppletive imperatives.⁷

- (8) a. No stá parlare! (Paduan)
 b. *Stá parlare!

Several authors have objected to this analysis. Most of those critics assume that the imperative verb itself has to move to a mood position.⁸ This movement would then

⁴These examples all come from Zanuttini (1997).

⁵This is a working out of her 1991 PhD thesis.

⁶In terms of Huntley's categorial grammar approach the Italian negation would be of type t''/t'' , while imperatives are of type t .

⁷van der Wouden (1998) presents a problem for extending this analysis to Dutch, on the basis of the distribution of the particle 'maar' in suppletive negative imperatives in non-standard Dutch with the auxiliary 'doe'.

⁸This classification of the imperative verb as expressing mood is supported as well by morphological studies of Spanish (Harris, 1998) and German (Fries, 2000). The Spanish imperative can be seen as a morphological variant of the subjunctive, rather than as a separate verb form. The German imperative shows unique conjugations, some with 'Hebung' (vowel raising) which suggests that it carries a mood feature.

explain the impossibility of negation in imperatives in some languages. Rivero and Terzi (1995) point out that there are some Balkan languages with preverbal negation in negative imperatives, such as Serbo-Croatian and Ancient Greek. They suggest that the imperative verb has to move in order to check a 'logical mood' feature. In some languages this mood feature is hosted above the negation phrase, in which case the negation blocks the movement, causing the syntactic derivation to 'crash'. In other languages the imperative mood is hosted below the negation phrase, so there is no problem for the construction of negative imperatives.

Objections have been raised by several authors against the idea of a cross-linguistic difference in the position where imperative mood is checked (Tomić, 1999; Isac and Jakab, 2004). Both Tomić and Isac and Jakab claim that a uniform analysis of the imperative is possible. They assume that imperative mood is always checked in a mood projection that is located below the complementizer position, just above (Isac and Jakab) or below (Tomić) the negative head.⁹ The differences between languages that do and those that do not allow for negation in imperatives is explained as a difference in the characteristics of *negation* in those languages.¹⁰ In particular, Isac and Jakab propose that negation can check the imperative mood feature itself. Isac (2002) applies this idea to explain why in many languages suppletive imperatives are more common than nonnegative ones. This can be confirmed for Dutch and English as well.¹¹

- (9) a. *Zo zeuren!
b. Niet zo zeuren!

- (10) a. ?Smoking.
b. No smoking.

-
- (i) a. Gib mir die Bücher!
b. (?)Sieh mal einer an!
c. Steh (du) auf!
d. (Du) trag das weg!

Fries also points to the fact that the German imperative verb differs from complementizers with respect to 'left dislocation'. The imperative verb can be preceded by a topic phrase, but complementizers cannot.

- (ii) a. Die Bücher lass liegen.
b. *Ich empfehl dir, die Bücher dass du liegen lässt

⁹Isac and Jakab still call the feature checked at the mood position an imperative force feature, but there appears to be no reason following from their analysis for why the feature in question would need to be a marker of illocutionary force.

¹⁰See also Zeijlstra (2004), who makes the generalization that negation is allowed in imperatives precisely when the negation is base generated in the functional head for negation. This negation position lies between the verb phrase and the mood phrase. When the negation is base generated in this position it blocks movement of the verb to the mood projection, thus making the negative imperatives ungrammatical.

¹¹Palmer (2001) claims that (10-a) is possible in English, though only in very constrained contexts.

Of course this discussion of the literature on the syntax of imperatives does not license any definite conclusion. At best it can be claimed that there is good reason to think of the imperative as expressing mood, not force. However, I will not discuss the issue further. In the following I will only attempt to show that there are semantic reasons to oppose a qualification of imperatives as nonfinite complementizer phrases.

3.2 Do imperatives have tense?

If imperatives are nonfinite, they cannot have a past tense. This means that the sentence cannot grammatically express what the relationship between utterance time and intended reference time is. A test case would therefore have to be an imperative that is to be interpreted with a past tense reference time so that we can see if it has been grammatically marked for this. However, a *prima facie* reasonable assumption would be that imperatives cannot have a past tense interpretation due to their directive interpretation. That would make the issue a purely theoretical one.

As it turns out though, we do find a construction in Dutch that exhibits all the characteristics of imperatives with a past tense form of the verb. It has been claimed that these sentences should not be analyzed as imperatives, but I will argue that they are imperatives. However, I will start with a discussion of English.

English present perfects

English imperatives are never used with a past tense interpretation, neither with a past form nor with a present form.

- (11) a. *Went home yesterday.
b. *Go home yesterday.

Some authors have suggested counterexamples:

- (12) a. Don't have had an accident.
b. Let him have survived.

Firstly, these constructions are perhaps not really imperative. They are really optatives, expressing a wish of the speaker that a certain event did or did not happen. It can be doubted whether it would make sense to treat them as 'directives in a shifted context'. In contrast to imperatives, the person denoted by the subject cannot be the addressee in the utterance context, and they share the future orientation of imperatives only in an epistemic sense: the speaker hopes that it *will turn out to be the case* later that the person about whom he is thinking did not have an accident before the speech time. But more important for the present discussion, these sentences are not really *past* tense. The eventuality concerned is a state of having had an accident and of having survived, respectively. This state, if it has been realized, continues into the present (and future). This is not a semantic past and so we would not expect a morphological

past anyway.

Dutch pluperfect imperatives

The conclusion that past tense reference is excluded by the directive interpretation is not entirely correct, though. In Dutch and Frisian we do find past tense imperatives, with past tense morphology.¹² I will restrict myself to the Dutch examples here.

A simple past tense command is not possible in Dutch, for the same pragmatic reasons it is not possible in English either.

- (13) a. *Ging onmiddellijk naar huis.
Went immediately to house
'Went home immediately.'
b. *Liep zoëven rond het huis.
Walked PART around the house
'Walked around the house just now.'

But in the ANS¹³ a construction is included that is called the 'imperatief van het plusquamperfectum'. Here are some examples:

- (14) a. Was toch naar huis gegaan toen Jan het foto-album
Was PART to home go-PP when Jan the photo-album
opende.
open-past-sg
'You should have gone home when Jan opened the photo-album.'
b. Had je telefoonnummer dan ook niet aan die vent gegeven.
Had your phone-number PART PART not to that guy give-PP
'You shouldn't have given your phone number to that guy.'
c. Had die appel dan ook opgegeten.
Had that apple PART PART up-eat-PP
'You should have eaten that apple.'

They can be considered to be imperatives because they share the same form (verb first, implicit second person subject) and have a closely related use. This is illustrated in the electronic ANS by means of the following examples:

- (15) a. Houd je mond!
Shut your mouth!
'Shut your mouth!'

¹²The first to have noticed this are, to my knowledge, Beukema and Coopmans (1989). A similar observation is made with respect to Syrian Arabic, reported in Palmer (2001). Also, Bosque (1980) reports what he calls a 'retrospective imperative' in Spanish, though it is an infinitive and not an imperative clause form. For Frisian, see Wolf (2003).

¹³Algemene Nederlandse Spraakkunst (1997), 'Standard Dutch', available online at <http://www.kun.nl/e-ans/>. I will use several examples from this electronic version in the remainder of this section.

- b. Je moet je mond houden.
You must your mouth shut-INF
'You must shut your mouth.'
- (16) a. Had je mond maar gehouden!
Had your mouth PART hold-PP
'You should have kept your mouth shut!'
- b. Je had je mond moeten houden.
You had your mouth must-INF hold-INF
'You should have kept your mouth shut.'

The simple present imperative in (15-a) can be paraphrased as in (b) with the modal verb 'moeten' (*must*). The same holds for the pluperfect examples in (16). The interpretation is one of reproach: the addressee did not perform the action in the past, though he should have done so.

Are these sentences really imperatives? Bennis (2001) suggests that the sentences in (14) are optatives rather than imperatives:

These clauses have most of the properties of imperfect imperatives, such as V1 and the non-lexical second person subject. In this case the past auxiliary seems to implicate irrealis instead of past (the participle indicates perfect aspect). [...] I will hold on to the view that Tense is not present in imperatives. (Bennis, 2001, note x)

Wolf (2003) similarly argues that they are not really imperative. The reason he gives is that these past participle sentences do not have present tense equivalents, because there the irrealis reading is excluded.

- (17) *Heb dat dan toch ook eerder gedaan!
Have that PART PART PART earlier do-PP
'Have done that earlier!'

However, he argues that there are also some real past tense imperatives in Dutch. Those constructions will be discussed later on.

I think that this reasoning is mistaken. Bennis' classification of these sentences as optatives is problematic: why would an irrealis marker in an imperative sentence transform it into an optative? Moreover, the fact that these sentences presuppose that the action was in fact not carried out (what might be called irrealis) does not exclude the fact that they are concerned with actions in the past, nor that they have what might be called a directive communicative function. The speaker means to commit the hearer to the action that he or she did not perform. This is not exactly the same as imposing an obligation on the part of the hearer to perform some action. Rather, they are used incite the hearer to admit that the actual course of action was wrong and to face the consequences of that faulty choice. Lastly, the fact that they cannot be used with present tense is not a sign of non-imperativeness but can be explained on

independent semantic grounds: the present auxiliary plus past participle construction indicates perfect aspect (whereas with a past auxiliary it indicates *perfective* aspect) and the irrealis interpretation is obtained with the help of presuppositional particles that do not make sense in realis, present tense sentences. This point will be explained first.

The contribution of modal particles One important element in the sentences under discussion is the occurrence of modal particles like ‘maar’, ‘toch’, ‘dan ook’ and so on. They are not compulsory, but they do affect the interpretation in a non-trivial way. The particles ‘toch’ and ‘ook’, possibly in combination, are indicative of a presupposition. As such, they contrast with a particle like ‘maar’, that is used to downplay the material, in a meaning somewhat like ‘just’, ‘simply’ or ‘only’. The pluperfects with this latter particle have a somewhat optative interpretation:

- (18) a. Was maar thuisgebleven.
Was PART at-home-stay-PP
‘If only you had stayed at home.’
- b. Had Jan die opgaven maar op tijd ingeleverd.
Had Jan those exercises PART on time in-hand-PP
‘If only Jan had handed in those exercises on time.’

The optative reading is clear from the gloss. It is compatible with an added comment like ‘But how could he have known in advance?’, and it is also possible with a third person subject as in (b).

The other particles yield a quite different reading.¹⁴

- (19) a. Was toch thuisgebleven.
Was PART at-home-stay-PP
‘You should have stayed at home.’
- b. *Was Jan toch thuisgebleven.
Was Jan PART at-home-stay-PP
‘Jan should have stayed at home.’

The particle seems to suggest that the addressee could have known, at the time of action, that the action was a bad choice and would lead to the unfortunate circumstances. With this particle, the sentence is not compatible with the added information that the addressee could not have known in advance that his or her course of action was the less preferred one.

¹⁴There is a remote possibility of using (19-b) with contrastive stress on ‘Jan’. The meaning is one in which someone else stayed at home instead of Jan and the speaker is talking to someone who played a role in the decision who was to stay. By default the main sentence stress would be placed on the first syllable of the participle. In that case the overt subject is definitely not possible.

- (20) Was toch lekker thuis gebleven. ?Dit blijkt niet een leuk
 Was PART nicely at-home stay-PP This appears not a nice
 feestje te zijn.
 party-DIM to be-INF
 ‘You should have just stayed at home. This appears not to be a nice party.’

The contrast is even clearer with ‘dan ook’, which indicates that the unfortunate circumstances are the hearer’s own fault.

- (21) Had hem dan ook niet een blaaskaak genoemd. ?Blijkbaar vinden
 Had him PART PART not a gas-bag call-PP Apparently find-INF
 sommige mensen dat niet leuk.
 some persons that not nice
 ‘You should not have called him a gas-bag. Apparently some people do not like that.’

The combination of ‘dan ook’ with something like ‘apparently’ is incoherent.

As can be seen in (19-b), the construction with ‘toch’ is also not compatible with a third person subject, indicating that it is really a *performative* interpretation of ‘you should have’ that is meant here. The restriction to second person remains, even though the reference to a different time or world is grammatically expressed.¹⁵ In combination with the presuppositional meaning of ‘toch’, we can really interpret these clauses as presenting an advice at the time of making the choice, rather than at the speech time. For more on the semantics of particles, including ‘toch’, see Zeevat (2003).¹⁶

This contribution of particles also partly explains why the present perfect example (17) of Wolf is not found. The presupposition that some action would have the right or the wrong outcome does not fit with present tense imperatives: the future is normally not predictable like that.

The meaning of the Dutch past participle The second point concerns the contribution of the past participle in Dutch. Bennis claims that the participle indicates perfect aspect and the past auxiliary provides the irrealis. We may agree to the latter point, but the past participle in Dutch is in these sentences arguably also a real past tense

¹⁵If we may eventually conclude that the pluperfect form is the grammatical expression of tense or mood, or both, this fact directly contradicts the theory of Platzack and Rosengren who argue that the absence of a subject is due to the lack of finiteness, which in turn is missing because the verb does not have tense or mood. What that would mean for the syntactic analysis of imperatives and nonfiniteness is beyond the scope of the present study.

¹⁶The particles can also be combined, as in (i).

- (i) Was toch maar gewoon college blijven geven.

This sentence has the imperative reading. It is not clear to me whether this combination is also possible with an optative reading and third person subject.

operator.

The ‘hebben’ + V-PP construction in Dutch is not restricted to a resultative aspect like in English.¹⁷ The Dutch simple present and past are normally classified as imperfective. For reporting what is presently happening in English one has to use the progressive whereas in Dutch the simple form is used.

- (22) Ik loop nu in het park.
I walk now in the park
‘I am walking in the park now.’

In contrast to this, the past participle form is commonly used as a perfective. That is to say, with a present reference time they behave like resultative present tense (just like in English), but with a past reference time they are closer to a past perfective interpretation. As the ANS indicates, the participle is used as a past tense (a) when the sentence reports one incident, rather than some reoccurring or enduring activity, (b) when the sentence merely asserts that once this event happened, not presenting a specific reference time, (c) when the result of the event continues to the present. This last use is identical to the resultative perfect, with its ‘present relevance’.

- (23) a. Opa heeft vorig jaar nog gefietst.
Grandfather has last year PART bicycle-PP
‘Grandfather rode a bicycle only last year.’
b. Zij heeft de mazelen gehad.
She has the measles have-PP
‘She had the measles (already).’
c. Het heeft vannacht geregend. De straten zijn nat.
It has last.night rain-PP The streets are wet
‘It has been raining last night. The streets are wet.’

The imperfective interpretation of a simple past makes it less preferred in certain contexts:

- (24) a. ?Nadat ik was opgestaan, kleepte ik mij aan.
After I was up-get-PP dressed I me on
‘After I had gotten up, I was dressing myself.’
b. Nadat ik was opgestaan, heb ik mij aangekleed.
After I was up-get-PP have I me on-dress-PP
‘After I had gotten up, I dressed myself.’

The first of these is odd when the second clause is given a progressive interpretation because that suggests a ‘gap’ between the two described events: after the completion of the getting up event all of a sudden one is in the middle of the dressing event. The past participle in (24-b) is perfective, and therefore the event of dressing is seen as a

¹⁷In fact the English present perfect also has a remote possibility as an ‘existential perfect’—for example in the ‘sports commentator’ descriptions of a game—but not to the same extent as Dutch.

single whole, comprising its initiation and completion as well. This clearly separates the two events, enabling us to represent a choice moment before the beginning of the second event. An argument supporting this view is the fact that an inchoative construction ‘zijn’ (‘be’) + ‘gaan’ (‘go’-INF) + infinitive can be used in those cases as well, even though it does not entail completion of the event.

- (25) Nadat ik was opgestaan, ben ik mij gaan aankleden.
 After I was up-get-PP am I me go-INF on-dress-INF
 After I had gotten up, I started to dress myself.

It seems to me that this is exactly what the past participle contributes in the ‘pluperfect imperatives’ as well. An imperfective form is not very natural as a past imperative in these cases. Imperatives imply voluntary action and so they put focus on the initiation of the event. It is not completion that the pluperfect imperatives require, as can be seen from the inchoative in (26).

- (26) Was dan ook gaan zitten toen hij dat vroeg.
 Was PART PART go-INF sit-INF when he that ask-sg-past
 ‘You should have sat down when he asked you to.’

On the other hand, as Wolf mentioned, we do not find present perfect imperatives in a present tense context. But this is simply due to the fact that in a present tense context the past participle only gets a resultative interpretation. Obviously a result state can not be enforced by the addressee if it is to occur at the moment of speech. Past participle imperatives are possible, but only without presuppositional particles and with an explicit future reference time (deadline).

- (27) Heb je kamer (*toch) opgeruimd voordat de visite komt.
 Have your room (PART) up.clear-PP before the guests arrive
 ‘Have your room cleared up before the guests arrive.’

In short, aspect provides a perfectly good reason for why past participles may be used in the past imperatives but not similarly in a present tense context. It may be that the past participle in the pluperfect imperatives indicates a perfective aspect, but part of the semantics of perfectivity *is*—at least here—a past reference time.

Present and future tense and irrealis The past is used for irrealis in many constructions in Dutch where in English a modal auxiliary is required (examples in (28) and (29) are taken from the ANS).

- (28) a. Als ik de loterij won, gaf ik een groot feest.
 If I the lottery won, gave I a big party
 ‘If I won the lottery, I would host a big party.’
 b. Gingen ze maar vast aan het werk.
 Went they PART PART on the work

'If only they would start working.'

One may argue that these are all semantically present tense. In (28-a) the speaker is saying that, if he would have won the lottery now, he would host a party now. And in (28-b) the speaker expresses a wish that 'they' would start working now.¹⁸

The pluperfect is used when the desired or imagined state or action would have occurred in the past, but did not.

- (29) a. Als ze me toen aangeboden hadden om hier te komen
 If they me then offer-PP had-pl in.order here to come-INF
 werken, had ik meteen ja gezegd.
 work-INF, had I immediately yes say-PP
 'If they had offered me then to come and work here, I would have said
 yes immediately.'
- b. Ik was toen geen penningmeester, maar ik had ze geen cent meer
 I was then no treasurer, but I had them no cent more
 gegeven.
 give-PP
 'I wasn't the treasurer back then, but I wouldn't have given them a
 penny more.'

They present an event in the past that did not actually occur, and usually the speaker states what would have happened under those circumstances. It seems, then, that the irrealis resides in the tense, and the semantic present/past contrast is indicated by the past participle.

An important example, not mentioned by other authors, is the fact that the pluperfect is also used with future reference if this future event is certain already at the speech time. Not only the (a) sentence is used, but also (b).

- (30) a. Als Jan gisteren niet ziek was geworden, zou hij morgen op
 If Jan yesterday not ill was become-PP, would he tomorrow on
 vakantie zijn gegaan.
 holiday be-INF go-PP
 'If Jan hadn't become ill yesterday, he would have gone on holiday to-
 morrow.'
- b. Als Jan gisteren niet ziek was geworden, was hij morgen op
 If Jan yesterday not ill was become-PP, was he tomorrow on
 vakantie gegaan.
 holiday go-PP
 'If Jan hadn't become ill yesterday, he would have gone on holiday to-
 morrow.'

And we see the same thing when we look at the imperative pluperfect.

¹⁸In fact it is even possible to use these sentences with a future time of reference. See (31) below.

- (31) Waaron heb je die vakantie volgende week nou toch afgezegd?
 Why have you that holiday next week PART PART cancel-PP?
 Was er toch lekker even een weekje tussenuit gegaan!
 Was there PART PART PART a week-DIM between-out go-PP
 ‘Why did you cancel that holiday for next week? You should just have taken
 a week off!’

This may seem to be an argument against treating the pluperfect in these cases as past tense. But in fact it is exactly what we should expect: not the location of the event time itself is what the tense expresses, but the time of making the choice to perform the action or not. If the tense shifts the *advice* to a previous time, it does not matter whether the action is executed directly after this choice or not. The action itself may lie in the future, present or past, but a pluperfect is excluded when the choice is being made in the future. The same can be seen in the counterfactual conditionals.

- (32) *Als Jan vanavond niet ziek is, was hij morgen op vakantie gegaan.
 If Jan this.evening not ill is, was he tomorrow on holiday go-PP
 ‘If Jan isn’t ill this evening, he would have gone on holiday tomorrow.’

When the not going on holiday is assumed to be a decided fact of the world, one has to use a past-irrealis construction to create an imaginary, past context in which the decision has not been made and thus going on holiday is still an option.¹⁹

Simple past imperatives

Apart from the widely used pluperfect imperatives, Proeme (1991) and Wolf (2003) observe that Dutch speakers also use simple past imperatives in certain contexts. This is an example found via Google.²⁰

- (33) En zei dan maar niks, want dan kon je opstappen.
 And said then PART nothing because then could you up-step-INF
 ‘And then you had better say nothing, because otherwise you would get the sack.’

Here the speaker is telling about past times, when he was working for a boss, and he mentions that it used to happen that when they were all leaving, the boss would sometimes look at his watch and say it was still one minute to four thirty. And so, in those situations, you had better say nothing, because otherwise you would be fired.

¹⁹This is comparable to the use of the simple present tense to talk about the future.

- (i) I fly to London tomorrow.

These sentences are possible only if it is assumed that the flight is completely scheduled and certain to take place. So in these cases we use the present tense to assert what happens in the future and we have to use a past tense to issue directives for the future.

²⁰On <http://www.meekrap.nl/projecten/portretten/portretten.htm#goederee>.

The generic reading of the past tense—describing the way things would go in those days—appears to be an important part of their meaning. To direct someone towards an action in a *specific* past situation, without an irrealis indicating that the actual course of action is to be disregarded, may just be impossible. Note that here it is really the past morphology itself that indicates the past tense interpretation.

Apart from these generic narrative imperatives, Wolf and Proeme claim that simple past imperatives are also used by some speakers when talking about specific, non-generic, cases.

- (34) *Reed* dan ook niet zo *hard*. Je *wist* toch dat de politie aan het Drove PART PART not so fast. You knew PART that the police on the controleren was!
check-INF was
'You shouldn't have driven that fast. You knew the police was surveilling.'

They seem to be identical in meaning to the pluperfect imperatives: irrealis and with a feeling of reproach. The latter element, in combination with the presuppositional particles suggests that the addressee should have known the unfortunate consequences of his actions. It may be that these speakers give a perfective interpretation to the simple form or otherwise do not need to have a grammatical indication of initiation of an action that the past participle and inchoative 'gaan' would contribute.

Thirdly, Proeme and Wolf discuss the use of simple past imperatives where the tense does not seem to add anything to the temporal interpretation.

- (35) a. Ging/Ga maar liever eens een beetje bijtijds naar bed (- dan Went/Go PART PART PART a bit-DIM by-time to bed (- then zou je er meteen een stuk beter uitzien)!
would you PART immediately a lot better out-look-INF)
'You'd better go to bed a bit earlier (- you would look a lot better if you did)!'
b. Ik zie jou ook nooit anders dan in jeans en T-shirt.
I see you.acc PART never other than in jeans and T-shirt.
Trok/Trek liever eens een fatsoenlijk pak aan.
Put-past/Put-pres PART PART a decent suit on
'I never see you in anything other than jeans and T-shirt. You'd better put on a decent suit for once.'

Regardless of the tense, these sentences are used to encourage the hearer to change his habits. So in these cases the past tense is, according to them, merely a matter of politeness. This is also a common usage of the Dutch past tense, witness the following examples from the ANS.

- (36) a. Hoeveel dacht u te besteden?
How.much thought you-polite to spend-INF

- ‘How much were you planning to spend?’
- b. Hij zakt steeds weer, hij kon beter ophouden met die
 He fails every.time again, he could better stop-INF with those
 rijlessen.
 driving.lessons
 ‘He keeps failing time and again, he’d better stop with those driving
 lessons.’
- c. Het is al laat, we moesten maar eens opstappen.
 It is already late, we must-past-pl PART PART up-step-INF
 ‘It’s already late, we should be leaving.’

Finally, another construction worth mentioning is the present tense imperative with presuppositional particles as in (37).

- (37) a. Geef die nijptang dan toch ook aan.
 Give that pincers PART PART PART on
 ‘Hand me those pincers (why didn’t you)!’
- b. Kijk dan toch ook uit!
 Look PART PART PART out
 ‘Watch out (why didn’t you)!’

These imperatives can be uttered after the addressee has failed to comply with it. (37-a) means something like: ‘I told you to give it, so you should have. Now look what happens.’ Presumably the present tense is used here because to indicate that the speaker is reminding the hearer of a standing obligation. The hearer is told that in the future he or she should be more compliant. The presupposition particles are crucial to get this reading.

Future tense imperatives

In Germanic languages the forms commonly associated with future tense are arguably not pure tenses. They often contain inchoative or modal auxiliaries, giving the sentence not only a future reference time but also qualifying the event as expected to a higher or lesser degree. Imperative sentences in Dutch and English do not contain any modal auxiliaries, and consequently they do not have the forms that are normally called the future tense in these languages.

(38) *Will go home.

(39) *Zal naar huis gaan.
 Will to home go
 ‘Will go home.’

In both languages, the simple present tense may be used in declaratives as a future tense when the event is considered to be completely certain at the speech time. Of

course imperatives do not assert anything, so they can refer to the future freely with the simple present.

- (40) Take your sister to the zoo tomorrow.
(41) Neem een bad zodra je thuiskomt.
Take a bath as soon as you at home come-2sg
'Take a bath as soon as you get home.'

Sometimes in Dutch the lexical verb in an imperative has to be supported by an auxiliary 'ga' ('go'), 'kom' ('come') or 'blijf' ('stay'), but this may be for aspectual reasons. The verbs for which this is the case are activity verbs where it only makes sense to command their initiation. Without the auxiliary, as in (42-a), they are only possible as forceful commands (e.g. talking to one's dog).

- (42) a. Zit!
Sit
'Sit!'
b. Ga zitten.
Go sit-INF
'Be seated.'

Some native North American languages do distinguish between an immediate and a delayed imperative. Cheyenne is an example (Mithun, 1999).²¹

- (43) a. méseestse
eat!
b. méseheo?o
eat (later on)!

In Maidu there is a similar contrast between two imperatives (Shipley, 1964). One "is used when the action of the order is to be carried out in the presence of the speaker or when there is no interest in the place of the ordered action". The second imperative "is used when the ordered action is to be carried out in the absence of the speaker".

- (44) a. /bá ník sójep./
Pass me the salt!
b. /mymýk púlkydi dákpajtípadà./
Stick it on his door!

These data are very limited and do not as such exclude the possibility that the distinction is in fact an aspectual one.

²¹Neither Mithun nor Shipley has exact glosses with these examples.

Conclusion

Without a clear criterion for calling something an imperative sentence or not, the disqualification of the Dutch pluperfects as imperatives is ad hoc. It means that we have to call them something else, and give an alternative explanation of why they have the interpretations they do. That could be a valid option if there would be no way in which we can come to a uniform interpretation of these irrealis sentences and ordinary imperatives, but in this case we may wonder whether the irrealis sentences cannot be understood as real imperative sentences in a shifted context. The combination of (a) past reference time, (b) perfective or inchoative aspect, and (c) presupposition that the consequences of the action that was actually performed could have been expected at the time of action, provide sufficient reason for why these sentences are interpreted the way they are in Dutch. From the perspective of the reference time the embedded imperative is meaningful as an advice to the addressee. The fact that past tense imperatives always have to be either irrealis or generic is not a proof of idiosyncrasy, but can be explained as a natural consequence of the interaction of the representational semantics of tense and the conversational function of simple imperatives. A declarative is used to say that something is true at a certain point in time. For this to be sensible, the speaker has to presuppose that whatever is true at that point in time is already decided somehow at the speech time. If the speaker considers it possible that someone's actions may still influence the outcome, he cannot use a simple declarative sentence. The future is commonly considered to be undecided in this way, the past is commonly considered to be 'fixed' (Thomason, 1984). This means that declaratives are normally restricted to talk about what lies in the past or present and the occurrence of a future event can only be asserted if it is considered to be completely decided (45).

(45) I fly to London tomorrow.

Otherwise a modal auxiliary has to be used, whose function is to qualify the judgement as an expected course of events. In other words, it shifts our perspective to a plausible future of the speech time, where the simple present declarative is claimed to be true.

(46) I will (probably) fly to London tomorrow.

In exactly the opposite sense, imperatives can only refer to the future unless the past is considered to be undecided (or nonspecific) somehow. This perspective on the past as if it had not been decided already (irrealis) is therefore a necessary element of any past tense imperative. In some languages, such as English, a modal auxiliary is needed to mark sentences as being irrealis, but Dutch allows the speaker to do so with just the past tense. Presumably this is (part of) the reason why Dutch allows for past tense imperatives.

Since Dutch and Frisian are the only Germanic languages I know to have these past tense uses of imperatives, I conclude that insofar as a semantic past tense is found in Germanic imperatives it is grammatically marked just like in declaratives.

3.3 Hortatives as indirect directives

The previous section addressed the question whether there can be imperatives whose context of reference is not the context of utterance and, if so, whether this difference is grammatically expressed. Here we will be concerned with the same question for a different contextual element: the addressee. So the question is: can there be imperatives that are not directed at the addressee and, if so, is this difference grammatically expressed? Looking from a typological perspective, the answer is clearly positive. In many languages the imperative mood has a complex agreement system with first, second, and third person forms, sometimes even with further distinctions in number agreement (van der Auwera, Dobrushina, and Goussev, 2003). Unfortunately, I know of no discussion of such non-addressee imperatives in the context of formal semantics, which makes it difficult to say how they are to be analyzed formally. There is, however, a construction in Dutch that has the meaning of a non-addressee imperative. I will restrict myself to an analysis of those sentences below, hoping that the first and third person imperatives in other languages can be understood in roughly the same way. But first I will discuss the expression of non-addressee imperatives in English.

Non-addressee imperatives in English

At first glance, English appears to have third person imperatives as well. That is to say, English imperatives may contain what is from the point of view of grammar a third person subject. We have already seen several examples of this and here are some more.

- (47)
- a. Somebody get this table out of the way.
 - b. Whoever bought this television bring it back.
 - c. The oldest of the girls sing a song for daddy.
 - d. Nobody move a muscle.

Let me start this discussion by, very briefly, recalling from the works of others, the arguments against treating the imperative subject as a vocative construction. Schmerling (1975) lists some compelling arguments that show why this noun phrase is not a vocative.²² A vocative is separated from the main clause by a comma or exclamation mark, may be expanded with ‘there’, can co-occur with an imperative subject and does not allow for quantifier floating.

²²On pages 503 – 504. Further arguments have been presented by other authors, such as Stockwell, Schachter, and Partee (1973, page 648), Beukema and Coopmans (1989, page 421ff).

- (48) You (there), you sit still!
- (49) a. *You both there, pay attention.
b. You both pay attention.

Beukema and Coopmans (1989) show that the subject quantifier can be used to bind a pronoun in the imperative.

- (50) a. Somebody_i take off his_i coat.
b. Somebody_i take off his_j coat.

In the second case the pronoun is not bound and has to be interpreted deictically. Beukema and Coopmans observe that this pronoun binding as in (50-a) is not possible when 'somebody' is vocative.

These arguments show that the noun phrases in (47) are a genuine part of the sentence. Despite this formal difference between imperative subjects and vocatives, it is clear that the imperative subject contributes roughly the same to the meaning of the sentence as a vocative would.

- (51) a. Everybody be quiet.
b. Everybody, be quiet.

In this respect, imperative subjects are very different from ordinary subjects, also those found in optative sentences. In (52) the introduction of a comma transforms the optative (a), expressing a wish that God save the queen, to a directive (b), instructing God to save the queen.

- (52) a. God save the queen.
b. God, save the queen.

So what is the meaning of the imperative subject as in (47)? It does not denote the addressee *simpliciter*. This becomes clear in particular when we look at (47-d). The subject 'nobody' surely does not indicate that the speaker is talking *to* nobody, telling this addressee to move a muscle. More appropriately we can say that the imperative subject expresses *who of the addressees is to comply with the imperative*. The mentioned sentence is an instruction to addressees that none of them move a muscle.

On the basis of this discussion it can be concluded that the imperative subject in sentences like (47) does not really indicate a departure from the context of utterance. In all of the examples the addressees of the imperative are simply the addressees of the imperative utterance. The subject does not introduce a distinct context of reference relative to which the imperative is to be evaluated. The function of an imperative subject is to constrain the applicability of the imperative to an intended part of the audience. Quantified subjects 'everybody', 'nobody', 'somebody' and 'anybody' are used to make sure that everybody who hears the utterance understands that he or she is being addressed. A referential expression such as 'you' is in general only used when the person who has to perform the action is contrasted with other persons. Conse-

quently, this subject requires stress. This is clear from the fact that such a subject cannot be combined with emphatic 'do', which also has to be stressed.

- (53) a. Do go home
 b. You go home.
 c. *Do you go home.

There are some exceptions to this rule. The two stress requiring words can be combined in one sentence when 'you' receives contrastive stress (54). In these sentences the subject is still contrasted with other potential addressees.

- (54) a. Do *at least you* have a go, even if the others won't. (Davies, 1986)
 b. Do *someone* help him quickly. (Potsdam, 1995)

- (55) Don't you dare call me a liar.

Another exception is negation (55). Here the subject can remain unstressed (and 'do' as well, since it is not there for emphasis, but for supporting the negation). As amongst others Schmerling (1982) has pointed out, 'do' supported imperatives are 'more finite' than others, allowing for structure that is not possible without it, including VP ellipsis and quantifier floating.

- (56) a. *John said to be careful, so be!
 b. John said not to be careless, so don't be!

- (57) a. *Both go.
 b. Don't both go.
 c. Do both go.

It is not entirely clear to me what, if anything, the function is of the optional, unstressed 'you' subject in these imperatives.

Granted that the imperative subject has a contrasting function and is not a context shifter, we may ask how such contexts shifts *are* expressed in English, assuming that it is possible to do so in this language. The natural translation of a first person plural imperative such as (58) in French is with the help of auxiliary 'let'.

- (58) Chantons!
 Sing-1st.pl
 'Let's sing!'

In the previous chapter it was illustrated that the contracted 'let's' is only used when the speaker includes him- or herself in the group that is incited to sing. Put differently, despite the accusative case the contracted pronoun 'us' is unambiguously the (semantic) *subject* of the sentence.

- (59) a. Let's take our clothes off!
 b. Let us take our clothes off!

The first of these can only be used to make a suggestion for some joint action, or to encourage the addressee to participate in the action. The second sentence can be used in the same contexts, though it would sound a bit more formal than with the contracted form. However, it also can also be used as an ordinary imperative. This possibility can be illustrated clearly by introducing a subject in the sentence.

- (60) a. *You let's take our clothes off!
 b. You let us take our clothes off!

In (60-b) the pronoun 'us' is the direct object, which is impossible in case the contracted form is used. We can therefore say that the first person plural imperative has been grammaticalized in English.

The situation is not the same for the first person singular and third person (singular or plural) imperatives.

- (61) a. Let me get my coat and I'll join you.
 b. Let me know if you decide to join me.
 (62) a. Let 'em show the world what they're capable of.
 b. Let 'em each have a try at it.

