Expressing Expectations

Inés Crespo, Hadil Karawani, and Frank Veltman

Forthcoming 2018. In B. Rabern and D. Ball (eds.), The Science of Meaning. Oxford University Press.

Abstract

In this paper we have to say something about a variety of topics:

- Conditionals. (There is a third kind of conditionals, somewhere between indicatives and counterfactuals.)
- Relative gradable adjectives. (How do they get their evaluative force?)
- Generic sentences. (Why aren't they all equally general?)

What these topics have in common is that one cannot explain the meaning—not even the logical properties—of the expressions concerned without explaining how they affect people's expectations. This can best be done in a framework in which the meaning of a sentence is not equated with its truth conditions but with its (potential) impact on the intentional state of an addressee.

1 Introduction

Our main purpose in this paper is to estabish the following claim.

> There are many[1] grammatical constructions the meaning of which cannot be explained without explaining how they affect people's *expectations*.

We hope to convince readers of all persuasions of the importance of this claim, whether they favour a truth-conditional or an information-based, a static or a dynamic, a contextualist, a relativist or an expressivist theory of meaning. Therefore, we will keep the discussion as informal as possible. It is, however, impossible to talk about meaning without any theoretical bias. In the back of our minds there is the (information-based, dynamic and expressivist) framework of update semantics enabling us to structure the data. It will appear that the sometimes bewildering data can be smoothly incorporated into this framework. For other frameworks this is a challenge, but we do not claim that it is impossible.

[1] = more than you would expect. (Cf. **?**.)

In update semantics the meaning of a sentence—be it indicative, interrogative, or imperative—is equated with the (potential) change it brings about in the intentional state of an addressee. So, formally, the meaning of a sentence is an operation on intentional states. For S an intentional state and φ a sentence, we will write $S[\varphi]$ for the intentional state that results when S is updated with φ.

Important notions in this set up are the following:

- *Support.* Sometimes $S[\varphi] = S$. Then the information conveyed by φ is already subsumed by S. In such cases we say that φ *is accepted* in S, or that S *supports* φ, and we write this as $S \models \varphi$.
- *Presupposition.* The sentence φ *presupposes* the sentence ψ iff for all S, $S[\varphi]$ is defined only if $S \models \psi$.
- *Logical validity.* An argument is valid iff whenever the update of a state with the premises is defined, the result is a state that supports the conclusion. Formally:
  $\varphi_1, \ldots, \varphi_n \models \psi$ iff $S[\varphi_1] \ldots [\varphi_n] \models \psi$ for every S such that $S[\varphi_1] \ldots [\varphi_n]$ is defined.

Note that the notion of presupposition is addressee-oriented. If φ presupposes ψ, φ is not *interpretable* by an addressee whose state does not support ψ. (Of course, in many cases the addressee will be willing to accommodate the presupposition.)

If φ presupposes ψ, then in general also the speaker's state will support the presupposition, because speakers are supposed to only assert sentences that they accept themselves. (But it will appear that there are exceptions to this rule.)

Maybe not surprisingly, expectations play an important role in the semantics of imperatives, deontic modals,[2] the future tense, and epistemic modals like *must* and *may*. It will be less obvious that they are also of vital importance for understanding conditionals, relative gradable adjectives, and generic sentences. For this reason, we will focus on the last three topics.

2 Descriptive vs. normative expectations

Expectations are rather peculiar constituents of intentional states. They can be not only *descriptive* but also *normative* in character.[3] Compare:

- *The weather will be nice tomorrow. We expect sunshine all day.*
- *I expect you to be back home at 11PM—no excuses.*

It is logically possible that you expect me to be back home at 11PM, yet you do not expect that I will really be back at that time—the former expectation being normative and the latter descriptive. So, we should not mix up these two kinds

[2] **?** and **?** are much in the spirit of what we are doing here.

[3] The distinction goes back at least to **?**.

of expectations. But then, we often do. We all expect that our car will start when we turn the key. And then, some of us get very angry and even kick our car if it 'refuses' to do so.

