

IMPERATIVES AS SEMANTIC PRIMITIVES

ROSJA MASTOP

1 INTRODUCTION

There are three different ways in which nondeclaratives have been integrated into formal theories of meaning. These are: the performative analysis, which treats them as explicit or modal performatives and attempts to reduce them to statements; the parametric analysis, distinguishing a sentence type expression M from a ‘sentence radical’ p , together forming a meaningful expression $[M,p]$; and the operator analysis, according to which (nondeclarative) sentence type expressions scope over an statement, yielding $M(p)$. The difference between the second and third approaches is that the parametric analysis considers all statements to subordinate its semantic content, whereas on the operator analysis simple propositions p are treated on a par with sentences containing a sentence type expression. According to the operator analysis an assertion-operator is unnecessary, because an utterance of a proposition (under appropriate circumstances) in itself constitutes an assertion. The idea that binds these three accounts of imperatives is that the intuitive connection between declaratives and imperatives, as in (1), must be explained by reference to a shared semantic entity contained in an analysis of those sentences.

- (1) a. Ann closes the door.
b. Ann, close the door.

A fundamental idea of formal semantics is that the semantic value of propositions (expressed by means of simple indicatives) is primitive. In classical semantics propositions are simply true or false, and in dynamic semantics propositions are atomic information units. Any compositional or decompositional semantic analysis of indicatives begins with the primitive semantic values of propositions. In this paper I want to propose that we treat instructions (expressed by means of simple imperatives) as semantic primitives, on a par with propositions: instructions are atomic directive messages, just as propositions are atomic informative messages. A compositional or decompositional semantic analysis of imperatives has to start with the simple semantic value of instructions.

To avoid confusion, I should preliminarily contrast this *semantic* conception of imperatives with a *pragmatic* one. The latter would equate the imperative with a speech act type such as commanding, advising or requesting, or a bundle of these. It is a commonplace to analyse, e.g., ‘that’ noun clauses as expressing propositions, despite the fact that the clause as such is not a statement and does not function then and there to provide factual information. The semantic

value of the ‘that’ clause is the informative content it would have when used canonically. A similar argument was offered in favour of the semantic view of interrogatives (Groenendijk and Stokhof, 1984): ‘wh’ noun clauses are analysed in terms of interrogative semantics, despite the fact that they do not convey a question. The semantic value of a ‘wh’ clause (at least in the context of a verb such as ‘wonder’) is the interrogative content it would have when used canonically. Here, the term ‘instruction’ will be used for the semantic content of a canonical imperative utterance. An instruction can occur in a non-canonical context. Perhaps we can consider certain types of infinitival clauses as embedded instructions (that will not be argued for here). In that case the non-canonical instruction will be assigned the semantic content it would have when used canonically.

There is a critical element and a constructive element to the proposal of this paper. The critical element is the rejection of all attempts to reductively analyse imperatives in terms of a propositional semantics and a pragmatics of mood.¹ Imperatives should be analysed in terms of a distinctive imperative semantics, not divided into separate layers or components. The only pragmatics there is to imperatives concerns the question why a speaker decides to use a particular imperative at a particular occasion, just as in the Gricean pragmatics of conversation. The constructive element of the proposal concerns the identification and compositional analysis of complex imperatives. In this paper we will only be concerned in detail with one such case: the embedding of imperatives under a counterfactual or ‘irrealis’ modality. I will argue that Dutch has such a construction and I will propose an analysis of this construction in terms of update semantics.

In first three sections, I will develop the critical element of the proposal, by criticising the aforementioned three different ways in which imperatives have been reductively analysed in the literature. The first two of these are argued to face conceptual problems. The third is conceptually clear and coherent, but faces empirical problems in dealing with complex imperatives: quantified imperatives, first and third person imperatives and counterfactual imperatives. The empirical data on which this argument is based are taken from Dutch. A further objection is the so-called ‘Ross’ paradox’, which concerns disjunctive imperatives. It is argued that ‘or’ in imperatives behaves differently from ‘or’ in indicatives, which is a further argument that complex imperatives are to be analysed on their own terms.

In the sections thereafter, I will develop the constructive element of the proposal. This includes: a brief explanation of the conceptual underpinnings of the semantic framework, a presentation of an update semantics for propositions and instructions, and an analysis of counterfactual imperatives in terms of that update semantics. In this second part I cannot deal with all the cases of complex imperatives discussed in the preceding, critical part. The aim here is not to present a full-fledged semantic theory of imperatives, but to develop a new approach for doing semantic analysis of imperatives, and show by means of an example that it is a sound and fruitful approach.

¹See also Hamblin (1987) for a criticism of reductionism in the semantics of imperatives.

2 THE PERFORMATIVE ANALYSIS

The performative analysis has been largely abandoned since its inception in the 1970s, although some versions of it are still implicit in contemporary generative grammar (perhaps Han, 1999, and Platzack and Rosengren, 1998 are examples). Recently, Schwager (2006) has defended what can be considered as a version of this view.

Performatives can be categorised 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 (2-a) and (2-b).

- (2) 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. Besides explicit performatives we may also identify modal performatives, such as (2-c), that can be used for the same conversational task as the previous ones.

- (2) c. You (should/will) shut the door.

There are sometimes practical reasons for using explicit performatives: a simple sentence like (2-a) does not explicitly (lexically) indicate what the speaker is doing, so it may fail to communicate whether the speaker is commanding, advising, requesting and so on. I think Austin explained the relation between the two correctly:

‘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, 1956, p. 244)

The central idea of the performative analysis is to reverse Austin’s account, analysing primary performatives as covert or abbreviated explicit or modalized performatives, and then to draw on the indicative form of performatives to award them a propositional analysis.² That is, (2-a) is considered to be a shortened form of (2-b), and (2-b) expresses a proposition that is true if, and only if, at the moment of speaking the speaker is ordering the addressee to shut the door.

There are two versions of the analysis, corresponding to the two types of performatives. The analysis using *explicit* performatives is due to Lewis (1972), who based his ideas on Ross’ (1970) account of indicatives. Ross argued for the existence of a deleted phrase “I say to you that” in all simple indicatives, based on evidence that we would now mostly understand as indexicality. As Lewis noted, we cannot identify the meaning of a simple indicative with those

²Instead of constatives and performatives, I will differentiate between declarative and imperative sentences or forms, that can be used to make statements and give instructions, respectively. I do not exclude the possibility of nondiscriminating forms, such as “you shut the door”.

of its explicit performative counterpart, because their truth conditions do not coincide: every explicit performative is true if it is merely uttered sincerely. However, since we do not have to reckon with intuitive truth conditions of nonindicatives—since, intuitively, they do not *have* truth conditions—, we can safely identify them with their explicit performative counterparts and assign them the truth conditions of those explicit performatives.

The analysis using *modal* performatives goes back to Chomsky (1975) and Katz and Postal (1964). They motivated their analysis by reference to, amongst others, the possibilities for tags in imperatives.

(3) a. Go home, (will you/*did you/*must he)!

On the basis of such evidence, Katz and Postal concluded that the underlying logical form of imperatives is “you will VP”.

The fallacy of the performative analysis, in both of its forms, is to assume that, since explicit and modal performatives both communicate instructions and bear a truth value, the primary performatives also bear a truth value (and the same one at that) because they communicate the same instructions. The latter have two roles: a declarative-statement one and an imperative-instruction one, but never both at the same time. Even if we could explain the second of these in terms of the first, by indirect speech act theory, it does not allow us to conclude, contrary to common sense, that primary performatives are true or false.

There have been at least two explicit attempts to avoid this fallacy. Katz and Postal argued for the presence of an abstract morpheme *I* that triggers the deletion of the auxiliary and, optionally, the subject. This *I* is the feature that forces its performative interpretation. The account was not worked out and a decade later Katz (1977) offered an account that in fact comes closer to the parameter analysis. A different attempt to avoid the fallacy is due to Schwager (2006). She proposes a Kratzer-style intensional semantics for imperatives, in which the imperative operator reads (roughly) “Given what speaker and hearer jointly hold possible, it would be optimally in accordance with what the speaker commands if . . .”. As she notes (p. 71, p. 140), a problem for this analysis is that it is truth conditional, i.e., it implies that imperatives are true or false. She suggests that this problem can be overcome by adding a set of presuppositions to the semantic analysis of the imperative operator. These presuppositions are intended to ensure that the conditions under which the imperative may felicitously be used are such that the utterance evokes a performative effect, i.e., that of *issuing* a command.

An initial worry with this analysis is that it appears to involve a circularity: the formulation of the imperative operator already implies, or indeed presupposes, that the speaker is issuing a command. But the command made by the speaker is claimed to be a pragmatic effect of uttering a sentence with the imperative operator. At one point Schwager (p. 140) uses ‘what I [the speaker] want you [the speaker] to do’ as an alternative formulation, but as has been pointed out by several authors, the utterer of an imperative can be quite impartial to the fulfilment of the instruction: the issuing of the command might be obligatory itself, or the speaker might be randomly dividing several tasks among her assistants, without any preference for which task is

assigned to whom.

Yet, even if an appropriate formulation is offered we are still faced with a more serious difficulty. Presuppositions constrain the conditions under which truth values can be assigned to an expression, but it is not clear how presuppositions can explain that a truth value bearing expression is not considered to bear a truth value. Perhaps the presuppositions of imperatives under Schwager's analysis successfully constrain the use of the imperative operator to precisely those circumstances in which the speaker could also felicitously issue a command and, moreover, maybe the use of the imperative operator under such circumstances does evoke a performative effect. But still the expression could appropriately be called 'true' or 'false', unlike imperatives.

It is beyond the scope of this paper to discuss the four presuppositions Schwager proposes. Most important for present purposes is the presupposition that the speaker has social or rational authority over the property denoted by the VP. A speaker is an authority in this sense if the speaker has all and only true beliefs about that property in the context, including beliefs about whether the addressee grants the speaker this authority (pp. 153-159). This presupposition is not entirely accurate, or so it seems, because imperatives without authority are perfectly understandable as such:

- (4) I know you don't believe me, and I am in no position to tell you what to do, but just take the medicine.
- (5) On a Mac, hold down the Command key and click on the Gray channel. [...] No, I don't know what that means. But do it anyway!