The difference between (61-a) and (61-b) (in their usual contexts) is that in the first case the speaker expresses an *intention* to perform some action, whereas in the second case the speaker asks the hearer to perform some action. The contrast is one between an utterance in which the speaker is addressing him- or herself and an utterance in which the speaker is addressing the hearer. Note that only this first type of use does not require an addressee and can be used to talk to oneself. Also, in these cases the tag 'shall I' can be used.

- (63) a. Let me get my coat and I'll follow her.
 b. Let me hold the door for you, shall I?

A similar difference can be observed in (62). The first of those two sentences need not be uttered to a person who is then supposed to see to it that the 'them' in question show what they are capable of. The second is more typically uttered to someone who is then supposed to let each of the persons in the group denoted by 'them' have a try at it. To make this difference visible, we can again add a subject or a vocative to the sentence and see if it changes the reading.

- (64) a. ?You let 'em show the world what they're capable of.
 b. You let 'em each have a try at it.

The first of these is not meaningless as such, but with the added subject it does not retain the more natural reading it has without a subject.

As far as the English data go, the contrast presented above might as well be seen as a matter of pragmatic interpretation, as opposed to semantic meaning. The sentences

above would all be simple imperatives with a direct object pronoun though in some situations the imperative could be interpreted as addressed to an audience that is imagined to be present. Seemingly, this is what van der Auwera, Dobrushina, and Goussev believe.

With non-second person Imperative-Hortatives, the appeal is arguably still directed at the Addressee(s), but it is more complex and arguably less typical. Consider a third person construction like English (30).

(30) *Let* the party start!

The appeal is not to the party itself. It is again the Addressee(s) that is/are entreated to do something to the effect that the party will start. Also with the first person non-singulars, the Addressee(s) are appealed to.

(31) *Let* us sing!

(32) *Let* me sing!

In the inclusive reading, the Addressee(s) is/are supposed to join the speaker in singing. In the exclusive reading, the Addressee(s) is not entreated to sing, but still to do something to the effect that the speaker and one or more Referents get to sing. In the first person singular, one can see the Speaker either doubling up in a role of Addressee or as appealing to some real Addressee(s) to allow him/her, the Speaker, to sing. (van der Auwera, Dobrushina, and Goussev, 2003, page 10 – 11)

Apparently, by the inclusive reading they mean the reading that is maintained when ‘us’ is contracted. The exclusive reading is the one where we can add a subject ‘you’.

This argument is unsatisfactory. The authors fail to point out that the ‘hortative’ readings are obtained by interpreting the pronoun following ‘let’ as the subject, whereas in the imperative reading it is the direct object. This is especially clear from the example they give of third person imperatives. Certainly the appeal is not to the party, but to the addressees of the utterance. Hence, it is not a third person imperative. In this example ‘the party’ is simply a direct object and so the sentence is an ordinary, second person imperative.

The issue can perhaps be made more clear by looking at Dutch. Here the contrast between subject and direct object readings is (partially) grammaticalized. To be precise, when an accusative pronoun is used, the verb has its uninflected imperative form and has both readings. But alternatively one may use a *nominative* pronoun, with the auxiliary ‘laten’ agreeing with this pronoun. These sentences only have the hortative reading.²³

²³Apart from this, nominative pronouns can also be used with the verbs ‘kijken’ (*watch*) and ‘horen’ (*hear*) in the imperative, cf. Bennis, 2001.

- (i) a. Kijk hij eens rennen.
Look he PART run-INF

- (65) a. Laat ik een eitje bakken.
 Let I an egg-DIM fry-INF
 'Let me fry an egg.'
- b. Laat mij Uw postzegelverzameling bekijken.
 Let me your.polite stamp-collection view-INF
 'Let me view your stamp collection.'
- (66) a. Laten wij een bordspel spelen.
 Let-pl we a board-game play-INF
 'Let's play a board game.'
- b. Laat ons de grens passeren.
 Let us the border cross-INF
 'Let us cross the border.'
- (67) a. Laten ze eerst maar eens tonen wat ze kunnen.
 Let-pl they first PART PART tonen-INF what they can-INF
 'Let them first show what they are capable of.'
- b. Laat hen eens een dansje doen.
 Let them PART a dance-DIM do-INF
 'Let them do a little dance.'

To illustrate some of the differences between these sentences, (65-b) could be used when the addressee is holding his or her postal stamp album and does not want to let anybody look at the stamp collection. In those contexts the nominative pronoun could not be used. In (66-a) we could add the adverb 'gezamenlijk' ('together'), whereas it would be more natural in (66-b) to add 'in alle vrijheid' ('in all freedom'). The latter sentence can be uttered to a customs officer who is refusing to open the gate.

The meaning of first person imperatives (hortatives) is relatively simple to describe: the speaker includes him- or herself amongst the people who are to do the action. In the singular case this means that there need not be an addressee. This is a form of *soliloqui*. Compared with first person, the meaning of third person imperatives is a little harder to describe. Using (67-b) only makes sense when the addressee has control over the group denoted by the direct object. The speaker is then instruct-

-
- b. 'Look at him run.'
 Hoor ik eens brullen.
 Hear I PART growl-INF
 'Listen to me growl.'

The nominative pronouns are nevertheless always interpreted accusatively, as is clear from the glosses. Furthermore, the verb does not agree with the pronoun.

- (ii) *Kijken zij eens rennen.
 Look-pl they PART run-INF
 'Look at them run.'

ing the addressee to *make* that group do a little dance. It could be, for instance, that the speaker is talking to a puppeteer and points to the puppets when uttering the direct object. This ‘delegation’ use does not exist for (67-a). The nominative pronoun cannot be used to denote the puppets of the addressee. Because of this, it is difficult to see how it can still be an *imperative* sentence, since it cannot have a directive illocutionary force, or at least not in a strict sense. Perhaps the meaning can be illustrated by means of the following related example, taken from Stockwell, Schachter, and Partee (1973).

- (68) So your son, the prince, does not believe that Baby Jane kissed him while he was asleep? Would your son look at himself in the mirror, please? The rouge is still on his left cheek.

Paul Kiparsky is said to have claimed that the second sentence in this example is ungrammatical. The context was added by Stockwell, Schachter, and Partee to argue that it *is* grammatical and, moreover, meaningful. Observe that the sentence above has to be addressed to the father of the prince, presumably the king or the queen. Consequently, one cannot use a ‘let’ sentence, because that would be impolite. It would suggest that the speaker is delegating an instruction to the parent.

- (69) Laat hem in de spiegel kijken.
Let him in the mirror look-INF
‘Make him look in the mirror.’

Insofar as an imperative can be used in this context, it would have to be a third person one.

- (70) Laat hij in de spiegel kijken.
Let he in the mirror look-INF
‘He should look in the mirror.’

This sentence would still be impolite under the circumstances, but not to the king or queen directly. The impoliteness of (70) resides in the fact that the speaker is, rather bluntly, criticizing the prince for not believing the obvious. If the speaker would have authority over the prince, he or she would presumably use a simple imperative:

- (71) Kijk dan in de spiegel.
Look then in the mirror
‘Just look in the mirror.’

A final example is gossip. Suppose Tina is talking to her friend Ruby. Tina has met this boy with whom she went on a date, but the day after he did not phone her. Ruby tries to calm Tina down by suggesting that perhaps the boy did not have the opportunity to phone yet and will probably feel really sorry. But Tina is unforgiving and says:

- (72) Ja dààg! Laat 'ie z'n verontschuldigen maar komen aanbieden,
 Yes bye Let he his apologies PART come-INF make-INF,
 met een bosje bloemen.
 with a tuft-DIM flowers.
 'No way! Let him come over and make his apologies, with a tuft of flowers.'

It is clear from the context that Ruby is not being told to do anything. At this point in the conversation it may well be that she does not even know the boy's name. Again, it is as if Tina is saying *to* the boy that he should apologize. If he were present in the utterance context she would address him directly with a demand that could be phrased as a simple imperative.

For this reason I conclude that the third person imperative is really a *shifted* imperative. It shifts the context to a situation in which the speaker addresses the subject directly and issues the simple directive. We may capture this idea in a formal semantic analysis by treating the third person as an *operator* over a simple imperative sentence. This operator marks an intensional shift quite like modal and tense operators do in modal logic (Blackburn, de Rijke, and Venema, 2001). The default in the utterance context is that the persons who are required to perform the action are the addressees. The imperative subjects and hortative person shifters are all used to mark a shift away from this default, creating a context of reference in which only the relevant persons are addressees. In this context of reference the 'embedded', simple imperative is evaluated as a directive speech act.

A further point must be made with respect to the hortative construction. There is another usage of such sentences that has not been mentioned so far. In this usage the speaker is expressing a wish that something happen. Say, that someone perform some action.

- (73) Lieve help, laat hij alsjeblieft zijn mond houden.
 Dear help let he please his mouth keep-INF
 'Oh my, let him please shut his mouth.'
- (74) Laten wij alsjeblieft niet samen in één auto naar Wenen hoeven
 Let we please not together in one car to Vienna need-INF
 rijden.
 drive-INF
 'Let us please not have to drive to Vienna together in one car.'
- (75) Laat ik alsjeblieft niet de hoofdprijs winnen.
 Let I please not the main-prize win-INF
 'Let me please not win the first prize.'
- (76) Laat het alsjeblieft gaan regenen.
 Let it please go-INF rain-INF
 'Let it please start raining.'

Second person is impossible, because these sentences are never directed at a person. They are typically, though not necessarily, mumbled to oneself, with the eyes closed or turned to the sky. Because of this, in (74) the subject is not the speaker with some addressee(s), but the speaker with someone talked about (first plus third person). Note that in the English gloss the pronoun 'us' cannot be contracted, contrary to the other examples of Dutch 'laten wij' imperatives mentioned above. Lastly, the use of 'alsjeblieft' ('please'), optionally stressed, is typical for these sentences.

For (Schmerling, 1982), examples like the ones above are the reason for opposing to a pairing of the sentence type of 'categorical imperatives' and the conversational function of directives. Imperative-hortative sentences are, according to her, attempts to bring about a change in the world. So (76) is an attempt to make it start raining, even if this only makes sense by reference to some 'instinctive' inclination to try using magic. On the basis of the preceding discussion it seems more reasonable to me, though, not to treat these sentences on a par with ordinary simple imperatives, which would require us to widen our interpretative notion of 'imperative' considerably. They are borderline cases of hortatives that may perhaps be described as imperatives shifted to a different context where the subject could directly be addressed. In these borderline cases maybe we call upon God, or some other imagined higher power who could make even 'it' start raining.

Schmerling argued that ordinary imperatives are restricted to second person subjects exactly *because* the presence of an audience makes us interpret them as commands/requests. Reversing this analysis again, I would say that only in the absence of an audience can we make sense of these fiats, which may explain why they are considered to be 'prayers': The speaker closes his eyes or turns them to the sky. For comparison, interrogatives are sometimes used under the same circumstances and then they have a quite specific range of potential meanings amongst which expressing despair, though not 'asking for information'.

(77) Why did this have to happen to *me*, of all people?

Still, that fact alone is not a reason for abandoning the semantics of answerhood conditions for interrogatives. And this is because the absence of an audience is what *explains* the limited range of meanings of what under different circumstances could be an information-seeking question.

Analogously, I want to maintain that sentences like (76) are not to be understood as members of a separate syntactico-semantic class of optatives that only pragmatically obtain a 'shifted imperative' function. Viewing from the interpreter's point of view, it is only when the 'laten' sentence cannot be interpreted as having an imperative meaning that it is analyzed as the expression of a wish. This is the case when the subject is impersonal (76), or when the verb phrase does not denote something one can do (78), or when the reference time is past (79).²⁴

²⁴This is also true for infinitival complements, as discussed in §2.4. For example, sentences with main verb 'want' embedding an infinitive describe the actions that someone wants some person to

- (78) Laat hij voortleven in onze gedachten.
 Let he on-live in our thoughts
 'Let him live on in our thoughts.'
- (79) Laat hij het ongeluk overleefd hebben.
 Let he the accident survive-PP have-INF
 'Let him have survived the accident.'

As can also be seen from the next example, when the assumption is overridden that the verb phrase is not something one can do, the sentence 'regains' its directive meaning, so to speak.

- (80) *Fiat lux.*

In this sense the 'laten' sentences contrast with another construction in Dutch, involving a subjunctive form of 'mogen' ('may'), that *only* has an optative usage and is *never* used to address or instruct.

- (81) Moge het alsjeblieft gaan regenen.
 May-SUBJ it please go-INF rain-INF
 'If only it would start raining.'

Rehearsing a point from the previous two chapters, the 'laten' sentences with a non-second person subject present their content from the 'action' perspective: the subject of the sentence presents the *perspective* under which we conceive of the action being performed: what the speaker intends is for that person(s) to perform the action. Optatives such as (81) present the situation from the 'event' perspective: they are used to express a wish that some event would happen. Using an impersonal subject in the 'laten' sentence forces us to adopt the latter, event perspective and thereby we also lose the future orientation.

A note on English

In standard English only accusative pronouns are acceptable after auxiliary 'let'. Thus the only grammatical non-second person imperatives in English are the first person plural ones, though not for reasons of case but because the contraction of the pronoun

perform. It is only when the infinitive does not denote something that can be understood as denoting an action that the complement is analyzed as denoting an event that the main clause subject would like to occur, as in (i).

- (i) Frans wants it to rain.

On a more general note, it seems that in these cases the different uses of the same construction should not be accounted for by means of different enrichments of a common semantic core meaning, as Schmerling seems to assume, but as the result of *reanalysis* of a construction on the basis of an implausible standard meaning. This is similar to the idea of 'coercion' in the study of aspect, cf. Moens and Steedman (1988).

is not permitted when it functions as a direct object. So much was observed in the previous discussion.

However, the situation in English is not this straightforward. Archaically, there is a possibility for using nominative pronouns after 'let'. This has been observed by, amongst others, Seppänen (1977).

- (82) a. Let you and I cry quits.
b. Let him with me, and I with him, be laid within one shrine.

The Oxford English Dictionary mentions:

- (83) a. Awhile Let thou and I withdraw.
b. Let thou and I the battell trye.

In present-day colloquial English the use of 'let's' expands beyond its role in first person imperatives. First, it can express the involvement of the speaker in the action to be undertaken by the addressee alone. So, a mother would say (84) to her child even if the mother does not intend to help in performing the action (found via Google).

- (84) Let's put on the socks. Put them on.

These sentences also occur in instruction manuals:

- (85) Finally, let's put on the name. With the Text tool, type in the name you want over the plate.

Perhaps more interesting is the observation that sometimes 'let's' functions as an un-analyzed particle followed by a subject, with nominative case, and the infinitive. The subject can be of any person and number and the interpretation is that of a (direct or indirect) imperative. The following examples are taken from Krug (2004).

- (86) a. Let's give you a hand.
b. Let's you go first, then if we have any money left I'll go.
c. Let's people know that teachers work in the vacation.
d. You stand back and hold their coats and say, 'Let's him and him fight.'
You kind of just watch.

Krug here speaks of a 'desemanticization' of 'let's', now functioning merely as an introductory particle in imperatives and hortatives. Though the examples are rare, according to Krug, the consequences of this development are that English would possess a grammatical imperative for first (86-a), second (86-b) and third (86-c,d) person.

3.4 Concluding remarks

The imperative, as a sentence type, is best understood as a semantic category. The problems with a purely syntactic analysis were explained in the previous chapter, whereas the identification of the sentence type with directive illocutionary force was objected to in this chapter. The claim that all imperatives are nonfinite, not allowing for tense or mood—or, naturally extending the argument, person—has been countered by means of a study of Dutch. Whereas standard English appears to conform to the constraints implied by the analysis of Platzack and Rosengren, Dutch displays grammatical tense and person shifts within the imperative paradigm. I have argued that these past tense and hortative sentences can be interpreted in terms of context shifting operators over simple, subjectless imperative sentences. Those subjectless imperatives are instructions to one or more of the addressees in the context of reference.

The observations that the past tense imperatives are only irrealis and that the first person imperatives are only expressions of intention or proposals for joint action is of course not a proof of idiosyncrasy, but a consequence of natural, semantic constraints. We cannot command for the past, unless we adopt, temporarily, a perspective prior to the actual (non)performance of the action. Similarly, we cannot command actions, threatening with repercussions in case of disobedience, for groups that include ourselves as speakers. Belonging to a group that is to jointly perform the action implies that one is *dependent* on the decisions of the other members of that group. Once you threaten with repercussions, you place yourself outside of the group. So for both past tense and non-second person imperatives the pragmatic restrictions on their appropriate usage should be a consequence of their semantic meaning. This is all the more reason for attempting to develop a semantic theory capable of accommodating those constructions.

I have to make good on these claims, of course. This will be the agenda for the remainder of this thesis. In the last chapter I present a semantic theory in which (i) the perspectival distinction is a central part of the ontology, (ii) the performative function of imperatives is their semantic interpretation, without the interference of a truth conditional representation, and (iii) past tense irrealis imperatives and first and third person imperatives are attributed a meaning formulated in terms of an operator over simple imperative sentences. However, before I come to this, I will start out with a more simple formalization of imperatives that allows me to explain how some alleged problems with a formal semantics for imperatives can be solved by only implementing the second element in the theory: to understand the meaning of imperatives as inherently performative.

Ross' paradox and quandaries

Consider the following situation. You are a citizen of a small Western country. This country has a Minister for Foreign Affairs, who passes the following law.

- (1) If you risk inhuman treatment upon travelling to a certain country, you are forbidden to go there.

Furthermore, the Minister of Immigration Affairs proposes to make a new law which states that,

- (2) If you have been in this country illegally for less than thirty years, you have to go back to your home country.

Given these two conditional imperatives, a person who is illegally in this country for less than thirty years may come into a conflicting situation of simultaneously having to, though not being permitted to, return to his or her home country. What is the appropriate response in this situation? Perhaps the rules are 'weighed' differently, or an exception clause is introduced in the latter rule. However, I take it the response is *not* to assume that, presumably, these illegal immigrants will not exist, because if they did, then the rules would be inconsistent. Whatever the response may be, it will start with objecting when the second rule is introduced, noting that it conflicts with the earlier one. The rule system is then rejected as being in need of an improvement, even though there has not yet been an *actual* conflict, only a potential one.

Let me present a comparable example. I write a letter to the Minister, protesting against the laws being proposed. I ask the kid from the neighbors to post the letter. Now this kid likes to play with fire. So she says to herself: 'my neighbor told me to post the letter, so in effect he told me to post the letter or burn it; well, I shall burn it.' What is strange about this reasoning is that the kid assumes that my imperative entails a choice-giving disjunction. A disjunction, moreover, where the choice for complying with the second disjunct is incompatible with my original imperative.

This latter example is also known as the 'Ross paradox' (Ross, 1941). Ross concluded from it that there can be no such thing as a 'logic of imperatives'. Others have similarly argued that it is not sensible to speak of 'imperative inference' (Beardsley, 1944), or to look for, say, a cut-elimination theorem for imperatives (Belnap, 1990). Both Beardsley and Belnap point to the impossibility of using imperatives as premisses. We cannot hypothesize about imperatives, strictly speaking. But what does this difference really amount to? Sure, imperatives do not have truth values, so truth preservation cannot be a semantic relation between imperative sentences. Nevertheless, there are other such semantic relations that *are* applicable to imperatives. For instance, the imperatives 'Get up' and 'Don't get up' *conflict*, even if we do not wish to call that a 'contradiction'. So what is different about inference, in the sense of truth preservation, and the semantic relations that do exist between imperatives?

I want to suggest that it is the following. Declarative sentences have, or at least they can have, what Searle (1979) has called a 'word-to world' direction of fit. This means that we can witness a correctness criterion for the appropriate usage of declarative sentences that states that the sentence is appropriately used if and only if the sentence is in fact true. In contrast, imperative sentences have a 'world-to-word' direction of fit. When an imperative sentence is uttered, we need not look at the world to see if it was appropriate, but the addressee should *change* the world, in order to make the world agree with the imperative, so to speak. Imperatives do not have *preconditions*, but only *postconditions*. I believe that this opposition is crucial in understanding what the semantic relations between imperatives are, though there is also an important correction to be made at this point. Declarative sentences do not merely have preconditions, nor do those constitute their 'core meaning'. In general, we use declaratives to provide the addressee with information. Perhaps the effect of such information giving should not be explained as a change in the *world* itself, but certainly there is a change in the cognitive state of the addressee if the information is accepted.

Because of this, asserting a declarative disjunction after one of the disjuncts has already been accepted is odd. It suggests that the speaker is making a correction, or that for some other reason the weaker statement provides some new information.

(3) It's raining. ... ?It's raining or snowing.

The difference with imperatives, however, is that the informative reading of a declarative sentence can be 'cancelled', i.e., effectively ruled out, by means of additional discourse structure.

(4) It is snowing, and therefore, as a matter of fact, it *is* snowing or raining.

The use of 'therefore', reference to the 'matters of fact' and the verum focus (stress on 'is') all lead to a reading of the disjunction, not as providing new information, but as a description of the world on the basis of the present state of information. In (4) the disjunction *is* appropriately used, because only the aforementioned preconditions are required. So, when the informative function of declaratives is cancelled, we retain

their preconditions. Under those circumstances disjunction introduction is a valid principle.

In view of this, it can be questioned whether ‘truth preservation’ should play a central role in natural language semantics, given that the above example can hardly be called typical for the use of declarative sentences in ordinary conversation, though it seems reasonable to maintain that *inference* be understood in terms of truth preservation. More important for our present concerns is the fact that imperatives cannot even remotely be reduced to such preconditions. Using ‘therefore’ to connect two imperatives in discourse only leads to the natural interpretation that the acceptance of the first imperative makes it reasonable to accept (or command) the second as well. This never leads to a rule of ‘disjunction introduction’.

- (5) a. Have an apple. ?Therefore, have an apple or have a pear.
 b. Get out of here! ?Therefore, get out of here or tell me what you think of my new dress.

The conclusion should not be that imperatives cannot be given a semantics, but that this cannot be done in terms of preconditions.

On the basis of this conclusion, let us take a look again at the example with which I started out. What makes us demand that at least one of the laws be changed is the fact that we cannot resolve the conflict in the rules by stipulating that in one of them the apodosis is ‘incorrect’. Because of this, conditional imperatives are not the same as indicative conditionals. For the latter there is the rule of Modus Tollens, meaning that the following is a valid inference.

- (6) If John is at home, then he isn’t working. John *is* working, so he isn’t at home.

The matter is different for imperatives:

- (7) If you are at home, then don’t work. ?Work, so you are not at home.

Again, this is not to say that the use of indicative conditionals as illustrated in (6) is very common. But what is important here is that the possibility does not even remotely exist for imperatives. A conditional imperative can only be understood to mean that the addressee is actually told to behave in the prescribed manner, in case the antecedent turns out to be true. This prescriptive function of conditional imperatives cannot be cancelled and so Modus Tollens, which involves the (unconditional) prohibition to comply with the conditional imperative only leads to (unconditional) incoherence.

I conclude that imperatives are sentences that are only used with postconditions, i.e., rules that state what the appropriate *response* is. Accepting an imperative directed at you means adopting the intention to comply with it. It is in terms of this notion of acceptance that we should formulate a semantics of imperatives. A conceptual motivation for this claim was presented in the first chapter. Here I hope to show that with such a semantics, the ‘logical’ problems of Ross and others are also easily

avoided.

4.1 Update semantics

In the first chapter I argued that no attempt to define an evaluative semantics for imperative sentences will suffice. Let me briefly recapitulate. The attempts (e.g., McGinn, 1977) to work around this problem by restricting the treatment of imperatives to a definition of what it means for an imperative to be 'fulfilled' do not suffice. Such attempts manage to maintain a central role for truth in the analysis of meaning, but only at the expense of not being linguistically adequate. What does the notion of fulfillment tell us about the directive function of imperatives, the future orientation, the lack of a subject, etc.? Why can we not use an imperative sentence to *assert* that it has been fulfilled? Fulfillment is a concept by means of which we can relate imperatives to declaratives, but it is not a means to analyze imperatives as meaningful on their own.

Alternatively, the idea that all such considerations about the use of a sentence is beyond the scope of semantics, that semantics would only deal with 'mood independent contents', is to miss the point profoundly. The truth conditional semantics of declaratives is first and foremost a pragmatic theory that interprets declaratives in terms of their function of describing the state of affairs. It makes little or no sense to abstract away from the declarative sentence' having a truth value in order to come to a notion of moodless representational content, as some authors seem to suggest (Huntley, 1984; Han, 1999b). Even if we think of the meaning of a sentence as a set of possible worlds, then still this set is only defined as the set of worlds *in which the sentence is true* (Kripke, 1963).

Thus, if we restrict our interest in imperatives to the extent to which they can be related to the truth conditions of declaratives we cannot say much about their distinctive properties as such. The consequence of this situation would then be that the linguistic study of imperatives regarding interactions with aspect, tense, mood, and person would not be part of semantics but left to pragmatics. An undesirable situation, surely. On the other hand, there is also no way to give imperatives an independent status in semantics while maintaining a central, universal role for truth, description, reference. That would be having one's cake and eating it too.

Developing a semantics of imperatives then means that we must capture their function as directives in a formal framework. Some authors have proposed theories of interpretation in which the appropriateness conditions for imperatives are characterized (Wilson and Sperber, 1988). The result is that imperatives are understood as expressing an attitude of desire. Apart from the fact that this will not allow us to distinguish imperatives from optatives, it is not true that the use of an imperative sentence is only appropriate in case of a desire by either the speaker or the hearer. Instructions can be given on the basis of a random choice—when someone has to divide the tasks over a group of people—or in a purely instrumental sense—to express

some condition that must be met in order to correctly perform a certain procedure ('read the manual').

Instead, let us take the ideas from ordinary language philosophy seriously, and say that the meaning of an imperative sentence is its use as a performative utterance. An imperative sentence does not have necessary and sufficient preconditions, only such postconditions. These postconditions can equally well be represented in a semantic framework. And indeed, unlike the wide variety in possible preconditions for appropriate usage of imperatives¹, there does seem to be a common *goal*: the expansion of the hearer's schedule with the action. That is to say, there may be all kinds of reasons to utter an imperative, but in all cases, if the hearer chooses to *accept* the instruction this yields an expansion or change of his schedule. If the addressee accepts the imperative (be it by acknowledging it or by a relation of power or authority between speaker and hearer) he or she is thereby committed to perform the action.² For this reason the notion of acceptance will be taken as a common core characterizing the meaning of imperative sentences.

The framework of update semantics (Veltman, 1996) is a formalization of meaning in terms of acceptance. Under the general heading of the slogan that 'meaning is context change potential' several semantic theories have been developed within that framework to capture the performative meanings of certain constructions: epistemic modal clauses (Veltman), deontic modality (van der Torre and Tan, 1998), interrogatives (Groenendijk, 1999) and in fact also imperatives (Zarnic, 2002; Lascarides and Asher, 2003, though both assume a mood-radical structure).

The general idea behind update semantics is that the meaning of a sentence is to be understood as the change it brings about in the cognitive state of the person who accepts the news conveyed by it. Consequently, a semantic theory is not based on a truth assignment to sentences, as is the case in classical semantics, but formulating a semantic theory in this framework consists in defining an *update system* (Veltman, 1996).³

DEFINITION 4.1. An update system is a triple $\langle L, \Sigma, [\cdot] \rangle$, with L a language, Σ a state space, and for each $\varphi \in L$, an update operation $[\varphi] : \Sigma \rightarrow \Sigma$.

The notion of *acceptance* of a sentence φ in a state $\sigma \in \Sigma$ is what replaces the classical notion of entailment as truth preservation. The update operation is written

¹Some such reasons are that the speaker desires its consequences, or that the hearer would benefit from doing it, or that it is the right thing to do, or that it is the way to achieve the (hypothetically) required goal, etc. For a more concise overview, see Hamblin (1987); Wilson and Sperber (1988).

²This commitment is not to be seen as a psychological inclination or feeling of responsibility, but as a normative fact: not performing the action constitutes opting out of 'playing the game' that imperatives draw their meaning from (Searle, 1969). Just as the assertion of $p \wedge \neg p$ in the case of declaratives is not factually impossible, but cannot be understood as an attempt to correctly describe the world.

³The appendix contains a list of set theoretic notation used in the thesis.

in post-fix notation, $\sigma[\varphi] = \sigma'$, so that the notation pairs naturally with the incremental left-to-right processing of texts. Updating with a text $\varphi_1, \dots, \varphi_n$ can then be seen as sequential composition $\sigma[\varphi_1] \dots [\varphi_n]$.

DEFINITION 4.2. φ is *accepted* in σ iff $\sigma[\varphi] = \sigma$. We write this as $\sigma \Vdash \varphi$.

An inference from premisses $\varphi_1, \dots, \varphi_n$, in that specific order, to conclusion ψ is *valid* iff for every state $\sigma \in \Sigma$ it holds that $\sigma[\varphi_1] \dots [\varphi_n] \Vdash \psi$. The statement that the inference is valid is written as: $\varphi_1, \dots, \varphi_n \Vdash \psi$.

A sentence is accepted in a context if it would not add anything to that context if it were uttered. Veltman mentions several variants of the formal definition of validity of which I will be using only the one defined above.

4.2 An update system for declaratives and imperatives

In this section I will present an update system for a combined language of imperatives and declaratives. On the basis of the definition, we need three things: a language, a state space, and an update operation. These three entities are defined subsequently.

Language

For the moment I will restrict myself to the assumption that we have a set of simple declarative sentences and a set of simple imperative sentences, and I do not discuss the connection between them. Also, those matters discussed in the previous chapters concerning the temporal and agentive aspects of declarative and imperative interpretation are sidestepped here. One consequence of this limitation is that only imperatives for the agent whose commitment slate we are modelling are taken into consideration. Another consequence is that we cannot formulate the statement that some imperative was fulfilled. This requires that we take into account the connection between what I have been calling actions and events. These issues are dealt with extensively in the next chapter.

DEFINITION 4.3. Let $L_0 = (\mathcal{P} \cup \mathcal{A})$ be a language of atoms, where \mathcal{P} is a set of atomic declaratives, and \mathcal{A} a set of atomic imperatives. The language of connectives L_1 is defined as follows. $L_0 \subseteq L_1$, if $\varphi \in L_1$ then $\neg\varphi \in L_1$, and if $\varphi, \psi \in L_1$ then $\varphi \wedge \psi, \varphi \vee \psi \in L_1$.

When φ contains only declarative atoms, I will write $\varphi \rightarrow \psi$ abbreviating $\neg\varphi \vee (\varphi \wedge \psi)$. Conditional sentences are comparable to disjunctions, though they are more syntactically constrained.⁴ The protasis cannot contain imperatives, because it func-

⁴It must be noted, though, that in Russian the protasis of conditional sentences is in the imperative mood.

tions as a hypothetical addition to the cognitive state of the agent. Such hypothetical updates are not possible with imperatives, as I have explained above.

Negation is treated as a uniform sentential operator. This should not be understood as a substantial claim about the semantics (or syntax) of negation in natural language. The observation that in many languages negation is expressed differently in imperative/deontic contexts and declarative/epistemic contexts respectively, suggests that there may well be a semantic difference between the two. What the semantics here intends to show is that, at least as far as the discussed phenomena go, negation can be modelled in a semantically uniform way. So in order to deal with, e.g., the Ross paradox we do not need to make use of a distinction between declarative and imperative negation.

Finally, one issue that I will not be dealing with in this chapter is the interpretation of natural language mixed mood sentences, i.e., sentences in which an imperative and a declarative are combined in a conjunction or a disjunction.

- (8) a. Leave your bike here and it will certainly be stolen.
 b. Pay me 30 Euro's or you won't get your bike back.

Those sentences have peculiar semantic properties, including the hypothetical status of the imperative and a modal interpretation of the declarative, that require a richer theoretical framework. A discussion of these sentences is provided in §5.7.

States

The next thing is a state space Σ , which is a set of states σ . Such a state will represent both the information and the commitments for action of the agent/interpreter. I represent it by a set of 'possibilities under consideration' of the agent/interpreter. These possibilities, in turn, are pairs consisting of a 'situation' and a 'schedule'. Both are modelled in terms of *partial*, possibly inconsistent valuations of atomic sentences. Declaratives are assigned a value 'true' or 'false', or neither, or both, and imperatives get a value 'do' or 'don't', or neither, or both.

DEFINITION 4.4. A *situation* s is a subset of the product of \mathcal{P} and $\{\text{TRUE}, \text{FALSE}\}$. A *schedule* π is a subset of the product of \mathcal{A} and $\{\text{DO}, \text{DON'T}\}$. The set of all possible situations is S , the set of all possible schedules is Π .

$$\begin{aligned} S &= \wp(\mathcal{P} \times \{\text{TRUE}, \text{FALSE}\}) \\ \Pi &= \wp(\mathcal{A} \times \{\text{DO}, \text{DON'T}\}) \end{aligned}$$

Apart from situations and schedules, what we will also need is a notion of *expansion* of such partial valuations. Accepting new information or commitments results in a pointwise expansion of situations and schedules. For this I will use the operations \oplus and \ominus , defined next.

DEFINITION 4.5. The atomic expansions of situations and schedules are as follows.

$$\begin{aligned} s \oplus p &= s \cup \{\langle p, \text{TRUE} \rangle\} \\ s \ominus p &= s \cup \{\langle p, \text{FALSE} \rangle\} \\ \pi \oplus a &= \pi \cup \{\langle a, \text{DO} \rangle\} \\ \pi \ominus a &= \pi \cup \{\langle a, \text{DON'T} \rangle\} \end{aligned}$$

The operation \oplus adds a positive fact to s or adds a positive commitment to π , the operation \ominus adds a negative fact or commitment (i.e., a prohibition).

In other update semantic theories, uncertainty of information is modelled in terms of a set of possible complete situations (i.e., worlds). Thus, acquiring information leads to a reduction of those possibilities, namely, those possibilities that conflict with the new information. In the model I am proposing, information and commitments are acquired by *expanding* possibilities, making the valuations more complete. However, this does not mean that a state consists of only one such a situation and schedule. In particular, disjunction will introduce a plurality of 'live options', so to speak, into consideration. By adopting this analysis we will be able to explain some of the mentioned problems concerning this connective, as will be shown later on.

DEFINITION 4.6. A possibility i is a pair (s, π) of a situation and a schedule. The set of all possibilities is I . A state is a set $\sigma \subseteq I$ of possibilities. So the state space is $\Sigma = \wp(I)$.

Several authors who similarly model information and intention in a model theoretic way distinguish between two separate sets: one belief state consisting of a set of epistemically possible worlds and one desire state consisting of a set of deontically (or buletically) possible worlds. Example of this approach are van der Torre and Tan (1998) and Zarnic (2002). The difference between those models and the one proposed here—apart from the differences between situations and schedules—is that we have a single set of complex possibilities (s, π) . This has the advantage that it offers us a straightforward way of introducing cross-dependencies between information and commitments. Apart from that, it also enables us to define sentential operators and connectives in a sentence type indifferent way. Conjunction, disjunction, negation and implication are all operations on sets of possibilities, regardless of whether the embedded sentences are used to provide information or instructions.

The notion of a schedule is based on ideas by several other authors on this subject. Hamblin (1972) introduces commitment slates as sets of rules an individual is supposed to follow (in his 1987 book he works this idea out in more detail). These slates are expanded on the basis of imperative utterances. Similarly, Lewis (1979) makes use of scoreboards on which we keep track of what has been said. Commanding and giving permission thus alters the scoreboard. Lastly, and more recently, Portner (2003) uses the idea of 'to do lists' in the interpretation of imperatives.