If we do not ourselves mix up these two kinds of expectations, our language does so for us. There is a lot of overlap between the vocabulary for normative and descriptive expectations. For example, in English *must* can be used in both contexts.[4]

- *That must be the postman. He always rings twice.*
- *You must believe me, no matter what the people say.*

Another parallel: On the descriptive side, we always expect that things will be *normal*—or at least as normal as possible, given the circumstances. On the normative side, we always expect people to live up to the norms—or at least try their best under the circumstances.[5] This is the formal picture:

Definition

a. A *state* S is a triple $\langle W, K, < \rangle$, where W is a finite, nonempty set, K is a nonempty subset of W, and $<$ is a strict partial ordering of W.
b. Let $S = \langle W, K, < \rangle$. $E_S =_{df} \{i \in K \mid$ there is no $j \in K$ such that $j < i\}$

This picture can be interpreted in two ways. In both cases, S represents the intentional state of some agent. In both cases, W is the set of logically possible worlds. And in both cases, the relation $<$ represents the agent's expectations; if $i < j$, this means that the agent expects reality to be like i rather than j. Here "expect" can be understood either descriptively, or normatively, or maybe sometimes as a mixed up variant. K consists of the worlds that, according to the information at hand, might still turn out to be the real world. E_S contains the worlds in K that are most in line with the agent's expectations—the most normal in the descriptive case, the best possible in the normative case.

Consider a state $S = \langle W, K, < \rangle$. Let φ be a purely descriptive sentence. For such a sentence it makes sense to speak of the proposition expressed by φ, i.e. the set of worlds in which φ is true. Let $[\![\varphi]\!]$ be this set. If $K \subseteq [\![\varphi]\!]$, the agent knows φ—at least that is how the agent would put it; from an outside perspective, K represents what the agent thinks s/he knows. If $E_S \subseteq [\![\varphi]\!]$, the agent expects φ. There are various ways the agent can put this in words. Of course s/he can just say *I expect that* φ, but s/he can also use one of the modal auxiliaries *must*[6] or *will*, or adverbs like *presumably* or *likely* to express her/his expectations.[7]

An important distinction—in epistemic contexts—is the distinction between *likely possibilities* and *unlikely possibilities*. If $[\![\varphi]\!] \cap E_S \neq \emptyset$, φ is consistent with

[4] In **?** it is reported that this polyfunctionality of modal expressions is not a universal feature of modal systems. It only occurs in European languages. See **?** for an extensive discussion.

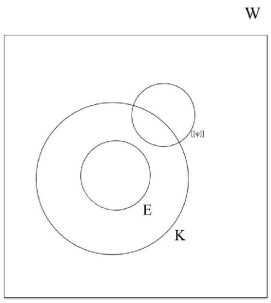
[5] And what is normal tends to become the norm. *Act normal!* is almost a tautology.

[6] So we stick to what in **?** is called the Mantra that *must* φ is weaker than φ.

[7] There are subtle differences in meaning here, but the distinctions made in our formal model are too coarse to bring them out.

the agent's expectations. In this case we will call φ a likely possibility; according to the agent φ *may* very well be the case.

The case that φ is an unlikely possibility is pictured below.



Here $[\![\varphi]\!] \cap E_S = \emptyset$, but $[\![\varphi]\!] \cap K \neq \emptyset$. In other words, it would be contrary to expectation if φ turned out to be true, but for all the agent knows φ *might* be the case.

People often have to make decisions in circumstances in which they have only limited information. It is in such circumstances that the difference between likely possibilities and unlikely possibilities matters. Likely possibilities are possibilities that one will take into account when taking decisions. For all our agents know any world in K might be the actual world, but they *expect* it to be one of the worlds in E_S, and mostly disregard the possibilities in $K \setminus E_S$.[8]

The reader will have noticed that we make a difference between *may* and *might*. A state S supports that φ *might* be the case if $K \cap [\![\varphi]\!] \neq \emptyset$. A state S supports that φ *may* be the case iff $E_S \cap [\![\varphi]\!] \neq \emptyset$. Given these definitions *may* implies *might*, but not *vice versa*.[9]

Actually, given these definitions it is a quantity implicature of *It might be that* φ that φ is unlikely. This is in line with an observation of Geoffrey Leech:

[8] Admittedly, this is too simplistic. Risk also plays a role. As one of the editors pointed out to us, sometimes one cannot disregard an unlikely possibility because the price to pay if this possibility would turn out to be the real one might be too high. That's why people buy a fire-insurance policy on their home.

[9] The following update conditions explain formally how this comes about. Here, we restrict ourselves to the case that φ expresses a proposition and does not carry any presuppositions.