Such imperatives may be pragmatically somewhat odd, but their meaning is not at all unclear: they are instructions to the addressee to take the medicine and to hold down the Command key and click on the Gray channel, respectively.

About the remarks of a completely reliable authority we might say, albeit redundantly, "true as always" in response to her modal indicatives, but not in response to her imperatives. Furthermore, a speaker could qualify a modal indicative epistemically, unlike imperatives: by coordinations with 'you don't know it yet, but ...' or 'you will be shocked to find out, but ...' and by qualifications such as 'there's no denying it', 'you will find out soon enough', and 'as any student of organic chemistry knows'. These qualifications are not blocked by the presuppositions Schwager mentions, and I do not see how any set of presuppositions could block the qualification of a truth value bearing expression as (non)veridical.

3 THE PARAMETRIC APPROACH

The parametric analysis is perhaps the most common view among semanticists. Its originators are Stenius (1967), Searle (1969) and Hare (1949). The analysis is supported by anyone who argues that sentences have, in their grammar, a parametric feature determining the mood or illocutionary force of the clause (e.g., Han, 1998), and by anyone who argues that a proposition is only a statement when it is added to a 'belief set' or 'commitment slate' and, perhaps, that

we can add the proposition to a ‘question set’ or a ‘to do list’ as well, thereby determining its conversational function as question or instruction. With some caution, we can include the view that imperatives denote properties (Hausser, 1978; Portner, 2005) under the heading of the parametric analysis. Although on this account the conversational function *selects for* some semantic type, the expressions of that type does not as such *have* the conversational function until they are presented or interpreted as something that is to be added to a ‘to do list’.³

The basic idea of this approach can be illustrated as follows.

- (6) a. It is the case [that you shut the door].
 b. Let it be the case [that your shut the door]!
 c. Is it the case [that you shut the door]?

The proposition is a ‘that’ clause and has a propositional content, but it needs to be in the slot of a mood expression to form a meaningful utterance. Semantics is the practice of assigning meanings to the sentence radicals, pragmatics deals with the formulation of general rules for the appropriate use of the mood expression in conversation, constituting their meaning.

As a piece of historical irony, the view has been inspired by Frege and Wittgenstein, who both opposed it explicitly. In *The Thought*, Frege suggested that interrogatives have the same senses as propositions. However, he continued:

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, p. 62)

Of course it is somewhat strange to deny that commands communicate something. But the point is nonetheless clear: the question of truth is constitutive of the concept of a thought. Since commands are not called true or false, they do not express thoughts.

One comment by Wittgenstein (1953) inspired Stenius’ to formulate his account in terms of ‘sentence radicals’. However, this comment by Wittgenstein was in fact intended as a footnote to a criticism of the parametric view on utterance meaning, suggested by Frege’s (1879) use of the ‘judgement stroke’. Here is the main argument.

Frege’s idea that every assertion contains an assumption, which is the thing that is asserted, really rests on the possibility found in our language of writing every statement in the form: “It is asserted that such-and-such is the case.”— But “that such-and-such is the case” is not a sentence in our language—so far it is not a move in the language-game. And if I write, not “It is asserted that . . .”, but “It is asserted: such-and-such is the case”, the words “It is asserted” simply become superfluous. (Wittgenstein, 1953, §22)

Wittgenstein thus argued against the suggestion that the judgement stroke reveals a two-layered structure in the sentence, distinguishing the “assumption” from the judgement that the assumption is true. He then uses this argument to reject the suggestion that the assumption is present

³The analysis of interrogatives in terms of sets of propositions (Groenendijk and Stokhof, 1984) is similar. But the same could not be said for the analysis according to which interrogatives are interpreted directly as performatives partitioning logical space (Groenendijk, 1999). I believe that a similar move would not be possible for imperatives-as-properties.

in all sentences. In the aforementioned footnote, Wittgenstein attempts to clarify the intuition behind the two-layer approach, by referring to pictures we might use to communicate various messages as “sentence radicals”, drawing on the analogy with chemistry. The sentence radical account, as I will understand it here, is that the proposition as such is *incomplete* and must be connected with a mood or sentence type to be meaningful utterance—just as a hydrogen atom and a chloride atom must be connected to be a stable molecule. In this sense the sentence radical theory treats the imperative as a *parametric* compound.

The main problem of the parametric analysis is that it conflicts with the idea that the primitives in a theory of meaning are—besides what we refer to—what we make judgements about (in a Fregean perspective) or what we use in language games (from a Wittgensteinian point of view). The meanings of the sentence’s constituents are inherited from these primitives by functional abstraction. We can attempt to assign primitive meanings to other expressions to avoid this problem, but those attempts have not been successful to date.

We could consider ‘that’ clauses, as in the examples before, or gerunds, as some have proposed (Beardsley, 1944; Hare, 1949), but neither will work, for two reasons (at least). First, in both cases a similar plurality appears at the supposed ‘sentence radical level’. Next to ‘that’ clauses there are ‘to’ clauses, or infinitives, and next to ‘subject-gerunds’ there are bare gerunds.

- (7) a. Harry remembered that Joe was hosting a party that evening.
 b. Harry remembered to bring a gift for Joe.
- (8) a. I enjoyed my playing the piano. (Lakoff, 1972)
 b. I enjoyed playing the piano.

Verbs that can take either a ‘that’ clause or an infinitive are not very common—‘know’ and ‘hope’ are other examples—but the contrast between their respective contributions is nonetheless clear. The same goes for the gerunds: in the (a) case the speaker enjoyed the playing as an observer and in the (b) case she enjoyed it as an agent. So, rather than finding a unity at the subsentential level, we encounter a further diversity.

To accommodate this problem, generative linguists have introduced PRO to create unity at this level of analysis. Although I question the soundness of that account, in any case a satisfactory reduction of the *semantics* of infinitives and bare gerunds to ‘that’ clauses and subject-gerunds has not yet been provided. Note that a reduction of (7-b) by means of an irrealis feature in the complementizer position (Stowell, 1982) and PRO-control will probably gives us (9), which is an incorrect rendering of the source sentence.⁴

- (9) Harry remembered that he would bring a gift for Joe.

However, the fundamental problem of the ‘sentence radical’ view is that we would have to

⁴Moreover, we can wonder whether the two roles of modals—performative and descriptive—are not reflected in their subordinated uses as well: the ‘irrealis’ here would have to be understood as expressing the meaning of ‘would’ under its descriptive role, i.e., something in the direction of “in every salient counterfactual situation”.

argue that the intuitions, data or evidence that semantics is based on concerns these complementizer clauses and gerunds. Indeed, this is what Beardsley and Hare propose.

“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, p. 182)

The intuitions on which the logic of connectives is based are not intuitions about which statement inferences are valid and which are not, but rather which gerund inferences are valid and which are not. That is, we would have to say that, *e.g.*, the disjunctive syllogism is valid *because* of our intuitions regarding ‘inferences’ such as the following, offered by Hare (1949).

$$\frac{\begin{array}{l} \text{Use of axe or saw by you shortly} \\ \text{No use of axe by you shortly} \end{array}}{\text{Ergo: Use of saw by you shortly}}$$

If this is a valid inference at all, it is because we grant a declarative interpretation to the gerunds, as if it were just a silly way of making statements.

The fact that truth values are the primitives in semantics is based on the awareness that the data or intuitions we base our semantic analysis on are ultimately derived from intuitions regarding what is true, valid, equivalent, meaningless, contradictory, or tautological. If we can accept that such intuitions may be pluriform, including intuitions about what is complied with, required, a conflict in commitments, contrary to duty, and so on, that is all we need to justify a pluriformity of semantic primitives.

4 THE OPERATOR APPROACH

Proponents of the operator approach are Hofstadter and McKinsey (1939), McGinn (1977) and, perhaps, Belnap (1990).⁵ I know of no more recent proponent of this approach. Superficially, it is a slight variant of the parametric approach. We can illustrate the idea as follows:

- (10) a. It is the case that [you shut the door].
 b. Let it be the case that [your shut the door]!
 c. Is it the case that [you shut the door]?

In all these sentences, the part between square brackets is itself also a sentence of the language, and it has a truth value when used in an appropriate context. The declarative operator does not contribute to the meaning of the sentence, but the other two operators do.

The operator approach thus avoids the problems of the parametric approach: it can explain the compositional meanings of (complex) sentences by reference to their argument structure and

⁵McGinn also presents a direct speech analysis (in effect a slight variant of the operator analysis) on which the imperative reads “Make this the case: the door is shut”.

truth functional composition, as we are common to do in formal semantics. The analysis implies that the meanings of imperatives are *not* reduced to the meanings of declaratives as such, but compositional semantics of the subsentential constituents and intersentential connectives can be completely relegated to truth conditional semantics (cf. especially McGinn). Thus, imperatives are ‘fulfilled’ rather than ‘true’, but their compositional semantics are spelled out in terms of truth conditions nonetheless. My objections to the operator approach are not conceptual but empirical.

One problem that is immediately encountered in working out the operator approach is to relate operator-argument imperatives to simple imperatives. That is, if we want to use the operator approach to assign meanings to all imperatives, we have to say which operator-argument pairs correspond to which imperatives. The different proponents have different views. Hofstadter and McKinsey have the operator ‘let it be the case that’ which, in their own terminology, constructs impersonal *fiats* rather than *imperatives*.

McGinn’s operator is different, “make it the case that”, but he constructs imperatives from the same impersonal statements. For instance, the imperative (11-a) is translated as (11-b).

- (11) a. Shut the door.
 b. Make it the case that [the door is shut].

McGinn then still owes us an account of the systematic formulation of the relation between the imperative and the corresponding statement in the operator-argument analogue, and an account of the meaning of the expression “making it the case” (possibly in terms of conversational rules, as in the parametric case) that ensures that (11-b) is only fulfilled in case the addressee shuts the door thereafter.