When we acquire information about the world or commit ourselves to act in some particular way in the world, we are dealing with the various possibilities that are open to us in those two senses of that word: the possibilities that the world might be like this or like that, and the possibilities of deciding to act like this or like that. Incomplete information (not having all the facts) and commitments (not being fully booked) will be represented by a set of such possibilities. Having more than one possibility under consideration will mean that one does not know which of those possibilities to adopt as a correct (partial) model of the world and as a schedule to be executed.

- If both (s, π) and (s', π) are open to consideration, then you do not know whether s is the situation you are in or s' , but regardless of which is the actual one, you are committed to act according to π .
- If both (s, π) and (s, π') are open to consideration, then, if you are in situation s , you are (for the moment) free to choose to act according to π or according to π' .
- If both (s, π) and (s', π') are open to consideration, then you do not know in which situation you are. However, if it turns out that you are in s , then you are committed to execute schedule π and if you are in s' you are committed to execute schedule π' .

The last type of state is particularly useful to deal with conditional imperatives. For example, if we are told

- (9) If the sun shines, go to the beach; if not, then go to the cinema

the result will be that we have two types of possibilities available: the situations in which the sun shines all are paired with a schedule in which we are committed to going to the beach. The remainder of the situations are all paired with a schedule in which we are committed to going to the cinema. Consequently, we will certainly have to go to either the beach or the cinema, but in order to know which of these we actually have to do we first need to find out whether or not the sun is shining.

As the example at the beginning of this chapter illustrates, accepting imperatives does not lead to excluding situations from consideration. Put differently, commands cannot provide information. Another aspect of this asymmetry between imperatives and declaratives concerns disjunction. When someone says that 'it is raining or it is snowing', then this person is not saying 'you may choose freely, because there is no restriction on adopting either belief'. Rather, the person means that 'I cannot tell you which one it is; I lack the information'. Consequently, if someone else responds by saying that it is raining, you may simply adopt this additional information. On the other hand, when someone says 'Go to the beach or go to the cinema', then the first type of reading *is* the more salient one. The speaker allows the addressee to keep both options open. Consequently, when someone else would continue by saying 'Don't go

to the beach', then, unlike with declaratives, there is a real conflict. The addressee will have to resolve this conflict by deciding who has the higher authority in matters of going to the beach or to the cinema. One such resolution is to comply with the second authority's prohibition and so to go to the cinema. Neither authority has prohibited that action, so the addressee will not have to face any sanctions. However, this is still a way of *resolving* the conflict. The way this difference is integrated in the semantics is by only allowing declaratives to 'override' earlier uncertainties. Imperatives simply give rise to *quandaries* (see Hamblin, 1972).

DEFINITION 4.7. A situation s is *consistent* iff for no $p \in \mathcal{P}$, p is both true and false in s . Similarly, π is functional iff no $a \in \mathcal{A}$ is both to be done and not to be done in π . A possibility (s, π) is a *quandary* iff s or π is not consistent. A state σ is quandary free iff it contains no quandaries. I_{QF} is the set of all non-quandary possibilities.

Not all possible states are acceptable states. In the introduction of this chapter it was explained that if the rules imply a *possible* conflict, they cannot be accepted as such. In the framework of update semantics we then say that the state becomes *absurd* and the update procedure ends. Consequently, there are two distinguished states: the minimal state **1** and the absurd state **0**.

$$\begin{aligned} \mathbf{1} &= \{(\emptyset, \emptyset)\} \\ \mathbf{0} &= \emptyset \end{aligned}$$

As a rule, we say that if the state contains a quandary at any stage, it results in the absurd state.

Update operation

The third and last element of the update system is the update operation for all the members of L_1 . Before defining this operation, I first need to say a little bit about negation. What is it to deny an imperative? If we think of negation as a sentential operator, as we normally do in logic and semantics, then to say "Don't leave me here" is not merely to 'not-command' leaving, it is to *prohibit* it. Thus if the English sentence mentioned is considered an instance of sentential negation, then negation must be more than the usual notion of a set-theoretic complement.

For dealing with negation I will use a variant of the semantics used in Veltman (1986). To each sentence correspond two updates, a positive one and a negative one. Negation switches between the two procedures.

DEFINITION 4.8. Let $\sigma \in \Sigma$ be a state. The *positive update* of σ with a sentence $\chi \in L_1$ is the function $\uparrow \chi : \Sigma \rightarrow \Sigma$, and the *negative update* $\downarrow \chi : \Sigma \rightarrow \Sigma$ are defined by the following recursion. If quandary free,

$$\begin{aligned}
\sigma \uparrow p &= \{(s \oplus p, \pi) \in I \mid (s, \pi) \in \sigma \ \& \ (s \oplus p) \text{ is consistent}\} \\
\sigma \downarrow p &= \{(s \ominus p, \pi) \in I \mid (s, \pi) \in \sigma \ \& \ (s \ominus p) \text{ is consistent}\} \\
\sigma \uparrow a &= \{(s, \pi \oplus a) \in I \mid (s, \pi) \in \sigma\} \\
\sigma \downarrow a &= \{(s, \pi \ominus a) \in I \mid (s, \pi) \in \sigma\} \\
\sigma \uparrow \neg \varphi &= \sigma \downarrow \varphi \\
\sigma \downarrow \neg \varphi &= \sigma \uparrow \varphi \\
\sigma \uparrow \varphi \vee \psi &= (\sigma \uparrow \varphi) \cup (\sigma \uparrow \psi) \\
\sigma \downarrow \varphi \vee \psi &= (\sigma \downarrow \varphi) \downarrow \psi \\
\sigma \uparrow \varphi \wedge \psi &= (\sigma \uparrow \varphi) \uparrow \psi \\
\sigma \downarrow \varphi \wedge \psi &= (\sigma \downarrow \varphi) \cup (\sigma \downarrow \psi)
\end{aligned}$$

Otherwise, the outcome is $\mathbf{0}$.

The proclaimed difference between imperative and declarative updates resides in the difference between the atomic updates and the ‘meta-rule’ that the overall outcome of any update should be quandary free, or else it will be absurd. With the update with an atomic declarative, the inconsistent situations are ‘automatically’ removed from the state, via the explicit restriction that only consistent outcome situations are included in the result states. Therefore, if σ is quandary free, $\sigma \uparrow p$ will also be quandary free. This is different with imperatives. Here we do not remove the inconsistencies, so in case we have a state containing a possibility to not do a , the result of the update with a would contain a quandary and is therefore absurd.⁵ In short, an update with both $a \vee b$ and $\neg a$ will result in the absurd state, whereas the update with both $p \vee q$ and $\neg p$ will mean that q is the only option left. Apart from this, disjunction is ordinary set union and conjunction is, as in most dynamic semantics, sequential composition.

DEFINITION 4.9. A sentence φ is *accepted* in state σ iff $\sigma \subseteq (\sigma \uparrow \varphi)$. When φ is accepted in σ we may write $\sigma \Vdash \varphi$.

$$\varphi_1, \dots, \varphi_n \Vdash \psi \text{ iff } \forall \sigma \in \Sigma : \sigma \uparrow \varphi_1 \uparrow \dots \uparrow \varphi_n \Vdash \psi.$$

A sentence is accepted in a state iff we keep all old possibilities when we update with the sentence. The definition of validity is kept the same as in Veltman’s original system. To illustrate what the update clauses amount to, let me mention some of the validities in the update system.

⁵One way of dealing with inconsistencies in information using partial valuations is Tamminga (2004).

FACT 4.1. *The following entailments hold in the update system as defined.*

<i>De Morgan laws:</i>	<i>Double negation:</i>	<i>Identity:</i>
$\neg(\varphi \vee \psi) \Vdash \neg\varphi \wedge \neg\psi$	$\varphi \Vdash \neg\neg\varphi$	$\varphi \Vdash \varphi$
$\neg(\varphi \wedge \psi) \Vdash \neg\varphi \vee \neg\psi$	$\neg\neg\varphi \Vdash \varphi$	

Not valid are:

<i>Excluded middle:</i>	<i>Weakening:</i>
$\not\vdash \varphi \vee \neg\varphi$	$\varphi \not\vdash \varphi \vee \psi$

Recall that implication is defined in terms of disjunction, requiring that the antecedent is declarative. The update system validates a principle that could be called *ex absurdo sequitur quodlibet*: in the absurd state everything is accepted. Due to this principle, the negation of the antecedent is always accepted in Modus Tollens reasoning.

$$\mathbf{1} \uparrow p \rightarrow a \uparrow \neg a = \mathbf{0}$$

So, formally it is a valid inference scheme. Nevertheless, the assertion of the conditional antecedent is equally accepted as a conclusion as its denial is.

4.3 The Ross problem revisited

Often, people have proposed a pragmatic, Gricean solution to the disjunction problem that Ross presented. A disjunction is weaker than either disjunct, so if the speaker uses the weaker command, then apparently the stronger command was not appropriate. Consequently, any way of complying with the weaker command will do. Hence, the addressee infers a permission to perform either action (Hare, 1967). If the free choice were indeed an implicature, not the meaning, of disjunctive imperatives, it would be expected that it can be cancelled by other contextual means.

- (10) Have a cookie! ?So, effectively, have a cookie or have a chocolate.
- (11) Sing or dance! ?Guess which one.
- (12) Sing or dance! [Addressee starts to dance.] ?No, I meant sing!
- (13) ?Sing or be the emperor of China!

The imperative does not *describe* the speaker's attitude, so even if the speaker desires that only one disjunct be complied with, then communicating this still does not change the directive issued. Furthermore, whereas it is common that information grows in the course of time (14), denying one imperative disjunct can only be understood as *conflicting* with the earlier disjunction.

- (14) It is raining or it is snowing. . . . It is not snowing.
- (15) Go to the beach or go to the cinema. . . . ?Don't go to the beach.

Declaratives have preconditions and, in terms of those, we conceive of growth of information as an improvement of our knowledge of the actual world. So there is a natural incentive to acquire more information that explains why there is no conflict in a discourse such as (14). The first speaker will have given information to the best of his or her ability. The second speaker further improves on the state of information. Imperatives differ fundamentally from declaratives in this respect. There is no natural incentive to accept more restrictive instructions, because growth of commitments does not imply any improvement of one's cognitive state. It does not mean being better equipped to deal with decision problems. Someone who gives you less options is not being more informative, but such a person is simply more demanding. If your grandma tells you 'Have a cookie or have a chocolate' and your grandpa says 'Have a cookie', a natural response would be to reply 'Grandma told me I could also have a chocolate'.

I contend that there is no reason to believe that weakening is semantically valid for imperatives. Due to the partiality in the schedules, we can account for the invalidity of disjunction introduction for imperatives.⁶ The inference from 'post the letter' to 'post the letter or burn it' is not generally valid. Namely, in a context where 'don't burn the letter' has been accepted updating with the disjunction will lead to the absurd state. Despite this general invalidity, note that if we update the minimal state with 'post the letter' the disjunction *is* accepted. However, when we assume, as seems plausible, that the letter cannot be posted if it has been burnt, the possibility of having both commands on your schedule could be considered a quandary, for reasons of 'world knowledge'. In that case the Ross inference would come out as invalid even in the minimal state.⁷ With respect to declaratives, disjunction introduction is generally valid. A quandary free state will not become absurd once we add weaker information to it than is contained in it. So it is due to the difference in dealing with quandaries that we can account for the problem Ross encountered. This means that the entailment relation has, amongst others, the following properties.

⁶There are several other logical approaches to the problem of disjunctive imperatives. Meyer (1993) gives an explanation using dynamic logic, where imperatives are state transitions and a disjunctive imperative says that state transitions of either label will lead to 'safe' outcome states. Aloni (2003) argues that disjunctions are ambiguous between a descriptive and a free choice interpretation. On the latter interpretation they give rise to a partition of possible actions. Next to classical entailment, Aloni also proposes a semantic relation between sentences such that $A \approx B$ iff 'any way of complying with A is a way of complying with B '. Under this relation a disjunction is stronger than either disjunct.

⁷Such effects of world knowledge can be better modelled once we are able to express that an imperative has been fulfilled or not in a situation. Such an expansion will be provided in the next chapter.

FACT 4.2. Let $\varphi!, \psi! \in L_1$ contain only imperative atoms. Then these properties may be observed:

$$\begin{aligned} \varphi! &\not\models \varphi! \vee \psi! \\ \mathbf{1} \uparrow a &\Vdash a \vee b \\ \varphi! \vee \psi! &\Vdash \varphi! \vee \psi! \\ \varphi! \wedge \psi! &\Vdash \varphi! \vee \psi! \\ \varphi!, \neg\psi! &\not\models \varphi! \vee \psi! \end{aligned}$$

Note that the invalidity of the inference $\varphi! \not\models \varphi! \vee \psi!$ does not mean that $\varphi!$ is no longer accepted after the update with $\varphi! \vee \psi!$. A disjunctive imperative does not delete any standing commitments, it only (potentially) introduces new ones.

After the conjunction of two imperatives, their disjunction is always accepted. This is because the expansions resulting from both disjuncts is included in each schedule already. This may be considered counterintuitive by some, but I contend that if that is so it is because of a pragmatic consideration. When someone uses the disjunction then this is usually because it will suffice if the addressee comply with either disjunct. In case both actions must be performed, the disjunctive imperative is pointless (it has already been accepted), but not incoherent. In short, this seems to me a Gricean implicature from the maxim of informativeness, adapted to imperatives (Grice, 1975).

The last property in the above list is telling. The result of accepting $\varphi! \wedge \neg\psi!$ is that each schedule commits the addressee to perform a $\varphi!$ action and to refrain from any $\psi!$ action. If we then update with $\varphi!$ this will not have any effect, but if we update with $\psi!$ we expand each schedule in such a way that it commits to both perform and refrain from $\psi!$ actions. We then end up in an absurd state. It is therefore not because of a *logical* inconsistency that the second update leads us to the absurd state, but the reason is that the result of the update is an unacceptable schedule in one or more of our possibilities under consideration.

Consider, finally, the problem that we started out with. Subsequently updating with $p \rightarrow a$ and $p \rightarrow \neg a$ leads to the absurd state. It would be strange to conclude from two such conditional imperatives that 'apparently p is false, because it would entail inconsistent commitments'. Rather, we do want to keep p under consideration, but we have to protest at that point that the result of the two updates is unacceptable. That is, if it so *happens* that p , we will not be able to live up to our commitments.

4.4 Free choice permission

A problem closely related to that of Ross' paradox is the free choice permission problem (Kamp, 1973) which concerns the following pair of sentences.

- (16) a. You may go to the beach.
b. You may go to the beach or go to the cinema.

The problem is similar to the Ross problem. In standard deontic logic, where ‘may’ is an existential modal operator, disjunction introduction in the complement of permission is a valid principle. From that we may be inclined to conclude that using (16-a) would make the latter redundant. However, obviously this latter sentence gives you *more* permission than the first. Many solutions to this problem have been proposed. Those proposals have involved epistemic logic (Zimmermann, 2000), situation semantics (Rohrbaugh, 1996), lumping (van Rooy, 1999), Boolean modal logic (van Benthem, 1979), and more. The solution to the free choice permission problem Kamp himself proposes is to introduce an alternative entailment concept that captures the idea that permission sentences *give* permission and allow the addressee more freedom than he or she had before. Update semantics clearly presents a promising candidate to formalize such a dynamic conception of permission.⁸

In line with the update semantics of Veltman (1996), let me introduce a modal operator *may* that takes any sentence from L_1 as its argument. We do not allow for recursion: the *may*-sentences are not arguments of other sentences. Unlike in Veltman’s approach, the modal sentences will not be *tests* on the state, merely checking whether the state satisfies some formal condition, but they will give rise to changes of state. A *may* sentence adds the possibility that the embedded sentence be accepted in the state, while keeping the initial possibilities as well. When *may* scopes over an imperative, i.e., it is a deontic modality, the result will be that the addressee is given a choice. Due to the fact that imperatives have to maintain quandary freedom and so cannot contradict previously generated possibilities, the possibility generated by the deontic *may* sentence constitutes a *right*. If the same modal operator scopes over a declarative sentence, i.e., an epistemic modality, the formal result will be the same. Nevertheless, declarative sentences ‘automatically’ exclude inconsistent possibilities, so the possibilities generated by weak epistemic modal sentences do not have to be maintained in the future. Effectively, epistemic *may* is then the same as *might* in Veltman’s system.

A permission update is not required to be quandary free. If that were so, the consecutive update with *may a* and *may ¬a* would always lead to absurdity. On the other hand, permission is not without coherence constraints either. A *may* sentence such as in (17) is interpreted as giving ‘unconditional’ permission. This explains why it is strange in its context. The permission conflicts with the earlier conditional prohibition. Though we may be inclined to interpret the permission as a correction or as a retraction, this already indicates that the absurd state has been reached.

(17) If you haven’t done the dishes, then don’t go out. ?You may go out.

With an atomic declarative the situation is different. Now the *may* update is possible if the information provided by the embedded sentence is *compatible* with the information in the state.

⁸Van Rooy’s semantics is also a dynamic one. His approach combines update semantics with situation semantics and belief revision.

(18) If John is ill, then he is not in the office. John may be in the office.

One way of expressing this difference is that a 'weaker' form of quandary freedom is implied by permission giving. The update with a permission sentence requires that for all possible *situations* kept open in σ there is at least quandary free one outcome possibility that contains that situation (or an expansion thereof). In other words, the permission means that you must always be able to choose a schedule in which the granted permission is acted on. The idea of various degrees of quandary freedom has been proposed by Hamblin (1972) as well. The proposed notion of quandary freedom is comparable to what he calls 'strategic quandary freedom': the agent can always play a strategy to avoid ending up in a quandary. Here, permission will be defined as saying that a strategy can be adopted in which the permitted action is performed and one steers clear of quandaries. One way of implementing this idea is presented next.

DEFINITION 4.10. A *strategy* in σ is any $\sigma' \subseteq \sigma$ for which it holds that for all $i \in \sigma$ there is a $j \in \sigma'$ such that $s_j \subseteq s_i$.

A strategy is a set of possibilities under consideration such that every contingency is 'covered' by it. No matter what further information you gather in the future, the actual world will turn out to be an extension of one of the situations in the strategy-set. Using this notion of a strategy, we can say what the constraint is on permissions.

DEFINITION 4.11. If $\varphi \in L_1$, then $\text{may } \varphi \in L_2$. The update with a sentence in L_2 is defined as follows.

$$\sigma \uparrow \text{may } \varphi = \sigma \cup \{i \in (\sigma' \uparrow \varphi) \mid \sigma' \text{ is a strategy in } \sigma\},$$

if there is a strategy σ' in σ such that $\sigma' \uparrow \varphi$ is quandary free. Otherwise, it is is $\mathbf{0}$.

Comparing this definition with the update clauses for simple imperatives, we can see that the constraint imposed on simple imperatives is an *absolute* form of quandary freedom: it could be rephrased by requiring that not just in some strategy in σ you can steer free of quandaries, but that this requirement must hold for the entire set σ .

Given the weaker constraint, we do find that $\mathbf{1} \uparrow \text{may } a \uparrow \text{may } \neg a$ is not absurd. But in line with the observation concerning (17), $\mathbf{1} \uparrow p \rightarrow \neg a \uparrow \text{may } a = \mathbf{0}$. In the latter example, the first update creates two possibilities, one with p false, the other with p true and a forbidden. This means that the only strategy in this state is the state itself: neither possibility has a situation that is a subset of the other. Therefore the update with the a has to be absolutely quandary free in that state. That is not the case, so the update yields absurdity.

Let me move on to disjunction. On the basis of the above definitions, the free choice permission problem is immediately resolved. To see this, observe first that when σ' is a strategy in σ , it will also be a strategy in $\sigma \uparrow \text{may } \varphi$, for any σ and φ .

(This is so provided that the mentioned update does not lead to the absurd state. In that case all sentences are trivially accepted, including all *may*-sentences, so then the free choice inference would also be valid.) If i is a possibility in $\sigma \uparrow \text{may } \varphi$, then there will always be a possibility j in σ such that $s_j \subseteq s_i$. That is, either $j = i$ is already present in σ , or j has been introduced by the update as an extension of a possibility i in σ .

Now, according to the definition, if we know that $\sigma \uparrow (\varphi \vee \psi)$ is non-absurd, then there must be a strategy σ' in σ such that $\sigma' \uparrow (\varphi \vee \psi)$ is quandary free. This can only be the case when both $\sigma' \uparrow \varphi$ and $\sigma' \uparrow \psi$ are quandary free. Given that, as has been pointed out above, σ' is also a strategy in $\sigma \uparrow \text{may } (\varphi \vee \psi)$, we know that in the latter state, *may* φ and *may* ψ can both be non-absurdly updated with. Finally, taking into consideration that non-absurd *may*-updates preserve all the possibilities that occur in the input state, we conclude that both *may* φ and *may* ψ are accepted in $\sigma \uparrow \text{may } (\varphi \vee \psi)$.

FACT 4.3. *The following inferences are valid.*

$$\begin{aligned} \text{may } (\varphi \vee \psi) &\Vdash \text{may } \varphi, \\ \text{may } (\varphi \vee \psi) &\Vdash \text{may } \psi. \end{aligned}$$

In the literature on permission sentences it has been observed that there is also a ‘wide scope disjunction problem’: the inference from (19-a) to (19-b) seems to be valid as well (Zimmermann, 2000; Geurts, 2003).

- (19) a. You may take a cookie or you may take an apple.
b. You may take a cookie.

How should this be understood. I contend that it is not by arguing that the disjunction here scopes over two deontic modal statements. From the above definition of ‘may’ it is already clear that it functions not as a modal statement, but as a characterization of a certain type of update. So in fact, *may* is closer to a *mood* marker than to a modal operator. This can also be observed from several other uses of ‘may’ in English.

- (20) May he live long.
(21) Be that as it may, ...
(22) If it may happen that ...

Mood, as I have tried to argue before, is not an operator over a sentence. It is not at all uncommon for one mood to be expressed twice in a sentence, or in combination with a modal expression that does the same as what the mood expresses.

- (23) If it might at all be possible that ...
(24) You may perhaps remember that, if I’m correct, we met last year at the summer school.

The second disjunction problem shows that 'may' can be used as a mood marker, instead of as a modal operator. We should therefore not attempt to explain its scope relative to the logical or semantic operators, but treat it in a way comparable to, e.g., the past tense in English. That is to say, English is a so-called 'sequence-of-tense' language, and (19-a) can be similarly understood as an instance of 'sequence-of-mood'. The speaker is indicating in every clause that the embedded imperatives stand in the permissive mood, i.e., that the new possibilities do not *replace* the old ones, but they are to be *added* to those old ones. Consequently, I do not consider (19-a) to be a logical, or semantic problem.⁹ The logical form of wide and narrow scope permission sentences is the same. This is not to say that there are many interesting issues that the example raises, concerning the expression of mood in English, but it is not an issue for the 'semantics of modality', strictly speaking.

4.5 From schedule to plan, from information to belief

In standard deontic logic¹⁰ it is a theorem that whatever is not forbidden is permitted. This theorem has been contested by many authors. As von Wright (1996) puts it, it is not a matter of *logic* that this rule should hold in a norm system. Instead, it is a *meta-rule* stating a closure condition on such a norm system. So a legal system will sometimes contain the principle *nullum crimen sine lege*, "no fault without a law". This means that whatever is not forbidden by the legal system is *thereby* permitted in it. If the authority wishes some action were forbidden, it should have made this explicit. As von Wright points out, it is not unthinkable that we would have a different meta-rule. For instance, it could also be stated that whatever is not permitted is thereby forbidden, or that in case something is not covered by the law the person should *ask* permission first.

In the semantics developed here, a duality between permission and obligation is not logically entailed. Some things will be forbidden, i.e., the imperatives that are evaluated as 'don't'. Some other things will be permitted, namely the imperatives that are on at least one schedule evaluated as 'do' (on the assumption that the actual world is as represented in the situation with which the schedule is paired). Note that such possibilities cannot be overruled by an imperative that conflicts with it. In this sense permissions are *rights* (see below). But due to the partiality in the schedules there may be things left 'open' by the state. So what is their status, and to what extent is it a matter of semantics to decide this?

Given that an agent is in a state where he or she knows that whatever the situa-

⁹Though note that, if we were to introduce disjunction between modal sentences, we would most likely get that $\sigma \uparrow (\text{may } a \vee \text{may } b)$ would lead to the expansion of σ with both the possibilities obtained by either permission. So, here too, the free choice would be a natural consequence.

¹⁰See (von Wright, 1951a; Hilpinen and Føllesdal, 1981). In this logic obligation is a universal modal operator and permission is its dual. Its axiom system is **K+D**, where **K** is the axiom that if $\varphi \rightarrow \psi$ is obligatory, and so is φ , then ψ is obligatory as well (modal modus ponens). **D** is the axiom that whatever is obligatory is permitted.

tion may be, there is a possibility to choose a schedule π . Then, supposing that the agent decides to adopt this schedule, there may still be more things he or she might decide to do, provided they are not incompatible with the prohibitions existing in π . So, when choosing a schedule to actually perform, in principle all extensions of π are possible. Those considerations about the possible things to do are expressed in English with modality. With a modal auxiliary such as ‘might’ we can express the possibilities that remain when we have to make a plan on the basis of our state. The use of ‘will’ indicates that all possible plans inevitably will contain some action. It is in the meaning of these modal auxiliaries that von Wright’s closure conditions are integrated into the formalism. If, given my possibilities under consideration, I say that I might go home, this implies that this option is left open by those possibilities. If I would say that I will go home, then not going home is not an option.

What I want to propose, furthermore, is that in fact a similar view on declaratives must be adopted. On the basis of the information we have, we can adopt certain beliefs, expectations, and so forth, to the extent that those are compatible with this information. So we can also consider situations larger than the ones that are in our states. In fact, when we assume that the agent only considers *complete* situations, i.e., worlds, then the evaluation of declaratives in such a state comes down to checking whether its truth conditions are secured in it. For each possibility we can then only say whether the truth conditions of some declarative sentence are met in it.

Given a state σ , we can give its *potential expansion* as the set of complete possibilities it leaves open. These are the possibilities that may enter into the considerations of the agent forming plans or beliefs on the basis of the information and commitments gathered in σ . In practice not all of these possibilities may be seriously considered, possibly because of expectations that operate in the background (cf. Veltman, 1996).

DEFINITION 4.12. A situation s is a complete valuation iff for all $p \in \mathcal{P}$, either $\langle p, \text{TRUE} \rangle$ or $\langle p, \text{FALSE} \rangle$ is in s . Similarly, a schedule π is a complete valuation iff for all $a \in \mathcal{A}$, either $\langle a, \text{DO} \rangle$ or $\langle a, \text{DON'T} \rangle$ is in π .

Given a quandary free state σ , its *potential expansion* is σ^* , where $i \in \sigma^*$ iff $\exists j \in \sigma$, such that $s_i \supseteq s_j$ and $\pi_i \supseteq \pi_j$ are both complete valuations.

Using this notion we can define the meaning of the modal operators *might* and *will*. They function as *tests* on the cognitive state. If the test succeeds, then nothing changes, but if the test fails then the absurd state is returned (Veltman, 1996). I do not mean to suggest that this reflects a fundamental distinction in natural language between ‘may’ and ‘might’ or ‘will’, the one functioning as an update and the other ones as tests. What I intend to do is keep apart the function of *introducing* a possibility, i.e., *making* something possible, and the function of testing whether or not something is still possible as far as the information and commitments go.

DEFINITION 4.13. If $\varphi \in L_1$, then *might* $\varphi \in L_2$, and *will* $\varphi \in L_2$. The update with a sentence in L_2 is defined as follows.

$$\begin{aligned} \sigma \uparrow \textit{might } \varphi &= \sigma \text{ if } (\sigma^* \uparrow \varphi) \neq \mathbf{0} \\ &\quad \mathbf{0} \text{ otherwise} \\ \sigma \uparrow \textit{will } \varphi &= \sigma \text{ if } (\sigma^* \uparrow \varphi) = \sigma^* \\ &\quad \mathbf{0} \text{ otherwise} \end{aligned}$$

FACT 4.4. *If φ contains only declaratives and is a tautology of proposition logic, then $\Vdash \textit{will } \varphi$.*

4.6 Concluding remarks

In this chapter I have proposed that we distinguish imperatives and declaratives in the following respect. Declarative sentences provide information, that may be overridden by stronger, more specific information. Accepting imperative sentences means committing yourself to some action. The possibilities induced by the acceptance of imperatives may not be overridden. It has been shown that the framework of update semantics can be used to attribute a uniform meaning to sentential connectives. Seemingly, the differences between declaratives and imperatives in relation to those connectives and to modal auxiliaries can be accounted for in terms of their basic update function, rather than by having different interpretation mechanisms for the complex sentences. This way, the Ross paradox and related puzzles are naturally resolved.

On the basis of states representing information and commitments we develop beliefs and plans. This means that we expand the possibilities under consideration in the states to their possible, complete extensions. With this step we move beyond the process of acquiring information and commitments itself and consider the way the agent can *use* its output in other cognitive activities. I have argued that it is here that we must locate the 'meta-rules' von Wright discussed for deontic logic and, furthermore, we should treat the relationship between information and belief in a similar fashion. I have assumed, for the sake of simplicity, that these extensions consist of all and only complete valuations. Further research will have to say what would be a more reasonable analysis of this process.

The limitations of the semantics presented here are clear. The language does not allow us to express that an imperative has been fulfilled, or that it has not, nor have tense and imperative subjects been taken into account. The next chapter builds on the present one, by introducing a richer language and ontology that will help to account for the phenomena observed earlier.

Actions in a semantics for imperatives

In the various attempts at giving a semantics for imperatives people have taken recourse to propositions, events or comparable entities in order to be able to express the semantic relations between imperatives and declaratives. According to such theories the fulfillment of an imperative is definable in terms of the truth of one or more declaratives, because the first commands either the truth of the second or (the occurrence of) the event that the second asserts. This means that semantics treats the relationship between the moods as *syntactic*. In the first chapter I have argued that this is not the right approach, because it does not allow us to explain the difference in ‘content structure’ (Belnap, 1990) between sentences in those different moods. That argument was further supported by the discussions of various properties of infinitives, hortatives and imperatives in the second and third chapter. I argued that the difference between imperative and declarative sentences is *perspectival* in nature and that the connection between the two must be sought in the cognitive reality of ‘learning by imitation’. Imperatives direct an addressee to perform an action and the agent is not internal to the concept of action. Furthermore, the action is always understood as a capacity at a certain point in time, hence the perspective on actions is never as something completed or past of the reference time. Declarative sentences describe events and when such an event is the performance of an action the agent is a necessary part of it. In order for it to be described we have to take a perspective on the event as complete or ongoing. So there is a concrete content difference between imperatives and declaratives concerning the agent and the temporal perspective taken.

In this last chapter I will present a formal proposal for a semantics of imperatives in which their connection with declaratives is mediated by the ontology. It will be shown that this presents us with a more natural analysis of, amongst others, the imperative subject and the temporal interpretation of imperatives. Apart from this semantics of simple imperatives, I will also make good on the suggestions made in the course of the third chapter, in which it was argued that imperative sentences can be semantically complex: past tense, irrealis, third person. A considerable part of the chapter

is devoted to the introduction of a semantic interpretation of tense, modality, and hortative ‘let’, which allows us to explain the meaning of those complex imperatives. Furthermore, I discuss the phenomenon of ‘mixed mood’ or ‘pseudo-imperative’ sentences, where an imperative and a declarative clause are coordinated by means of ‘and’ or ‘or’. As a final point, I discuss one issue that I have sidestepped in the entire thesis, namely the aspectual interpretation of imperatives. It will be shown that there we find still more problems that warrant a semantic study of imperatives in their own right.

5.1 An ontology of actions and events

The complement of deontic modality

The idea that for a sufficiently general representation of reasoning we need (simple or complex) terms representing actions *proper*, besides propositions describing the *performance* of those actions, was already expressed by von Wright (1951a) with his introduction of ‘Deontic Logic’. The deontic modal operators ‘Obligatory’ and ‘Permitted’ scoped over actions such as ‘theft’, ‘murder’ and ‘smoking’. As a consequence, the person(s) who is (are) the subject to which the deontic statements applied had to be decided contextually. That theft is forbidden means that ‘we’, those living under the moral code in question, are not permitted to steal.

As Geach (1981) points out, for unclear reasons this idea about the complement of deontic operators was altered in subsequent work in the field of deontic logic and, to Geach’s reasoned opinion, this was not for the better. In line with the standard intensional semantics of modal operators (Kripke, 1963), the analysis of deontic judgments was revised to the form of an intensional operator over a propositional content. In effect, the statement that theft is forbidden became reformulated as stating that ‘it is forbidden that it so happens that you steal’. One of the principal objections against this development Geach mentions is that it incorrectly predicts sentences such as the following two to be logically equivalent.

- (1) a. John ought to beat up Tom.
- b. Tom ought to be beaten up by John.

Under the interpretation of ‘ought’ as a propositional operator, both sentences would be translated as ‘ought(John beats up Tom)’. Geach claims that there is no inconsistency in asserting one of them and denying the other. This is perhaps a bit too strongly put, but certainly the sentences do not mean the same. The first sentence attributes an obligation to John to perform the action of beating up Tom, whereas the second sentence expresses that Tom deserves to undergo a beating up by John. If John complies with the obligation then Tom will get what he deserves, but that is not to say that the sentences mean the same. Precisely this attribution of what the person is obliged to do or deserves to undergo is what cannot be expressed in the language of propositional deontic logic.

Geach proposes to reinstate von Wright’s original analysis of ‘ought’ by formalizing

it as an operator over predicables.¹ Thus, given a predicate ‘beat up Tom’ we can form the predicate ‘ought to beat up Tom’ and predicate this of John. This idea, merely sketched by Geach, has led to a number of more detailed proposals by several deontic logicians. Lokhorst (1999) attempts a direct formalization of Geach’s idea by implementing it in modal logic with lambda abstraction. In this logic ‘ought’ is interpreted as an intensional abstraction operator, such that for every $\lambda x_1, \dots, x_n A$ also $Ox_1, \dots, x_n A$ is an expression of the language. The evaluation of this operator is done by means of the reduction

$$Ox_1, \dots, x_n A =_{\text{def.}} \lambda x_1, \dots, x_n \mathbf{O}A$$

Here, \mathbf{O} is a standard propositional modal operator that can be defined in turn by $\mathbf{O}A =_{\text{df.}} \Box(\neg A \rightarrow V)$, with \Box the alethic modal operator and V the propositional constant ‘All hell breaks loose’ (cf. Anderson, 1958). Though Lokhorst now claims that $Ox(Bjx)t$ and $Ox(Bxt)j$ are not logically equivalent, it is easy to see that in fact they are. Both sentences say that ‘necessarily, if John does not beat up Tom, all hell breaks loose’.