- $S[\varphi] = \langle W, K \cap [\![\varphi]\!], < \rangle$.
  So, $S \models \varphi$ iff $K \subseteq [\![\varphi]\!]$.
- $S[\neg\varphi] = \langle W, K \setminus [\![\varphi]\!], < \rangle$.
- $S[\textit{it is likely that } \varphi] = S$ if $E_S \subseteq [\![\varphi]\!]$; otherwise, $S[\textit{it is likely that } \varphi] = \emptyset$.
- $S[\textit{it is unlikely that } \varphi] = S$ ff $E_S \cap [\![\varphi]\!] = \emptyset$; otherwise, $[\textit{it is unlikely that } \varphi] = \emptyset$.
- $S[\textit{may } \varphi] = S$ iff $E_S \cap [\![\varphi]\!] \neq \emptyset$; otherwise $S[\textit{may } \varphi] = \emptyset$.
- $S[\textit{might } \varphi] = S$ iff $K \cap [\![\varphi]\!] \neq \emptyset$; otherwise $S[\textit{might } \varphi] = \emptyset$.

Note that the update conditions for the modal operators are all *tests* in the sense of **?**.

> The effect of the hypothetical auxiliary [i.e. *might*], with its implication 'contrary to expectation', is to make the expression of possibility more tentative and guarded.[10]
>
> (**?**, §186)

3 Between indicative and counterfactual

3.1 Unlikely antecedents

Most logicians seem to think that there are two kinds of conditionals: indicatives and counterfactuals. Indicative conditionals are typically asserted in circumstances in which it is an open question whether the antecedent is true, counterfactuals in circumstances in which the antecedent is known to be false.

If this is the way you look at it, you will have trouble classifying the second conditional in the following dialogue.

(1)
- Journalist: *Sir, what will you do if you lose the election?*
- Candidate: *I expect to win by a big amount.*
- Journalist: *I see, sir, but what if you were to lose?*

The first conditional is an indicative conditional, the second is not. The antecedent is unlikely, but it might be true. The same holds for (**??**) below.

(2)
a. *I don't know if he will come, but if he came, he would have a great time.*

b. *He told me he won't come. Too bad. If he had come, he would have had a great time.*

That there is a difference in meaning between the conditionals in (**??**) and (**??**) becomes clear if we put the conditional of (**??**) in the context of (**??**).

(3) *# I don't know if he will come, but if he had come, he would have had a great time.*

Example (**??**) is taken from **?**, who notes that (**??**) can be asserted by someone who is agnostic about the antecedent, and she adds in a footnote that some people have the intuition that the easiest obtainable meaning of this kind of conditional involves unlikelihood of the antecedent.

[10] Leech is not the only linguist saying such things. It is, however, not easy to find convincing examples showing that *may* and *might* are not always interchangeable. The best we can come up with is the sentence

– *John might come to the party, and if he came, we would have a great time*

and ask the reader to compare this sentence with (**??**) in the next section.

Iatridou was not the first to bring up examples like (**??**). She cites David Lewis[11] who wrote:

> There are subjunctive conditionals pertaining to the future, like "If our ground troops entered Laos next year, there would be trouble" that appear to have the truth conditions of indicative conditionals, rather than of the counterfactual conditionals I will be considering.
>
> (**?**:4)

3.2 Presuppositions

To deal with the examples cited above, we need a three-way distinction. There are three kinds of conditionals: indicative, weakly subjunctive,[12] and strongly subjunctive. The latter are also called counterfactual conditionals. Indicative conditionals are typically asserted in circumstances in which the antecedent may be true, weakly subjunctive conditionals in circumstances in which it is unlikely that the antecedent is true, and strongly subjunctive conditionals in circumstances in which the antecedent is false.

The phrase "typically asserted in circumstances in which ..." is in need of precisification. Within the framework of update semantics, this can be done as follows. Let $S{=}\langle W, K, <\rangle$:

- An indicative conditional *If it is the case that* φ, *then it is the case that* ψ presupposes *it might be the case that* φ. In other words, $S[$*if it is the case that* φ, *then it is the case that* $\psi]$ is defined only if $K \cap [\![\varphi]\!] \neq \emptyset$.
- A weakly subjunctive conditional *If it were the case that* φ, *then it would be the case that* ψ presupposes *it is unlikely that* φ. In other words, $S[$*if it were the case that* φ, *then it would be the case that* $\psi]$ is defined only if $E_S \cap [\![\varphi]\!] = \emptyset$.[13]

[11] She could also have cited **?** where the same point is made.

[12] From a linguistic point of view, the term 'subjunctive' is a misnomer. See **?**. But we will follow the usual practice here.