Belnap has yet a different operator: “see to it that”. Furthermore, the arguments of this operator are not the impersonal statements but agentive statements.

- (11) c. See to it that [you shut the door].

Again, no systematic correlation between the argument of (11-c) and (11-a) is offered, although a semantics of “sees to it that” is offered in terms of modal logic.

I will not labour the issue, because I think the issue can be shown to lead to more substantial problems. To illustrate, Hamblin (1987, p. 102) once ridiculed the operator approach of Hofstadter and McKinsey by remarking that according to them “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”. The claim I want to put forward is that in fact that will not do. The problem of the imperative operator is that it must be the highest thing in the clause if it is to relegate all semantics to the declarative beneath it. As I hope to convince the reader, there are imperatives that do not fit the scheme and thus show conclusively that we need to treat the imperative as a *semantic* entity, with simple and complex cases and a compositional semantics, rather than relegating its peculiarities to pragmatics and reducing its content to truth conditions.

4.1 The imperative subject

As has been commonly observed in the linguistics literature, imperative sentences in various languages can have a subject. Here are some in English.

- (12)
- a. You go home now.
 - b. You two take this end and your spouses take the other end.
 - c. Somebody get this table out of the way.
 - d. Whoever bought this television bring it back.
 - e. The oldest of the girls sing a song for daddy.
 - f. Nobody move a muscle.

It has been argued convincingly that these subjects are not vocatives. Schmerling (1975) has the following observations: (i) vocatives can be supplemented with the word ‘there’, as in (13-a), (ii) vocatives can co-occur with imperative subjects, as in (13-a), and (iii) only imperative subjects allow for quantifier floating, as in (13-b).

- (13)
- a. You there, you sit still.
 - b. You both (*there) pay attention.

Beukema and Coopmans (1989) add the observation that an imperative quantified subject can bind a pronoun, unlike vocatives.

- (14)
- a. *Somebody_i, take off his_j coat.
 - b. Somebody_i take off his_i coat.

We can furthermore add the semantic argument that ‘nobody’ cannot sensibly be used as a vocative.

It will be clear that the imperative subject poses a problem for the operator approach. We cannot translate, say (12-d) into (15).

- (15) Make it the case that whoever bought this television brings it back.

Someone who uses this latter sentence must be addressing some particular person or group who are instructed. By contrast, (12-d) can only be uttered by someone who does not know who the addressee of the instruction is. Similarly, (12-c) is uttered by someone who does not care who does the actual moving. Its presumable translation (16) is always addressed to someone, as an instruction to delegate the task of moving the table.

- (16) Make it the case that somebody gets this table out of the way.

I think the solution to this problem is evident: the imperative subject must scope *over* the imperative operator:

- (17) Somebody make it the case that this table is out of the way.

So far it might still be argued that, although there are imperative subjects, they do not have an important semantical function. They seem only to select a portion of the audience that is addressed with the remainder of the instruction. It is then perhaps still conceivable that the imperative subject is syntactically a part of the main clause but nevertheless only bears on the pragmatics of the construction: as an expression of scope restriction. That is, the translation of (12-d) is just “Make it the case that this television is brought back”, and ‘whoever bought it’ is directly interpreted as a scopal restriction on the audience.

An argument that blocks this option is the existence of third person imperatives. Typological data on third person imperatives (e.g., van der Auwera et al., 2003) are difficult to evaluate and often questioned, as it is not quite clear how there could be third person imperatives: if the point of an imperative is to instruct someone, then how can the subject, the person instructed, not be in the audience to the utterance? However, it is precisely semantics that should explain the peculiarities of the interpretation of third person imperatives by reference to the combination of third person and the imperative semantics. In the following I make use of examples from Dutch. This language does not have a syntactically third person imperative construction, but it does have a construction that should be identified as having the interpretation of a third person imperative. Investigating this construction may help us to get somewhat more clear on the idea of third person imperatives itself.

Whereas French, for instance, has a special form for first person plural imperatives, e.g. “Chantons!”, English has the verb ‘let’ to express such proposals to the collective of which the speaker is a part, e.g., “Let’s sing!”. The verb ‘let’ can also be used as the main verb of an ordinary second person imperative. The difference can be marked with tags.

- (18) a. Let’s go to the beach, shall we?
 b. Let us go, will you please?

As such, the distinction may be thought to be pragmatic: the intuitive difference in meaning resides merely in the pragmatic issue whether the hearer is part of the group denoted by ‘we’ or not.

Dutch has a verb ‘laten’ quite similar to English ‘let’: it also has the two uses, but unlike English the first person imperative construction can be singled out by a nominative case on the pronoun following ‘laten’.

- (19) a. Laten wij naar huis gaan.
 Let-pl we to house go-inf
 ‘Let’s go home (shall we).’
 b. Laat ons naar huis gaan.
 Let-sg us to house go-inf
 ‘Let us go home (shall we/will you please).’

In the first person imperative construction the verb has to agree with the nominative pronoun, unlike in the ordinary (second person) imperative. The construction with accusative subject can also be used as a first person imperative, albeit archaically. But the construction with a nominative pronoun cannot be used as a second person imperative.

On top of this, the ‘laten’ construction also distinguishes nominative and accusative third person pronouns. As a consequence, we can grammatically single out the third person imperative in Dutch.

- (20) a. Laten zij eerst maar eens hun excuses aanbieden.
 Let-pl they first prt prt their apologies offer-inf
 ‘Let ’em first offer their apologies.’
- b. Laat hen eerst maar eens hun excuses aanbieden.
 Let-sg them first prt prt their apologies offer-inf
 ‘First let/make them offer their apologies.’

The second of these is again an ordinary imperative, with imperative verb ‘laten’ (‘let’, ‘allow’, ‘make’) and addressed at the hearer. The former, on the other hand, has a meaning that is not easily expressed unambiguously in English. It concerns the actions to be executed by some group disjoint from the audience of the utterance. Importantly, the hearer need have no connection with the group referred to with the third person pronoun. For instance, the speaker might be discussing the behaviour of her colleagues with a friend who does not know any of these colleagues. In that case the meaning of (20-a) can be described as an instruction for an absent addressee. If the group of persons referred to would be present, the speaker would address them directly, with a simple second person imperative.

There are two different ways of accounting for the ‘laten + 3rd.nom’ construction of (20-a). One possible account is that these sentences have a specific conversational function, call it *absentive*, which is tied to the grammatical construction as a whole. We have then identified a correlation between a grammatical form and a conversational function and treat this as similar, but not semantically related to the imperative. The other possible account, which I prefer, is to *explain* the conversational function semantically, by analysing it as the result of embedding an imperative under a context shifting operation, expressed by ‘laten’ and the nominative pronoun. That is, the speaker intends to give advice or make a request to someone, but this person is not present and so cannot be addressed. This means that the speaker has to present the situation *as if* the person in question is present in order for the utterance to be meaningful as advice or request. This shift in the context is marked by the ‘laten + 3rd.nom’ phrase heading the sentence. The fact that the speaker is shifting the context explains the difference between absentives and ordinary requests: by a request we mean something the addressee can fulfil by performing some action; but here the addressee is not really present, so the normal reaction to it is precluded. And this preclusion is what explains the utterance being understood as an absentive.

Intuitively, we can think of third person imperatives as:

- (21) 3rd(Make it the case that you offer your apologies).

The operator 3rd is similar to a modal operator in shifting the context of interpretation to a non-actual world in which the subject of the imperative is the addressee of the speech act. [...]

In what follows I will not develop a formal semantic account along these lines, but a first approximation can be found in Mastop (2005). I will offer a formal semantic account of counterfactual imperatives in the next sections, which involves embedded imperatives. I believe that a semantics of third person imperatives can be developed in an analogous way.

Interestingly, Schmerling (1982) proposed an analysis of the imperative subject that is precisely the opposite of what I am proposing here. According to her, the basic meaning of imperative and hortative forms (i.e., ‘let’/‘laten’ constructions) is the expression of an attempt to bring about a change in the world. What we normally call ‘imperatives’ are in fact the result of restricting this basic meaning to those cases where the subject is interpreted as an addressee, who can assist the speaker in bringing about the desired change. In case the subject is not interpreted as the addressee, the sentence has an optative interpretation, i.e., as the expression of a wish or a prayer. In other words, the imperative is analysed as a *presentive* or *addressive* conversational function of a more basic semantic notion. Supporting this view, we may consider impersonal ‘laten + 3rd.nom’ sentences that naturally obtain an optative interpretation.

- (22) Laat het alsjeblieft gaan regenen.
 Let it please go-inf rain-inf
 ‘Let it please start raining.’

I prefer the analysis which treats the ordinary imperative as basic and the third person case as aberrant. One reason is that it makes the difference between third person imperatives and optatives more clear. But more importantly, it allows us to explain the difference between impersonal imperatives and optatives. To use an impersonal imperative, one has to revert one’s eyes or turn them to the sky—otherwise they are interpreted as addressed to the audience. This is different from real optatives such as (23), that are still expressions of a wish when they are uttered to someone.

- (23) May they live a long and happy life.

4.2 Counterfactual imperatives

The second argument against the operator analysis of imperatives is the possibility of irrealis in imperatives in Dutch. There are two constructions we may consider.

- (24) Was toch lekker thuisgebleven.
 Was prt prt at.home.stay-pp
 ‘You should just have stayed at home.’
- (25) Gaf hen dan maar geen bekeuring.
 ‘Gave-sg them prt prt no fine’
 ‘You had better not give them a fine.’

The first of these is a commonly used construction, by means of which the speaker reproaches the addressee, telling him what he should have done. The second is a less frequently used construction, about which different subjects appear to have rather different intuitions. One use that is widely recognised is in narratives about generic scenarios in the distant past: ‘in those days, this was the wise thing to do’.

The latter of these constructions has been called into question by some syntacticians and it is not recognised by Dutch grammar overviews (cf. ANS, 1997). For these reasons, I will focus exclusively on the former construction, which is undisputed. However, Bennis (2006) claims that sentences like (24) are “optative constructions” rather than perfective imperatives. 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.