Other authors have proposed indexing the deontic modal operators (Hilpinen, 1969; Thomason, 1981). A deontic sentence then reads ‘It is obligatory for John that John beats up Tom’. Horty and Belnap (1995) instead index action modalities and let a deontic operator scope over such action modal sentences. Those sentences then say that ‘It is obligatory that John sees to it that John beats up Tom’. In both ways the equivalence described above no longer holds. What is obligatory for one person need not be obligatory for another, and if it is obligatory that John sees to it that some proposition is true then it need not be obligatory that Tom sees to the same thing.

However, on both approaches extra constraints are needed to explain why with deontic modal sentences you cannot express that someone has an obligation that concerns the actions of other persons, or why not everything that you can see to can be expressed as being obligatory with deontic modal sentences. Arguments against identifying doing with making a proposition true have been provided in §1.2. The fact that deontic statements concern actions is not circumvented by talk of obligations-for-someone, nor by talk of someone-making-true something. One option would be to combine the ideas of Lokhorst and Hilpinen, by indexing obligation under abstraction. Then we would get sentences of the form $\lambda x.O_x P x(x)$. Again, there is no theory internal motivation for why the obligation variable could not be bound by a different abstractor than the one binding the argument of the predicate. In this chapter I will provide such a motivation, by letting deontic modal operators *connect* the subject to the verb phrase. The latter will not be something that itself needs an individual argument, but it is semantically interpreted *relative to* the subject of the deontic modal sentence as a potentiality. More precise, deontic modal statements present the

¹Other authors have proposed comparable analyses. So, for instance, Schmerling (1983) treats modal auxiliary verbs in English as (finite clause) subject transformers and Butler (2002) interprets root modals as verb phrase operators in a minimalist framework.

obligation from the first person point of view. For the sake of simplicity I will equate this point of view with the notion of action, though I will also say something about undergoing as a 'passive' analogue of action.

Actions and events

Adding a distinction between actions and events will allow us to systematically explain the 'future orientation' and subject properties of imperatives as well as some related clauses such as hortatives and infinitives. There are two aspects to the distinction: a temporal one and an agentive one. The temporal side to the distinction is the 'future orientation' of the action perspective and the 'past orientation' of the event perspective. All occurred events taken together make up the history of the world, an action is a way of continuing that world into the future. In using declarative sentences the speaker has to take up a perspective, real or imagined, from which the event predicated is seen as *complete* or *ongoing*.

Declarative sentences may be used to talk about the future, but they can only be used to *describe* the world at some time insofar as that world is assumed to be completed up to that time. To some extent we can think of the future as a decided matter of fact. In those cases a simple present tense is used in English (Steedman, 2000).

(2) I fly to London tomorrow.

Other circumstances in which we use simple present declarative sentences to talk about the future is in making bets.

(3) The coin comes up heads.

These sentences can perhaps be said to have a truth value, depending on one's position regarding (ant)actualism (Burgess, 1980), but they are not descriptions of the world. They do not have an information content that can be accepted by the addressee. In terms of the discussion in the previous chapter we could say that these sentences do not have any preconditions for appropriate usage. If the speaker wants to speak about some event that is expected to occur in the future, though it is not certain that this will be the case, a modal auxiliary such as 'will' is necessary. I consider this use of modality an indication of a *shift* in temporal perspective to some imagined future time from where we can see the event as a realized part of the world. I will make an idealization and say that imperative sentences can be used for precisely those times for which declarative sentences cannot be used. Imperative sentences can only be used to give instructions for actions at some point in time to the extent that the world has not already been completed up to and including that time.

The agentive aspect to the distinction is intended to account for the range of constructions, including imperatives, control infinitives and subjectless gerunds, in which the subject is simply absent and the agent of the action is interpreted as a

conversational perspective from which the utterance must be interpreted. An overt subject (agent identifier) functions as an operator setting or changing the conversational perspective for the utterance, not as a part of the action commanded with the sentence. In contrast, declarative sentences—at least those describing actions being performed—require an explicit agent identifier.

In order to talk about events in formal semantics it is a common practice to introduce a domain \mathcal{E} of event types e . Parallel to this set I will assume a primitive set \mathcal{A} of action types a . Besides these two, we will need a domain \mathcal{D} of objects d , a subset \mathcal{P} of which consists of all agents. The events and actions are linked by means of a *perspectival map*:

$$\mu : (\mathcal{A} \times \mathcal{P}) \rightarrow \mathcal{E}$$

This map is an injective function that gives us, for every pair of action type a and person p , the event that we will understand as ‘the performance of a by p ’.

Furthermore, we will need to assume a set \mathcal{R} of roles, including at least those of *agent* and *patient* or *undergoer*. A function *role* assigns to some of the members of this set, given an action or event, an object from the domain.

$$role : ((\mathcal{A} \cup \mathcal{E}) \times \mathcal{R}) \hookrightarrow \mathcal{D}$$

For instance, if e is an event of Sasha hurting Dirk, the assignment will be $role(e, agent) =$ Sasha and $role(e, patient) =$ Dirk. It need not be the case that all roles are assigned for an event. For instance, the role of ‘theme’ or ‘source’ (Dowty, 1991) may not be defined for the above event. Actions, too, have thematic roles. The action of hurting Dirk has Dirk as patient.

The roles of *agent* and *patient* have special significance as will be clear from the above discussion. They are not mere accidental properties of objects in events, but they are understood *on the basis of* the perspectival mapping. As a consequence, we will assume a constraint on this assignment function that $role(e, agent) = p$ iff $e = \mu(a, p)$ for some a , otherwise the value is undefined. This means that the role of agent is not defined for any action.

DEFINITION 5.1. The following are all primitive sets: \mathcal{A} is a set of actions, \mathcal{E} a set of events, \mathcal{D} a set of objects, and $\mathcal{P} \subseteq \mathcal{D}$ a set of persons. The perspectival map μ is

$$\mu : (\mathcal{A} \times \mathcal{P}) \rightarrow \mathcal{E}.$$

\mathcal{R} is a set of thematic roles, containing at least *agent*. The function

$$role : ((\mathcal{A} \cup \mathcal{E}) \times \mathcal{R}) \hookrightarrow \mathcal{D}$$

states which objects play which role in the event or action, respectively. The role *agent* is not assigned for actions, and $role(\mu(a, p), agent) = p$.

5.2 Agentivity and arguments

Declarative sentences will be interpreted in terms of events, imperative sentences in terms of actions. Because the agent is *external* to the action and *internal* to the event, we can use this distinction to account for the grammatical phenomenon observed in earlier chapters. Namely, that in imperative sentences, as well as many other action-constructions, reference to the agent is optional. As was argued before, this optionality is not merely a matter of whether or not the subject is *pronounced*, rather the subject is really *absent* in both a syntactic and semantic sense. Still, the imperative subject can really be said to be a subject, rather than a vocative.

Granted that the optional imperative subject is not a parameter of the simple imperative, but an operator over an atomic subjectless imperative, this has certain consequences for the definition of such atomic sentences. Imperative and declarative sentences are built with the same verbs and arguments, but the atomic imperative sentence ‘Hand me the knife’ has only two arguments, whereas the declarative ‘John hands me the knife’ has three. The former sentence is interpreted as commanding an action (handing the speaker the knife) to John, the latter as describing an event (John handing the speaker the knife).

The language of actions and events

Using the ontology of actions and events, and the link between the two, we can say how imperatives are directives for action, whereas declaratives are assertions about events, without there being any element in the sentences that represents those events or actions itself. In the simplified conception of syntax I will be using a basic sentence consists of a verb and zero or more noun phrases. The noun phrases—in the most elementary form they are names—denote objects in the world, the verb relates those objects in a particular way. If the sentence is declarative the verb designates a particular configuration of the objects. If, on the other hand, the sentence is imperative, the verb designates a specific way in which the addressee is to engage the objects, i.e., to configure him- or herself with respect to the objects.

First the names. Let \mathcal{N} be a set of names n . They are interpreted as rigid designators by means of a function $[[\cdot]] : \mathcal{N} \rightarrow \mathcal{D}$. So $[[\text{John}]]$ is the object $d \in \mathcal{D}$ that is denoted by the name John.

Besides names we have verbs. They form a set \mathcal{V} of symbols V , such that V^\times and V° are function symbols.² The first will be the verb as used in an imperative sentence (pointing to the action that the verb names), the second is the verb as used in a declarative sentence (pointing to the event of someone performing the action).

If V^\times is a k -ary function symbol and $n_1, \dots, n_k \in \mathcal{N}$, then $Vn_1, \dots, n_k!$ is a sentence. These are the imperative and subjectless infinitive clauses, such as:

²Of course not all verbs can be used in imperatives. So there would also be individual level verbs that do not occur in imperatives. They are disregarded here.

- (4) a. Walk.
 b. Hit Bill.
 c. Give Susan the phone.

Note that there are also nullary imperative verbs (e.g. ‘walk’), in which case the sentence consists of only a nullary function symbol. The exclamation mark does not have a semantic function other than to indicate the particular way the sentence is to be analyzed, i.e., as imperative. It does not contribute a force item or operator, but it indicates that the verb is interpreted as the function V^\times , not V° . We can think of it as a special imperative morpheme, though not one that has a semantic content of its own.

The arguments of the verb assign to objects the roles they play in the action. This role assignment is done by a function ϑ . If V^\times is a k -ary function symbol, then $\vartheta(V^\times) \in \mathcal{R}^k$. For this k -tuple it is required that (i) no two items are the same, (ii) no item is *agent*. To give some examples:

- $\vartheta(\text{Walk}^\times) = \emptyset$;
- $\vartheta(\text{Hit}^\times) = \langle \textit{patient} \rangle$;
- $\vartheta(\text{Give}^\times) = \langle \textit{goal}, \textit{theme} \rangle$.

The atomic imperative sentence commands an action. That is to say, applying the function denoted by the verb to the denotations of the names yields the action denoted by the sentence. The function denoted by the verb is $V^\times : \mathcal{D}^k \rightarrow \mathcal{A}$, with k the arity of the verb. This means that:

$$V^\times(\llbracket n_1 \rrbracket, \dots, \llbracket n_k \rrbracket) \in \mathcal{A}.$$

The possible meanings of verbs are constrained by the *role* assignment function. As follows: if $V^\times(\llbracket n_1 \rrbracket, \dots, \llbracket n_k \rrbracket) = a$, then for all i , $\textit{role}(a, \vartheta(V^\times)_i)$ will have to be $\llbracket n_i \rrbracket$. For example, if *Hit Bill* gives us a , then $\textit{role}(a, \textit{patient})$ must be $\llbracket \text{Bill} \rrbracket$. I will write $\llbracket n_1, \dots, n_k \rrbracket$ as a shorthand for $\llbracket n_1 \rrbracket, \dots, \llbracket n_k \rrbracket$.

From here we move to declaratives. To each imperative correspond the declaratives that predicate the action of some agent. Here are some examples again.

- (5) a. John walks.
 b. Sally hits Bill.
 c. Branford gives Susan the phone.

Put simplistically, these declaratives are the result of preposing a name to the imperative sentence. So they are $n_{k+1} V n_1, \dots, n_k$, though I will write this with the verb preceding all of the arguments, merely for ease of notation. So, $V n_{k+1}, n_1, \dots, n_k$ for declarative sentences. Again the punctuation sign indicates the way the verb is interpreted.

The declarative sentence is interpreted by means of the function V° . The role assignment function for it will be $\vartheta(V^\circ) = \langle agent, r_1, \dots, r_k \rangle$, such that $\langle r_1, \dots, r_k \rangle = \vartheta(V^\times)$. The first, nominative argument represents the agent of the event. This is the role that was absent in the imperative representation. Note that this rule, in combination with the requirement on the role assignments that they not assign the same role to more than one argument, also implies that imperative sentences cannot have an agent-argument.

The perspectival dualism adopted here leads us to the following interpretation of declaratives:

$$\text{if } V^\times(\llbracket n_1, \dots, n_k \rrbracket) = a, \text{ then } V^\circ(\llbracket n_{k+1}, n_1, \dots, n_k \rrbracket) = \mu(a, \llbracket n_{k+1} \rrbracket).$$

To summarize the proposal, here are the definitions of language and interpretation.

DEFINITION 5.2. Let \mathcal{N} be a set of names, and \mathcal{V} a set of verbs. Then for each $V \in \mathcal{V}$, $V^\times : \mathcal{D}^k \rightarrow \mathcal{A}$ and $V^\circ : \mathcal{D}^{k+1} \rightarrow \mathcal{E}$ are the two application functions of the verb. The language \mathcal{L}_0 consists of all strings of the form $Vn_1, \dots, n_k!$ and Vn_1, \dots, n_{k+1} . for all $V \in \mathcal{V}$ such that V^\times is a k -place function, and for all $n_1, \dots, n_{k+1} \in \mathcal{N}$.

On the basis of this language of atoms we will again introduce \mathcal{L}_1 as the language of connectives, as well as some other operators, in the same way as it was done in the previous chapter. Sentences are used in order to command the performance of actions resp. to assert the occurrence of events. The names in the sentences stand for the objects playing certain roles in those actions and events.

The actions and events denoted by the sentences must correspond to the role assignments in the ontology, and the declaratives must represent the events that are the performances of the actions under the perspectival map. Therefore the interpretation of terms and sentences proceeds as follows.

DEFINITION 5.3. Names are interpreted by the rigid designation $\llbracket \cdot \rrbracket : \mathcal{N} \rightarrow \mathcal{D}$. As a shorthand, $\llbracket n_1, \dots, n_k \rrbracket$ is written instead of $\llbracket n_1 \rrbracket, \dots, \llbracket n_k \rrbracket$. Roles are assigned by the function ϑ . If V^\times is a k -place function, then $\vartheta(V^\times)$ is an array of k different roles. Furthermore, if $\vartheta(V^\times) = \langle r_1, \dots, r_k \rangle$, then $\vartheta(V^\circ) = \langle agent, r_1, \dots, r_k \rangle$.

The functions V^\times and V° have to meet the following constraints:

$$\begin{aligned} \text{if } V^\times(\llbracket n_1, \dots, n_k \rrbracket) = a, \text{ then } \forall i(1 \leq i \leq k \Rightarrow \text{role}(a, \vartheta(V^\times)_i) = \llbracket n_i \rrbracket); \\ \text{if } V^\times(\llbracket n_1, \dots, n_k \rrbracket) = a, \text{ then } V^\circ(\llbracket n_{k+1}, n_1, \dots, n_k \rrbracket) = \mu(a, \llbracket n_{k+1} \rrbracket). \end{aligned}$$

In the remainder it will often be convenient to write a_φ and e_ψ for the action commanded by $\varphi \in \mathcal{L}_0$ and the event asserted by $\psi \in \mathcal{L}_0$ respectively.

Passive voice

One issue which is of importance but will not be discussed hereafter, is the passive voice. For both types of sentences there is a ‘passive’ voice. That is:

- (6) a. *Be walked.
 b. Be hit.
 c. Be given the phone.
- (7) a. *Is walked.
 b. Bill is hit.
 c. Susan is given the phone.

Verbs like ‘walk’, which do not have a direct object, do not have a passive form. The passive voice requires that the first argument is ‘stripped off’ so to speak. To some extent we could also get ‘The phone is given’, but, I contend, only insofar as it is clear from the context to whom the phone is given. The passive forms of action sentences are concerned with things that might happen to you: what you experience, undergo. The passive forms of event sentences describe states of objects that occur in the process of (or as a result of) some event taking place. For those two types of sentences we can introduce two types of entities: things that someone can *undergo* $u \in \mathcal{U}$ and things that can *happen* to someone $h \in \mathcal{H}$.

To what extent are they really necessary as primitive ontological concepts? Whenever it is true that Bill is hit, then there exists an event of someone hitting Bill. Consequently, we may think of the passive construction as denoting a subevent of the active one. However, in what sense is it an event, properly speaking? It cannot really be individuated, since a hitting event always requires two objects: the one hitting the other. If we decompose the hitting event we may come up with something like the following: Sally swinging her arm, the arm moving through the air, the fist hitting Bill’s nose, and Bill going to the ground. Amongst these subevents there is none of ‘Bill being hit’. It would not be natural to reanalyze the hitting relation into two properties: one of someone hitting and one of someone being hit.

In the passive sentence we *abstract away* from the hitting agent, it is not part of the way the scene is conceptualized. This is not in the same sense as the agent is not internal to the action: there it is due to the fact that we view the action through the eyes, being engaged in the action, whereas here it is because of topicalization. It is not that we do not perceive of the fist hitting Bill, but we do not concern ourselves with the object hitting Bill, the interaction that took place. The only thing that concerns the utterer of the passive sentence is the change-of-state Bill endures.

The issue is clearer for the things a person undergoes. It would not make any sense to call the experience of ‘being hit’ part of the action of hitting Bill. Actions and ‘undergoings’ constitute two *complementary* first person perspectives on events. The first views it from the agent’s side, the second from the patient’s side.

I propose the following passive perspective map.

$$\mu\text{-pass} : (\mathcal{H} \times \mathcal{P}) \rightarrow \mathcal{E}$$

This function gives, for every h and d , the event of that object being the agent ‘behind’ the state. For example, if h is Bill being hit, then $\mu\text{-pass}(h, \llbracket \text{John} \rrbracket)$ is the event of John hitting Bill. Consequently, if $e = \mu\text{-pass}(h, d)$, then $\text{role}(e, \text{agent}) = d$. The role of agent is not defined for these ‘happenings’. Concerning the things a person can undergo, they are related to happenings in the same way as actions are related to events: what the patient undergoes is the first person perspective on what happens to the person viewed from an external point of view. Instead of the one perspectival map μ we then get two.

$$\begin{aligned} \mu_1 &: (\mathcal{A} \times \mathcal{P}) \rightarrow \mathcal{E} \\ \mu_2 &: (\mathcal{U} \times \mathcal{D}) \rightarrow \mathcal{H} \end{aligned}$$

Here μ_1 is just the same as the original μ , but it is mirrored by another such function for passives.

Now we can say what the passive sentences are. Syntactically speaking, the passive voice gives us for every verb V the verb phrase *Be V-PP*. To these passive verb phrases correspond the functions V_{pass}^\times and V_{pass}° . The latter are defined in terms of the passive perspectival map directly.

$$V^\circ(\llbracket n_1, \dots, n_k \rrbracket) = \mu\text{-pass}(V_{\text{pass}}^\circ(\llbracket n_2, \dots, n_k \rrbracket), \llbracket n_1 \rrbracket),$$

The former are interpreted using the above interpretation function in combination with μ_2 . If $V_{\text{pass}}^\circ(\llbracket n_{k+1}, n_1, \dots, n_k \rrbracket) = \mu_2(u, \llbracket n_{k+1} \rrbracket)$, then $V_{\text{pass}}^\times(\llbracket n_1, \dots, n_k \rrbracket) = h$. That is, if u is being hit and d is Bill, then $h = \mu_2(u, d)$ is the happening of Bill being hit. This means that μ_2 is also required to be injective.

Declaratives can be either passive or active. Seemingly we find passive—or at least, patient—imperatives in this sense. Consider the following examples.

- (8)
- a. Don't you be having no more heart attacks now, y'hear.
 - b. Be warned: those candy bars can kill you.
 - c. Undergo an operation.
 - d. Enjoy your meal.
 - e. Get lost.

However, in all these cases the event is either understood to be willfully and freely undergone or otherwise treated *as if* the addressee has some control over it. The first would be used ironically to downplay the role of being the victim, the second is a common way of stressing the importance of making sure that the addressee take the mentioned risk seriously, the third uses a patient verb but can only be interpreted as instructing the addressee to take steps leading to the undergoing of an operation. Also the fourth is interpreted as something the addressee has (some) control over. It

is not optative, we cannot sensibly add the adverb ‘hopefully’ to it. But we can say ‘Don’t let anyone spoil your dinner; you just enjoy your meal now’. The fifth and last example is a ‘get’-passive. They are used to talk about actions being undertaken by the subject, resulting in the state expressed by the participle (i.e., being lost). In many cases they are even impossible with a ‘by’ phrase indicating the agent and when a ‘by’ phrase *is* possible, the ‘get’-passive cannot be used in an imperative.

- (9) a. ?I got the car fixed by the mechanic.
b. ?Get left out of the team (by your coach).

The difference between imperatives with patient verbs or passive constructions and those infinitives as mentioned above is clear: As real patient verb phrases imperatives do not make sense.

- (10) a. ?Be told what to do.
b. ?Be criticized by your driving instructor.

Henceforth I will assume that, though imperatives are not necessarily grammatically active, they are always interpreted as commanding actions, not undergoings.

Concluding points

With the help of the distinctions that has now been made, we can explain the meanings of imperatives and the way imperatives and declaratives are connected without having to adopt any form of reductionism whatsoever. On the basis of this analysis the imperative and hortative subjects can be interpreted as operators rather than arguments. Though I will not be concerned with propositional attitudes, one might hope that in the same manner it could be explained how the following is, as Lakoff (1972) points out, not a contradiction.

- (11) I wanted to be president, but I didn’t want myself to be president.

As I have said, the passive voice and matters of aspect are also beyond scope here. That is not to say that their analysis is clear at present. Some issues and problems concerning aspect in imperatives are mentioned towards the end of the chapter.

5.3 Update semantics revisited

In the previous chapter an update system was introduced for a simple language of declaratives and imperatives. In order to deal with the complexities of tense, modality and person shifts we need to make not only the language, but also the states more complex. In the following, states will no longer be sets of possibilities alone, but they will be quadruples consisting of a set of possibilities as before (only the situations and schedules are more complex), as well as an event time (action time) and reference time in the sense of Reichenbach (1947) and an individual who represents the perspective

from which the sentence is interpreted. But let me first explain what the possibilities will be like.

Durations

Event tokens and action tokens have durations. A situation gives us partial information about which events took place when. Schedules give us partial constraints on our actions by demanding that some action be performed during some period of time. In both cases we are dealing with periods of time. I will only give a rather minimal definition of such durations of time, since no more is needed for the exposition of the framework developed hereafter. I will assume that time has the structure that satisfies the ‘basic postulates’ of van Benthem (1991). We have an inclusion order \sqsubseteq which is transitive, reflexive, and anti-symmetrical. Furthermore, when overlap is defined as $x \circ y =_{\text{def}} \exists z(z \sqsubseteq x \ \& \ z \sqsubseteq y)$ and ‘underlap’ as $x * y =_{\text{def}} \exists z(x \sqsubseteq z \ \& \ y \sqsubseteq z)$, then we also assume that these have a greatest upper bound and a least upper bound.

$$\begin{aligned} \text{CONJ} \quad & \forall x \forall y (x \circ y \rightarrow \exists z(z \sqsubseteq x \ \& \ z \sqsubseteq y \ \& \ \forall u((u \sqsubseteq x \ \& \ u \sqsubseteq y) \rightarrow u \sqsubseteq z))) \\ \text{DISJ} \quad & \forall x \forall y (x * y \rightarrow \exists z(z \sqsupseteq x \ \& \ z \sqsupseteq y \ \& \ \forall u((u \sqsupseteq x \ \& \ u \sqsupseteq y) \rightarrow u \sqsupseteq z))) \end{aligned}$$

The latter axiom is in fact not part of the basic postulates, though it will be useful to assume it, as will be explained below. Apart from inclusion we have a relation of precedence $<$ that satisfies the axioms of transitivity and irreflexivity. Furthermore, the two orders are connected via two monotonicity principles.

$$\begin{aligned} \text{LEFT MON} \quad & \forall x \forall y (x < y \rightarrow \forall z(z \sqsubseteq x \rightarrow z < y)) \\ \text{RIGHT MON} \quad & \forall x \forall y (x < y \rightarrow \forall z(z \sqsubseteq y \rightarrow x < z)) \end{aligned}$$

Using the disjunction and conjunction axioms we can define a union relation \cup and an intersection relation \cap on times, such that $x \cup y$ is the greatest lower bound of x and y and $x \cap y$ is the least upper bound of x and y . For the union operation we need an additional axiom to ensure that union behaves well in connection with precedence.

$$\begin{aligned} \text{DISJ MON} \quad & \forall x \forall y (x < y \rightarrow \forall z(z < y \rightarrow (x \cup y) < z)) \\ & \forall x \forall y (y < x \rightarrow \forall z(y < z \rightarrow y < (x \cup z))) \end{aligned}$$

The reason for including greatest lower bounds is that it allows us to define the two operations $F(x)$ and $P(x)$, i.e., the future and past of x , respectively. They are defined via the following axioms.

$$\begin{aligned} \text{FUT} \quad & \forall x \forall y (x < y \leftrightarrow y \sqsubseteq F(x)) \\ \text{PAST} \quad & \forall x \forall y (x < y \leftrightarrow x \sqsubseteq P(y)) \end{aligned}$$

$F(x)$ is the greatest lower bound of all times following x , $P(x)$ is its precedence counterpart. Since the precedence relation is irreflexive, the ‘present’ is itself not included in its past or future. Let me summarize the temporal ontology with the following definition.

DEFINITION 5.4. Let \mathcal{T} be a set of times, or durations, τ . On this set there are two relations:

\sqsubseteq is a relation of inclusion satisfying transitivity, reflexivity, anti-symmetry, and the axioms of conjunction and disjunction;

$<$ is a relation of precedence satisfying transitivity and irreflexivity.

The two relations also satisfy the axioms of left and right monotonicity and of disjunction monotonicity. The two operators F and P satisfy the axioms FUT and PAST.

The weak order \leq is defined as:

$$\tau \leq \tau' \text{ iff } \tau < \tau' \text{ or } \tau \sqsubseteq \tau'.$$

Situations and schedules

A situation is, as before, a partial valuation. Only now the valued entities are not propositions, but event-duration pairs. Schedules are indexed for agents. That is to say, a schedule assigns to each agent a partial valuation of action-duration pairs. Importantly, we need to recast the definition of consistency of a situation or schedule in view of the temporal ontology. An event cannot take place somewhere during $\tau \in \mathcal{T}$ if in the same situation it does not take place in the same or in a longer period. Vice versa, an event cannot be evaluated false during an period τ if it is evaluated true at some period contained in it. The same monotony constraints hold for consistent schedules.

DEFINITION 5.5. A situation s is a subset of $(\mathcal{E} \times \mathcal{T}) \times \{\text{TRUE}, \text{FALSE}\}$. A schedule is a function $\pi : \mathcal{P} \rightarrow \wp((\mathcal{A} \times \mathcal{T}) \times \{\text{DO}, \text{DON'T}\})$. \mathcal{S} is the set of all situations and Π is the set of all schedules.

A situation is *consistent* iff it meets the following constraints.

$$\begin{aligned} \langle (e, \tau), \text{TRUE} \rangle \in s \ \& \ \tau \sqsubseteq \tau' \ \Rightarrow \ \langle (e, \tau'), \text{FALSE} \rangle \notin s, \\ \langle (e, \tau), \text{FALSE} \rangle \in s \ \& \ \tau' \sqsubseteq \tau \ \Rightarrow \ \langle (e, \tau'), \text{TRUE} \rangle \notin s. \end{aligned}$$

A schedule π is consistent iff it meets the constraints that, for all $p \in \mathcal{P}$,

$$\begin{aligned} \langle (a, \tau), \text{DO} \rangle \in \pi(p) \ \& \ \tau \sqsubseteq \tau' \ \Rightarrow \ \langle (a, \tau'), \text{DON'T} \rangle \notin \pi(p), \\ \langle (a, \tau), \text{DON'T} \rangle \in \pi(p) \ \& \ \tau' \sqsubseteq \tau \ \Rightarrow \ \langle (a, \tau'), \text{DO} \rangle \notin \pi(p). \end{aligned}$$

DEFINITION 5.6. A situation is τ -complete iff $\forall e$ and $\tau' \leq \tau$, $\langle e, \tau' \rangle$ is either true or false in s . A schedule is complete iff $\forall p, a$ and $\tau' > \tau$, $\langle a, \tau' \rangle$ is either to be done or not to be done in $\pi(p)$.

s resp. π is *complete* iff it is τ -complete for all τ .

Extending the terminology, I will also refer to the objects $\pi(p)$ as schedules.

Note that, importantly, a *positive* fact $\langle (e, \tau), \text{TRUE} \rangle$ means that *somewhere* during the period the event takes place, whereas a *negative* fact $\langle (e, \tau), \text{FALSE} \rangle$ means that *nowhere* during τ does the event take place. This means that the monotonicity requirements for the positive and negative cases are opposite. In case of a positive fact that e happens somewhere in τ , we will also have that it takes place somewhere in $\tau' \sqsupseteq \tau$. On the other hand, the nonoccurrence of an event e during τ will mean that the event also does not occur at any $\tau' \sqsubseteq \tau$. The same can be said about actions in schedules. The duration can be seen as giving the *green light* and *deadline* of the required action. For a positive commitment the duration represents the period in which the action must be performed. For a negative commitment the duration is the period during which the agent has to refrain from performing the action. No assumption is made with respect to the compatibility of the events or actions. As far as the framework goes, any valuation of events and actions is possible that meets the monotonicity constraints. A more restrictive definition of situations and schedules should result from adding world knowledge, inertia and by taking the internal temporal constitution of events and actions into account.

In line with the previous discussion, two symmetric temporal constraints will be imposed on the update with declarative and imperative clauses. Declarative sentences require a temporal perspective such that the event can be considered to have been completed or to be ongoing. Imperative sentences require a temporal perspective such that the action can be considered as future or ongoing. Admittedly, this is a somewhat idealized picture of the relationship between the two, though I believe it serves as a fruitful explanation of the way the two types of entities, actions and events, function in a complementary manner in natural language. What we will need in order to express these constraints is presented next.

DEFINITION 5.7. Situations and schedules can be restricted as follows. The situation s up to τ is $(s|\tau)$ and the situation s from τ on is $(\tau|s)$. Similarly, the schedule π up to τ is $(\pi|\tau)$ and the schedule π from τ on is $(\tau|\pi)$.

$$\begin{aligned} (s|\tau) &= \{ \langle (e, \tau'), B \rangle \in s \mid \tau' \leq \tau \} \\ (\tau|s) &= \{ \langle (e, \tau'), B \rangle \in s \mid \tau < \tau' \} \\ (\pi|\tau) &= \lambda p. \{ \langle (a, \tau'), C \rangle \in \pi(p) \mid \tau \leq \tau' \} \\ (\tau|\pi) &= \lambda p. \{ \langle (a, \tau'), C \rangle \in \pi(p) \mid \tau' < \tau \} \end{aligned}$$

Here, $B \in \{\text{TRUE}, \text{FALSE}\}$ and $C \in \{\text{DO}, \text{DON'T}\}$.

If $s = (s|\tau)$ we say that s is τ -restricted. If $\pi = (\tau|\pi)$ we say that π is τ -restricted.

Note that the notion of a τ -restriction is opposite for situations and schedules. The following will provide a useful terminology.

DEFINITION 5.8. A commitment (a, τ) is called *pre- ρ* iff $\tau \leq \rho$ and *post- ρ* iff $\rho \leq \tau$. Furthermore, (a, τ) is a *positive* commitment in $\pi(p)$ iff $\langle (a, \tau), \text{DO} \rangle \in \pi(p)$, and (a, τ) is a *negative* commitment in $\pi(p)$ iff $\langle (a, \tau), \text{DON'T} \rangle \in \pi(p)$.

The relation between actions and events can now be used to explain the relationship between schedules and situations. Recall from the first chapter that, in order to give a semantics for imperatives, McGinn (1977) introduced the notion of the *fulfillment* of an imperative, defined in terms of truth. Here, we can think of fulfillment as the circumstance that some person acted on an existing commitment in a schedule, so that its performance is now an event in a situation.

DEFINITION 5.9. The concept of a commitment being *fulfilled* in a situation is defined as follows:

a positive commitment (a, τ) is fulfilled by p in s iff $\langle (\mu(a, p), \tau), \text{TRUE} \rangle \in s$;
a negative commitment (a, τ) is fulfilled by p in s iff $\langle (\mu(a, p), \tau), \text{FALSE} \rangle \in s$.

A schedule $\pi(p)$ is *followed* in s iff all positive and negative commitments in $\pi(p)$ are fulfilled by p in s . A schedule π is followed in s iff it is followed by every $p \in \mathcal{P}$.

Fulfillment is not a defining concept for the meaning of imperatives, but a concept by means of which we can relate imperatives to declaratives. When the imperative directing p to perform a during τ has been fulfilled, the declarative stating that $\mu(a, p)$ occurs during τ will be true.

We can use the concept of fulfillment to express that a schedule is *executable* in a situation or that it is not. By this I mean that the situation can be extended so that the schedule is completely followed.

DEFINITION 5.10. A schedule $\pi(p)$ is *executable* in s iff for some consistent $s' \supseteq s$, $\pi(p)$ is followed in s' . A schedule π is executable in s iff it is executable for every $p \in \mathcal{P}$.

A schedule is executable if the situation describing its execution is a consistent expansion of the situation in which it is to be executed. In practice an agent is more constrained than this. Such constraints should be made part of the ontology. As I mentioned above, more restrictions on the possibility of situations could be proposed. The perspectival map makes that those restrictions would automatically result in restrictions on executable schedules. Natural restrictions would be the requirement

that objects are continuous in space and time and limitations on the skills and abilities of persons.³ In some cases we want to say that only the future oriented part of a schedule is executable. In that case we simply refer to $(\tau|\pi)$ as being executable in the situation.

Finally, another notion that we will need is that of an expansion of a situation or schedule. Those are as before, with the exception that we now have to take the index of the schedules into account. Schedules can be expanded by an action for a specific person. Nothing is deleted from schedules. It would perhaps be natural to remove commitments from the schedules once they have been (or decidedly have not been) fulfilled, but this would not be practical when we need to deal with past tense imperatives.

DEFINITION 5.11. The positive and negative expansions of schedules are defined in the following manner.

$$\begin{aligned} s \oplus (e, \tau) &= s \cup \{ \langle (e, \tau), \text{TRUE} \rangle \} \\ s \ominus (e, \tau) &= s \cup \{ \langle (e, \tau), \text{FALSE} \rangle \} \\ \pi(p) \oplus (a, \tau) &= \pi(p) \cup \{ \langle (a, \tau), \text{DO} \rangle \} \\ \pi(p) \ominus (a, \tau) &= \pi(p) \cup \{ \langle (a, \tau), \text{DON'T} \rangle \} \end{aligned}$$

The (positive or negative) expansions of π with an action for p are written $\pi \oplus_p (a, \tau)$ and $\pi \ominus_p (a, \tau)$. The results of these operations are such that for all $q \neq p$ the schedule remains the same.

Possibilities

Possibilities are no different from what they were in the previous chapter. They are pairs of a situation and a schedule.

DEFINITION 5.12. A cognitive state σ is a set of possibilities (s, π) . The set of all possibilities $\mathcal{S} \times \Pi$ is called I and the set of all possible cognitive states $\wp(I)$ is called Σ . The minimal state is $\mathbf{1} = \{(\emptyset, \emptyset)\}$ and the absurd state is $\mathbf{0} = \emptyset$.

Lastly, we need to restate the definition of quandary freedom of a state. This, too, is the same as in the previous chapter.

DEFINITION 5.13. A possibility (s, π) is a quandary iff for some p , $\pi(p)$ is not executable in s . I_{QF} is the set of all non-quandary possibilities. σ is called *quandary free* iff no possibility in σ is a quandary.