[13] Continuing footnote **??**, we stipulate:

- $S[$*If it is the case that* φ, *then it is the case that* $\psi] = S$ iff $K \cap [\![\varphi]\!] \neq \emptyset$ and $S[\varphi] \models \psi$;
  $S[$*If it is the case that* φ, *then it is the case that* $\psi] = \emptyset$ iff $K \cap [\![\varphi]\!] \neq \emptyset$ and $S[\varphi] \not\models \psi$;
  otherwise, $S[$*If it is the case that* φ, *then it is the case that* $\psi]$ is undefined.
- $S[$*If it were the case that* φ, *then it would be the case that* $\psi] = S$ iff $E_S \cap [\![\varphi]\!] = \emptyset$ and $S[\varphi] \models \psi$;
  $S[$*If it were the case that* φ, *then it would be the case that* $\psi] = \emptyset$ iff $E_S \cap [\![\varphi]\!] = \emptyset$ and $S[\varphi] \not\models \psi$;
  otherwise, $S[$*If it were the case that* φ, *then it would be the case that* $\psi]$ is undefined.

Note that the indicative conditional and the weakly subjunctive conditional only differ in their presuppositions. Where Lewis would give weakly subjunctive conditionals the same truth conditions as indicative conditionals, we give them the same update conditions. (These update conditions for indicatives were first proposed in **?**.)

– A strongly subjunctive conditional *If it had been the case that* φ, *then it would have been the case that* ψ presupposes *it is not the case that* φ. In other words, S[*if it had been the case that* φ, *then it would have been the case that* ψ] is defined only if $K \cap [\![\varphi]\!] = \emptyset$.[14]

The case that interests us most here is the case of the weakly subjunctive conditional, but we will first discuss the other two cases because we suspect some readers will have frowned at these—or at least at the case of the counterfactual.

To see why, recall the classical definition of presupposition:

– *Presupposition in a truth-conditional approach:* The sentence φ presupposes the sentence ψ iff φ does not have a truth value—either true or false—unless ψ is true.

As far as we know, nobody ever claimed that counterfactuals presuppose the falsity of their antecedent in this classical sense. Before anybody could do so, Anderson [**?**] had already given a counterexample. Imagine the following situation: Mr. A and Mrs. B differ in opinion about the question whether a particular patient has taken arsenic. Mr. A thinks he did, Mrs. B thinks he didn't. Now it is perfectly possible for Mr. A to assert (**??**) after the counterfactual conditional in (**??**).

(4) a. *If he had taken arsenic, he would have shown exactly those symptoms.*
b. *He, therefore, did take arsenic.*

No contradiction arises. The falsity of the antecedent cannot be a presupposition in the classical sense of the word because it would clash with (**??**).[15]

It is also easy to find counterexamples to the claim that indicative conditionals presuppose—in the classical sense of the word—that the antecedent might be true. Mrs. B could continue the discussion by saying:

(5) *If he took arsenic, I am the empress of China.*

Somehow, this sentence conveys that the antecedent cannot possibly be true.

The notion of presupposition we are working with here differs from the classical one. In the arsenic example (**??**), the speaker, Mr. A, believes the antecedent is true, the addressee, Mrs. B, believes it is false. Notice the difference between (**??**) and (**??**).

(6) a. *# I believe that he took arsenic. But if he had taken arsenic, he would have shown exactly those symptoms.*

[14] We will not spell out the definition itself. See **?** for a proposal, and **?** for amendments.

[15] Notice however that it does not *follow* from (**??**) that the referent of "he" in the example took arsenic. One would need an extra premise, saying that taking arsenic is the *only* possible cause for these symptoms.

b. *I believe that he took arsenic. You believe that he didn't. But at least you should admit that if he had taken arsenic, he would have shown exactly those symptoms.*

Example (**??**) sounds fine, as opposed to (**??**). What happens in (**??**) is that the speaker purposefully uses the conditional that is licensed by the addressee's state in an attempt to change that state into one that looks more like the speaker's own state.

The arsenic case is special: a case in which speaker and addressee disagree. We are not dealing with a simple information exchange where the interlocutors just update each other's states, adding proposition to proposition. When there is no disagreement, the interlocutors will share the same presuppositions. But when there is a disagreement, and this disagreement concerns a presupposition, then there is a problem. Of course, speakers can always simply speak their minds. However, sometimes it is more helpful to take the addressee's perspective, if only to show that what the addressee presupposes cannot be upheld.