- (26) *Heb dat dan toch ook eerder gedaan!
 Have that prt prt prt earlier do-pp
 ‘Have done that earlier!’

Contrary to these claims, I will argue that we had best consider (24) as a genuine counterfactual imperative.

The first step in this argument is to note that there is an important role for the particles in this construction. The particles ‘toch’ and ‘dan’ do not combine with a subject, unlike the particle ‘maar’.

- (27) a. Was (*Jan) toch lekker thuisgebleven.
 b. Was (Jan) maar lekker thuisgebleven.

The difference in meaning is also clear: (27-b) is a real optative and glosses ‘If only Jan had stayed at home’. Such an ‘if only’ gloss is not appropriate for the construction with ‘toch’ and ‘dan’.

The second step is to consider the meaning of the Dutch past participle construction. In combination with a present tense auxiliary, the past participle mostly leads to a resultative interpretation, but in the context of a past reference time it can also lead to a perfective reading. With an utterance of (28) the speaker indicates that the dressing took place after having gotten up and that the activity of dressing herself was completed. But it does not mean that the speaker is dressed at the moment of speaking.

- (28) Nadat ik was opgestaan, heb ik mijzelf aangekleed.
 After I was up.get-pp, have I myself on.dress-pp
 ‘After I had gotten up, I dressed myself.’

The difference between the past participle construction in past and present tense contexts is important here, because it explains the oddity of (26): if the reference time is *present*, the past participle imperative obtains an unintelligible resultative interpretation, namely that some

action be completed at speech time; but if the reference time is *past* the expression does not get a resultative interpretation, but indicates that the activity occurs after the reference time and (when relevant) that it be completed.

The reason why the counterfactual imperatives contain a past participle construction is because this construction is used in Dutch to indicate that the event or action takes place *after* some contextually specified past reference time. This fact is perhaps even clearer when we consider the infinitivus pro participio (IPP) construction which is used to focus on the inception of some activity or process.

- (29) Nadat ik was opgestaan, ben ik mijzelf gaan aankleden.
 After I was up.get-pp, am I myself go-inf on.dress-inf
 ‘After I had gotten up, I started to dress myself.’
- (30) Was jezelf dan ook gaan aankleden.
 Was yourself prt prt go-inf dress-inf
 ‘You should just have started to dress yourself.’

It is not entirely clear why the counterfactual imperative requires the past participle or IPP construction, instead of the simple tense. To explain this requires an in depth study of Dutch grammatical aspect, which is beyond the scope of this paper. But the important point is that the past participle and IPP constructions are used to indicate an event time prior to the speech time, after some reference time, and without a resultative meaning.

The third and final step of the argument concerns the past tense on the auxiliary in (24). A difference between English and Dutch is that in Dutch mere past tense can be given an irrealis interpretation. That is, in (31) we can see that a simple past is used in the consequent of a counterfactual conditional. The past tense is enough to express the counterfactuality of the context, where in English one needs a modal ‘would’ to do so.

- (31) Als Jan vandaag niet ziek was, ging hij morgen op vakantie.
 If Jan yesterday not ill was, went he tomorrow on holiday
 ‘If Jan weren’t ill today, he would go on holiday tomorrow.’

Combining these three observations, we get the following analysis of the counterfactual imperative construction in Dutch: it is the past participle or IPP construction that indicates that the activity occurs after some contextually determined time in the past; and it is the past tense that is required to mark the non-factuality of the imperative. It is because we embed the imperative in this counterfactual context that it obtains a reproach interpretation: it cannot be a real advice, because at the time of speaking a different decision has already been made and followed through. The particles ‘toch’ and ‘dan ook’ enable us to grammatically single out the reproach use. We have seen that this particular construction (with the particles) does not allow for a non-addressing use. It is only possible to use it to reproach the addressee for his or her actions, indicating which action should have been undertaken instead. Like ordinary imperatives, this construction cannot be used with epistemic qualifications:

- (32) a. #Zoals elke scheikundestudent weet, had dan ook een erlenmeyer gebruikt!
 As any chemistry student knows, you should have used an Erlenmeyer flask!
- b. #Je weet het nog niet, maar was toch naar huis gegaan.
 You don't know it yet, but you should have gone home.
- c. #Het valt niet te ontkennen: had dan ook de truffelsaus gekozen.
 There's no denying it: you should have chosen the truffle sauce.

In view of this, I believe the analysis of the construction as a complex, counterfactual imperative is the most natural one. We can think of the construction as embedding an imperative, concerning a past event time, under an irrealis mood:

- (33) Irrealis(Made it the case that you went home)

Like before, we see that the operator-argument analysis of the imperative faces a problem. It cannot relegate all semantics to the argument, i.e., the proposition, because the operator itself must embed under an irrealis mood (and a past tense).

Mirroring the analysis of the imperative subject, there is an alternative possible account of the interpretation of (24), namely, to pair the entire grammatical construction directly to the conversational function of *reproachatives* (Schwager, 2006, pp. 113-115), which is perhaps also what Bennis has in mind. The advantage of the present account is that it explains the reproach interpretation by reference to the shift to a past reference time and non-actual world. In other words, the phenomenon of counterfactual imperatives can be explained if we think of “clause type systems” as more than fulfilling a “purely heuristic purpose” of pairing clause forms with speech act types, as Schwager proposes.

4.3 Ross' paradox and pragmatics

The third and last problem for the operator approach is the reduction of disjunctive imperatives to imperatives over disjunctions. That is, some doubt may be cast on the reduction of (34-a) to (34-b).

- (34) a. Make it the case that the letter is put into the letterbox or make it the case that the letter is burned.
- b. Make it the case that the letter is put into the letterbox or that the letter is burned.

The problem was raised by Ross (1941) and has been an issue in studies on ‘imperative logic’ since then. Ross noticed that imperative disjunctions give rise to a free choice for the addressee.

- (35) a. Put the letter in the letterbox.
- b. Put the letter in the letterbox or burn it.

If the speaker uses the second, disjunctive imperative, she thereby allows the addressee to choose between posting the letter and burning the letter.

A common response is that free choice effects are more general and occur in various areas of language use. However, arguable the imperative free choice phenomenon with disjunctive imperatives is different from the general phenomenon discussed in the literature, concerning ‘or’, ‘any’ and other such ‘free choice items’. With indicative uses of ‘or’ the speaker only raises the *expectation* of choice, or uncertainty on the part of the speaker. This expectation can be cancelled by means of an explicit contradiction:

- (36) First of all, the letter was put in the the letterbox or it was burned. Second of all, the letter was not burned.

The second clause indicates that the speaker does know whether the letter was posted or burnt: the fact that he does not tell presupposes that he could tell, hence that he knows, which it is. With imperatives the matter is different. The analogous example is nonsensical.

- (37) First of all, put the letter in the letterbox or burn it. Second of all, don’t burn it.

Some authors have suggested that even in the case of imperatives the free choice effect is cancellable. Rescher and Robison (1964) offer the following example (also quoted by Aloni, 2005).

- (38) Teacher: ‘John, stop that foolishness or leave the room!’
 John gets up and starts to leave.
 Teacher: ‘Don’t you dare leave this room!’

The authors claim that the teacher is merely “explaining” her earlier command, not “abrogating” it. I believe they are mistaken. The teacher may have meant many things with her first utterance, but by making the utterance she offered John a choice. At best one might analyse the first command as flouting the maxim of *quality*. That is, the command could be understood as offering something *so* unrealistic (i.e., allowing the student to leave) that it cannot be taken seriously, thus giving additional urgency to the (implicated) instigation to stop the foolishness. But then we acknowledge that the literal meaning of the teacher’s instruction is that a choice is being offered.

We can conclude from this argument that the semantics of ‘or’ is sensitive to the semantics of the clauses it coordinates: if they are indicative, the free choice effect is merely a pragmatic enrichment that can be cancelled, hence it is not part of the literal meaning of the disjunction; if the clauses are imperative, a genuine free choice between the alternatives is irrevocably conveyed by the utterance. Consequently, we need to distinguish between imperatives and indicatives within semantics, in order to be able to draw this distinction.

In line with the proposal of Mastop (2005) we will explain the imperative free choice effect by treating the alternatives raised by imperative disjunctions as *granted permissions*, which cannot simply be overruled by additional commands: being granted permission to do *A* and having a prohibition against *A* is logically impossible. Propositions have a different semantics: the alternatives raised by indicative disjunctions are considered to be epistemic alternatives, which

can be overruled with additional information. Having partial information that does not exclude A and having stronger information that does exclude A is not impossible.

Summing up the points from this section, supporters of the operator analysis have not only refrained from offering a systematic reduction from imperatives to operator-declarative forms, but any such attempt faces serious obstacles when considering third person and mood. Those obstacles can, at least in principle, be avoided by increasing the plurality of basic semantic types, but I do think that some moderation is due there.

5 A LOGIC OF IMPERATIVES?

The issue whether there is, or can be, such a thing as a ‘logic of imperatives’ goes back to the 1930s. Against the proposals for a logic of imperatives by Mally (1926), Jorgensen (1938) and others, legal positivists such as Ross (1941) argued that imperatives cannot have a logic because the concepts of validity, premise, argument and so on do not apply to imperatives. [The existence of one norm does not logically entail or preclude the (non)existence of some other norm.]

The proposals to develop a theory of meaning for non-declarative speech acts was also severely criticised. Speech act theorists (Austin, 1962; Hare, 1949) were based on a concept of ‘felicity’ of a speech act, but critics pointed out that truth is a concept on a different level: it is the act of *stating* something that may or may not be felicitous, but it is the *content*, the *statement* made by means of the stating, that is either true or false (e.g. Garner, 1968; Searle, 1968). This distinction soon gave rise to the two-layered analysis of a pragmatics of mood and a semantics of truth conditions, which I criticised in the preceding sections.