In the previous chapter quandaries were defined in terms of the consistency of situations and schedules. Here it is done in terms of executability. Note that this implies

³For a clear formalization of these notions, cf., e.g., Horty and Belnap (1995), van Eijck (2000).

consistency: an inconsistent schedule cannot be fulfilled in a consistent situation, and if the situation after fulfilling π in s is consistent, then s itself must also be consistent. An advantage of the present formulation is that it allows us to add world knowledge to the model by imposing constraints on situations only and thereby influence what is executable (and hence what are quandaries).

Contexts

We have said what states are, but in order to deal with the *shifting* function of tense, modality, and person we need to put more information in the update function. Instead of defining updates on states, I will be using *contexts* c , which are quadruples consisting of a state $\sigma \in \Sigma$, but also of an *event time* $\varepsilon \in \mathcal{T}$, an *individual perspective* $p \in \mathcal{P}$, and a reference time $\rho \in \mathcal{T}$. Clearly these are not all the contextual parameters we would ever need in interpreting natural language. It is for that reason that several authors have argued for a distinction between *context* and *index* (Lewis, 1980). Indices are tuples of contextual parameters that form a coherent set somehow. Contexts are generally much richer in parameters and not fully exhausted by the indices.⁴ Here I conflate the two notions and only speak of contexts as a small set of parameters. These are all the parameters that can be shifted by the sentential operators that are discussed here (so they are what Lewis would call indices). Some non-shiftable parameters will be used to represent deictic reference. They are a temporal entity *now* $\in \mathcal{T}$ for the speech time, a person *me* $\in \mathcal{P}$ for the person whose cognitive state we are modelling, and a set *addressee* $\subseteq \mathcal{P}$ for the addressees.

DEFINITION 5.14. A context c is a quadruple $\langle \sigma, \varepsilon, p, \rho \rangle$, with $\sigma \in \Sigma$, $\varepsilon, \rho \in \mathcal{T}$, and $p \in \mathcal{P}$. The set of all such contexts is C .

If c is a context, c_1, c_2, c_3 and c_4 are the projections of its members. If c_1 is the absurd state, then c is called absurd. If c is a context, then $c(\mathbf{0})$ is $\langle \mathbf{0}, c_2, c_3, c_4 \rangle$.

In what follows $i \in c$ will abbreviate $i \in c_1$.

The notions of event/action time ε and reference time ρ are adopted from studies of aspect, starting with Reichenbach (1947). However, I will not be dealing with aspect here at all. The distinction between event time and reference time is normally made in order to deal with matters of grammatical aspect. The event time is the time of which the event is predicated and for which the action is commanded. The reference time has a different function, that has been introduced above. Namely, it expresses the temporal point of view from which we interpret the utterance. Its future is that part of the time line we view as that for which we need to make plans, its past (and present) as that part about which we may have information. By default this reference time is the speech time, though it can be shifted with modality. By default the event time is the reference time, though it can be shifted with tense.

⁴See also chapter two for a more detailed exposition.

The other perspectival parameter is the individual p through whose eyes we view the situation. This parameter only plays a role when we talk from a first person perspective, as in control infinitives, subjectless gerunds, and imperatives. In some sentence types the default perspective is the speaker. For instance in declaratives and certain expressives.⁵

- (12) a. Hmm, lekker geslapen.
 Hmm nice sleep-PP
 ‘Hmm, I slept well.’
 b. Lekker geslápén, zeg!
 Nice sleep-PP say
 ‘Oh my, I slept well.’

However, in the constructions we are dealing with in this chapter the default *me*. This is the person whose state we are modelling, i.e., the interpreter. When it is shifted, the value of this parameter functions as the perspective taken when we think about ‘what it means *for X* to do this/experience that/...’

Updates

After having defined what the language and the state space are, the last element we need is the update function for every element of the language. Naturally, declarative sentences are interpreted as providing information and thereby restricting the set of possibilities by constraining the worlds. Acceptance of imperatives leads to an expansion of possibilities by expanding the schedules.

DEFINITION 5.15. Let $c = \langle \sigma, \varepsilon, p, \rho \rangle$ be a context and φ an atomic sentence. The positive update of c with φ is $c[\varphi]^+ = \langle \sigma \uparrow \varphi, \varepsilon, p, \rho \rangle$ and the negative update of c with φ is $c[\varphi]^- = \langle \sigma \downarrow \varphi, \varepsilon, p, \rho \rangle$. The first arguments of the output contexts are defined as follows. If quandary free,

$$\begin{aligned} \sigma \uparrow V\vec{n}. &= \{(s \oplus (e_{V\vec{n}}, \varepsilon), \pi) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad s \oplus (e_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted \& consistent}\} \\ \sigma \downarrow V\vec{n}. &= \{(s \ominus (e_{V\vec{n}}, \varepsilon), \pi) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad s \ominus (e_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted \& consistent}\} \\ \sigma \uparrow V\vec{n}! &= \{(s, \pi \oplus (a_{V\vec{n}}, \varepsilon)) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad \pi \oplus (a_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted}\} \\ \sigma \uparrow V\vec{n}! &= \{(s, \pi \ominus (a_{V\vec{n}}, \varepsilon)) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad \pi \ominus (a_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted}\} \end{aligned}$$

Otherwise, the outcome is $\mathbf{0}$.

⁵Perspective shifts in declaratives could be useful in the study of evidentiality. Here the default perspective from which the information is said to originate is the speaker (strong, direct perception evidence). Indirect evidence is given when the speaker presents the assertion from the perspective of someone other than him- or herself.

The global requirement in this definition has two roles. First, it makes all updates absurd that do not sustain quandary freedom, as in the previous chapter. Secondly, it makes all those outcomes absurd that do not meet the constraint of ρ -restriction. Acquiring information means a reduction of the possibilities under consideration: only those possibilities are retained in which the history so far contains an event token at the event time of the event type predicated. Undertaking commitments means that the schedules in each possibility are expanded after ρ by an action token of the action type commanded.

These definitions lead directly to the past (completion) orientation of declaratives and future (undecided) orientation of imperatives. In both cases this is due to the role of the reference time as a time-internal perspective on the world: we can only consider the history of this time as the realized portion of the world, and we can only schedule actions for the future of this time. The former idea is implemented by requiring that the update with a declarative does not change the state with respect to the future of ρ . The latter idea is implemented by requiring that the expansion of a state with an imperative does not alter anything about the past of ρ . This means that the schedule is only expanded insofar as its post- ρ part is concerned. Effectively, then, if a declarative update does not lead to absurdity $\varepsilon \leq \rho$, whereas if an imperative update does not lead to absurdity $\rho \leq \varepsilon$. Because for imperatives $c_3 = me$, i.e., the individual perspective is the interpreter, the update with an imperative yields a restriction on schedules by constraining the possibilities of this person. That fact accounts for the (default) interpretation of imperatives as being directed at the hearer.

We can then reintroduce the sentential connectives that were already discussed in the previous chapter. They are defined as operations on contexts, rather than on states. In the following definition I first introduce the language and give the additional update clauses for those connectives.

DEFINITION 5.16. Let \mathcal{L}_1 be the smallest set containing all atomic sentences in \mathcal{L}_0 , such that: (i) if $\varphi \in \mathcal{L}_1$, then $\neg\varphi \in \mathcal{L}_1$, and (ii) if $\varphi, \psi \in \mathcal{L}_0$, then $\varphi \vee \psi, \varphi \wedge \psi \in \mathcal{L}_1$. The positive update $[\cdot]^+$ and the negative update $[\cdot]^-$ of c for all $\varphi \in \mathcal{L}_1$ are defined below. If quandary free,

$$\begin{aligned}
c[\neg\varphi]^+ &= c[\varphi]^- \\
c[\neg\varphi]^- &= c[\varphi]^+ \\
c[\varphi \vee \psi]^+ &= \langle (c[\varphi]^+)_1 \cup (c[\psi]^+)_1, c_2, c_3, c_4 \rangle \\
c[\varphi \vee \psi]^- &= (c[\varphi]^-)[\psi]^- \\
c[\varphi \wedge \psi]^+ &= (c[\varphi]^+)[\psi]^+ \\
c[\varphi \wedge \psi]^- &= \langle (c[\varphi]^-)_1 \cup (c[\psi]^-)_1, c_2, c_3, c_4 \rangle
\end{aligned}$$

Otherwise the outcome is $c(\mathbf{0})$.

Negation switches from positive update to negative update and vice versa. Conjunction is sequential composition. Disjunction means taking the outcomes of both

updates and unifying the possibilities either update leaves open. Under negation, disjunction and conjunction clauses are reversed. In the previous chapter it was shown that this leads to the correct analysis of disjunctive imperatives, as well as disjunctive permissions. With disjunction only the first parameter, c_1 , is changed. The remaining parameters are always left unaltered.

Lastly, validity is defined in the same way as in the previous chapter, as set inclusion.

DEFINITION 5.17. A sentence φ is accepted in context c iff $c_1 \subseteq (c[\varphi]^+)_1$.
 A text $\varphi_1, \dots, \varphi_n$ supports a conclusion ψ iff for all c , $c[\varphi_1]^+ \dots [\varphi_n]^+ \Vdash \psi$.
 The statement that this is so is written as $\varphi_1, \dots, \varphi_n \Vdash \psi$.

Overview

Let me summarize the framework laid out above. At the core of this ontology there is a contrast between actions and events, intrinsically connected by means of a perspectival map. This dualism is mirrored by the distinction between situations and schedules, a distinction that can be described as having a temporal and an agentive side. On the temporal side, the central role is for the reference time. Situations provide partial information about how the world has been realized until the reference time. Schedules list positive and negative commitments for each agent regarding how to continue the world from the reference time onwards. On the agentive side to the distinction, the schedules are schedules *for* agents, so the agent is not *part of* the action. The situations are descriptions of events, e.g., which agent performs which action, so here the agent is part of the event.

In terms of this difference between situations and schedules, some further concepts have been developed. These are: consistency of a situation or a schedule, possibilities as pairs of a situation and a schedule, and the fulfillment and executability of a schedule in a situation, and quandary freedom. This way we have set the stage for a semantic theory in which the temporal and agentive differences between the meanings of declaratives and imperatives, as well as those other constructions that have been related to imperatives at various places in this thesis, can be captured in a systematic way.

In the remainder I will present the outlines of such a semantics. Tense, modality, hortatives and mixed mood sentences will be introduced and given an interpretation. The goal is to show under what angle these sentences and operators can be understood in the framework, it is not supposed to provide a completely sufficient analysis of the phenomena connected with those sentences. The language has to be extended to deal with all of these issues. I will do so in the course of the chapter, though it is assumed that the operators introduced can also, to some extent, be embedded under one another. In the appendix I state the exact definitions.

5.4 Tense as a context shift

Imperative sentences can have a past, irrealis form and interpretation, as we saw in the previous chapter. To allow for such meanings in the semantic framework presented here, we have to define tense and mood operators in a general, sentence type independent way. To do so will be the main aim of this section. Tense and modality will be represented by sentential operators that generate temporary ‘shifted’ contexts, in which one or more of the contextual parameters is replaced. The sentence forming the complement of the operator is then interpreted in that temporary context. The overall result of the interpretation procedure is modelled as a restriction of the information/intention state σ , just like in the basic cases. In this section I will present an interpretation for past and future tense operators.

In the semantic literature two competing theories of tense interpretation have been proposed. The referential theory of tense (Partee, 1973) construes time as a grammatical argument of sentences. Tense is treated as a kind of pronoun that obtains its reference either via deixis (present tense), or via coreference. The latter we see when the past tense sentence is introduced in a context, e.g., with the help of temporal adverbial phrases or other context.

- (13) a. Do you remember (working Friday afternoons at the grocery store)_{*t*}?
Back then_{*t*} I was_{*t*} hopelessly in love with the neighbor girl.
b. I met John yesterday_{*t*}. He was_{*t*} taking out the garbage.

The event time of the second sentence in (13-b) is coreferential with the time introduced in the first sentence with the help of ‘yesterday’, just like in (13-a) ‘he’ is interpreted as coreferential with the name in the first sentence.

The other theory treats tense like an intensional operator (Prior, 1967). On this approach tense is a modal (existential) quantifier that states that ‘there is an earlier/later time where the embedded clause is true’. The sentence then does not have a time argument of its own, but it is interpreted relative to a contextual time at which the sentence is interpreted: it is relative to *this time* that the past and future tense sentences are interpreted as quantifying over earlier resp. later times. They first replace the contextually given time by any one of those earlier or later times and thereby they create a new context relative to which the sentence embedded under it is then interpreted.⁶ Instead of using deixis, the present tense is obtained by not having a tense operator and therefore not shifting the event time away from the contextually given one.

One potential problem of this latter type of approach is that mostly non-present tense sentences are used with a *specific* event time in mind. This definiteness can be obtained in the quantificational approach by means of *contextually restricted quantification* (Westerståhl, 1984). Adverbial phrases, such as ‘when John entered the room’

⁶Of course in a sequence-of-tense language like English the tense can also be merely *indicative of* the temporal shift, maintaining an earlier shift in event time.

and ‘while you were sleeping’, link the event time of the sentence to some other, known event. Thereby the range of possible values for the existential tense quantifier are restricted. In the extreme case the temporal adverbial phrase *names* the time of the event, in which case the existential quantifier only has *one* possible output. In this case we can call the adverbial phrase deictic.

The most natural way of dealing with tense in this framework is to treat it as a context changing operator that resets the temporal variable. The past tense sets the value c_2 , the event time, to the temporal domain preceding c_4 , the reference time. The future tense is the opposite of the past. It sets the event time to the entire domain of time following the reference time. Temporal adverbs (‘yesterday’, ‘tomorrow’) and adjuncts (‘before they see you’) are domain restrictors.

I will distinguish tense from temporal quantification. The past tense only contributes a temporal domain restriction. Temporal quantifiers such as ‘always’ take such a domain and quantify over all the durations contained in it. Negation does not scope over the tense, but only over such adverbs. This means that the relation between tense, negation and quantification is not ‘(not) in the past (always) (not) A ’, but ‘in the past (not) (always) (not) A ’. Below is the definition of the language \mathcal{L}_T containing tense operators, and of their update clauses.

DEFINITION 5.18. The language \mathcal{L}_T consists of those sentences φ such that (i) $\varphi \in \mathcal{L}_1$, or (ii) $\varphi = \mathbf{X}\psi$ such that $\psi \in \mathcal{L}_T$ and \mathbf{X} is either **now**, or **P**, or **F**. The update clauses for these three operators are given next.

$$\begin{aligned} \langle \sigma, \varepsilon, p, \rho \rangle [\mathbf{now}\varphi] &= \langle \sigma, \text{now}, p, \rho \rangle [\varphi] \\ \langle \sigma, \varepsilon, p, \rho \rangle [\mathbf{P}\varphi] &= \langle \sigma, P(\rho), p, \rho \rangle [\varphi] \\ \langle \sigma, \varepsilon, p, \rho \rangle [\mathbf{F}\varphi] &= \langle \sigma, F(\rho), p, \rho \rangle [\varphi] \end{aligned}$$

An update with a non-negated past tense sentence constitutes the change of state that somewhere in the past the embedded sentence is true/to be done. An update with a negative sentence results in the acceptance that the embedded sentence is false/not to be done *throughout* the past. Tense operators do not merely present a scope for the embedded sentence, but they reset a contextual parameter. This parameter remains at the new value until another tense operator changes it again.

In line with the Priorean semantics for tense I have made it relative to the perspective time, c_4 . Past here means ‘the time that lies behind us from where we are viewing the situation/schedule’. This relative tense thus contrasts with the deictic views on tense, where past always means ‘past from the actual speech time’. Using the deictic **now** operator we can also define an absolute past or future tense, simply by concatenating **nowP** or **nowF**, respectively.

The past tense (**P**) operator can in general only be used with declaratives. As I have mentioned before, for declarative sentences the requirement that the output only provide information about the past means that they can in general only be used with an event time before ρ . The future tense (**F**), on the other hand, is applicable

to imperatives, in virtue of their requirement of being future oriented. In Dutch and English only past tense is grammaticalized. However, we have seen in chapter three that Cheyenne is a language that (seemingly) does grammatically distinguish between a present tense and a future tense imperative (Mithun, 1999).

A note on temporal quantifiers Doing universal quantification over all times in the past by means of *sequential* update for all those times is not a very manageable thing to do. However, the partial update semantics is not easily combined with a more ‘parallel computing’ for universal quantification. One way of avoiding having to do large (infinite?) conjunctions for universal quantification is to introduce ‘non-events’ and ‘non-actions’ (i.e., refraining) into the ontology. I will briefly indicate how this would be done, restricting myself to events here. For actions the method is identical.

Let $\bar{\mathcal{E}}$ be the set of ‘non-events’ \bar{e} for every $e \in \mathcal{E}$. We can think of such non-events as counterexamples to the truth of a continuous occurrence of the events. If \bar{e} is true for some period τ , this means that *somewhere* during τ e is not happening. Similarly, if \bar{e} is false for τ , then there is no e non-event during the entire period. In other words, e then takes place at *every* time contained in τ . Consequently, the monotonicity requirements for the consistency of a situation are the same with non-events as they are for ordinary events.

$$\begin{aligned} \langle (\bar{e}, \tau), \text{TRUE} \rangle \in s \ \& \ \tau \sqsubseteq \tau' \Rightarrow \langle (\bar{e}, \tau'), \text{FALSE} \rangle \notin s \\ \langle (\bar{e}, \tau), \text{FALSE} \rangle \in s \ \& \ \tau' \sqsubseteq \tau \Rightarrow \langle (\bar{e}, \tau'), \text{TRUE} \rangle \notin s \end{aligned}$$

To be able to talk about non-events, we need to enrich the language as well. The language $\bar{\mathcal{L}}_1$ consists of the same atoms and connectives as \mathcal{L}_1 , with the addition of the ‘anti-’ operator $\bar{\varphi}$, for every $\varphi \in \mathcal{L}_0$. Complex sentences in the scope of the anti- operator are reduced to complexes of anti- atoms, by means of the following equivalences.

$$\begin{aligned} \overline{\varphi \wedge \psi} &= \bar{\varphi} \vee \bar{\psi} \\ \overline{\varphi \vee \psi} &= \bar{\varphi} \wedge \bar{\psi} \\ \overline{\neg \varphi} &= \varphi \end{aligned}$$

For atomic declarative φ , the positive update with $\bar{\varphi}$ makes \bar{e}_φ true in each possibility, the negative update makes that same non-event false in each possibility. The temporal quantifiers can be defined in terms of the language.

$$\begin{aligned} \textit{sometimes } \varphi &= \varphi \\ \textit{always } \varphi &= \neg \bar{\varphi} \end{aligned}$$

5.5 Root modality and past tense imperatives

From tense I move to modality. Past tense imperatives are not possible as such, but in combination with irrealis modality they do exist in Dutch. I will show how this meaning can be explained in a semantics of modality that takes the contrast between actions and events into consideration. This distinction helps us to disambiguate epistemic and root modality. The future orientation often associated with modal auxiliaries is a natural consequence of their prototypical first person perspective. The performative function of such sentences as statements about the future ('will' and other dynamic modalities) or to command or advice actions ('should' and other deontic modalities) can be understood in terms of their basic meanings as *tests*, in the sense explained in the previous chapter. The imperative irrealis can then be seen as a modal operator that does not yield any test of this sort, but that merely creates a temporal perspective shift such that the past from that point onwards is no longer seen as a determined, completed history. In that irrealis context the sentence is interpreted as a real, committing imperative.

A decompositional analysis of root and epistemic modality

An old observation is that modal auxiliaries allow for ambiguous interpretations.

- (14) a. Felipe might call in sick tomorrow.
 b. Felipe might be sick today.

The first of these sentences is naturally interpreted as mentioning a possibility for Felipe to act, the latter presents a possibility that is not *epistemically* excluded by the speaker. Kratzer (1981) proposed that we analyze this ambiguity as the result of a contextual parameter, called a 'modal base', consisting of all the worlds that are 'possible' in one of the various senses of that word: epistemically, dynamically or deontically.⁷ The example in (14-a) is typically used in a context selecting a dynamic modal base for the evaluation of the modal statement. So it is read as a description of a potentiality or ability. In contrast, the contexts in which (14-b) would normally be used provide an epistemic modal base, leading to an epistemic modal reading. Depending on which modal base is salient in the utterance context the modal operator will quantify over different sets of possibilities. Thus, as far as the formal semantics of these modals is concerned, there is no ambiguity. The logical form of dynamic and epistemic modal sentences is the same.

This analysis raises the question how we are to explain the variety in the readings concerning the temporal reference in sentences with modal auxiliaries. In case of

⁷The term 'dynamic modality' was introduced by von Wright (1951b) for the meaning of the auxiliary 'can' in sentences such as "Jones can speak German". It should be kept distinct from the way the term is used in 'dynamic semantics' or 'dynamic logic'. Some authors call this type of modality 'alethic' or 'metaphysical', but this is not quite the same. If we say that something will happen we do not mean that it is logically necessary, or 'in virtue of the notion of reality as such'.

an epistemic reading the sentence can be about a state in the present, but this is excluded when it is read as a dynamic modality. So (14-a) could be either epistemic or dynamic, depending on the context, whereas (14-b) can only be epistemic, unless we treat 'being sick' as an activity (i.e., throwing up). On the dynamic reading of (14-b) the temporal reference is only to 'sometime later today'. Another point where this issue comes up is when a modal is combined with perfect 'have' (Condoravdi, 2002).

- (15) a. Susan might have gotten sick. That would explain her absence.
 b. Susan might have gotten sick, if it hadn't been for Dr. Vogel's wonder medicine.

In (15) we see two uses of 'might have'. Due to their respective contexts, (15-a) is only epistemic and (15-b) is only 'counterfactual'. The first sentence presents the possibility of Susan getting sick as a possibility of a *past* event that is *presently* under consideration, whereas the second sentence presents an event that *was* a possibility of how things could have continued at some past time. In other words, on the counterfactual reading we take a perspective in the past and conceive of the event as something that was possible back then, though not any longer.

Condoravdi discusses the proposals to explain this difference as a lexical ambiguity of the modals, such as the one presented by Enç (1996). So, in (14) we have two 'modals for the present'. The first (14-a) would be a 'forward-shifting modal' and in (14-b) with a 'non-shifting modal'. The sentences in (15) are examples of 'modals for the past', where (15-a) is a 'backward-shifting modal' and (15-b) is a 'backward-then-forward-shifting modal'. Condoravdi rightly objects to this analysis. It would be much preferred if we could find an explanation of the different readings of the modal sentences while keeping a uniform semantics of the modal verbs.

Condoravdi claims that all modal auxiliaries *expand* the time of reference forward. The difference between the readings in (14) are due to a difference in the evaluation of stative and eventive predicates with respect to their time of reference. The ambiguity of 'might have' as in (15) is explained as a *scopal* ambiguity of the modality and the perfect. Concerning the first point, a stative predication is evaluated as true at a time τ iff its duration *overlaps* with τ , whereas an eventive predication is evaluated true at τ iff its duration is *contained* in τ . Consequently, if the modal expands the time of reference into the future, a stative predicate in its scope can still refer to some state overlapping with the present. An eventive predicate in the scope of a modal will have to refer to an event that is contained in the period between the time of reference and its (indefinite) future. This means that the event as a whole has to be future of the time of reference. Because of this, the interpretation of 'be sick' in (14-b) as eventive immediately forces the interpretation that 'today' is understood as 'later today'.

The other contrast is that between the epistemic and counterfactual modals for the past. Condoravdi proposes that the difference between these readings is a matter

of scope. In the first case the modal scopes over the perfect.⁸ The modal then first expands the time of reference forward and, relative to this expanded reference time, the perfect presents the embedded predication as referring to something that happened *before* that time. This analysis is supported by the observation that we also find a ‘future perfect’ in English.

(16) He may have arrived by next week.

Though Condoravdi restricts herself to not discuss these sentences in the paper, they seem to illustrate the point: the modal expands the time to next week and relative to that time we evaluate the perfect sentence ‘he has arrived’ as describing a past event of arriving.

The counterfactual reading results from a scope reversal. When the modal occurs in the scope of the perfect, the result is that we first shift the time backwards (this is what the perfect contributes) and relative to that time we expand the reference time into its future. This is the time for which we evaluate the embedded predication. Consequently, the event or state is located in the past⁹, but it is future to the ‘viewpoint’ we have adopted with the perfect. This means that the intensional quantification done by the modal concerns what was back then (still) possible, though it is not any longer so. In order to account for the fact that the counterfactual reading implies that the event did not *in fact* take place, Condoravdi uses a Gricean argument: if at the speech time it were still possible that the event did take place, the shift into the past would not be necessary and would only make the statement weaker. So, for reasons of informativity and economy that reading is excluded.

This analysis neatly fits with my distinction between actions and events. If we suppose that root modality (i.e., modals on their dynamic or deontic readings) concerns actions, and epistemic modality events, we can explain (i) why stative verb phrases are most naturally interpreted epistemically (they are used to characterize a situation); (ii) why they may have a present tense interpretation; (iii) why this is not possible for root modality. When the modal sentence is given a root interpretation, the future orientation is necessary, because that is implicit in the notion of action: actions are concerned with ways of continuing the world into the future. Historical linguistics has shown that epistemic modals normally develop from root modals (Traugott and Dasher, 2002). If we thus assume that the root reading is the default, this would explain why modal auxiliaries expand the reference time as Condoravdi argues they do. Furthermore, the possibility of the perfect occurring under the scope of the modal is only possible when the modal is analyzed as scoping over an event denoting expression. Alternatively, when the modal scopes over the perfect it is analyzed as a root

⁸Condoravdi also argues against the view that modal auxiliaries scope over tensed sentences (e.g., Steedman, 2000). She points out that the perfect contributes a *relative* time shift, not one that is deictic to the actual speech time. This means that the past tense operator **P** that was defined in the previous section is what on Condoravdi’s account is the perfect.

⁹As far as the semantics goes, it may also be located in the future.

modality. When a stative verb phrase occurs in a ‘might have’ sentence there are only two options: either we get an epistemic reading with the modal scoping over the perfect, or we get a root reading with the stative reanalyzed as an eventive predicate (as in the example of being sick).

- (17) Felipe might have been sick.
 Reading 1: MIGHT(PERF(Felipe is sick))
 Reading 2: PERF(MIGHT(Felipe throws up))

Importantly, I do not wish to claim that deontic modality only concerns what an agent can do, witness (18).

- (18) There should have been an Elfstedentocht this year.

The difference between the ‘epistemic’ and ‘root’ reading I am proposing is in itself only a *formal*, decompositional distinction. However, the compositional semantics of the different analyses restricts the possible readings qua contextual modal base. Specifically, epistemic modality concerns only events, dynamic modality concerns only actions. So, the readings are:

subject MODAL(action)	(root)
PERF(subject MODAL(action))	
MODAL(event)	(epistemic)
MODAL(PERF(event))	

Note that on this analysis we can also explain Geach’ observation that deontic modality, at least the way it is most commonly expressed in ‘ought to’ sentences, scopes over ‘predicables’. On the root reading of such sentences the modal connects the verb phrase to the subject. The sentence then states that, from the point of view of the subject, the action is/was a possibility/necessity.

Let us adopt a working definition of the three different modal bases.

DEFINITION 5.19. The modal bases *epistemic*, *deontic*, and *dynamic* are functions that meet the following constraints.

$$\begin{aligned}
 \textit{epistemic}(\sigma, \tau) &\subseteq \{i \in I \mid \exists j(j \in \sigma \ \& \ s_i \supseteq s_j \ \& \ \pi_i \supseteq \pi_j) \ \& \\
 &\qquad\qquad\qquad s_i \text{ is } \tau\text{-complete}\} \\
 \textit{deontic}(\sigma, \tau) &\subseteq \{i \in I \mid \exists j(j \in \sigma \ \& \ s_i \supseteq (s_j \mid \tau) \ \& \ \pi_i \supseteq \pi_j) \ \& \\
 &\qquad\qquad\qquad s_i \text{ is } \tau\text{-complete} \ \& \ (\tau \mid \pi_i) \text{ is followed in } s_i\} \\
 \textit{dynamic}(\sigma, \tau) &\subseteq \{i \in I \mid \exists j(j \in \sigma \ \& \ s_i \supseteq (s_j \mid \tau) \ \& \ s_i = (s_i \mid \tau) \ \& \\
 &\qquad\qquad\qquad s_i \text{ is } \tau\text{-complete} \ \& \ (\tau \mid \pi_i) \text{ is executable in } s_i\}
 \end{aligned}$$

Because an epistemic modal base concerns only complete situations (up to the reference time), there is no room to talk about actions that could be performed, commitments that could be followed, and so on, because they all have been, or have not

been, performed. In other words, the epistemic modal base constitutes a perspective from which we view the world as a fixed entity, that can only be observed as to its properties. The deontic modal base contains possible extensions of what the situation is/was at τ and what the schedule contains. It requires that all commitments are fulfilled, so what ought to be done does not conflict with what ought to be. Lastly, in a dynamic modal base we are concerned with executable schedules only. Again we adopt from the ‘actual’ cognitive state what the situation is/was at τ and we look at the possible ways of continuing from that point onwards. The modal bases are subsets. Not everything that σ leaves open may be considered to be plausible. For example, default rules could restrict the modal base to only the most ‘normal’ or plausible possibilities that meet the above mentioned constraints.

The next thing we need is a language containing modal auxiliaries. I will restrict myself here to the modals *should* and *could*. The first has clearly distinguishable deontic and epistemic readings, the second has dynamic and epistemic readings. Furthermore, both allow for scoping under the perfect in the root reading.

- (19) a. John should buy a house. (deontic)
 b. John should have bought a house.
- (20) a. Mary should be in the office by now (epistemic)
 b. Mary should have been sacked by now.
- (21) a. Herbert could eat a horse. (dynamic)
 b. Herbert could have waited another minute.
- (22) a. Meredith could be up for promotion. (epistemic)
 b. Meredith could have been sitting there for hours.

It should be stressed at this point that the semantics presented hereafter is not intended to be a complete analysis of these modal verbs, nor do I mean to suggest that all other modal verbs can be explained in strictly the same manner. The semantics only serves as an explication of the idea of a decompositional analysis of the difference between epistemic and root modality, in the terms explained above.

A modal operator is allowed to scope over or under tense operators. Root modalities take imperative arguments, epistemic modalities take declarative arguments.

DEFINITION 5.20. Let φ and $\psi \in \mathcal{L}_T$ be such that φ consists of only declarative atoms, and ψ of only imperative atoms. Furthermore, let $q \in \mathcal{P}$ be a person. Then the language of modals \mathcal{L}_M is such that (i) $\mathcal{L}_T \subseteq \mathcal{L}_M$; (ii) *should*(φ), *could*(φ), *q should*(ψ), and *q could*(ψ) are members of \mathcal{L}_M ; and (iii) if $\chi \in \mathcal{L}_M$, then $\mathbf{X}\chi \in \mathcal{L}_M$, where \mathbf{X} is a tense operator \mathbf{P} , or \mathbf{F} , or **now**.

The updates with modal sentences are the following tests.

$$\begin{aligned}
 c[q \text{ should}(\varphi!)] &= c && \text{if } \langle \text{deontic}(c_1, c_2), F(c_2), q, c_2 \rangle \Vdash \varphi! \\
 & c(\mathbf{0}) && \text{otherwise} \\
 c[q \text{ should}(\varphi!)] &= c && \text{if } \langle \text{dynamic}(c_1, c_2), F(c_2), q, c_2 \rangle [\varphi!] \neq \mathbf{0} \\
 & c(\mathbf{0}) && \text{otherwise} \\
 c[\text{should}(\varphi.)] &= c && \text{if } \langle \text{epistemic}(c_1, c_2), F(c_2), c_3, c_2 \rangle \Vdash \varphi. \\
 & c(\mathbf{0}) && \text{otherwise} \\
 c[\text{could}(\varphi.)] &= c && \text{if } \langle \text{epistemic}(c_1, c_2), F(c_2), c_3, c_2 \rangle [\varphi.] \neq \mathbf{0} \\
 & c(\mathbf{0}) && \text{otherwise}
 \end{aligned}$$

Tense and modality interacting

With the help of the definition above, it can be shown that a past tense scoping under a modal sentence is meaningful when that modal is epistemic and not meaningful when it is a root modality. Vice versa, a past tense scoping over a modal sentence is meaningful only if it is a root modality. With respect to the first, note that an epistemic modal base gives us a set of situations that are complete valuations until the reference time. In the default case this reference time is simply the speech time, so what the modal base does is extend our partial information about the past to a set of *complete* situations for the past. When we update with a past tense sentence in this context, the past tense first brings us back from the expanded event time to the past of the reference time (past of the speech time) and for this event time we update with the embedded declarative sentence. Because the modal base has extended our information about the past, the update-for-the-past can be successful.

Adopting the semantics for temporal quantifiers sketched in the previous section, a simple illustration can be given of epistemic tests for the past. Below, I will treat ‘yesterday’ as a temporal restriction operator.

$$c[\mathbf{yesterday}(\varphi)] = \langle c_1, (c_2 \cap \mathbf{yesterday}), c_3, c_4 \rangle [\varphi]^+$$

Here, *yesterday* is a time functionally dependent on *now*. In the following, note that the past (and other bold-face operators) *resets* the event time, whereas an adverb like *always* is restricted to its scope. The example argument goes as follows. In the past, John has always been either ill or bad tempered. Yesterday, John was not ill, so he should have been bad tempered.

$$\frac{\begin{array}{l} \mathbf{nowP}(\mathbf{always}(\mathbf{ill}(\mathbf{john}) \vee \mathbf{temper}(\mathbf{john}))), \\ \mathbf{yesterday} \neg \mathbf{ill}(\mathbf{john}) \end{array}}{\Vdash \mathbf{now}(\mathbf{should}(\mathbf{P} \mathbf{yesterday}(\mathbf{temper}(\mathbf{john}))))}.$$

The first sentence sets the event time to the entire past and performs the universal quantification that at each period contained in the past *ill(john)* is true or *temper(john)* is true. The second sentence, still evaluated with respect to the entire past,

first restricts the event time to yesterday and then makes *ill(john)* false for that time. The conclusion first resets the event time to the speech time. Next, it changes the state by its epistemic extension and expands the event time to the future. Subsequently, it shifts the event time back into the past, restricts it to yesterday again, and makes *temper(john)* true for that time. The reason why the test succeeds can be explained in terms of the modal base. The epistemic modal base is always an extension of the information present in the context (i.e., the premisses). Since the context excludes the possibility that yesterday John did not have a bad temper, the update with *temper(john)* in the conclusion will not exclude any possibility that is left open in the epistemic modal base.

Next, I will give an example of a root modal use of *should* under the scope of a past tense. This morning your boss asked you to read the manuscript of his new book. He told you: “If you come across a typo, let me know.” During the lunch break you are reading the second chapter and you notice a spelling mistake. So now we would like to conclude that you should have let your boss know. Because this example involves two speech events, I will use two deictic pronouns **now**₁ and **now**₂, assuming that *now*₁ < *lunch(now*₂). The first refers to the speech act performed by your boss, the latter to the time of evaluating the ‘should have’ sentence. Like ‘yesterday’ above, **lunch** is a temporal restriction operator.¹⁰

$$\frac{\begin{array}{l} \mathbf{now}_1 \mathbf{F}(find(me, typo) \rightarrow tell(boss!)), \\ \mathbf{now}_2 \mathbf{P} \mathbf{lunch}(find(me, typo)) \end{array}}{\Vdash \mathbf{now}_2 \mathbf{P} \mathbf{lunch}(me \text{ should}(tell(boss!)))}$$

The validity of the argument again results from the constraint on the modal base. The deontic modal base retains all information in the cognitive state up to and including the event time (the lunch break) and it deletes all information about the time following it. Consequently, the information that you came across a typo is present in the modal base with which we evaluate the conclusion. Furthermore, the deontic modal base also retains all the commitments in the schedules before and *after* the event time. Taken together, this means that the conditional commitment to let your boss know you found a typo, resulting from accepting the first sentence, is an *unconditional* commitment in the deontic modal base.