Certainly the objections had a point. A theory of meaning must make a careful distinction between the speech act performed and the message conveyed by means of the speech act. However, doing so does not at all force us to the view that all semantic content is uniformly truth conditional. By analogy to the distinction between stating and statement, we can distinguish between the act of instructing and the instruction it conveys, or the act of asking and the question it conveys, and so on. There is no *prima facie* reason for semantics not to take those distinctions into account. A logic of interrogatives has been developed by, amongst others, Groenendijk and Stokhof (1984) and Groenendijk (1999).

Whether there can be a *logic* of imperatives is another matter. Imperatives are not true or false, and having a truth value seems to be a prerequisite for being a premise or a valid or invalid conclusion in an argument. But if not all concepts we study in logic apply to imperatives, that is not to say that none of them do. Instructions (i.e., the messages conveyed by means of the uttering of imperatives) can be consistent or inconsistent. Two instructions can even be contradictory. This is not a theoretical claim but a simple observation of the way we speak about instructions. Note that we are here not claiming the logical impossibility of there being norms that cannot logically all be fulfilled, e.g., “You ought to go home” and “You ought not to go home”. It is crucial to the notion of ‘imperative consistency’ appealed to here that they are

instructions. Norms or laws may, and often do, put the people subject to them in a quandary. But as *instructions*, “Go home” and “Don’t go home” can be genuinely said to be contradictory (see also von Wright (1996) for an exposition of this point). As von Wright (1957) put it: “logic has a wider reach than truth”.

To retain the ‘centrality of truth’ (Davidson, 1999) in the theory of meaning, one would have to explain this phenomenon away somehow. The most obvious candidate for this is to say that two instructions are contradictory if the statement that both are fulfilled is a contradictory statement. Ironically, Ross’ paradox, first introduced in objecting to the idea of a logic of imperatives, now figures as an obstacle for such a reduction. The theory {I posted the letter, I posted the letter or I burned the letter} is not contradictory, but the set of instructions {post the letter, post the letter or burn the letter} is. Further differences between consistency of propositions and consistency of instructions can be given. Modus Tollens does not work for conditional imperatives, for example:

- (39) a. If there is a pizza in the fridge, then there is beer in the fridge as well. There is no beer in the fridge, so there is no pizza in the fridge either.
 b. #If you see John tell him I said ‘hi’. Don’t say ‘hi’ to John, so you do not see him.

These observations seem to warrant an investigation into the ‘logic’ of imperatives in their own right.

Even if someone were to agree with all this, a crucial question is how to formalise such a logic of imperatives without reference to the concept of truth. Price (1994), for instance, backs down at this stage.⁶

If only we could justly retain familiar platitudes about validity, truth-functional connectives, and the like, without cutting ourselves off from the insights of non-factualism. (Price 1994, p.12 of draft)

In view of this, Price proposes that we use the concept of ‘truth’ in a wide sense to retain uniformity in semantics, so as not to have to embark on “evasive manoeuvres” (*idem*) that make semantics more complex. As I hope to show in the final section, Update Semantics (Veltman, 1996) offers a way of formalising the logic of imperatives without truth and propositions being the building blocks of the semantics.⁷ I claim that this does not constitute an evasive manoeuvre or gives rise to an unwanted degree of complexity.

6 UPDATE SEMANTICS FOR COUNTERFACTUAL IMPERATIVES

6.1 Update semantics

In this section I will present a formal semantics for imperatives, including counterfactual imperatives, in the framework of update semantics. In update semantics (Veltman, 1996) we analyse the meaning of a sentential expression as a function that transforms an initial commitment slate

⁶By ‘non-factualism’ Price means the view that not all meaningful language consists in the description of facts.

⁷Forerunners of this framework are Stalnaker (1970), Hamblin (1971), Kamp (1981), Heim (1982) and Groenendijk and Stokhof (1991). Earlier proposals for an update semantic analysis of imperatives were developed by van der Torre and Tan (1998) and Zarnic (2002).

into a new one, in which the message conveyed by the sentence has somehow been incorporated.⁸ In the form of a slogan: You know the meaning of a speech act if you know the change it brings about in the commitment slate of anyone who accepts the message conveyed by it.⁹ The primary task of the semanticist is therefore to characterise commitment slates and the operations whereby one commitment slate is transformed into another.

Formally, the specification of an update system consists of the definition of three components: a formal language \mathcal{L} , a space \mathcal{S} of possible commitment slates S and a (recursive) definition of an update operation $[\varphi] : \mathcal{S} \rightarrow \mathcal{S}$ for every \mathcal{L} expression φ . We can then write $S[\varphi] = S'$, meaning that applying the operation $[\varphi]$ to commitment slate S results in commitment slate S' .¹⁰

Instead of introducing entailment in the sense of truth preservation, the update semantic framework is centered around the notion of *support* of a sentence in a commitment slate. We say that S supports φ , written $S \models \varphi$, if, and only if, $S[\varphi] = S$. In other words, a commitment slate supports some expression if accepting the message it conveys it does not have any effect. Support is a notion that is meaningfully applied, not only to propositions, but also to issues raised by accepting a question and intentions undertaken by accepting commands. After having accepted the question ‘Who will attend the meeting?’ one’s commitment slate supports the question ‘Will John attend the meeting?’. The latter question is already on the table: any complete answer to the first question encompasses an answer to the second. Similarly, after having accepted the command ‘Replace the hard disk’ the command ‘Remove the hard disk’ is supported, because fulfilling the first command encompasses fulfilling the second.

Besides support we can appeal to various other ‘mood-neutral’ definitions of logical concepts. For instance, two \mathcal{L} expressions are consistent if, and only if, there is a commitment slate such that we can update it with both expressions, without this resulting in an absurd commitment slate. A commitment slate can be called ‘absurd’ if the information it incorporates qualifies all possible state of affairs as possible, or if the intentions it incorporates qualifies all course of action prohibited. Just which commitment slates we consider to be absurd determines which expressions we consider to be contradictory, i.e. ‘unacceptable’. Finally, an argument with premises $\varphi_1; \dots; \varphi_n$ (in that specific order) to conclusion ψ is said to be *valid* if, and only if, for all possible commitment slates S , after updating S with $\varphi_1; \dots; \varphi_n$ the resulting commitment slate supports ψ .¹¹

6.2 Language, worlds and plans

The basic idea concerning imperatives and indicatives, as indicated in the introduction, is that propositions and instructions are treated on a par as basic semantic entities. The performative function of imperatives is explained in terms of the semantics of instructions as giving rise to new

⁸The term ‘commitment slate’ is adopted from Hamblin (1971). Alternatively, semanticists use terms ‘information state’ or ‘cognitive state’ or ‘(deontic) scoreboard’.

⁹This slogan is an adaptation of Veltman’s.

¹⁰We use a post-fix notation for the update operation, which more naturally conforms with the left-to-right parsing of a text, e.g., $\varphi_1; \dots; \varphi_n$. That is, $S[\varphi_1; \dots; \varphi_n] = S[\varphi_1] \dots [\varphi_n]$.

¹¹Veltman (1996) and van der Does et al. (1997) offer more detailed accounts and analysis of the update semantic framework.

intentions, just as the performative function of indicatives is explained in terms of the semantics of propositions as expanding one’s information.

We do need to appeal to the fulfilment of instructions, if only to spell out the difference between normal instructions and counterfactual ones. This means that we make a connection between propositions and instructions. In order to do so, we introduce propositions δ_i that state that instruction i has been fulfilled. Note that this connection between propositions and instructions is different from operator accounts of imperatives: the δ_i propositions are atomic propositions and are assumed only for atomic instructions.

DEFINITION 1 (Syntax). We assume a finite set I of instructions: i, j, k, \dots , and a finite set P of propositions: p, q, r, \dots and δ_i , for each $i \in I$.

- \mathcal{L}_I is the smallest set containing I , such that if ι and η are \mathcal{L}_I expressions, then so are $\neg\iota$, $\iota \vee \eta$ and $\iota \wedge \eta$.
- \mathcal{L}_P is the smallest set containing P , such that if π and ρ are \mathcal{L}_P expressions, then so are $\neg\pi$, $\pi \vee \rho$ and $\pi \wedge \rho$.
- \mathcal{L}_M is the smallest set containing \mathcal{L}_P and \mathcal{L}_I such that if π and ρ are \mathcal{L}_P expressions and ι is a \mathcal{L}_I expression, then $\pi \Rightarrow \rho$, $\pi \Rightarrow \iota$ and *was toch* ι are \mathcal{L}_M expressions.

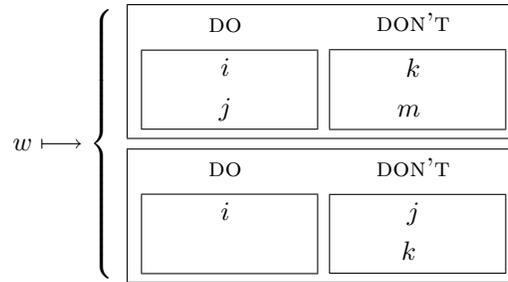
The expressions $\pi \Rightarrow \rho$ are counterfactual conditionals and the expressions $\pi \Rightarrow \iota$ are conditional imperatives. The expressions of the form *was toch* ι are the counterfactual imperatives as we find them in Dutch. One may consider the performatively used English modal indicatives ‘you should have such-and-so’ to have the same semantic analysis.

To come to an interpretation of propositions and instructions, we look at the type of message they convey. For propositions, we can adopt the idea that they convey information about what the world is actually like. A possible world here is a valuation of atomic propositions as true or false. Accepting an instruction amounts to a change in one’s intentions. These intentions are modelled by means of functions from worlds to a set of ‘to do lists’. Here is an example of one to do list:



A set of to do lists is called a *plan*. Intentions, or practical commitments, are modelled as

functions from worlds to plans



This diagram says that, conditional on w being the actual state of affairs, its holder is committed to, either fulfilling instructions i and j and refraining from fulfilling k and m , or fulfilling instruction i and refraining from fulfilling j and k . In other words, he is committed to fulfil i and refrain from fulfilling k , and he is free to choose between on the one hand refraining to fulfil j and on the other hand fulfilling j but not m . Accepting an instruction n leads you to undertake a commitment to comply with n , placing it under ‘do’ in all of the to do lists for any world you hold (doxastically) possible. Accepting a negative instruction $\neg n$ amounts to rejecting the embedded instruction n , i.e., placing it on the ‘don’t’ part. If the same instruction occurs on both the DO and the DON’T side of a single to do list, we call that list *conflicting*.

DEFINITION 2 (Worlds, to do lists and plans). A *world* w is a complete function from propositions to truth values $w : P \rightarrow \{\text{TRUE}, \text{FALSE}\}$. A *to do list* l is an assignment of ‘do’ and ‘refrain’ to atomic instructions: $l \subseteq (I \times \{\text{DO}, \text{DON’T}\})$. We call a to do list l *conflicting* if for some $i \in I$ both $\langle i, \text{DO} \rangle \in l$ and $\langle i, \text{DON’T} \rangle \in l$. The null to do list is $\{\emptyset\}$. A *plan* α is a set of to do lists. Given two plans α and β , their product is defined as pairwise union: $\alpha \sqcap \beta = \{l_1 \cup l_2 \mid l_1 \in \alpha \ \& \ l_2 \in \beta\}$. W is the set of all worlds and L is the set of all to do lists. The set of all plans is $\text{Pow}(L)$.

A plan tells us what we intend to do. There may be a degree of undecidedness in our plans. For instance, we may plan to go to the beach either by car or by train. This plan is represented in our semantics as a set of two to do lists: the first list reads “go to the beach; take the car”, the second list reads “go to the beach; take the train”. Intuitively, the multiplicity of to do lists in a plan represents the choices (and freedom to choose) of the holder of the plan. The null to do list is an empty list: “”, the null plan is the set containing only the null to do list, so $\{\emptyset\}$.

A useful distinction in theories of action is that between the intrinsic *result* of an action and its causal *consequences* (see von Wright 1971). For instance, the result of opening the window is the window’s opening, or its being open. And the result of the raising of your arm is the rising of your arm. A possible consequence of opening the window is the blowing away of sheets of paper on your desk. Note that the consequences of your actions are simply the (causal) consequences of the results of your actions: the blowing away of the sheets is a causal effect of the window’s opening. These concepts will be useful in a semantic analysis of counterfactual conditionals and counterfactual imperatives.

DEFINITION 3 (Result). The *result* of a to do list l is represented by the set $\epsilon(l) \subseteq W$. Here is

the definition of this set: $w \in \epsilon(l)$ if, and only if, $w(\delta_i) = \text{TRUE}$ for all i such that $\langle i, \text{DO} \rangle \in l$ and $w(\delta_i) = \text{FALSE}$ for all i such that $\langle i, \text{DON'T} \rangle \in l$. Extending this notation to refer to the result of plans, $w \in \epsilon(\alpha)$ if, and only if, $w \in \epsilon(l)$ for some $l \in \alpha$.

DEFINITION 4 (Consequence). The *consequences* of some state of affairs $X \subseteq W$ in a world $w \in W$ are represented by a function $E : (W \times \mathcal{P}ow(W)) \rightarrow \mathcal{P}ow(W)$. If $v \in E(w, X)$ we say that v is a possible consequence of X in w . A constraint on this function is that $E(w, X) \subseteq X$.

The consequences of a state of affairs in a world are not logically determined by the world and the state of affairs. It is rather something we learn by gathering information, and we express our commitment to such a function by making counterfactual conditional statements: If I had opened the window, the sheets would have blown away. Therefore, accepting a counterfactual conditional will amount to undertaking further commitments concerning the consequences of certain states of affairs (or actions).

The power of this function E lies in the fact that, besides representing causal responsibility, it also tells us what the consequences *would be* of some X such that $w \notin X$. In other words, it determines both the effects of actual and counterfactual states of affairs. In case $w \notin X$, the worlds in $E(w, X)$ are the possible courses of events in case X , rather than not- X , would have occurred in w .¹²

6.3 Commitment slates

Communication is a diverse activity: we gather information by accepting the simple assertions of others, we undertake practical commitments by promising or by accepting instructions from others, we assign responsibility by attributing causal consequences to actions, events and so on. The meaning of these communicative activities can be characterised by means of changes in one's commitment slate (scoreboard, cognitive state). The diversity of communicative acts requires that we represent commitment slates equally diverse. We have, first of all, a 'fact sheet' $F \subseteq W$ on which our factual commitments (beliefs, information) are listed. This fact sheet is formally represented by a set of worlds: namely, those worlds that are consistent with one's factual commitments. Second of all, there are practical commitments: intentions and conditional intentions. They are formally represented by functions $R : W \rightarrow \mathcal{P}ow(L)$, assigning a plan to all possible worlds, including the ones that are inconsistent with one's factual commitments (as seen in the diagram earlier). Third and last, there are causal dependency commitments, which we undertake by adopting certain expectations. They are formally represented by consequence functions E , as defined above. A commitment slate combines these elements into a single 'scoreboard'.

DEFINITION 5 (Commitment slate). A *commitment slate* S is a triple $\langle F_S, R_S, E_S \rangle$, where $F_S \subseteq W$ is a fact sheet, $R_S : W \rightarrow \mathcal{P}ow(L)$ is an intention function and E_S is an expectation function.

A commitment slate S is *consistent* if, and only if,

1. Non-absurd: $F_S \neq \emptyset$, and for all w and X , $R_S(w) \neq \emptyset$ and $E_S(w, X) \neq \emptyset$,

¹²See the subsection on time below for further discussion, and a possible reduction, of this concept.

2. Consequence: for all w and X , $E_S(w, X) \subseteq X$,
3. Non-conflicting: for all w , no $l \in R_S(w)$ is conflicting, and
4. Executable: for all $w \in F_S$, for all $l \in R_S(w)$, $E(w, \epsilon(l)) \cap F_S \neq \emptyset$.

The blank commitment slate **1** is $\langle W, w \mapsto \{\emptyset\}, (w, X) \mapsto X \rangle$, and the absurd commitment slate **0** is $\langle \emptyset, w \mapsto \emptyset, (w, X) \mapsto \emptyset \rangle$.¹³

Consistency of a commitment slate requires four things: you do not have contradictory factual commitments, contradictory intentions or contradictory causal commitments; E conforms to the conditions on a consequence function; you do not have conflicting intentions, even in hypothetical cases; and your potential practical commitments (i.e., intentions in factually possible worlds) are taken to be causally possible.

With this definition of commitment slates in place, we can now work our way to the definition of the updates. The following definition gives us the minimal fact sheets and plans for a Boolean complex of propositions or instructions.

DEFINITION 6 (Minimal fact sheet and minimal plan). To each \mathcal{L}_P formula conforms a *minimal fact sheet* and to each \mathcal{L}_I formula belongs a *minimal plan*. They are specified as presented below.

$$\begin{array}{ll}
\|p\| &= \{w \mid w(p) = \text{TRUE}\} & \|i\| &= \{\{i, \text{DO}\}\} \\
\|\neg p\| &= \{w \mid w(p) = \text{FALSE}\} & \|\neg i\| &= \{\{i, \text{DON'T}\}\} \\
\|\pi \vee \rho\| &= \|\pi\| \cup \|\rho\| & \|\iota \vee \eta\| &= \|\iota\| \cup \|\eta\| \\
\|\neg(\pi \vee \rho)\| &= \|\neg\pi\| \cap \|\neg\rho\| & \|\neg(\iota \vee \eta)\| &= \|\neg\iota\| \cap \|\neg\eta\| \\
\|\pi \wedge \rho\| &= \|\pi\| \cap \|\rho\| & \|\iota \wedge \eta\| &= \|\iota\| \cap \|\eta\| \\
\|\neg(\pi \wedge \rho)\| &= \|\neg\pi\| \cup \|\neg\rho\| & \|\neg(\iota \wedge \eta)\| &= \|\neg\iota\| \cup \|\neg\eta\|
\end{array}$$

The minimal fact sheets are just the classical ‘propositions’. Breaking with the symmetry with minimal plans, we may equally formulate the minimal fact sheet of a negation $\|\neg\pi\|$ as $W \setminus \|\pi\|$.

Using the concept of minimal fact sheet and minimal plan, we can now characterise the changes in R_S and in E_S , as a result of adopting new practical and causal commitments, respectively.

DEFINITION 7 (Intention and expectation change). Let S be a commitment slate. The incorporation of a practical commitment to ι in a world is $R_S \otimes \|\iota\|$ and the incorporation of a causal commitment to ρ being a consequence of π in a world is $E_S \otimes_{\|\pi\|} \|\rho\|$.

$$R_S \otimes \|\iota\| = \begin{cases} w \mapsto (R_S \cap \|\iota\|) & \text{if } w \in F_S \\ w \mapsto R_S & \text{otherwise} \end{cases} \quad E_S \otimes_{\|\pi\|} \|\rho\| = \begin{cases} (w, \|\pi\|) \mapsto (E_S \cap \|\rho\|) & \text{if } w \in F_S \\ (w, \|\pi\|) \mapsto E_S & \text{otherwise} \end{cases}$$

Lastly, we need a retraction operation. Retracting information from one’s fact sheet leads to the (re)introduction of some possible worlds. The reasons for such a retraction differ from

¹³Here $(w, X) \mapsto X$, etc., are a shorthand for the function mapping all pairs $(w, X) \in W \times \text{Pow}(W)$ to X , etc..

one occasion to the next. One reason is the consideration of non-actual possibilities in the evaluation of a counterfactual conditional. Another reason is the (re)consideration of past choices other than one's actual decision. The latter species of retraction is invoked in the analysis of counterfactual imperatives. Accordingly, we define the retraction operation by means of two clauses: one for retracting propositions and another one for retracting (the result of fulfilling) practical commitments from one's factual information.¹⁴

DEFINITION 8 (Retraction). Let S be a commitment slate and π and ι be variables for \mathcal{L}_P and \mathcal{L}_I expressions, respectively. The retraction of π from S is $S \downarrow \pi$ and the retraction of ι from S is $S \downarrow \iota$. This does not change the intention and expectation functions: $R_{S \downarrow \pi} = R_{S \downarrow \iota} = R_S$, $E_{S \downarrow \pi} = E_{S \downarrow \iota} = E_S$. The retractions do change the fact sheets.

$$\begin{aligned} F_{S \downarrow \pi} &= F_S \cup \{w \mid w \in E_S(v, \|\neg\pi\|) \text{ for some } v \in F_S\} \\ F_{S \downarrow \iota} &= F_S \cup \{w \mid w \in E_S(v, \epsilon(\|\neg\iota\|)) \text{ for some } v \in F_S\} \end{aligned}$$

6.4 Update

Now we can define the updates on commitment slates themselves.