Past tense imperatives

With these deontic ‘should have’ sentences, we have approached the issue of past tense imperatives. Of course there is a difference between, on the one hand, saying that some deontic test-update succeeds for some past time and, on the other hand, actually instructing someone to perform an action in the past. It looks as if the Dutch past tense imperatives are exactly doing the latter. This seems odd: how can one command an action, commit someone to comply, if the time of the action lies in the

¹⁰To be precise, we also need two realis operators for the two *nows*, see below.

past and the decision has already been made to the contrary? Nevertheless, the two constructions—English ‘you should have’ and Dutch past imperatives—are not so far apart as they may appear to be at first sight.

Sentences starting with ‘you should have’ are not always, perhaps not even normally, responded to by saying ‘Oh, I did not know that’, merely accepting its informational content. Natural reactions, such as ‘I guess you are right, I should have’ or ‘Yeah, stupid of me’, express an attitude of remorse or regret. This remorse or regret indicates the presence of an actual, felt commitment instead of merely the belief that the commitment would have been reasonable under the circumstances. The Dutch past imperatives are interpreted as instigating precisely this feeling of commitment. They are typically used to reproach the addressee for (not) performing some action. In order to see this it may be observed that, unlike the past imperatives, ‘you should have’ sentences can be used in a non-negative sense, suggesting how some alternative course of action would also have been nice, perhaps even better than the one actually taken.

- (23) You know what also would have been fun? You should have gone waterskiing!

These meanings are not expressed with the Dutch past imperatives (as in (24)) exactly because a sense of commitment or fault is lacking.

- (24) Weet je wat ook leuk zou zijn geweest? ?Was toch gaan waterskieën!

It appears that the right approach to past imperatives, odd as it may seem, is to really treat them as attempting to get the addressee to commit to some action that in fact has not been undertaken.

I will introduce an irrealis operator that does nothing more than shift the temporal perspective to whatever the time of reference is at that point. This operator has the following semantics.

DEFINITION 5.21. Let \mathcal{L}_I be the smallest expansion of \mathcal{L}_M such that the irrealis and realis operators **I** and **R** may occur where tense operators may occur. The updates with those sentences are defined below.

$$\begin{aligned} c[\mathbf{I}\varphi] &= \langle c_1, c_2, c_3, c_2 \rangle[\varphi] \\ c[\mathbf{R}\varphi] &= \langle c_1, c_2, c_3, now \rangle[\varphi] \end{aligned}$$

The effect of having the irrealis operator is that we can update with imperatives for times following c_2 . Recall that we had two symmetrical constraints on updates. Declaratives are restricted to describe events that occur at a time before the time of reference. Imperatives can only be used to instruct the addressee to actions that must take place after the time of reference. If the event time is past of the reference time, as the perfect ensures, then the irrealis will create a context in which we can use

imperative sentences to command actions to be undertaken in the period between the event time and the speech time.

So we can update with a sentence $\mathbf{PI}\varphi!$, without this resulting in the absurd state. In fact, this it is possible even in a context where it is already known whether $\varphi!$ has been fulfilled or not. Why is this strange? It is reasonable to assume as a maxim of conversation that we may only command actions if it is possible for the addressee to perform that action and possible to not perform the action. Formally, this is the requirement that the tests $\mathbf{R}_{you\ could}(\varphi!)$ and $\mathbf{R}_{you\ could}(\neg\varphi!)$ must both succeed in the cognitive state of the speaker (*you* here functions as a deictic pronoun referring to the addressee). These tests clearly fail for the Dutch past tense imperatives. In fact, this is being communicated with the particles ‘toch’ and ‘dan ook’ that are often used in them.

However, maxims can be violated and I want to propose that this is what happens with the past tense imperatives as well. Specifically, when we *flout* a maxim, we expressly go against it so that the hearer can indirectly infer our message. A past tense imperative cannot be understood as an instruction to perform some action. Still, the use of the imperative indicates that there is a rule, or a reason, that the instruction should have been carried out. This rule or reason is what is (conventionally) implicated by the past tense imperative.

Put in more formal terms, the sentence $\mathbf{PI}\varphi!$ can force us to accept other sentences. For example, if I decide to go to some party and when I arrive there a friend tells me that I should not have come, I can infer that the party is not nice, supposing that there is a common ground between my friend and me that I should only go to nice parties. Similarly, we can draw imperative conclusions from counterfactual, past tense imperatives. Let me give an example. You are a new employee of the Philosophy department. In the coffee room hangs a calender on which the birthdates of all the staff members are mentioned. Last Tuesday it was the birthday of one colleague, Henk. Not being used to a very colloquial working environment you did not bring a present and you were reprimanded for not doing so by your professor who says: “Had toch een kadootje meegenomen!” (*you should have brought a present*). On the basis of this reprimand you infer that you are supposed to bring presents when it is someone’s birthday. Today is the birthday of another colleague, Karen. This time you may conclude that you are to bring her a present.¹¹

$$\begin{array}{l}
 \mathbf{now}_1\mathbf{R}_1\mathbf{F}(\mathit{always}\forall x(\mathit{birthday}(x). \rightarrow \exists y\mathit{bring}(x, y)!) \vee \\
 \quad \mathit{always}\forall x(\mathit{birthday}(x). \rightarrow \neg\exists y\mathit{bring}(x, y)!)), \\
 \mathbf{now}_2\mathbf{R}_2\mathbf{PTuesday}(\mathit{birthday}(\mathit{henk}))., \\
 \mathbf{I}(\exists y\mathit{bring}(\mathit{henk}, y)!), \\
 \mathbf{now}_2\mathbf{R}_2(\mathit{birthday}(\mathit{karen})). \\
 \hline
 \Vdash \exists x\mathit{bring}(\mathit{karen}, x)!
 \end{array}$$

¹¹When we think of the quantifiers in these sentences as ranging over a finite domain (there are only so many things you can give as a present), they can be reduced to disjunctions and conjunctions.

Again, here I use two *now*'s to distinguish between the two speech acts. The first time is when you decided that either everybody or nobody should be given presents on their birthdays. The second time is when you conclude that you are to bring Karen a present. The third sentence, updated in the scope of the past tense and the restriction to last Tuesday, is the counterfactual imperative.

5.6 Imperative subjects

The imperative subject as a context shifting operator

The gist of this update semantic approach to imperatives will be clear by now. Of the three parameters in the contexts only the third one, the individual perspective, has so far not been exploited. This parameter is influenced by the imperative subject and hortative constructions. The default value for the individual perspective is the holder of the cognitive state, the interpreter. There are two different types of deictic shift away from this default. First, there may be several persons present in the audience of which the speaker means to instruct only one or some; second, the speaker may want to propose an action for someone who is not part of the actual audience. In the first case an imperative with an overt (and often stressed) subject is used, in the latter case a hortative with 'let', in Dutch 'laten' followed by a nominative pronoun.

To recapitulate some points from the third chapter, we saw that the imperative subject is a real subject and not a vocative construction, even though its semantic contribution is not that far apart from a vocative. The imperative subject can be a deictic pronoun 'you', used mainly for pragmatic purposes of contrast. It can also be a quantified expression, such as 'everybody' and 'the first person to open his mouth'. The imperative subject is restricted to the addressees of the utterance, though it is not identical to it per se. Existential or negative quantified subjects, e.g., 'somebody' and 'nobody', do not mean to single out an intended audience, but to identify who of the addressees is to perform the action. An important point about the quantified subjects is that they are not, or at least not necessarily, addressed as a collective.

- (25) a. Everybody sit still.
b. Somebody rescue me!

With sentences such as these, the speaker does not address the group of all addressees, but he or she addresses each of those persons individually. In the first case the instruction is an instruction for everybody, but in the second case the instruction is such that, if one person fulfills it, then the others need not do so. These subjects cannot be used to command collective action. In (26) we can only conclude that each of the persons in the audience has to come up with one candidate, not that they do so collectively.

- (26) Everybody come up with a single candidate.

There are, of course, many examples of instructions to collective action, especially

those hortative sentences starting with ‘let’s’. Nevertheless, I will restrict myself to only ‘distributed’ instructions.¹²

This first type of imperative subjects consists of those cases in which the subject is a referential expression that is intended to identify one member of the addressees as being instructed.

- (27) a. You take this and your friend take the other end.
 b. *Yóu* stop talking or you’ll be flunked.

These sentences can be analyzed in a way similar to ‘now’. That is, whatever the context may be, using this pronoun brings you back into the default case of the perspective being *me*, the person whose cognitive state it is. This suggests that we will at least need the operator **you** to express this deictic shift.

Non-deictic shifts are done by means of ‘let’. Seppänen (1977) has convincingly argued that ‘let’ is in all respects a modal auxiliary verb. I will take this idea seriously and treat ‘let’ in the same way as the root modals in the previous section. That is to say, ‘let’ connects the subject to an embedded imperative sentence. This subject can in principle be anyone, though ‘you’ is not possible. I presume that the reason for this is pragmatic: to issue orders to the (already identified) addressee, a simple imperative can be used. Therefore there is no reason to use a shifting operator such as ‘let’. A sentence with this auxiliary will be of the form **let**(*q*, ϕ !), where *q* is a person and ϕ ! an \mathcal{L}_1 sentence with only imperative atoms.

The third and last type of imperative subject is the quantified one. Again here any determiner phrase seems possible, as long as it denotes a suitable subset of the addressees. The most basic ones, semantically speaking, are ‘everybody’, ‘somebody’ and ‘nobody’. I already explained that these sentences are not really ‘quantified updates’. They inform the interpreter of whether or not he or she is being instructed by the speaker. If the imperative has ‘everybody’ as its subject, then the interpreter, being one of the addressees, knows that the instruction also applies to him or her. When it is ‘nobody’, then it is also clear that none are to follow the instruction, i.e., that everybody is to refrain from doing so. The subject ‘somebody’ is perhaps the most difficult to deal with in practice. If one person considers him- or herself instructed and acts on it, the imperative has been fulfilled. But if nobody acts on it, then everybody is responsible. In view of this, it appears that we need a multi-agent perspective in order to give a proper semantics to the imperative subject. The meaning of this subject determines which agents update *their* cognitive state with the imperative.

I will not present such a multi-agent semantics here. Instead, I will focus on the sense in which one addressee *does* update with the quantified imperative. Namely, if

¹²There is at least no fundamental problem with expanding the present framework to deal with plural imperatives and joint action. We would have to replace the individual perspective c_3 by a set of persons and let μ map pairs of actions and groups to events. Note that Hamblin (1987), page 58, argues in favor of addressee-action reductionism: an imperative is intelligible only if it provides clear instructions for each of the persons being instructed. Hamblin calls this “perhaps the most fundamental principle behind the treatment of imperatives in this book”.

one person considers an imperative to have been collectively accepted, then it follows that everybody should fulfill the instruction. So, as *higher order* information, the update is performed. This may be compared with the analysis of modality in some dynamic semantic theories: via the meaning of the modal as communicating that some test on the speaker's state succeeds, the hearer can draw inferences on the state of information of the speaker, or of the person who accepts that the test succeeds. Similarly, the interpreter of an 'everybody' imperative can infer that, if it is accepted by the addressees, those addressees have expanded their schedules accordingly and so they should fulfill the imperative. In this sense, we can define the quantifiers in terms of the 'let' modality:

$$\begin{aligned} \mathbf{everybody}\varphi! &=_{\text{def}} \bigwedge_{q \in \text{addressee}} \mathbf{let}(q, \varphi!) \\ \mathbf{somebody}\varphi! &=_{\text{def}} \bigvee_{q \in \text{addressee}} \mathbf{let}(q, \varphi!) \\ \mathbf{nobody}\varphi! &=_{\text{def}} \bigwedge_{q \in \text{addressee}} \mathbf{let}(q, \neg\varphi!) \end{aligned}$$

Note that we could also define the meanings of the quantifiers directly, but that would require a parallel update, which is not straightforward in the partial update semantics that is being used here. Conjunction as sequential composition is not equivalent to intersection. If so desired, one way of defining a parallel conjunction is to make the updates 'pointwise'. This means that we update each possibility in the input state separately with the parallel universal quantifier, and union the results of those updates again in the output state. The parallel quantification itself then involves, not an intersection, but a union of the output situations and output schedules respectively.

Let me come to the definition of the imperative subjects.

DEFINITION 5.22. If $\varphi \in \mathcal{L}_1$ consists of only imperative atoms, and $q \in \mathcal{P}$ is a person, then $\mathbf{you}\varphi$ and $\mathbf{let}(q, \varphi)$ are members of \mathcal{L}_S . The update with these sentences is defined below.

$$\begin{aligned} c[\mathbf{you}\varphi] &= \langle c_1, c_2, me, c_4 \rangle[\varphi] \\ c[\mathbf{let}(q, \varphi)] &= \langle c_1, c_2, q, c_4 \rangle[\varphi] \end{aligned}$$

Quantifying into imperatives

Quantifying-in means that we reverse the processing of the quantifiers. So the declarative 'Everybody said something' has two readings:

- Normal reading: $\forall x \exists y \text{Say}(xy)$.
- Quantified-in: $\exists y \forall x \text{Say}(xy)$.

Under the first reading it states that for each person there was something that this person said, on the second reading there is only this one thing that everybody said.

Schmerling (1982) claims that imperatives do not allow for quantifying-in. That is, the quantified imperative subject cannot be subordinated to an existential quantifier for one of the imperatives' arguments.

- (28) a. Everybody taste some dish.
 b. Everybody tasted some dish.
- (29) a. Somebody taste every dish.
 b. Somebody tasted every dish.

The declaratives (28-b) and (29-b) have a reading in which the direct object quantifier takes widest scope, so ‘There was some dish that everybody tasted’ and ‘Every dish was tasted by somebody’ respectively. The imperatives do not have such readings; Schmerling claims this judgement is ‘widely shared’.

The question then is, what makes quantifying-in impossible in imperatives? She argues that the lack of a quantified-in reading of imperatives is a matter of syntax or semantics, not of pragmatics. For this she gives three arguments. First of all, an ambiguity does not arise with the combination of a subject quantifier and negation either:

- (30) a. Don’t everybody go.
 b. ?Don’t somebody go.

Second, what she calls a declarative ‘paraphrase’ does have a quantified-in reading.

- (31) a. Everybody is to taste some dish.
 b. Somebody is to taste every dish.

Thirdly, a pragmatic explanation that would explain the phenomenon by saying that the addressee would not know how to comply cannot work, witness (32).

- (32) A: Take me to 1310 West Elm Street.
 B: OK. How do I get there?

Looking at the semantics for imperatives presented here, nothing would prevent an object quantifier to scope over an imperative subject quantifier, resulting in a quantified-in reading of sentences that, according to Schmerling do not have such readings. There is nothing wrong with an advice that goes as follows.

- (33) My advice to you is: keep together. Either everybody stay or everybody leave.
 But don’t split up.

Formally, this advice would read **everybody***stay!* \vee **everybody***leave!*. Supposing that this is semantically possible, the impossibility of quantifying into imperatives cannot be a semantic impossibility if existential quantification is a generalization of the above disjunctive form. The problem is not the meaning of the sentence under the quantified-in reading, but getting that reading for that sentence is what appears to be impossible.

- (34) Everybody take some road
 \nrightarrow Everybody take road A, or everybody take road B, or ...

Schmerling's arguments are not entirely persuasive, though. Regarding the first one, the declarative counterparts of negated universal quantifications are unambiguous as well.

- (35) Not everybody left. ↯ “For each person it is not the case that this person left.”

Moreover, the second argument only restates the problem: a sentence that states that all persons have a requirement to taste some dish then of course quantifying-in is possible, as is commonly the case with declaratives. The third argument is not relevant either. There is an important difference between not knowing how to comply with a command and not knowing what has been commanded. The problem with a quantified-in reading of (28-a) is not so much the lack of *knowledge* of how to comply, but the fact that the imperative itself was not specific enough for expressing the speaker's intentions. Certainly conversations like (32) do occur, but it is a wrong comparison. The issue is rather that in response to A's request in (36) B may pick a route. A's reaction is therefore unnatural.

- (36) A: Take me to 1310 West Elm Street *somehow*.
 B: OK. I'll go via the highway.
 A: ?No, that's not the route I meant.

We may instead look for a pragmatic explanation of the impossibility of quantifying into imperatives. One possibility would be that the quantified-in reading is not available for matters of intonation. That is, the overt subject requires stress but the object quantifier wanting to get wide scope also requires stress. This stress pattern might be impossible to impose on the sentence.

Another possible reason for not getting the scope reversal in (28-a) could just be that we cannot talk to the dish.

- (37) ?Some dish be tasted by everyone.

I argued already that there are no real passive imperatives. It may well be that quantified-in readings really require a reconstruction of the sentence and interpreting it as a passive sentence.

However, now imagine you are a tour guide on a culinary holiday tour. You are visiting a restaurant in Paris where the chef has prepared some specific dish—say, *aïgo bouido*—for all the participants in the tour. You yourself have never heard of this dish before. The chef tells you that they can all come in to taste the dish and you relay this message by saying to the group:

- (38) Everybody come in and taste some dish the chef has prepared for you.

This sentence does have a quantified-in reading. The indefinite is licensed by not knowing the dish, perhaps even do not quite knowing how to pronounce it. The

indefinite is not licensed when there is a plurality of salient objects that might be chosen as a referent for the indefinite.

I do not have an explanation of the phenomenon at present, but on the basis of the above discussion it seems at least plausible that a pragmatic explanation be found.

5.7 Mixing moods

One range of issues that has been disregarded so far, concerns ‘mixed mood’ sentences, where a declarative and an imperative are seemingly coordinated with a conjunction or a disjunction, though the coordinated sentence as a whole obtains a quite different interpretation than what is defined above.

Eat that tomato and you’ll choke
Eat that tomato or you’ll starve
Choke or starve and you’ll die
Ergo: You’ll die

It is a commonplace that the use of the conjunctions ‘and’ and ‘or’ in English (or their counterparts in other languages) is more constrained than their Boolean interpretations in propositional logic can explain. Both connectives indicate a *coordinating* discourse relation between the two conjuncts (Txurruka, 2003). In the study of ‘information structure’ or ‘information packaging’ this notion of a coordinating discourse relation can be expressed by saying that both conjuncts address the same question under discussion (see for instance Txurruka or Umbach, 2005). Both conjuncts comment on one explicitly or implicitly formulated topic. With ‘and’ both conjuncts give both a positive or both a negative answer on this issue, the use of ‘or’ indicates that the disjuncts present alternative answers, thereby suggesting informational uncertainty of the speaker or undecidedness on the decision problem. The connective ‘but’ is like ‘and’ except that it indicates that the answers are opposite in some manner (one a positive and the other a negative answer on the topic). Subordinating discourse relations establish a connection where the subordinate clause comments on an issue in- or explicitly raised by the superordinate clause. Examples of such subordinating discourse relations are ‘explanation’ and ‘condition’.

In this context, it seems highly surprising that both ‘and’ and ‘or’, when connecting sentences of different moods, are interpreted as subordinating discourse relation markers.

- (39) a. Eat this tomato and you’ll choke.
 b. Eat this tomato or you’ll starve.

Though (39-a) is, pragmatically speaking, an instruction not to eat the tomato, the first conjunct does not itself function as a main clause imperative. The sentence could be rephrased as ‘if you eat this tomato, then you’ll choke’. In (39-b) the first disjunct *is* an imperative sentence, but it also functions in the same way as in (39-a) when

we update with the second disjunct. That sentence ‘you’ll starve’ is to be understood as ‘if you do not comply with the imperative, then you’ll choke’. So in both cases the ‘pseudo-imperative’ (the term comes from Clarck, 1993) creates a hypothetical context relative to which the declarative is evaluated. In the case of ‘and’ this hypothetical context is the situation in which the action is performed, in the case of ‘or’ it is the context in which the action is *not* performed. Furthermore, the ordering of the moods is fixed. We do not in general find conjunctions in which the first clause is declarative and the second imperative.¹³

- (40) a. ?I am ill and make me some soup.
 b. ?I do not have a gun or step away from the car.

The question that all of this raises is: what is it about the sentence types that makes for these asymmetric discourse relations? This question has been addressed by several authors from Beardsley (1944) to Txurruka (2003).

The following principle seems valid: *every compound sentence has one and only one function*. That is to say, we must exclude compound sentences which appear to disjoin or conjoin sentences of different moods, like “It is a nice day and come outdoors”. (Beardsley, 1944, page 181)

An explanation of these phenomena has to consist of (at least) three elements: the temporal ordering that coordinating connectives can contribute, the modal (irrealis) element that the auxiliary in the second clause contributes, and the purely instrumental interpretation of the first clause in ‘and’ sentences.

Regarding the first point, ‘and’ and ‘or’ generally have a reading of indicating a *continuation* of the scenario, rather than just conjoin resp. disjoin two statements (or commands) about the world. This has been pointed out by both Txurruka (2003) and Lascarides and Asher (2003).

- (41) Go to Fred’s office and get the red file folder. (Lascarides and Asher, 2003)

Here the command is that the actions are to be performed in the order in which they are presented. The same holds for declaratives.

- (42) Mary took off her socks and went to bed.

One of the possible discourse relations by which ‘and’ can connect two sentences is Narration. When this relation holds between two sentences, the event presented by the first one precedes the event presented by the second one. Lascarides and Asher suggest that we can capture this ordering in the case of imperatives in terms of an algebra of actions in which complex actions can be built from simpler ones by means of *sequential composition*. The problem is that what ‘and’ connects is not just verb phrases but complete sentences, as can be seen in (43).

¹³One exception is Frisian, which has a so-called ‘Imperativus pro Infinitivus’ (Wolf, 2003).

- (43) a. Everybody go to the office and nobody leave.
 b. Everybody go to the office and somebody come back to bring me the red file folder.

The subject operators make it impossible to analyze this in terms of actions of ‘going back and leaving’ or ‘going back and returning’. Instead, what ‘and’ contributes is the continuation of the scenario, by replacing the event time for the first conjunct by an event time that (immediately) follows it. For simplicity I will let this replacement of the event time be done by the future tense operator **F** alone. Nevertheless, this is clearly not sufficient, because ‘somewhere in the future’ does not mean the same as ‘afterwards’.

The second matter is the modal element in the interpretation of mixed mood sentences. Han (1998) has observed that the declarative second conjunct normally contains a modal auxiliary (when it does not the sentence seems to have a generic interpretation). She proposes to take this fact into account by means of modal subordination (Roberts, 1989). The second conjunct is interpreted relative to a subordinate context in which the first conjunct is integrated as a fact of the matter. With ‘or’ the subordinate context is the one in which the *negation* of the first disjunct is integrated into the context.

Instead of using modal subordination, I will account for this element of the interpretation by means of a specific choice for the dynamic modal base. This is the function that assigns to every context (state plus event time) a set of possibilities of how the situation could be continued from that point onwards. Here that set will be constrained by the requirement that the schedule up to the (new) reference time has in fact been fulfilled.

DEFINITION 5.23. A schedule π is better followed in situation s than in situation s' iff (i) all commitments in π that are fulfilled in s' are fulfilled in s and (ii) there are commitments in π that are fulfilled in s but not in s' . A schedule is *maximally* followed in s iff there is no s' in which it is better followed.

If we now add the requirement of being maximally followed to the definition of the dynamic modal base, then we get what we need.

$$\text{dynamic}(\sigma, \tau) \subseteq \{i \in I \mid \exists j(j \in \sigma \ \& \ s_j \supseteq (s_j \mid \tau)) \ \& \ s_i = (s_i \mid \tau) \ \& \ s_i \text{ is } \tau\text{-complete} \ \& \ \pi_j \text{ is maximally followed } s_i \ \& \ (\tau \mid \pi_i) \text{ is executable in } s_i\}$$

Now, if the imperative is accepted for the future, and so it still is executable, and the time of evaluating the dynamic modal is future to the time for which the imperative is accepted (and this is the case, given the reading of ‘and’ as ‘and next’), then in the dynamic modal base the imperative will have been fulfilled in all situations in the modal base.

Combining the ideas developed thus far, the interpretations of the mixed mood sentences are presented next.

$$\begin{aligned} c[\varphi! \text{ and } will(q, \psi!)] &= c[\varphi! \wedge \mathbf{F} will(q, \psi!)] \\ c[\varphi! \text{ or } will(q, \psi!)] &= c[\varphi! \vee (\neg\varphi! \wedge \mathbf{F}will(q, \psi!))] \end{aligned}$$

In the clause for ‘or’ the negation of the first clause is used. This is needed for the modal subordination to work: if the dynamic modality is interpreted in a context in which the negation of the imperative is accepted, the modal base will be one in which that negative commitment is followed. Hence, ‘stop or I’ll shoot’ means ‘stop! or (don’t stop! and I will shoot.)’. Under this interpretation the inference at the beginning of this section is valid, provided that the imperative disjunction in the third premise is interpreted as standing in the context of a future tense operator.¹⁴

One issue has been left unanswered. This is the fact that the ‘and’ sentences can be used without directive force, as pure conditionals, whereas the imperative in the ‘or’ sentences always has imperative force. This phenomenon is actually not restricted to conjunctions of declaratives and imperatives alone. More generally, both ‘and’ and ‘or’ allow for subordinating discourse relations between declarative sentences when one of the two is modally qualified.

- (44) a. John was always feeling miserable. You would ask him how he felt and he would shudder and bow his head.
 b. Trisha must be having an exam tomorrow, or she wouldn’t be studying so hard today.
 c. PSV will win the championship this year, or I’m a Dutchman.

Han (1998) presents some facts about the first clauses in the ‘and’ sentences that suggest that they are not really imperatives. These facts were already mentioned in §2.1. Positive imperative sentences do not contain negative polarity items, whereas mixed mood sentences do (45). Moreover, condition sentences do not contain imperative subjects (46) or ‘do’-supported negation (47). Finally, they can be used with past reference time (48).

- (45) a. *Come any closer.
 b. Come any closer and I’ll shoot.
 (46) a. Everybody come in.
 b. *Everybody come to the party and she will be happy.
 (47) a. #Don’t worry so much, and you’ll be happier.
 b. The safety drill is important. Not listen and it’ll be your own fault if you get into trouble.
 (48) Life was hard in those days. Say one word out of turn and they’d dock you a week’s wages.

¹⁴This may be a universal or existential, small or wide scope quantifier.

Both Clarck and Han (1998) argue on the basis of these observations that they are not imperatives. For Clarck this means that his attempt to explain mixed mood sentences using the theory of Wilson and Sperber (1988) need not be extended to explain the meaning of these sentences, whereas Han claims that her feature [directive] is not present in them. Neither one seems to do more by saying this than to restate the facts.

5.8 Aspect and imperatives

Perhaps the most difficult issue in the semantics of imperatives has been tiptoed around in this thesis. It is the study of aspect in imperatives. Aspect concerns the internal temporal (and perspectival) constitution of the scenario presented by the sentence (or discourse). Here actions, events and times are particulars. But of course in practice such a view is quite insufficient. Lexical aspect, which concerns the distinction between states, activities, punctual state-changes, and so on, requires that we think of some events and actions as having a quantized duration and as triggering incremental or instantaneous change. Furthermore, aspectual operators like the perfect and the progressive are operators over simple sentences allowing us to present events as either a completed or a continuing process, respectively. In this last section I will present some points of concern for the semantics of imperatives in relation to the study of aspect.

Van Lambalgen and Hamm (2004) have presented a model for the study of aspect in which the context dependence and nonmonotonicity of this interpretation plays a central role. Verbs do not correspond with specific event-particulars, but they point to complex *eventualities* that comprise of the various elements of a typical scenario for which the verb would normally be used. So to a verb phrase like ‘climb the mountain’ would correspond an eventuality consisting of an activity of climbing, a process of incrementally closing the top of the hill, a culmination event of reaching the top and a result state of being at the top. What a sentence with this verb phrase actually asserts in the context of use may vary a lot. For instance, in combination with a clause ‘until I grew tired of it’ would make us interpret the sentence as indicating a repeated process of climbing, reaching the top, going back and climbing again. In this context it would become an activity (without an intrinsic endpoint), rather than an accomplishment (having such a natural endpoint). This influence of context on the aspectual interpretation of the sentence is called ‘coercion’. There seems to be hardly no restriction on the possibility to coerce sentences into any aspectual category. As for imperatives, in general they do not contain stative verb phrases, “*Be rectangular”, but to a shape shifter like Barbapapa one may say “Be rectangular for an hour”.

In this sense, all imperatives are coerced into something involving an activity. This is clear when looking at achievement verbs.

(49) Find the cat.

This sentence commands, oddly, that some result is achieved. The appropriate response is not to sit back and hope that the cat will eventually walk by, but to go out and look for the cat until you find it. Even stative verbs are interpreted as commanding an eventuality that starts with doing something. We find lexical statives (50), ‘be’ with an adverb (51), ‘be’ with a past participle (52), progressive (53), ‘have’ with a nominal argument (54) and what appear to be perfect imperatives (55), though it has been suggested that ‘have’ in these sentences is in fact the lexical verb (note the clause final position of the past participle).

- (50) a. Know that I’ll be there for you.
b. Love me do.
- (51) a. Be patient.
b. Be the ball. (teaching a golf course)
- (52) a. Be gone, demon!
b. Be warned: this hamster is ruthless.
- (53) a. Be sitting here when I come back.
b. Be standing at the gate before the car arrives.
- (54) a. Have a nice day.
b. Have mercy on my soul.
- (55) a. Have this jacket cleaned by 4PM.
b. Have your homework finished by Friday.

The sentence in (55-a) means the same as “Have somebody clean this jacket”. I have not found examples of ‘have been’ or of passive imperatives, nor have I found habitual imperatives, except when a change of state is implied.

- (56) *Be used to smile politely at strangers.
- (57) a. Drink less.
b. Don’t smoke. (meaning: stop smoking)

None of this is very surprising. The imperative commands an action, so a verb phrase can only be used in an imperative sentence insofar as it can be coerced as being agentive.

It was pointed out in §2.2 that in sentences like (53) the temporal adverbial phrase is obligatory.¹⁵ Without it, the event time defaults to the speech time, which would be nonsensical: you cannot perform any action that would lead to you sitting here at present. However, other statives can be used without a temporal adverbial.

- (58) a. Be cool.
b. Relax.

¹⁵In order to get the imperative reading. There is still the ‘prayer’ interpretation of “Please, be standing at the gate”.

- c. Sit still.
- d. Stay on the phone.

The difference between these sentences and the ones in (53) is that what is commanded in (58) is not a *result* state, but a state that has to be *maintained* by the agent. Though nothing happens if someone is cool, it requires a constant effort to stay that way. In this sense we can distinguish two types of agency. The one type is that of causing a result, the other is that of maintaining a state. This distinction between two notions of agency, achievement and maintenance, has been made as well by Latrouite and Naumann (1999) in the context of a study on unaccusative-causative alternations.

This agentive interpretation of statives is made explicit in Dutch by means of a special verb form of 'zijn' (*to be*).

- (59)
- a. Doe eens aardig.
 - b. *Ben eens aardig.
 - c. Wees eens aardig.

The first is an imperative with the verb 'doen' (*to do*), the second and third use the verb 'zijn'. The second would seem to command a real property of being a friendly person to the addressee, the third commands the stage-level state of being friendly (acting friendly). Furthermore, it was mentioned in §3.2 already that Dutch statives generally require an inchoative auxiliary 'ga' (*go*). We can thus observe the following contrast between the stative verb phrase 'staan' (*stand*) and the accomplishment 'opstaan' (*stand up*).

- (60)
- a. ?Sta
 - b. Ga staan.
- (61)
- a. Sta op.
 - b. *Ga opstaan.
- (62)
- a. *Sta niet.
 - b. Ga niet staan.

These matters of coercion and aspectual auxiliaries point in the direction of some connections between aspect and the perspectival dualism adopted here. Representing a scenario as an action implies that it has an activity element in its representation. Passivization, on the other hand, leads to an exclusion of the activity from the representation of the scenario. So imperatives are in general not compatible with the passive voice, unless an activity can somehow be introduced into the representation. The internal structure of the scenario's and eventualities may also help to make the notion of a *role* assignment more systematic. Roughly, the agent is whoever is involved in the activity, the patient is the individual who is influenced in the process driven by the activity or the culmination that eventually ensues. Due to the strong requirements on the presence of an activity element in the representation imperatives

form a useful tool in the study of aspect and thematic roles.

More interesting is the interpretation of temporal adverbial phrases in stative imperatives. Temporal adverbial phrases, those starting with 'before', 'while' and so on, are used to 'ground' the main clause in discourse by contextually restricting the possible event times for that main clause.¹⁶

- (63) When I won my only game against Bobby Fisher, I used the Ruy Lopez opening.

The example (63) from Steedman (2000) indicates that there is some flexibility in the temporal interpretation that the adverbial clause permits. Here it is most naturally interpreted as pointing to the game as a whole, not to the winning. However, this flexibility is lacking for imperatives.

- (64) ?When you win against Bobby Fisher, use the Ruy Lopez opening.

Sometimes the flexibility is found in imperatives as well: 'When you leave the house, switch off all the lights first'. Possibly, this difference is due to the fact that 'leaving the house' can be more readily thought of as a list of things to do before closing the door behind you. Note, furthermore, that the same goes for root modality.

- (65) When you win against Bobby Fisher, you will (*play/have played) the hardest game of your life.

A similar observation can be made with respect to 'before'. In general this adverb points to the period immediately preceding that of the adverbial phrase event.

- (66) Before you came in I was checking my mail.

This is most clear when the event preceding the coming in is stative. In that case the sentence is naturally interpreted as saying that the state went on until the point where the next one starts. So (66) is understood as saying that the speaker stopped reading his mail at the moment when the addressee came in. However, 'before' allows for there to be gaps between the adverbial phrase event and the main clause state.

- (67) Unlike Freddy, Harry was already collecting stamps before he was nine years old, but he lost interest at the age of three.

- (68) Renate lived in Germany, Great Britain and the United States before she moved to Amsterdam.

In (68) Renate cannot have been living in all those countries up to the point when she moved to Amsterdam. In these contexts we get an 'existential' interpretation of the state: there has been some period before the reference time (which is indicated by

¹⁶See Mastop (2003).

the adverbial clause) where the state held. This existential reading is not available for stative imperatives with ‘before’.

- (69) Be out of town before the lecture begins, #but be back in time to welcome the guests.
- (70) Be standing at the gate before the car arrives.

The first example shows that the commanded state has to continue up to the point in time indicated by the adverbial clause. I believe that the same holds for the second example. There as well the addressee is commanded to be present at the gate when the car arrives.