DEFINITION 9 (Update). Let π and ρ be \mathcal{L}_P expressions and let ι be an \mathcal{L}_I expression. The update of a commitment slate S with a \mathcal{L}_M expression is defined as follows.

$$\begin{aligned} S[\pi] &= \begin{cases} \langle F_S \cap \|\pi\|, R_S, E_S \rangle & \text{if consistent} \\ \mathbf{0} & \text{otherwise} \end{cases} \\ S[\iota] &= \begin{cases} \langle F_S, R_S \otimes \|\iota\|, E_S \rangle & \text{if consistent} \\ \mathbf{0} & \text{otherwise} \end{cases} \\ S[\pi \Rightarrow \iota] &= \begin{cases} \langle F_S, R_{(S \downarrow \neg\pi)[\pi][\iota]}, E_S \rangle & \text{if consistent} \\ \mathbf{0} & \text{otherwise} \end{cases} \\ S[\pi \Rightarrow \rho] &= \begin{cases} \langle F_S, R_S, E_{(S \downarrow \neg\pi) \otimes_{\|\pi\|} \|\rho\|} \rangle & \text{if consistent} \\ \mathbf{0} & \text{otherwise} \end{cases} \\ S[\textit{was to ch } \iota] &= \begin{cases} \langle F_S, R_{(S \downarrow \neg\iota)[\iota]}, E_S \rangle & \text{if consistent} \\ \mathbf{0} & \text{otherwise} \end{cases} \end{aligned}$$

The retraction operations are used in the analysis of conditionals. They do not lead to a genuine retraction of information in F_S , but they only set up the right context in which we update with the consequent of the conditional. Let me give an example of a counterfactual conditional. Suppose we have accepted that it does not rain and that the streets are not wet, so $S = \mathbf{1}[\neg\textit{rain}][\neg\textit{wet}]$. In this context F_S contains some information, but R_S and E_S are still trivial. Now we update with the counterfactual ‘‘If it were raining, the streets would be wet’’, i.e., $\textit{rain} \Rightarrow \textit{wet}$. This means that we have to compute $E_{(S \downarrow \neg\textit{rain}) \otimes_{\|\textit{rain}\|} \|\textit{wet}\|}$. We start with

¹⁴See Veltman (2005) for a definition of retraction based on a distinction between factually possible and counterfactually possible worlds.

determining $S' = S \downarrow \neg rain$. As the definition of retraction shows, the only aspect of S that changes as a result of the retraction is the fact sheet: $F_{S'}$ combines the worlds in which it does not rain and the streets are not wet, i.e., the worlds in F_S , with the worlds that are the possible consequence of *rain* in F_S worlds, i.e., the worlds in $E_S(w, \|\text{rain}\|)$ for $w \in F_S$. Relative to this slate S' , we update $E_{S'} = E_S$ as follows: $E_{S'} \otimes_{\|\text{rain}\|} \|\text{wet}\|$. For worlds not in $F_{S'}$ this does not have an effect. But for the worlds w in $F_{S'}$ it does: from $E_{S'}(w, \|\text{rain}\|)$ we exclude all those worlds that do not belong to $\|\text{wet}\|$. In other words, we determine that in such worlds, the consequence of it raining would be that the streets are wet.

The analysis of counterfactual imperatives also involves retraction. Let us take the example “Was toch thuisgebleven” (you should have stayed at home). This imperative is used only in a context in which it is commonly accepted that in actual fact you did not stay at home. So we have to consider this update to take place relative to a commitment slate S in which $\neg \delta_{stay}$ is accepted (*stay* is an atomic instruction in I). If we are confronted with the mentioned counterfactual, *was toch stay*, the update proceeds as follows. We first consider the result of retracting $\neg stay$ from S . The fact sheet $F_{S \downarrow \neg stay}$ consists of the worlds in which δ_{stay} is evaluated as true, and the worlds resulting from not fulfilling the instruction *stay* in that world: what would have been the case if I had decided not to stay. Relative to this new context we update $R_{S \downarrow \neg stay}$ with the instruction *stay*. In effect, what we accept is that in the situation that we would have been in when the decision whether to stay had not yet been made, we would have been committed to stay. Note that we cannot accept this instruction if our actual decision not to stay was something to which we had a commitment. In that case the counterfactual imperative to stay is unacceptable.

Using the update definition we can also see how Ross’ problem is avoided. If we accept a disjunctive imperative $i \vee j$, e.g., “post the letter or burn it”, then a subsequent update with the imperative “don’t burn the letter” leads to the introduction of conflicting to do lists and, hence, to the absurd commitment slate. Let $\mathbf{1}$ be the minimal commitment slate, $S_1 = \mathbf{1}[i \vee j]$ and $S_2 = S_1[\neg i]$. Then R_{S_1} is such that for all w , $R_{S_1}(w) = \|\textit{i} \vee \textit{j}\| = \{\{\langle i, D \rangle\}, \{\langle j, D \rangle\}\}$. Now if we could continue by updating with $\neg i$, then R_{S_2} would be such that for all w , $R_{S_2}(w) = \|\textit{i} \vee \textit{j}\| \sqcap \|\neg \textit{i}\| = (\|\textit{i}\| \cup \|\textit{j}\|) \sqcap \|\neg \textit{i}\| = \|\textit{i} \wedge \neg \textit{i}\| \cup \|\textit{j} \wedge \neg \textit{i}\| = \{\{\langle i, D \rangle, \langle i, R \rangle\}, \{\langle j, D \rangle, \langle i, R \rangle\}\}$. This plan contains a conflicting to do list. Consequently, S_2 would not be consistent. According to the definition of the updates, this means that $S_2 = \mathbf{0}$.

This incompatibility of $i \vee j$ and $\neg i$ does not mean that it is pragmatically impossible to deal with such instructions. It merely makes the semantic point that after the acceptance of $i \vee j$, the acceptance of $\neg i$ has to be construed as a *revision* of one’s intentions, whereby an accepted practical commitment—i.e., the *decision to choose* between i and j —is (implicitly) retracted.

With these definitions in place, we have now given a formal semantic analysis of imperatives that does not attribute a ‘propositional content’ to them. The analysis does not only account for simple, atomic instructions such as ‘Go home’ or ‘Open the window’, but also for the more complex counterfactual ones found in Dutch. I hope the reader will be convinced that the framework is powerful and clear enough to extend it to other cases, such as first and third person imperatives. Possibly, certain deontic modal expressions could be analysed in terms of

this framework as well (see Nauze, 2007). Facts and plans are different matters. Taking their difference seriously allows us to avoid the problems with disjunctive imperatives noticed by Ross. Before concluding, I would like to consider one possible amendment for the presented framework, indicating the possibility of a tighter connection between counterfactuals and time-dependent possibility.

6.5 Time

Many semantic analyses of counterfactual conditionals and many semantic analyses of imperatives make crucial reference to temporal concepts (see for instance Condoravdi, 2002 for a recent example). Others have preferred non-temporal semantic analyses of counterfactual conditionals (Lewis, 1979; Veltman, 2005). The semantic analysis presented above does not involve any explicit reference to time. However, it would not be too difficult to introduce explicit temporal concepts in this account, if desired, by defining the consequence relation and the retraction operation in terms of temporal concepts. The following is an outline of such a temporally explicit version of the account given above. Let \mathcal{T} be a set of ordered times (or intervals). We assume that for every time t there is an equivalence relation $\simeq_t \subseteq W \times W$, where $w \simeq_t v$ should have the meaning that worlds w and v are similar up to, and including, time t . (If we add a notion of ‘event time’ for atomic propositions, we might define this relation by saying that w and v agree on all propositions with an event time t or earlier.) Furthermore, given a set of physically possible worlds $Phys \subseteq W$, the physically possible continuations of w after a time t would be those worlds v that are equivalent to w up to t ($v \simeq_t w$) and that are physically possible ($v \in Phys$). Now, given any set X , we assume that there is a unique latest time t_X such that $w \simeq_{t_X} v$ for all worlds v and w in X (so t_X is the latest time for which X is a \simeq equivalence class). The set $E(w, X)$ can now be defined as consisting of all physically possible continuations of w after $t_{X \cup \{w\}}$ that are members of X .

To define retraction, we adopt the following definitions. World v is a closest X -alternative to w if, and only if, (i) w and v are both physically possible, (ii) $w \notin X$ and $v \in X$ and (iii) for all times t , if $w \simeq_t u$ for some $u \in X$, then $w \simeq_t v$ as well. Now we set $F_{S \downarrow X} = \{w \mid w \text{ is a closest } (W \setminus X)\text{-alternative to some } v \in F_S\}$, where X can be $\|\pi\|$ or $\epsilon(\|\iota\|)$.

Using the reduction of the consequence relation E to the set of physically possible worlds $Phys$ naturally leads us to replace the commitment slate parameter for E by a commitment slate parameter $Phys_S$. Rather than changing E as a result of updating with counterfactual conditionals, we now make changes in $Phys_S$. The update of commitment slate S with $\pi \Rightarrow \rho$ would change this parameter: $Phys_{S[\pi \Rightarrow \rho]} = (Phys_S \setminus F_{(S \downarrow \neg \pi)[\pi][\neg \rho]})$. It tells us that, from all the closest π -alternatives to the worlds in F_S , the $\neg \rho$ worlds are physically impossible.

7 CONCLUDING REMARKS

The main purpose of this paper was to argue for an approach to the semantics of imperatives which does not involve a separation between a ‘propositional content’ and a mood indicator or

illocutionary force operator. Instead, instructions are taken to be irreducible semantic entities, just like propositions—truth value carrying expressions—are commonly taken to be semantically primitive. First, three different types of reductive approaches to imperatives were distinguished and arguments against each of them were offered. The first two face conceptual problems, but the third has empirical problems: the cases of third person imperatives, counterfactual imperatives and the different logical behaviour of disjunction in imperatives. Update semantics has been presented as a framework for dealing with these problems: it makes no use of a distinction between content and force but interprets the imperatives directly as instructions, which are represented in the semantics as update functions that transform one commitment slate into another commitment slate. Instructions can be combined into larger wholes and embedded under ‘modal’ operators, such as the counterfactual ‘*was toch*’ operator. The semantic analysis of the latter construction constitutes a faithful interpretation of the counterfactual imperative in Dutch. Thereby I hope to have shown that the emancipation of imperatives in natural language semantics is not only a good linguistic idea, but that it is also theoretically sound and formally feasible.

REFERENCES

- M. Aloni. Utility and implicatures of imperatives. In *Proceedings of DIALOR'05, Loria, Nancy, France, 2005*.
- J. L. Austin. Performative utterances. Transcript of a talk for B.B.C. radio, 1956. Published in (Austin, 1979), pp. 233-252.
- J. L. Austin. *How to do things with words*. Oxford UP, 1962.
- J. L. Austin. *Philosophical Papers*. Clarendon Press, 3rd edition, 1979. Edited by J. O. Urmson and G. J. Warnock.
- E. L. Beardsley. Imperative sentences in relation to indicatives. *Philosophical Review*, 53:175–185, 1944.
- N. Belnap. Declaratives are not enough. *Philosophical Studies*, 59(1):1–30, 1990.
- H. Bennis. Agreement, pro and imperatives. In P. Ackema, P. Brandt, M. Schoorlemmer, and F. Weerman, editors, *Arguments and Agreement*, pages 101–127. Oxford University Press, 2006.
- F. Beukema and P. Coopmans. A government-binding perspective on the imperative in English. *Journal of Linguistics*, 25:417–436, 1989.
- N. Chomsky. *The Logical Structure of Linguistic Theory*. New York: Plenum Press, 1975.
- C. Condoravdi. Temporal interpretation of modals: Modals for the present and modals for the past. In D. Beaver, S. Kaufmann, B. Clark, and L. Casillas, editors, *The Construction of Meaning*, pages 59 – 88. Stanford: CSLI Publications, 2002.
- D. Davidson. The centrality of truth. In J. Peregrin, editor, *Truth and its Nature (If Any)*, pages 105–115. Dordrecht: Kluwer Academic Publishers, 1999.
- G. Frege. *Begriffsschrift*. Halle a. S., 1879.
- G. Frege. Der gedanke. eine logische untersuchung. *Beiträge zur Philosophie des deutschen Idealismus*, 2:58–77, 1918.
- R. Garner. Utterances and acts in the philosophy of J. L. Austin. *Noûs*, 2(3):209–227, 1968.
- J. Groenendijk. The logic of interrogation: Classical version. In T. Matthews and D. Strolovitch, editors, *Proceedings of SALT IX, Santa Cruz*. CLC Publications, 1999.
- J. Groenendijk and M. Stokhof. *Studies on the Semantics of Questions and the Pragmatics of Answers*. PhD thesis, Universiteit van Amsterdam, 1984.

- J. Groenendijk and M. Stokhof. Dynamic predicate logic. *Linguistics and Philosophy*, 14(1):39–100, 1991.
- W. Haeseryn, K. Romijn, G. Geerts, J. de Rooij, and M. van den Toorn, editors. *Algemene Nederlandse Spraakkunst*. Groningen/Deurne: Martinus Nijhoff uitgevers/Wolters Plantyn, 1997.
- C. L. Hamblin. Mathematical models of dialogue. *Theoria*, 37:130–155, 1971.
- C. L. Hamblin. *Imperatives*. Basil Blackwell, 1987.
- C. Han. *The Structure and Interpretation of Imperatives: Mood and Force in Universal Grammar*. PhD thesis, University of Pennsylvania, 1998.
- C. Han. Deontic modality, lexical aspect and the semantics of imperatives. In *Linguistics in Morning Calm 4*. Seoul: Hanshin Publications, 1999.
- R. M. Hare. Imperative sentences. *Mind*, 58:21–39, 1949. Reprinted in Hare (1971).
- R. M. Hare. *Practical Inference*. London: MacMillan, 1971.
- R. Hausser. Surface compositionality and the semantics of mood. Manuscript, München, 1978.
- I. Heim. *The Semantics of Definite and Indefinite Noun Phrases*. PhD thesis, University of Massachusetts, Amherst, 1982.
- A. Hofstadter and J. McKinsey. On the logic of imperatives. *Philosophy of Science*, 6:446–457, 1939.
- J. Jorgensen. Imperatives and logic. *Erkenntnis*, 7:288–298, 1938.
- H. Kamp. A theory of truth and semantic representation. In J. Groenendijk, T. Janssen, and M. Stokhof, editors, *Formal Methods in the Study of Language*, pages 277–322. Amsterdam: Mathematisch Centrum, 1981.
- J. J. Katz. *Propositional Structure and Illocutionary Force*. The Harvester Press, 1977.
- J. J. Katz and P. M. Postal. *An integrated theory of linguistic descriptions*. Cambridge Mass.: MIT Press, 1964.
- G. Lakoff. Linguistics and natural logic. In D. D. . G. Harman, editor, *Semantics of natural language*. Dordrecht: Reidel, 1972.
- D. K. Lewis. General semantics. In D. Davidson and G. Harman, editors, *Semantics of Natural Language*, pages 169–218. Dordrecht: D. Reidel, 1972.
- D. K. Lewis. Counterfactual dependence and time’s arrow. *Noûs*, 13(4):455–476, 1979.
- E. Mally. *Grundgesetze des Sollens. Elemente der Logik des Willens*. Graz: Leuschner & Lubensky, 1926.
- R. Mastop. *What can you do?* PhD thesis, ILLC, Amsterdam, 2005.
- C. McGinn. Semantics for nonindicative sentences. *Philosophical Studies*, 32:301–311, 1977.
- F. Nauze. Deontic modality in formal semantics: some problems. Presentation at RUC-ILLC Workshop on Deontic Logic, November 2007.
- C. Platzack and I. Rosengren. On the subject of imperatives: A minimalist account of the imperative clause. *The Journal of Comparative Germanic Linguistics*, 1(3):177–224, 1998.
- P. Portner. The semantics of imperatives within a theory of clause types. In K. Watanabe and R. B. Young, editors, *Proceedings of Semantics and Linguistic Theory*, volume 14. Ithaca, NY: CLC Publications, 2005.
- H. Price. Semantic minimalism and the Frege point. In S. L. Tsohatzidis, editor, *Foundations of Speech Act Theory: Philosophical and Linguistic Perspectives*, pages 132–155. Routledge, 1994.
- N. Rescher and J. Robison. Can one infer commands from imperatives? *Analysis*, 24:176–179, 1964.
- A. Ross. Imperatives and logic. *Theoria*, 25(7):53–71, 1941.
- J. R. Ross. On declarative sentences. In R. A. Jacobs and P. S. Rosenbaum, editors, *Readings in English Transformational Grammar*, pages 222–272. Waltham, Mass.: Ginn, 1970.
- S. F. Schmerling. Imperative subject deletion and some related matters. *Linguistic Inquiry*, 6:501–510, 1975.

- S. F. Schmerling. How imperatives are special and how they aren't. In R. Schneider, K. Tuite, and R. Chametzky, editors, *Papers from the parasession on Nondeclaratives*, pages 93–106. Chicago Linguistics Society, 1982.
- M. Schwager. *Interpreting Imperatives*. PhD thesis, Johann Wolfgang Goethe-Universität Frankfurt a.M., 2006.
- J. R. Searle. Austin on locutionary and illocutionary acts. *The Philosophical Review*, 77(4):405–424, 1968.
- J. R. Searle. *Speech Acts*. Cambridge: Cambridge University Press, 1969.
- R. C. Stalnaker. Pragmatics. *Synthese*, 22(1-2):272–289, 1970.
- E. Stenius. Mood and language-game. *Synthese*, 17:254–274, 1967.
- T. Stowell. On tense in infinitives. *Linguistic Inquiry*, 13:561–670, 1982.
- J. van der Auwera, N. Dobrushina, and V. Goussev. A semantic map for imperative-hortatives. In D. Willems, T. Coleman, and B. Defrancq, editors, *Points of Comparison in Linguistics: from Morphology to Discourse*. Basingstoke: Palgrave Macmillan, 2003.
- J. van der Does, W. Groeneveld, and F. Veltman. An update on “might”. *Journal of Logic Language and Information*, 6(4):361–380, 1997.
- L. van der Torre and Y.-H. Tan. An update semantics for deontic reasoning. In *Proceedings of DEON'98*, pages 409–426, 1998.
- F. Veltman. Defaults in update semantics. *Journal of Philosophical Logic*, 25:221–261, 1996.
- F. Veltman. Making counterfactual assumptions. *Journal of Semantics*, 22:159–180, 2005.
- G. H. von Wright. *Logical Studies*. London: Routledge and Kegan Paul, 1957.
- G. H. von Wright. *Explanation and Understanding*. London: Routledge & Kegan Paul, 1971.
- G. H. von Wright. Is there a logic of norms? In *Six Essays in Philosophical Logic*, pages 35–54. Helsinki: Societas Philosophica Fennica, 1996.
- L. Wittgenstein. *Philosophische Untersuchungen*. Oxford: Blackwell, 1953.
- H. Wolf. Imperatieven in de verleden tijd. *Taal & Tongval*, 55:168–187, 2003.
- B. Zarnic. Dynamic semantics, imperative logic and propositional attitudes. Uppsala prints and preprints in philosophy, Uppsala Universitet, 2002.