The point seems to be (and it can be generalized to other adverbs as well), that the imperative adverb only indicates the *aspectual* initiation and termination points, the and deadline, of the action. It cannot indicate a *temporal* relation between that action and another event. This makes the imperative a useful object in the study of aspect, because it may help to distinguish other such aspectual and temporal elements in the interpretation.¹⁷

5.9 Concluding remarks

In the semantics developed here we can of course not make all the distinctions that language allows us to make. For instance, promising something to someone is similar to committing oneself to an action. That is, promises cannot be distinguished from hortative ‘let me’ sentences. Such contrasts could be introduced e.g. by indexing commitments by a reference to the person to whom we are committed to act. In this way we can interpret first person singular hortatives as committing oneself to oneself to act, and promises as committing oneself to the hearer to act.

In the context of comparing languages and describing natural language, it seems that we must not aim for completeness in the relation between syntax (grammar) and semantics (i.e., that every semantic validity can be formulated syntactically). The language we are describing only grammaticalizes part of that which can be meaningfully expressed. And different languages grammaticalize different things. So the idea that the semantics should only contain as much complexity as the language allows us to express grammatically would lead us to develop distinct semantic theories for distinct natural languages. Instead, the semantics has to contain *more* than what can be expressed in the one or the other natural language, but it should be constrained in another sense: it should explain the restrictions on what can *potentially* be meant by someone using the language. It should thereby account for natural restrictions on the

¹⁷This still does not exhaust the number of interesting connections between aspect and imperative mood. One last issue to be mentioned in this respect concerns the interpretation of prohibitions. Russian negative imperatives are predominantly imperfective. The perfective ones are only ‘warnings’ (Terras, 1960). However, it appears to be difficult to say what precisely these meanings are, and what it is about the perfective aspect that leads to such an interpretation.

meanings of certain constructions. Let me give two examples.

Past tense imperatives are never commands or permissions, their function is closer to that of giving advice. We can explain this by pointing out that there is no point to threaten with sanctions (command) or to allow the action (permission) because that will not influence the outcome anymore. If not the presence or absence of a threat, the only reasonable motivation for using an imperative with a past reference time is to point something out concerning the past, or to express an attitude towards it. Instructing someone to add a line ‘Go to the party’ in his agenda for some past occasion can only be made sense of if these past-pages of the agenda are given either a descriptive interpretation or if they have consequences for future action. The former we see with some of the Dutch past tense imperatives, such as

- (71) Als de baas dan zei “Ik heb het nog altijd vijf voor vijf”, nou, zei dan maar niks, want anders kon je meteen vertrekken.

The other kind of interpretation we see with

- (72) Had toch een kadoetje meegebracht! Nu sta je te boek als zuinige Hollander.

So, rather than proposing that past tense imperatives are only possible for a certain class of imperative meanings or forces (Wolf, 2003), we should *explain* this restriction semantically by reference to the notion of a schedule and its relation to tense.

A similar case can be made for the hortative clauses. With first person hortatives the speaker is the person, or is a part of the group, addressed by the utterer of the sentence. Because of this, it makes no sense to seek a rationale for the utterance in sanctions that the speaker might impose on the addressee if they do not perform the action. The speaker can hardly threaten him- or herself with sanctions. The speaker can always put sanctions on him- or herself for not performing the action, but the threat of sanction cannot be used to motivate the choice, because the choice whether or not to sanction can be made to depend on the choice whether or not to act. I.e., I can say to myself ‘If I don’t clean my desk, I’ll hit me’, but the decision not to clean my desk can in principle always be a revision of my commitment to hit myself upon not doing so. The plural first person hortatives are more complex. Here the speaker can be the leader of the addressed group, in which case the interpretation is similar to that of the singular sentence. Otherwise the speaker can only suggest some action that must be decided on by the entire group, or by the group leader. Lastly, the third person hortatives will not be commands or permissions either. Threats are nonsensical in these situations as well, given the absence of the person whose schedule is to be updated. This situation gives rise to a specific range of uses that has been described in the third chapter already.

Instead of saying that such first and third person imperative-like constructions must be distinguished from imperatives because they have a different range of meanings, we should explain this difference in meaning from the fact that they are first and third person forms. This argument was also presented by Schmerling (1982), though

I have criticized her conclusions as taking the idea a step too far. We cannot exclude the possibility that some constructions are really only ‘imperative-like’ but encode really different meanings. The decompositional analysis presented in the section on mood and modality must be kept in mind at that point. Wishing for some event to take place is not the same as proposing the addition of an action to some schedule. The effect of tense on the interpretation of optatives cannot, as far as I can see, be explained in terms of the way schedules and temporal information are connected.

Finally, then, on the basis of the ideas developed in this chapter and the previous ones, we can come to a better understanding of what it means to say that ‘some language has a certain sentence type’. To identify some sentence type in a language, we need to be able to attribute to it a common grammatical form and interpret the (atomic) sentences with that form as performing one operation on contexts. The interaction of that operation with context shifting operations such as non-default person or non-present tense can be used to explain part of the variation in uses, contextual factors such as power relations between agents, background knowledge, discourse structure, or lexical presupposition can be used to explain other aspects of that variation. However, if those two factors (shifters and context) are not enough to explain the full range of possible meanings—and restrictions!—of the construction, I hypothesize that we will have to analyze the construction as sharing one (overt) form, though not thereby grammaticalizing one common context change operation.

Conclusion

To integrate imperatives into the formal study of meaning, a theory has to meet at least two requirements. The first is a perspectival pluralism in viewing action: either as a capability of an agent to engage in the world or as a performance of an agent that is part of that world. The second requirement is a dynamic conception of meaning in which at least some sentences can be assigned a meaning purely in terms of postconditions. I have argued that the central role of the concepts of truth and proposition in classical semantics stand in the way of expanding the work in that field to imperatives. Consequently, the imperative mood should not be understood as an operator over a propositional variable, but as a basic ‘meaning type’ *next* to propositions, the latter being the representatives of the declarative mood.

Thus, a semantics for imperatives along the lines of the work of Stenius, McGinn, and others does not suffice in explaining the meaning and use of those sentences. It creates an artificial distinction between content and function in order to sustain a theory of meaning that attributes an unequal weight to declaratives. The aim for upholding such a theory seems to be grounded in the belief that natural language semantics must be centered around one explanatory concept, ‘truth’, and framed in a mathematically uniform way. However, if we take the goal of semantics to be providing an idealized characterization of what capabilities a language user must possess in order to be able to master the language, then the perspectival dualism and sentence type pluralism do not appear to be implausible at all. The perspectival maps from the last chapter do not characterize an aspect of logical form, but they mirror a human cognitive capacity that is reflected in natural language.

I have argued that what we mean, intuitively, by ‘the imperative sentence type’, at least when looking at English and Dutch, can best be understood as a semantic notion. The sentence type category of ‘hypotheticals’, proposed by Bolinger and others, does correspond to a surface syntactically uniform construction, but it only characterizes a heterogeneous set of sentences that, for a variety of reasons, have an infinitive main verb. One semantical aspect that many sentences of this type share, though, is the first person perspective. This observation fits with the hypothesis of Blom that

finiteness marks declarative meaning—hence, a third person perspective.

On the other hand, the pragmatic analysis of the imperative sentence type fails, because it cannot explain how the imperative meaning is influenced by semantic categories that shift the context of reference. If the imperative would be something that *takes* a ‘content’ and gives it ‘force’, then the influence of semantic shifts on that force cannot be accounted for. Despite the fact that in many languages imperatives cannot be embedded—Korean appears to be a counterexample to this rule—in Dutch we did find past tense, irrealis imperatives and first and third person ‘hortative’ imperatives. Importantly, the context shifters affect the ‘force’ of these sentences, not just their content, so it seems plausible to analyze the sentences as complex imperatives the meaning of which is established in an *interaction* of the imperative semantic function and the context shifting operations.

Imperatives instruct (future) actions to one or more addressees, whereas declaratives inform the addressee of (amongst other things) the occurrence of an event in the world (history). Using these two distinctions, actions versus events and future versus past orientation, we can explain the range of conversational functions of imperatives vis-à-vis declaratives from the semantic operation they encode. Adding actions to a schedule is connected to planning just as expanding partial descriptions of the world is connected to forming beliefs. The step from meaning to use is then no longer a bridge to be gapped by means of illocutionary force operators, but it is only a diversification of a general operation to the different contexts within which that operation is applied: on the basis of an utterance by an authority, or by someone making a threat, or as an invitation by a friend, and so on.

Past tense and non-second person imperatives serve to illustrate this point. A past tense imperative is not semantically impossible, though in order to make sense of it, we have to make assumptions about the context within which such a sentence would be sensible. Similarly, a first person imperative cannot be the expression of a command, because such speech acts require that the speaker has asymmetrical authority over the person(s) instructed. When the speaker is instructing (amongst others) him- or herself, the conversational force can only be one of inviting or suggesting.

Throughout the thesis I have not looked at (simple) imperatives alone, but I have related them to a number of constructions that similarly present their meaning from a ‘first person perspective’. Amongst those constructions are (control) infinitives, subjectless gerunds, root infinitives, root modals and hortatives. Those comparisons lead to a number of suggestions for further research. First of all, the idea of a formal ambiguity between root and epistemic modality could perhaps be expanded to the other constructions. In the third chapter I commented on the contrast between hortative and optative ‘let’ sentences. Perhaps we can treat this contrast in an analogous manner. Extending the idea further, we can ask whether the infinitive-with-subject does not similarly allow for two decompositions. In some cases the subject seems to constitute the perspective under which we view the action presented by the infinitive verb phrase, in other cases the subject appears to be a part of the state of affairs described by the verb phrase.

That brings me to a second open question. If the semantics shows that there is no need for a principle such as ‘every sentence has a subject’, and we can perhaps explain the ‘tense’ phenomena discussed by Stowell in terms of the action/event contrast, is there still a reason, within generative grammar, to postulate a covert subject in (Dutch) imperatives, infinitives, and related constructions? Of course there may be syntactic motives for doing so, but as far as semantics goes it appears that such an assumption is not necessary.

A third question that comes up concerns the restriction to ‘actions’ and ‘events’, especially in the last chapter. I did sketch how we might extend the idea of perspectival contrasts beyond this dualism, but much needs to be done to see whether such an extension is attainable. An important aspect to this question is: what parts of sentence meaning can be accounted for in terms of event *structure*, and what calls upon a notion of perspective taking that is not captured by an analysis in those terms alone? The work by Moens and Steedman and by van Lambalgen and Hamm explains the distinctions between aktionsarten in terms of what parts of the event structure (eventuality) they ‘highlight’. I pointed out that the passive voice similarly marks a perspective on the event, though not one merely of highlighting a part of the event structure, but also one of focussing only on the individual being affected in the event (i.e., the patient). I explained that the combination of this passive voice perspective with the first person perspective of imperatives yields a view on an event as seen through the eyes of the person affected (the person *undergoing* the action). All of this shows that there is a wide variety of *kinds* of perspective taking involved in natural language interpretation. A more detailed analysis is needed to obtain a more thorough view on this variety of perspective takings.

Overall, the aim here has been to show what it means to develop a ‘semantics for imperatives’. I have argued that taking imperatives seriously means that we cannot equate meaning with truth assignments. The function of a sentence determines in a nontrivial way what its ‘content structure’ will be. For imperatives this function is instructing one or more addressees, which does not involve expressing a proposition. I believe that the analysis developed in the last two chapters rids us of, what Belnap called, the Declarative Fallacy. Moreover, I hope he was right in suggesting that a more balanced semantics will provide a more fruitful instrument in philosophical analysis.

[...] what [interrogatives and imperatives, RM] share with declaratives is this: that unless we bring them to light, or the light to them, there is much else of philosophical importance that will also remain in the dark. (Belnap, 1990, page 11)

A

List of definitions

Set theoretic notation

$\{x, y, \dots\}$	The set consisting of x, y , and so on.
$\{x \in X \mid P(x)\}$	The x in X , such that x has property P .
$x \in Y$	x is a member of the set Y .
$x \notin Y$	x is not a member of the set Y .
$X \subseteq Y$	X is a subset of Y . If $x \in X$, then $x \in Y$.
$X \subset Y$	X is a proper subset of Y . $X \subseteq Y$ and $X \neq Y$.
$X \cup Y$	The union of X and Y . $x \in (X \cup Y)$ iff $x \in X$ or $x \in Y$.
$X \cap Y$	The intersection of X and Y . $x \in (X \cap Y)$ iff $x \in X$ and $x \in Y$.
$X \sim Y$	The complement of X in Y , i.e., $\{x \in X \mid x \notin Y\}$.
$\wp(X)$	The powerset of X , i.e., $\{Y \mid Y \subseteq X\}$.
\emptyset	The empty set. For no x , $x \in \emptyset$.

Ontology

DEFINITION A.1. [Primitives]

The following are all primitive sets: \mathcal{A} is a set of actions, \mathcal{E} a set of events, \mathcal{D} a set of objects, and $\mathcal{P} \subseteq \mathcal{D}$ a set of persons. The perspectival map connecting actions and persons to events is $\mu : (\mathcal{A} \times \mathcal{P}) \rightarrow \mathcal{E}$.

\mathcal{R} is a set of thematic roles, containing at least *agent*. The assignment function *role* : $((\mathcal{A} \cup \mathcal{E}) \times \mathcal{R}) \leftrightarrow \mathcal{D}$ states which objects play which role in the event or action, respectively. The role *agent* is not assigned for actions, and $role(\mu(a, p), agent) = p$.

DEFINITION A.2. [Times]

Let \mathcal{T} be a set of times, or durations, τ . On this set there are two relations:

\sqsubseteq is a relation of inclusion satisfying transitivity, reflexivity, anti-symmetry, and

the axioms of conjunction and disjunction;

$$\begin{aligned}
\text{REFL} & \quad \forall x(x \sqsubseteq x) \\
\text{TRANS} & \quad \forall x \forall y \forall z((x \sqsubseteq y \ \& \ y \sqsubseteq z) \rightarrow x \sqsubseteq z) \\
\text{ANTI-SYM} & \quad \forall x \forall y((x \sqsubseteq y \ \& \ x \neq y) \rightarrow \neg y \sqsubseteq x) \\
\text{CONJ} & \quad \forall x \forall y(x \circ y \rightarrow \exists z(z \sqsubseteq x \ \& \ z \sqsubseteq y \ \& \ \forall u((u \sqsubseteq x \ \& \ u \sqsubseteq y) \rightarrow u \sqsubseteq z))) \\
\text{DISJ} & \quad \forall x \forall y(x * y \rightarrow \exists z(z \sqsupseteq x \ \& \ z \sqsupseteq y \ \& \ \forall u((u \sqsupseteq x \ \& \ u \sqsupseteq y) \rightarrow u \sqsupseteq z)))
\end{aligned}$$

Here $x \circ y =_{\text{def}} \exists z(z \sqsubseteq x \ \& \ z \sqsubseteq y)$ and $x * y =_{\text{def}} \exists z(x \sqsubseteq z \ \& \ y \sqsubseteq z)$.

$<$ is a relation of precedence satisfying transitivity and irreflexivity.

$$\begin{aligned}
\text{IRREFL} & \quad \forall x \neg(x < x) \\
\text{TRANS} & \quad \forall x \forall y \forall z((x < y \ \& \ y < z) \rightarrow x < z)
\end{aligned}$$

The two relations also satisfy the axioms of left and right monotonicity and of disjunction monotonicity. The two operators F and P satisfy the axioms FUT and PAST.

$$\begin{aligned}
\text{LEFT MON} & \quad \forall x \forall y(x < y \rightarrow \forall z(z \sqsubseteq x \rightarrow z < y)) \\
\text{RIGHT MON} & \quad \forall x \forall y(x < y \rightarrow \forall z(z \sqsubseteq y \rightarrow x < z)) \\
\text{DISJ LEFT MON} & \quad \forall x \forall y(y < x \rightarrow \forall z(y < z \rightarrow y < (x \cup z))) \\
\text{DISJ RIGHT MON} & \quad \forall x \forall y(x < y \rightarrow \forall z(z < y \rightarrow (x \cup y) < z)) \\
\text{FUT} & \quad \forall x \forall y(x < y \leftrightarrow y \sqsubseteq F(x)) \\
\text{PAST} & \quad \forall x \forall y(x < y \leftrightarrow x \sqsubseteq P(y))
\end{aligned}$$

The weak order \leq is defined by: $\tau \leq \tau'$ iff $\tau < \tau'$ or $\tau \sqsubseteq \tau'$.

Situations and schedules

DEFINITION A.3. [Situations and schedules]

A situation s is a subset of $(\mathcal{E} \times \mathcal{T}) \times \{\text{TRUE}, \text{FALSE}\}$.

A schedule π is a function $\mathcal{P} \rightarrow \wp((\mathcal{A} \times \mathcal{T}) \times \{\text{DO}, \text{DON'T}\})$.

The set \mathcal{S} consists of all situations and the set Π consists of all schedules.

DEFINITION A.4. [Consistency]

A situation is *consistent* iff it meets the following constraints.

$$\begin{aligned}
\langle (e, \tau), \text{TRUE} \rangle \in s \ \& \ \tau \sqsubseteq \tau' & \Rightarrow \langle (e, \tau'), \text{FALSE} \rangle \notin s, \\
\langle (e, \tau), \text{FALSE} \rangle \in s \ \& \ \tau' \sqsubseteq \tau & \Rightarrow \langle (e, \tau'), \text{TRUE} \rangle \notin s.
\end{aligned}$$

A schedule π is consistent iff it meets the constraints that, for all $p \in \mathcal{P}$,

$$\begin{aligned}
\langle (a, \tau), \text{DO} \rangle \in \pi(p) \ \& \ \tau \sqsubseteq \tau' & \Rightarrow \langle (a, \tau'), \text{DON'T} \rangle \notin \pi(p), \\
\langle (a, \tau), \text{DON'T} \rangle \in \pi(p) \ \& \ \tau' \sqsubseteq \tau & \Rightarrow \langle (a, \tau'), \text{DO} \rangle \notin \pi(p).
\end{aligned}$$

DEFINITION A.5. [Complete]

A situation is τ -complete iff $\forall e$ and $\tau' \leq \tau$, (e, τ') is either true or false in s . A schedule is complete iff $\forall p, a$ and $\tau' > \tau$, (a, τ') is either to be done or not to be done in $\pi(p)$. s resp. π is complete iff it is τ -complete for all τ .

DEFINITION A.6. [Commitment]

A commitment (a, τ) is called *pre- ρ* iff $\tau \leq \rho$ and *post- ρ* iff $\rho \leq \tau$. Furthermore, (a, τ) is a *positive* commitment in $\pi(p)$ iff $\langle (a, \tau), \text{DO} \rangle \in \pi(p)$, and (a, τ) is a *negative* commitment in $\pi(p)$ iff $\langle (a, \tau), \text{DON'T} \rangle \in \pi(p)$.

DEFINITION A.7. [Expansions]

The positive and negative expansions of schedules are defined in the following manner.

$$\begin{aligned} s \oplus (e, \tau) &= s \cup \{ \langle (e, \tau), \text{TRUE} \rangle \} \\ s \ominus (e, \tau) &= s \cup \{ \langle (e, \tau), \text{FALSE} \rangle \} \\ \pi(p) \oplus (a, \tau) &= \pi(p) \cup \{ \langle (a, \tau), \text{DO} \rangle \} \\ \pi(p) \ominus (a, \tau) &= \pi(p) \cup \{ \langle (a, \tau), \text{DON'T} \rangle \} \end{aligned}$$

The (positive or negative) expansions of π with an action for p are written $\pi \oplus_p (a, \tau)$ and $\pi \ominus_p (a, \tau)$. The results of these operations are such that for all $q \neq p$ the schedule remains the same.

DEFINITION A.8. [Fulfillment]

The concept of a commitment being *fulfilled* in a situation is defined as follows:

- a positive commitment (a, τ) is fulfilled by p in s iff $s(\mu(a, p), \tau) = \text{TRUE}$;
- a negative commitment (a, τ) is fulfilled by p in s iff $s(\mu(a, p), \tau) = \text{FALSE}$.

A schedule $\pi(p)$ is *followed* in s iff all positive and negative commitments in $\pi(p)$ are fulfilled by p in s . A schedule π is followed in s iff it is followed by every $p \in \mathcal{P}$.

DEFINITION A.9. [Executable]

A schedule $\pi(p)$ is *executable* in s iff for some $s' \supseteq s$, $\pi(p)$ is followed in s' . A schedule π is executable in s iff it is executable for every $p \in \mathcal{P}$.

Syntax

DEFINITION A.10. [Vocabulary]

Let \mathcal{N} be a set of names, and \mathcal{V} a set of verbs. Then for each $V \in \mathcal{V}$, $V^\times : \mathcal{D}^k \rightarrow \mathcal{A}$ and $V^\circ : \mathcal{D}^{k+1} \rightarrow \mathcal{E}$ are the two application functions of the verb.

DEFINITION A.11. [Atomic sentences]

The language \mathcal{L}_0 consists of all strings of the form $Vn_1, \dots, n_k!$ and Vn_1, \dots, n_{k+1} for all $V \in \mathcal{V}$ such that V^\times is a k -place function, and for all $n_1, \dots, n_{k+1} \in \mathcal{N}$.

DEFINITION A.12. [Complex sentences]

- $\mathcal{L}_1 \supseteq \mathcal{L}_0$ is the smallest set such that (i) if $\varphi \in \mathcal{L}_1$, then $\neg\varphi \in \mathcal{L}_1$ and (ii) if $\varphi, \psi \in \mathcal{L}_1$, then $\varphi \wedge \psi, \varphi \vee \psi \in \mathcal{L}_1$.
- $\mathcal{L}_2 \supseteq \mathcal{L}_1$ is the smallest set such that (i) if $\varphi \in \mathcal{L}_3$, then also $\mathbf{P}\varphi, \mathbf{F}\varphi, \mathbf{now}\varphi, \mathbf{I}\varphi$, and $\mathbf{R}\varphi \in \mathcal{L}_3$; (ii) if $\varphi \in \mathcal{L}_3$ contains only declarative atoms and does not contain *should* or *could*, then *should*(φ), and *could*(φ) $\in \mathcal{L}_3$; and (iii) if $\varphi \in \mathcal{L}_3$ contains only imperative atoms and does not contain *should* or *could*, and $q \in \mathcal{P}$, then *should*(q, φ), *could*(q, φ), *let*(q, φ), and $\mathbf{you}\varphi \in \mathcal{L}_3$.

Possibilities and states

DEFINITION A.13. [Possibilities]

A cognitive state σ is a set of possibilities (s, π) . The set of all possibilities $\mathcal{S} \times \Pi$ is called I and the set of all possible cognitive states $\wp(I)$ is called Σ . The minimal state is $\mathbf{1} = \{(\emptyset, \emptyset)\}$ and the absurd state is $\mathbf{0} = \emptyset$.

DEFINITION A.14. [Quandary freedom]

A possibility (s, π) is a quandary iff for some p , $\pi(p)$ is not executable in s . I_{QF} is the set of all non-quandary possibilities. σ is called *quandary free* iff no possibility in σ is a quandary.

DEFINITION A.15. [Temporal restriction]

The situation s up to τ is $(s|\tau)$ and the situation s from τ on is $(\tau|s)$. Similarly, the schedule π up to τ is $(\pi|\tau)$ and the schedule π from τ on is $(\tau|\pi)$.

$$\begin{aligned} (s|\tau) &= \{ \langle (e, \tau'), B \rangle \in s \mid \tau' \leq \tau \} \\ (\tau|s) &= \{ \langle (e, \tau'), B \rangle \in s \mid \tau < \tau' \} \\ (\pi|\tau) &= \lambda p. \{ \langle (a, \tau'), C \rangle \in \pi(p) \mid \tau \leq \tau' \} \\ (\tau|\pi) &= \lambda p. \{ \langle (a, \tau'), C \rangle \in \pi(p) \mid \tau' < \tau \} \end{aligned}$$

Here, $B \in \{\text{TRUE}, \text{FALSE}\}$ and $C \in \{\text{DO}, \text{DON'T}\}$.

If $s = (s|\tau)$ we say that s is τ -restricted. If $\pi = (\tau|\pi)$ we say that π is τ -restricted.

The temporal restrictions of states are defined as follows.

$$\begin{aligned} (\sigma|\tau) &= \{ ((s|\tau), (\pi|\tau)) \in I \mid (s, \pi) \in \sigma \} \\ (\tau|\sigma) &= \{ ((\tau|s), (\tau|\pi)) \in I \mid (s, \pi) \in \sigma \} \end{aligned}$$

DEFINITION A.16. [Modal bases]

The modal bases *epistemic*, *deontic*, and *dynamic* are functions that meet the following constraints.

$$\begin{aligned} \textit{epistemic}(\sigma, \tau) &\subseteq \{ i \in I \mid \exists j (j \in \sigma \ \& \ s_i \supseteq s_j \ \& \ \pi_i \supseteq \pi_j) \ \& \\ &\quad s_i \text{ is } \tau\text{-complete} \} \\ \textit{deontic}(\sigma, \tau) &\subseteq \{ i \in I \mid \exists j (j \in \sigma \ \& \ s_i \supseteq (s_j|\tau) \ \& \ \pi_i \supseteq \pi_j) \ \& \\ &\quad s_i \text{ is } \tau\text{-complete} \ \& \ (\tau|\pi_i) \text{ is followed in } s_i \} \\ \textit{dynamic}(\sigma, \tau) &\subseteq \{ i \in I \mid \exists j (j \in \sigma \ \& \ s_i \supseteq (s_j|\tau)) \ \& \ s_i = (s_i|\tau) \ \& \\ &\quad s_i \text{ is } \tau\text{-complete} \ \& \ (\tau|\pi_i) \text{ is executable in } s_i \} \end{aligned}$$

Update

DEFINITION A.17. [Interpretation]

Names are interpreted by the rigid designation $\llbracket \cdot \rrbracket : \mathcal{N} \rightarrow \mathcal{D}$. As a shorthand, $\llbracket n_1, \dots, n_k \rrbracket$ means $\llbracket n_1 \rrbracket, \dots, \llbracket n_k \rrbracket$. Roles are assigned by the function ϑ . If V^\times is a k -place function, then $\vartheta(V^\times)$ is an array of k different roles. Furthermore,

$$\text{if } \vartheta(V^\times) = \langle r_1, \dots, r_k \rangle, \text{ then } \vartheta(V^\circ) = \langle \text{agent}, r_1, \dots, r_k \rangle.$$

The functions V^\times and V° have to meet the following constraints.

$$\text{If } V^\times(\llbracket n_1, \dots, n_k \rrbracket) = a, \text{ then } \forall i(1 \leq i \leq k \Rightarrow \text{role}(a, \vartheta(V^\times)_i) = \llbracket n_i \rrbracket);$$

$$\text{If } V^\times(\llbracket n_1, \dots, n_k \rrbracket) = a, \text{ then } V^\circ(\llbracket n_{k+1}, n_1, \dots, n_k \rrbracket) = \mu(a, \llbracket n_{k+1} \rrbracket).$$

a_φ and e_ψ are the action commanded by $\varphi \in \mathcal{L}_0$ and the event asserted by $\psi \in \mathcal{L}_0$ respectively.

DEFINITION A.18. [Context]

A context c is a quadruple $\langle \sigma, \varepsilon, p, \rho \rangle$, with $\sigma \in \Sigma$, $\varepsilon, \rho \in \mathcal{T}$, and $p \in \mathcal{P}$. The set of all such contexts is C .

If c is a context, c_1, c_2, c_3 and c_4 are the projections of its members. If c_1 is the absurd state, then c is called absurd. If c is a context, then $c(\mathbf{0})$ is $\langle \mathbf{0}, c_2, c_3, c_4 \rangle$. If c_1 is quandary free, c is also called quandary free.

DEFINITION A.19. [Update, atomic sentences]

Let $c = \langle \sigma, \varepsilon, p, \rho \rangle$ be a context and φ an atomic sentence. The positive update of c with φ is $c[\varphi]^+ = \langle \sigma \uparrow \varphi, \varepsilon, p, \rho \rangle$ and the negative update of c with φ is $c[\varphi]^- = \langle \sigma \downarrow \varphi, \varepsilon, p, \rho \rangle$. The first arguments of the output contexts are defined as follows. If quandary free,

$$\begin{aligned} \sigma \uparrow V\vec{n}. &= \{(s \oplus (e_{V\vec{n}}, \varepsilon), \pi) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad s \oplus (e_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted \& consistent}\} \\ \sigma \downarrow V\vec{n}. &= \{(s \ominus (e_{V\vec{n}}, \varepsilon), \pi) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad s \ominus (e_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted \& consistent}\} \\ \sigma \uparrow V\vec{n}! &= \{(s, \pi \oplus (a_{V\vec{n}}, \varepsilon)) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad \pi \oplus (a_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted}\} \\ \sigma \uparrow V\vec{n}! &= \{(s, \pi \ominus (a_{V\vec{n}}, \varepsilon)) \in I \mid (s, \pi) \in \sigma \ \& \\ &\quad \pi \ominus (a_{V\vec{n}}, \varepsilon) \text{ is } \rho\text{-restricted}\} \end{aligned}$$

Otherwise, the outcome is $\mathbf{0}$.

DEFINITION A.20. [Update, connectives]

The positive update $[\cdot]^+$ and the negative update $[\cdot]^-$ of c with $\varphi \in \mathcal{L}_1$ are defined below. If quandary free,

$$\begin{aligned}
c[\neg\varphi]^+ &= c[\varphi]^- \\
c[\neg\varphi]^- &= c[\varphi]^+ \\
c[\varphi \vee \psi]^+ &= \langle (c[\varphi]^+)_1 \cup (c[\psi]^+)_1, c_2, c_3, c_4 \rangle \\
c[\varphi \vee \psi]^- &= (c[\varphi]^-)[\psi]^- \\
c[\varphi \wedge \psi]^+ &= (c[\varphi]^+)[\psi]^+ \\
c[\varphi \wedge \psi]^- &= \langle (c[\varphi]^-)_1 \cup (c[\psi]^-)_1, c_2, c_3, c_4 \rangle
\end{aligned}$$

Otherwise the outcome is $c(\mathbf{0})$.

DEFINITION A.21. [Update, shifters]

Let c be a context and φ a sentence in \mathcal{L}_3 . Then the update of c with φ is defined as follows.

$$\begin{aligned}
c[\mathbf{now}\varphi] &= \langle c_1, \mathit{now}, c_3, c_3 \rangle[\varphi] \\
c[\mathbf{P}\varphi] &= \langle c_1, P(c_4), c_3, c_4 \rangle[\varphi] \\
c[\mathbf{F}\varphi] &= \langle c_1, F(c_4), c_3, c_4 \rangle[\varphi] \\
c[\mathbf{I}\varphi] &= \langle c_1, c_2, c_3, c_2 \rangle[\varphi] \\
c[\mathbf{R}\varphi] &= \langle c_1, c_2, c_3, \mathit{now} \rangle[\varphi] \\
c[\mathbf{you}\varphi] &= \langle c_1, c_2, \mathit{me}, c_4 \rangle[\varphi] \\
c[\mathbf{let}(q, \varphi)] &= \langle c_1, c_2, q, c_4 \rangle[\varphi] \\
c[\mathit{should}(q, \varphi!)] &= c \text{ if } \langle \mathit{deontic}(c_1, c_2), F(c_2), q, c_2 \rangle \Vdash \varphi! \\
&\quad c(\mathbf{0}) \text{ otherwise} \\
c[\mathit{should}(q, \varphi)] &= c \text{ if } \langle \mathit{dynamic}(c_1, c_2), F(c_2), q, c_2 \rangle[\varphi] \neq \mathbf{0} \\
&\quad c(\mathbf{0}) \text{ otherwise} \\
c[\mathit{should}(\varphi.)] &= c \text{ if } \langle \mathit{epistemic}(c_1, c_2), F(c_2), c_3, c_2 \rangle \Vdash \varphi. \\
&\quad c(\mathbf{0}) \text{ otherwise} \\
c[\mathit{could}(\varphi.)] &= c \text{ if } \langle \mathit{epistemic}(c_1, c_2), F(c_2), c_3, c_2 \rangle[\varphi.] \neq \mathbf{0} \\
&\quad c(\mathbf{0}) \text{ otherwise}
\end{aligned}$$

DEFINITION A.22. [Validity]

A sentence φ is accepted in context c iff $c_1 \subseteq (c[\varphi]^+)_1$. A text $\varphi_1, \dots, \varphi_n$ supports a conclusion ψ iff for all c , $c[\varphi_1]^+ \dots [\varphi_n]^+ \Vdash \psi$. The statement that this is so is written as $\varphi_1, \dots, \varphi_n \Vdash \psi$.

Bibliography

- Aldrich, Virgil C. (1943). Do commands express propositions? *Journal of Philosophy* 40(24): 654 – 657.
- Aloni, Maria (2003). On choice-offering imperatives. In Dekker, Paul and Robert van Rooy, editors, *Proceedings of the Fourteenth Amsterdam Colloquium*. Amsterdam: ILLC.
- Anderson, Allen Ross (1958). A reduction of deontic logic to alethic modal logic. *Mind* 67: 100 – 103.
- Austin, John Langshaw (1962). *How to do things with words*. Oxford University Press.
- Austin, John Langshaw (1979). Performative utterances. In Urmson, J. O. and G. J. Warnock, editors, *Philosophical Papers*, pp. 233 – 252. Oxford University Press, third edition. Transcript of a B.B.C. talk in 1956.
- Beardsley, Elizabeth Lane (1944). Imperative sentences in relation to indicatives. *Philosophical Review* 53: 175 – 185.
- Belnap, Nuel (1990). Declaratives are not enough. *Philosophical Studies* 59(1): 1 – 30.
- Belnap, Nuel (1991). Backwards and forwards in the modal logic of agency. *Philosophy and Phenomenological Research* 51(4): 777 – 807.
- Bennis, Hans (2001). Featuring the subject in Dutch imperatives. In *Imperative Clauses in Generative Grammar*, pp. 19 – 37. Leiden.
- Beukema, Frits and Peter Coopmans (1989). A government-binding perspective on the imperative in English. *Journal of Linguistics* (25): 417 – 436.
- Blackburn, Patrick, Maarten de Rijke, and Yde Venema (2001). *Modal Logic*, Vol. 53 of *Cambridge Tracts in Theoretical Computer Science*. Cambridge University Press.
- Blom, Elma (2002). On the use and interpretation of root infinitives in early child Dutch. In Barbiers, Sjef, Frits Beukema, and Wim Wurff, editors, *Modality and its Interaction with the Verbal System*, number 47 in *Linguistik Aktuell/Linguistics Today*, pp. 103 – 131. John Benjamins.
- Blom, Elma (2003). From Root Infinitive to Finite Sentence. Ph.D. diss., Utrecht Institute of Linguistics OTS.
- Blom, Elma and Frank Wijnen (2000). How Dutch children's root infinitives become modal. In Howell, S.C., S.A. Fish, and T. Keith-Lucas, editors, *Proceedings of the 24th Annual BUCLD*. Medford (MA): Cascadilla Press.

- Bolinger, Dwight (1967). The imperative in English. In *To Honor Roman Jakobson*, Vol. 1, pp. 335 – 362. Den Haag: Mouton.
- Bolinger, Dwight (1977). *Meaning and Form*. London: Longman.
- Boser, K., B. Lust, L. Santelmann, and J. Whitman (1992). The syntax of CP and V-2 in early German child grammar: The strong continuity hypothesis. In *Proceedings of the North Eastern Linguistics Association*, Vol. 22, pp. 51 – 66. University of Massachusetts, Amherst.
- Bosque, Ignacio (1980). Retrospective imperatives. *Linguistic Inquiry* 11: 415 – 419.
- Brandt, Robert (1994). *Making it Explicit: Reasoning, Representing, and Discursive Commitment*. Harvard University Press.
- Broadie, Alexander (1972). Imperatives. *Mind* 82(322): 179 – 190.
- Burgess, John P. (1980). The unreal future. *Theoria* pp. 157 – 179.
- Butler, Jonny (2002). A minimalist treatment of modality. draft manuscript.
- Chierchia, Gennaro and Raymond Turner (1988). Semantics and property theory. *Linguistics and Philosophy* 11: 261 – 302.
- Chomsky, Noam (1975). *The Logical Structure of Linguistic Theory*. New York: Plenum Press.
- Chomsky, Noam (1981). *Lectures on Government and Binding*. Dordrecht: Foris.
- Clark, Billy (1993). Relevance and “pseudo-imperatives”. *Linguistics and Philosophy* 16: 79 – 121.
- Condoravdi, Cleo (2002). Temporal interpretation of modals: Modals for the present and modals for the past. In Beaver, D., S. Kaufmann, B. Clark, and L. Casillas, editors, *The Construction of Meaning*, pp. 59 – 88. Stanford: CSLI Publications.
- Davidson, Donald (1980). The logical form of action sentences. In *Essays on Actions and Events*, pp. 105 – 148. Oxford: Clarendon Press. Originally published in 1969.
- Davies, Eirlys (1986). *The English Imperative*. London: Croom Helm.
- Dowty, David R. (1991). Thematic proto-roles and argument selection. *Language* 67: 603 – 635.
- Dummett, Michael (1991). *The Logical Basis of Metaphysics*. Cambridge Mass.: Harvard University Press.
- Enç, Mürvet (1996). Tense and modality. In Lappin, Shalom, editor, *The Handbook of Contemporary Semantic Theory*, pp. 345 – 358. Oxford: Blackwell.
- Farkas, Donka (1992). On the semantics of subjunctive complements. In Hirschbueler, P. and K. Koerner, editors, *Romance Languages and Modern Linguistic Theory*, pp. 69 – 104. Amsterdam, Philadelphia: John Benjamins.
- Frege, Gottlob (1879). *Begriffsschrift*. Halle a. S.
- Frege, Gottlob (1884). *Grundlagen der Arithmetik*. Breslau: Wilhelm Koebner.
- Frege, Gottlob (1918). Der Gedanke. Eine logische Untersuchung. *Beiträge zur Philosophie des deutschen Idealismus* 2: 58 – 77.
- Fries, Norbert (2000). Wie finit ist der imperativ und wie infinit darf er sein? oder auch: Wie infinit ist der imperativ und wie finit darf er sein? draft manuscript, Berlin. http://www2.rz.hu-berlin.de/linguistik/institut/syntax/docs/fries_imp_2000.pdf.
- Geach, Peter T. (1981). Whatever happened to deontic logic? *Philosophia* 11: 1 – 12. Reprinted in *Logic and Ethics*, 1991, Kluwer Academic Publishers, pages 33 – 48.

- Geurts, Bart (2003). 'Or' in context. In Dekker, Paul and Robert van Rooy, editors, *Proceedings of the Fourteenth Amsterdam Colloquium*. Amsterdam: ILLC.
- Grice, Herbert Paul (1975). Logic and conversation. In Cole, Peter and Jerry Morgan, editors, *Syntax and Semantics*, Vol. 3: Speech Acts, pp. 43 – 58. New York: Academic Press.
- Groenendijk, Jeroen (1999). The logic of interrogation: Classical version. In Matthews, T. and D. Strolavitch, editors, *Proceedings of SALT IX, Santa Cruz*. CLC Publications.
- Groenendijk, Jeroen and Martin Stokhof (1984). Studies on the Semantics of Questions and the Pragmatics of Answers. Ph.D. diss., Universiteit van Amsterdam.
- Haeseryn, W., K. Romijn, G. Geerts, J. de Rooij, and M.C. van den Toorn, editors (1997). *Algemene Nederlandse Spraakkunst*. Groningen/Deurne: Martinus Nijhoff uitgevers/Wolters Plantyn.
- Hamblin, Charles Leonard (1958). Questions. *Australasian Journal of Philosophy* 36: 159 – 168.
- Hamblin, Charles Leonard (1971). Mathematical models of dialogue. *Theoria* 37: 130 – 155.
- Hamblin, Charles Leonard (1972). Quandaries and the logic of rules. *Journal of Philosophical Logic* 1: 74 – 85.
- Hamblin, Charles Leonard (1987). *Imperatives*. Basil Blackwell.
- Han, Chung-Hye (1998). The Structure and Interpretation of Imperatives: Mood and Force in Universal Grammar. Ph.D. diss., University of Pennsylvania.
- Han, Chung-Hye (1999a). The contribution of mood and force in the interpretation of imperatives. In *Proceedings of the 29th North East Linguistics Society*, pp. 97 – 111. GLSA.
- Han, Chung-Hye (1999b). Deontic modality, lexical aspect and the semantics of imperatives. In *Linguistics in Morning Calm 4*. Seoul: Hanshin Publications.
- Han, Chung-Hye and Chungmin Lee (2002). On negative imperatives in Korean. In *Proceedings of the 16th Pacific Asia Conference on Language, Information and Computation*. The Korean Society for Language and Information.
- Hare, Richard Mervyn (1949). Imperative sentences. *Mind* 58: 21 – 39. Reprinted in Hare (1971).
- Hare, Richard Mervyn (1967). Some alleged differences between imperatives and indicatives. *Mind* 76: 309 – 326. Reprinted in Hare (1971).
- Hare, Richard Mervyn (1970). Meaning and speech acts. *Philosophical Review* 79: 3 – 24. Reprinted in Hare (1971).
- Hare, Richard Mervyn (1971). *Practical Inference*. London MacMillan.
- Harris, James (1998). Spanish imperatives: syntax meets morphology. *Journal of Linguistics* 34: 27 – 52.
- Hilpinen, Risto (1969). An analysis of relativised modalities. In Davis, J. W., D. J. Hockney, and W. K. Wilson, editors, *Philosophical Logic*, pp. 181 – 193. Dordrecht: D. Reidel.
- Hilpinen, Risto and Dagfinn Føllesdal (1981). Deontic logic: An introduction. In Hilpinen, Risto, editor, *Deontic Logic: Introductory and Systematic Readings*. Dordrecht: Reidel.
- Hoekstra, Teun and Nina Hyams (1998). Aspects of root infinitives. *Lingua* 106: 81 – 112.
- Hofstadter, Albert and John C. McKinsey (1939). On the logic of imperatives. *Philosophy of Science* 6: 446 – 457.
- Horty, John F. and Nuel Belnap (1995). The deliberative stit: A study of action, omission, ability, and obligation. *Journal of Philosophical Logic* 24: 583 – 644.

- Huntley, Martin (1982). Imperatives and infinitival embedded questions. In Schneider, Robinson, Kevin Tuite, and Robert Chametzky, editors, *Papers from the parasession on Nondeclaratives*, pp. 93 – 106. Chicago Linguistics Society.
- Huntley, Martin (1984). The semantics of English imperatives. *Linguistics and Philosophy* 7: 103 – 134.
- Isac, Daniela (2002). Surrogate imperative forms: negation as a licenser of force. In *25th GLOW conference in Amsterdam*. <http://www.meertens.knaw.nl/glow2002/isac.pdf>.
- Isac, Daniela and Edit N. Jakab (2004). Mood and force features in the languages of the Balkans. In Tomić, Olga Mišeska, editor, *Balkan Syntax and Semantics*, number 67 in *Linguistics Today*, pp. 315 – 338. John Benjamins.
- Jacobs, Roderick A. (1981). On being Hypothetical. In Hendrick, Roberta A., editor, *Papers from the seventh regional meeting*, pp. 99 – 107. Chicago Linguistic Society.
- Jorgensen, J. (1938). Imperatives and logic. *Erkenntnis* 7: 288 – 298.
- Kamp, Hans (1973). Free choice permission. *Proceeding of the Aristotelian Society* 74: 57 – 74.
- Kaplan, David (1989). Demonstratives. In Almog, Joseph, John Perry, and Howard Wettstein, editors, *Themes From Kaplan*, pp. 481 – 563. New York: Oxford University Press.
- Katz, Jerrold Jacob (1977). *Propositional Structure and Illocutionary Force*. The Harvester Press.
- Katz, Jerrold Jacob and Paul Martin Postal (1964). *An integrated theory of linguistic descriptions*. Cambridge Mass.: MIT Press.
- Kayne, Richard S. (1992). Italian negative infinitival imperatives and clitic climbing. In Tasmowsky, L. and A. Zribi-Hertz, editors, *Hommages à Nicholas Ruwet*, pp. 300 – 312. Ghent: Communication and Cognition.
- Kratzer, Angelika (1981). The notional category of modality. In Eikmeyer, Hans-Jürgen and Hannes Rieser, editors, *Words, Worlds, and Contexts - New Approaches in Word Semantics*, pp. 38 – 74. Berlin: de Gruyter.
- Kratzer, Angelika (1989). An investigation into the lumps of thought. *Linguistics and Philosophy* 12(5): 607 – 653.
- Kripke, Saul A. (1963). Semantical considerations on modal logic. *Acta Philosophica Fennica* 16: 83 – 94.
- Krug, Manfred (2004). Adhortative *let's*: Negation and grammaticalization. Hand-out of a presentation in Pau at the second international conference on Modality in English.
- Lakoff, George (1972). Linguistics and natural logic. In Harman, D. Davidson & G., editor, *Semantics of natural language*. Dordrecht: Reidel.
- Lasarides, Alex and Nicholas Asher (2003). Imperatives in dialogue. In Kühnlein, Peter, Hannes Rieser, and Henk Zeevat, editors, *Perspectives on Dialogue in the New Millennium*, Vol. 114 of *Pragmatics & Beyond New Series*, pp. 1 – 24. Amsterdam/Philadelphia: John Benjamins.
- Latrouite, Anja and Ralf Naumann (1999). Unaccusative-causative alternations and the dynamic structure of verbs. In Kruijff, Geert-Jan M. and Richard T. Oehrle, editors, *Proceedings of Formal Grammar*.
- Lewis, David K. (1972). General semantics. In Davidson, D. and G. Harman, editors, *Semantics of Natural Language*, pp. 169 – 218. Dordrecht: D. Reidel.
- Lewis, David K. (1979). Scorekeeping in a language game. *Journal of Philosophical Logic* 8: 339 – 359.

- Lewis, David K. (1980). Index, context, and content. In Kanger, Stig and Sven Öhman, editors, *Philosophy and Grammar*. Dordrecht: Reidel.
- Lokhorst, Gert-Jan C. (1999). Geach's deontic quantifier. *Philosophia* 27(1 – 2): 247 – 251.
- Mastop, Rosja (2003). Imperatives and events. In Dekker, Paul and Robert Rooy, editors, *Proceedings of the 14th Amsterdam Colloquium*, pp. 49 – 54.
- McGinn, Colin (1977). Semantics for nonindicative sentences. *Philosophical Studies* 32: 301 – 311.
- Meyer, John-Jules Ch. (1993). Free choice permission and Ross's paradox: Internal vs external non-determinism. In Dekker, Paul, editor, *Proceedings of the Eighth Amsterdam Colloquium*, pp. 367 – 380.
- Mithun, Marianne (1999). *The languages of native North America*. Cambridge University Press.
- Moens, Marc and Mark Steedman (1988). Temporal ontology and temporal reference. *Computational Linguistics* 14(2): 15–28.
- Montague, Richard (1973). The proper treatment of quantification in ordinary English. In Hintikka, Jaakko, Julius Moravcsik, and Patrick Suppes, editors, *Approaches to Natural Language*, Vol. 49 of *Synthese Library*, pp. 221 – 242. Dordrecht: Reidel.
- Pak, M. (2004). Sentence types in Korean. Manuscript, Georgetown University.
- Palmer, Frank Robert (2001). *Mood and Modality*. Cambridge University Press.
- Partee, Barbara H. (1973). Some structural analogies between tenses and pronouns in English. *Journal of Philosophy* 70: 601 – 609.
- Pendlebury, Michael (1986). Against the power of force: reflections on the meaning of mood. *Mind* 91: 361 – 372.
- Platzack, Christer and Inger Rosengren (1998). On the subject of imperatives: A minimalist account of the imperative clause. *The Journal of Comparative Germanic Linguistics* 1(3): 177 – 224.
- Portner, Paul (1997). The semantics of mood, complementation, and conversational force. *Natural Language Semantics* 5: 167 – 212.
- Portner, Paul (2003). The meaning and force of imperatives. Handout from a presentation at ESSLLI, Vienna.
- Postal, Paul Martin (1964). Underlying and superficial linguistic structure. *Harvard Educational Review* 34: 246 – 266.
- Potsdam, Eric (1995). Phrase structure of the English imperative. In L., Gabriele and R. Westmoreland, editors, *Proceedings of the Sixth Annual Meeting of the Formal Linguistics Society of Midamerica*, pp. 143 – 154. Bloomington: Indiana University Linguistics Club Publications.
- Prior, Arthur N. (1967). *Past, Present and Future*. Oxford: Clarendon Press.
- Proeme, Henk (1991). Studies over het Poolse, Nederlandse en Russische werkwoord. Ph.D. diss., Vakgroep Slavische Taal- en Letterkunde, University of Leiden.
- Quer, Josep (2001). Interpreting mood. *Probus* 13: 81 – 111.
- Radford, Andrew (1990). *Syntactic Theory and the Acquisition of English Syntax*. Oxford and Cambridge, Mass.: Basil Blackwell.
- Reichenbach, Hans (1947). *Elements of Symbolic Logic*. Berkeley CA.: University of California Press.
- Rivero, María-Luisa and Arhonto Terzi (1995). Imperatives, V-movement and logical mood. *Journal of Linguistics* 31: 301 – 332.

- Rizzi, Luigi (1994). Some notes on linguistic theory and language development: The case of root infinitives. *Language Acquisition* 3: 371 – 393.
- Rizzi, Luigi (1995). The fine structure of the left periphery. In Haegeman, L., editor, *Elements of Grammar*. Dordrecht: Kluwer.
- Rizzolatti, Giacomo and Laila Craighero (2004). The mirror-neuron system. *The Annual Review of Neuroscience* 27: 169 – 192.
- Roberts, Craige (1989). Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy* 12(6): 683 – 721.
- Rohrbaugh, Gene (1996). An event-based semantics for deontic utterances. In Dekker, Paul and M. Stokhof, editors, *Proceedings of the Tenth Amsterdam Colloquium*. Amsterdam University Press.
- Ross, Alf (1941). Imperatives and logic. *Theoria* 25(7): 53 – 71.
- Ross, Alf (1968). *Directives and Norms*. London: Routledge and Kegan Paul.
- Ross, John Robert (1970). On declarative sentences. In Jacobs, R. A. and P. S. Rosenbaum, editors, *Readings in English Transformational Grammar*, pp. 222 – 272. Waltham, Mass.: Ginn.
- Rott, Hans (2000). Words in contexts: Fregean elucidations. *Linguistics and Philosophy* 23: 621 – 641.
- Sadock, Jerrold Murray (1974). *Toward a Linguistic Theory of Speech Acts*. New York: Academic Press.
- Sadock, Jerrold Murray and Arnold M. Zwicky (1985). Speech act distinctions in syntax. In Shopen, Timothy, editor, *Language typology and syntactic description, Volume I: Clause structure*, chapter 3, pp. 155 – 196. Cambridge University Press.
- Schmerling, Susan F. (1975). Imperative subject deletion and some related matters. *Linguistic Inquiry* 6: 501 – 510.
- Schmerling, Susan F. (1982). How imperatives are special and how they aren't. In Schneider, Robinson, Kevin Tuite, and Robert Chametzky, editors, *Papers from the parasession on Nondeclaratives*, pp. 93 – 106. Chicago Linguistics Society.
- Schmerling, Susan F. (1983). A new theory of English auxiliaries. In Heny, Frank and Barry Richards, editors, *Linguistic Categories: Auxiliaries and Related Puzzles*, Vol. 2, pp. 1 – 53. Dordrecht: Reidel.
- Searle, John (1969). *Speech Acts*. Cambridge: Cambridge University Press.
- Searle, John (1979). A taxonomy of illocutionary acts. In *Expression and Meaning*, pp. 1 – 29. Cambridge: Cambridge University Press.
- Seegerberg, Krister (1989). Bringing it about. *Journal of Philosophical Logic* 18: 327 – 347.
- Seppänen, Aimo (1977). The position of *let* in the English auxiliary system. *English studies: a journal of English letters and philology* 58(1): 515 – 529.
- Shipley, William F. (1964). *Maidu Grammar*, Vol. 41 of *University of California Publications in Linguistics*. Berkeley and Los Angeles: University of California Press.
- Steedman, Mark (2000). The Productions of Time. Tutorial notes about temporal semantics, draft 4.1.
- Stenius, Erik (1967). Mood and language-game. *Synthese* 17: 254 – 274. Page references in the text are with respect to the republication in Davidson and Harman, *Semantics of Natural Language*, Reidel 1972.

- Stockwell, Robert, Paul Schachter, and Barbara Partee (1973). *The Major Syntactic Structures of English*. New York: Rinehart and Wilson. Chapter "Imperatives", pp. 633 – 671.
- Stokhof, Martin (2002). *World and Life as One. Ethics and Ontology in Wittgenstein's Early Thought*. Stanford CA: Stanford University Press.
- Stowell, Tim (1982). On tense in infinitives. *Linguistic Inquiry* 13: 561 – 670.
- Takahashi, Hidemitsu (1995). English imperatives and speaker commitment. *Language Sciences* 16(3/4): 371 – 385.
- Tamminga, Allard (2004). Expansion and contraction of finite states. *Studia Logica* 76: 427 – 442.
- ter Meulen, Alice (1990). English aspectual verbs as generalised quantifiers. In Déchaine, R.-M., W. Philip, and T. Sherer, editors, *Proceedings of NELS 20*, pp. 378 – 390. GLSA: Amherst, Mass.
- Terras, V. (1960). Aspect and tense in Russian. *The Slavic and East European Journal* pp. 331 – 344.
- Thomason, Richmond (1981). Deontic logic and the role of freedom in moral deliberation. In Hilpinen, Risto, editor, *New Studies in Deontic Logic*, pp. 177 – 186. D. Reidel.
- Thomason, Richmond (1984). Combinations of tense and modality. In Gabbay, D. and F. Guenther, editors, *Handbook of Philosophical Logic: Extensions of Classical Logic*, pp. 135 – 165. Dordrecht: Reidel.
- Tomasello, Michael (1999). *The Cultural Origins of Human Cognition*. Harvard University Press.
- Tomić, Olga Mišeka (1999). Negation and imperatives. In *Catalan Working Papers in Linguistics*, Vol. 7, pp. 191 – 206. <http://www.bib.uab.es/pub/linguistics/1132256Xv7.htm>.
- Traugott, Elizabeth Closs and Richard B. Dasher (2002). *Regularity in Semantic Change*. Cambridge, UK: Cambridge University Press.
- Txurruka, Isabel Gómez (2003). Natural language conjunction *And*. *Linguistics and Philosophy* 26(3): 255 – 285.
- Umbach, Carla (2005). Contrast and information structure: A focus-based analysis of *but*. *Linguistics* 43(1): 207 – 232.
- van Benthem, Johan (1979). Minimal deontic logics. *Bulletin of the Section of Logic* 8(1): 36 – 42.
- van Benthem, Johan (1991). *The Logic of Time*. Kluwer Academic Publishers, 2nd edition.
- van der Auwera, Johan, Nina Dobrushina, and Valentin Goussev (2003). A semantic map for imperative-hortatives. In Willems, Dominique, Timothy Coleman, and Bart Defrancq, editors, *Points of Comparison in Linguistics: from Morphology to Discourse*. Basingstoke: Palgrave Macmillan.
- van der Torre, Leon and Yao-Hua Tan (1998). An update semantics for deontic reasoning. In *Proceedings of DEON'98*, pp. 409 – 426.
- van der Wouden, Ton (1998). Niet huilen maar: negation, directives and particles. In Barbiere, Sjef, Johan Rooryck, and Jeroen van de Weijer, editors, *Small words in the big picture. Squibs for Hans Bennis*, Vol. 2 of *HIL Occasional Papers*, pp. 125 – 128. Leiden: HIL.
- van Eijck, Jan (2000). Making things happen. *Studia Logica* 66: 41 – 58.
- van Ginneken, J. (1917). *De Roman van een Kleuter*. 's Hertogenbosch, Antwerpen: L.C.G. Malmberg.
- van Lambalgen, Michiel and Fritz Hamm (2004). *The Proper Treatment of Events*. Blackwell.
- van Rooy, Robert (1999). Questioning to resolve decision problems. In Dekker, Paul, editor, *Proceedings of the Twelfth Amsterdam Colloquium*. Amsterdam University Press.

- Veltman, Frank (1986). Data semantics and the pragmatics of indicative conditionals. In Traugott, Elizabeth Closs, Alice ter Meulen, Judy Snitzer Reilly, and Charles A. Ferguson, editors, *On Conditionals*, pp. 147 – 168. Cambridge University Press.
- Veltman, Frank (1996). Defaults in update semantics. *Journal of Philosophical Logic* 25: 221 – 261.
- Visser, Janneke (1996). Object drop in Dutch imperatives. *Linguistics in the Netherlands* (x): 257 – 268.
- von Wright, Georg Henrik (1951a). Deontic logic. *Mind* 60: 1 – 15.
- von Wright, Georg Henrik (1951b). *An Essay in Modal Logic*. Amsterdam: North Holland.
- von Wright, Georg Henrik (1996). Is there a logic of norms? In *Six Essays in Philosophical Logic*, pp. 35 – 54. Helsinki: Societas Philosophica Fennica.
- Westerståhl, Dag (1984). Determiners and context sets. In van Benthem, Johan and Alice ter Meulen, editors, *Generalized Quantifiers in Natural Language*, pp. 45 – 71. Dordrecht: Foris.
- Wexler, Kenneth (1994). Optional infinitives, head movement and the economy of derivations. In Lightfoot, D. and N. Hornstein, editors, *Verb Movement*, pp. 305 – 350. Cambridge: Cambridge University Press.
- Wijnen, Frank (1998). The temporal interpretation of Dutch children's root infinitivals. The effect of eventivity. *First Language* 18: 379–402.
- Williams, Christopher (2001). Uses of the imperative with the progressive form in English. *Nottingham Linguistic Circular* 16: 31 – 45.
- Wilson, Deirdre and Dan Sperber (1988). Mood and the analysis of non-declarative sentences. In Dancy, J., J. Moravcsik, and C. Taylor, editors, *Human Agency: Language, Duty and Value*, pp. 77 – 101. Stanford University Press.
- Wittgenstein, Ludwig (1922). *Tractatus Logico-Philosophicus*. London: Routledge and Kegan Paul. Translated by C.K. Ogden, with an Introduction by Bertrand Russell.
- Wittgenstein, Ludwig (1953). *Philosophische Untersuchungen*. Oxford: Blackwell. Translated by G.E.M. Anscombe.
- Wolf, Henk (2003). Imperatieven in de verleden tijd. *Taal & Tongval* 55: 168 – 187.
- Xrakovskij, Victor S., editor (2001). *Typology of Imperative Constructions*, Vol. 9 of *Lincom Studies in Theoretical Linguistics*. Muenchen: Lincom Europa.
- Zanuttini, Rafaella (1991). Syntactic properties of sentential negation: a comparative study of Romance languages. Ph.D. diss., University of Pennsylvania.
- Zanuttini, Rafaella (1997). *Negation and Clausal Structure. A Comparative Study of Romance Languages*. Oxford Studies in Comparative Syntax. New York, Oxford: Oxford University Press.
- Zarnic, Berislav (2002). Dynamic semantics, imperative logic and propositional attitudes. Uppsala prints and preprints in philosophy, Uppsala Universitet.
- Zeevat, Henk (2003). Particles: presupposition triggers, context markers or speech act markers. In Blutner, Reinhard and Henk Zeevat, editors, *Optimality Theory and Pragmatics*. Palgrave-McMillan.
- Zeijlstra, Hedde (2004). Sentential Negation and Negative Concord. Ph.D. diss., LOT, Meertens Institute.
- Zimmermann, Ede (2000). Free choice disjunction and epistemic possibility. *Natural Language Semantics* 8: 255 – 290.

Samenvatting

In de semantiek wordt de betekenis van zinnen van natuurlijke talen, zoals Nederlands en Engels, geanalyseerd door middel van formele logica. De karakteristieke eigenschappen van bepaalde taalkundige constructies worden aan het licht gebracht door aan te geven hoe zinnen in die constructie zich verhouden tot andere zinnen wat betreft onder meer consistentie, logisch gevolg, coherentie. Dit proefschrift presenteert een studie van de gebiedende wijs en, meer algemeen, de rol van wijs (ook wel ‘modus’ of ‘zinstype’ genoemd) in een dergelijke analyse.

Zinnen in de aantonende wijs worden normaal gesproken gebruikt om de eigenschappen, omstandigheden en verrichtingen van mensen en andere wezens en objecten te beschrijven. Gebiedende zinnen daarentegen hebben de functie om mensen (en andere wezens) tot bepaalde handelingen aan te sporen. Gegeven dit verschil in functie ligt het voor de hand dat aantonende zinnen een onderwerp zullen hebben—dat object of die persoon waarvan de eigenschappen of verrichtingen worden beschreven—terwijl dat voor gebiedende zinnen niet het geval hoeft te zijn. Instructies zijn gericht aan een persoon, maar zij *betreffen* deze persoon niet noodzakelijkerwijs en zodoende is er geen voor de hand liggende reden waarom zinnen met een dergelijke functie een onderwerp zouden hebben. Een verdere natuurlijke consequentie is dat aantonende zinnen betrekking hebben op een verleden, reeds voltooide, of gelijktijdig plaatshebbende gebeurtenis en gebiedende zinnen een nog onvoltooide of toekomstige handeling betreffen. Tenslotte is er het verschil dat aantonende zinnen informatie verschaffen over hoe de wereld feitelijk zou kunnen zijn, terwijl gebiedende zinnen mogelijkheden, verboden en verplichtingen bieden aan de aangesproken persoon.

Wanneer nu, zoals gebruikelijk is in de literatuur, de *betekenis* van zinnen van alle vormen en wijzen wordt opgevat als een ‘waarheidsconditionele inhoud’ (d.w.z. dat de betekenis van een zin wordt geïdentificeerd met het benoemen van de waarheidswaarde van de zin in alle mogelijke omstandigheden), dan kan het voornoemde functieverhaal niet als een betekenisverschil worden bestudeerd. Een gebiedende zin kan dan alleen nog maar worden begrepen als een instructie aan iemand om een

bepaalde beschrijving van de toekomst waar te maken. Dit stemt niet overeen met de grammatica en betekenis van feitelijke gebiedende zinnen in talen zoals het Engels en het Nederlands, wat kan worden aangetoond aan de hand van de volgende observaties.

Ten eerste is het verrichten van een handeling—zeg, het opblazen van een ballon—niet hetzelfde als het waarmaken van een beschrijving—dat ik een ballon opblaas. Slechts in het tweede geval is de actor ('ik') een onderdeel van hetgeen waarnaar verwezen wordt.

Bovendien zijn er bepaalde taalkundige fenomenen met betrekking tot de gebiedende wijs die moeilijk zijn te ondervangen met de traditionele benadering. Een voorbeeld daarvan is het contrast tussen de volgende zinnen:

- (1) Zet ieders telefoon uit.
- (2) Zet allemaal je telefoon uit.

De tweede zin zegt niet, zoals de eerste dat doet, dat de aangesproken persoon erop toe moet zien dat ieders telefoon uit is. Het woord 'allemaal' betekent hier dat elk van de aangesproken personen de instructie, je telefoon uitzetten, dient uit te voeren. Deze kwantificerende term heeft dus een semantische functie die niet is te analyseren in termen van het beschrijven van situaties. Een ander contrast is dat tussen de nu volgende zinnen:

- (3) Was (Patricia) maar niet met die uitgever in zee gegaan.
- (4) Was (*Patricia) dan ook niet met die uitgever in zee gegaan.

In de tweede voorbeeldzin, in tegenstelling tot de eerste, is een derde persoonsonderwerp niet toegestaan. De eerste zin, met 'maar', drukt de wens uit dat een gebeurtenis niet plaats had gevonden, nl. dat de aangesprokene/Patricia in zee ging met die uitgever. De tweede zin, met 'dan ook' of 'toch', drukt een verwijt uit, gericht aan de aangesprokene, dat de handeling van het in zee gaan met die uitgever in het verleden niet verricht had moeten worden.

Een derde reden om af te wijken van de standaard benadering van gebiedende zinnen in de semantiek betreft de regels voor het coherent gebruik van zulke zinnen. Hierbij is het volgende onderscheid illustratief.

- (5) Als Hubert met zijn moeder belt, is hij uren in gesprek. Hubert is niet uren in gesprek. Dus hij belt niet met zijn moeder.
- (6) #Als je nog iets nodig hebt, bel dan Hubert. Bel Hubert niet. Dus je hebt niets nodig.

De vorm van de eerste redenering heet *Modus Tollens*, en deze wordt gewoonlijk als een geldige redeneervorm beschouwd. De tweede redenering is van schijnbaar dezelfde vorm, maar evident ongeldig (d.w.z., incoherent). Het verschil kan als volgt worden begrepen.

De conditionele zin in (5) kan zo worden gebruikt dat de spreker niet uitsluit dat hij of zij al weet of Hubert uren in gesprek is. De conditionele zin in (6) kan echter alleen worden opgevat als een aansporing die in het midden laat of de aangesprokene nog iets nodig heeft, en die dus in het midden laat of de aangesprokene Hubert dient te bellen. Dit betekent dat de tweede, onconditionele gebiedende zin regelrecht in conflict is met de voorafgaande zin. Zodoende is de opeenvolging van zinnen in (6) incoherent.

Een ander voorbeeld is de zogeheten ‘Ross paradox’:

- (7) Ik heb de brief in de brievenbus gedaan. Dus is het zo dat ik de brief heb gepost of verbrand.
- (8) #Stop die brief in de brievenbus! Dus post hem of verbrand hem!

De regel ‘disjunctie introductie’ is niet van toepassing op gebiedende zinnen. Over het algemeen zegt een zin (aantonend of gebiedend) van de vorm ‘A of B’ dat A en B beide mogelijk zijn. Dat gegeven wordt in beide bovenstaande teksten tegengesproken door de voorafgaande zin. Het is echter mogelijk met de aantonende zin ‘A of B’ te zeggen dat deze in zijn geheel waar is, zonder daarmee te beweren dat zowel A als B voor mogelijk wordt gehouden. Dit is wat het woordje ‘dus’ signaleert. Voor gebiedende zinnen is er niet iets vergelijkbaars. Wij kunnen niet het bevel ‘A of B’ uitspreken en daarmee zeggen dat alleen ‘het geheel’ bevolen wordt, zonder dat daarmee een keuze wordt geboden aan de aangesprokene. In de terminologie van de Griceaanse pragmatiek kunnen wij dus zeggen dat de implicatie van een keuze in gebiedende zinnen met ‘of’ niet ‘canceleerbaar’ zijn.

Het proefschrift is als volgt georganiseerd. In het eerste hoofdstuk bespreek ik de taalfilosofische literatuur aangaande het onderscheid tussen zinswijzen. Ik bekritiseer de pogingen om gebiedende zinnen te analyseren als verkapt beweringen of als bevelen tot het waar maken van aantonende zinnen. In plaats daarvan stel ik voor dat er een perspectivistisch onderscheid wordt gemaakt tussen gebeurtenissen, zoals die worden gerapporteerd in aantonende zinnen, en handelingen, zoals die worden opgedragen in gebiedende zinnen. Dit onderscheid leidt onvermijdelijk tot een dualisme met betrekking tot de betekenis van werkwoorden: ‘opstaan’ is zowel iets dat kan plaatsvinden als iets dat gedaan kan worden. Dat dualisme is echter plausibel en vertegenwoordigt in de semantiek de cognitieve capaciteit om te kunnen wisselen tussen beide perspectieven.

Het tweede hoofdstuk betreft de taalkundige opvatting dat de gebiedende wijs in het Engels niets meer is dan een directief gebruikte infinitief-constructie. Ik betoog, contra ondermeer Bolinger en Huntley, dat de Engelse infinitief niet semantisch homogeen is en dat de voorgestelde semantische analyses niet adequaat zijn. Aan de hand van het proefschrift van Blom wordt aangegeven dat de schijnbare homogeniteit een heel andere oorzaak kan hebben, t.w. dat bewerende zinnen, die betrekking hebben op gebeurtenissen, altijd een onderwerp hebben en (daardoor) een werkwoord dat daarmee conjugeert. Niet-bewerende zinnen hebben vaak betrekking op

handelingen en hebben om die reden vaak niet een onderwerp. Het werkwoord kan dan de infinitievorm krijgen.

In het derde hoofdstuk bespreek ik complexe gebiedende zinnen. In de eerste plaats zijn daar de verledentijds-imperatieven van het Nederlands. Aangezien deze moeten worden begrepen als instructies relatief aan een verleden keuzemoment, laten zij de noodzaak zien om tot een semantiek van gebiedende zinnen te komen die gebiedende zinnen niet gelijkstelt aan de taalhandeling van het geven van feitelijke instructies aan de aangesproken persoon. Een verder argument voor een dergelijke semantiek ligt in de zogeheten ‘hortatieve’ constructie met ‘laten’, gevolgd door een nominatief voornaamwoord in de eerste of derde persoon en een infinitief.

(9) Laten wij een lied zingen.

(10) Laten zij zich met hun eigen zaken bemoeien.

Deze zinnen dienen te worden begrepen als gebiedende zinnen die gericht zijn aan iemand anders dan de persoon die feitelijk wordt toegesproken.

In de laatste twee hoofdstukken presenteer ik een formele semantiek voor gebiedende zinnen die de valkuilen van eerdere benaderingen vermijdt en waarmee de eerder genoemde verschillen tussen aantonende en gebiedende zinnen kunnen worden gekarakteriseerd. In hoofdstuk vier wordt een logica voor beide zinswijzen geformuleerd, die de Ross paradox en aanverwante problemen voorkomt. Ook wordt aangetoond dat het ‘vrije keuze permissie’ probleem van Kamp in dit model eenvoudig is verholpen. Het vijfde en laatste hoofdstuk biedt een uitwerking van deze semantiek, waarbij ook de temporele en agentieve aspecten van gebiedende zinnen worden verdisconteerd. Het hoofdstuk eindigt met een bespreking van een tweetal nog openstaande kwesties: zinnen die een gebiedende en een aantonende zin verbinden middels een coördinerend voegwoord (zogeheten ‘mixed mood’ zinnen) en grammaticaal en lexicaal aspect in gebiedende zinnen.