Similar remarks apply to the indicative conditional in (**??**). Again, what matters is not so much the speaker's state but the state of the addressee. Here the addressee is Mr. A and according to him the patient took arsenic, so the presupposition that the patient possibly took arsenic is satisfied. Mrs.B disagrees, but by asserting the antecedent of (**??**), she is taking the addressee's perspective, if only to arrive at a *reductio ad absurdum*.[16]

One might wonder why we use the term "presupposition" here, given that our definition differs so much from the classical one. One important reason for this is that presuppositions, in our sense of the word, have many properties of classical presuppositions. They project under negation, under epistemic modalities, and under question formation:[17]

(7) a. *# Trump won the election. It's not the case that if he had won, you would have felt better.*

b. *# Trump won the election. Maybe if he had won, you would have felt better.*

c. *# Trump won the election. Would you have felt better, if he had won?*

[16]This shift of perspective to the hearer's state also occurs in other environments. Take for instance the following example in which a teacher speaks to a student, testing her in maths.

Correct. 3 times 11 equals 33. Now here's a difficult one: 7 times 13.

Clearly, the exercise is not difficult for the teacher; but it is difficult for the student. What happens here with "difficult" can happen with many gradable adjectives, in particular predicates of personal taste (like *tasty* or *fun*), or with epistemic modalities—in fact with all grammatical constructions that in a static approach are sometimes taken to be assessment-sensitive. See the writings of John MacFarlane, for instance **?**.

[17]This is a claim. In the fully developed system this claim should be proved.

Our notion of presupposition has also much in common with the pragmatic notion of presupposition introduced by Stalnaker. For example, it is a common assumption among researchers in the Stalnaker school that indicative conditionals presuppose that the antecedent might be true. The difference is that for them it is primarily the speaker's belief state that should leave the possibility open that the antecedent is true.[18]

Let's now turn to weakly subjunctive conditionals. We stipulated that they cannot be properly used in a context in which the antecedent *may* be true.

In such a case one has to use the indicative (cf. **??**). On the other hand, it is fine to use an indicative conditional when the antecedent is consistent with what is known but not with what is expected (cf. **??**). And one can also use a weakly subjunctive conditional when it is known that the antecedent is false (cf. **??**).

(8) a. *# Maybe John will come to the party, and if he came, we would have a great time.*

b. *It's unlikely that John will come to the party, but if he comes, we will have a great time.*

c. *I know that he's not coming. If he were coming, mommy wouldn't be crying.*

The above does not explain the observation made in connection with example (**??**), that the use of the indicative suggests that the antecedent is a likely possibility. Here we need to appeal to pragmatics. The weakly subjunctive conditional presupposes that the antecedent is unlikely—the indicative does not. So when you use the indicative in a context in which the antecedent is unlikely, you have to explicitly mention this (or it should otherwise be clear from the context). Given this, when you use the indicative without explicitly saying that the antecedent is unlikely, the addressee will infer that the antecedent may very well be true.

In a similar way we can explain why the typical context for using a weakly subjunctive conditional is one in which the antecedent is unlikely, but not known to be false. The strongly subjunctive conditional presupposes that the antecedent is false, the singly marked only presupposes that the antecedent is unlikely. Given this, when you use a singly marked conditional rather than a strongly subjunctive conditional in a context in which the antecedent is false, you have to explicitly say so—if at least this is no common knowledge. Otherwise, the addressee will think it is just unlikely.

3.3 English, Dutch, Palestinian

Lewis, as cited at the end of subsection 3.1, only talks about weakly subjunctive conditionals *pertaining to the future*. Are there also such conditionals pertaining

[18] See for example Stalnaker **?**, von Fintel **?**, Gillies **?**, **?**. For all of them example (**??**) poses a problem.

to the present or the past? After all, people do not only have expectations about the future, they also have (descriptive) expectations about the present and the past. What do they say to express that in the unlikely case that φ is/was true, ψ is/was true?

Here, things get tricky, especially for English. Therefore, we will also discuss the matter for Dutch and Palestinian, where things are much clearer.

? provides (**??**) as an example showing that one can use a weakly subjunctive conditional also in cases in which the antecedent refers to the present. (**??**) and (**??**) are other candidates to show this.

(9) a. *I don't know if he's rich, but if he were rich, he would be popular with that crowd.*

b. *Obama a Muslim? Even if he were, so what?*

c. *I don't know what he does for a living. But even if he were a carpenter, I would marry him.*

The examples above sound better if one uses plain indicative conditionals—if at least one wants to convey that the antecedent might be true. Similar things can be said about the examples below, in which the antecedent is meant to refer to an unlikely *past* event. We put question marks in front of the examples to indicate that we doubt they work out the way we would like. As it stands, example (**??**) is too easily taken for a counterfactual, whereas (**??**) is better expressed by an indicative.

(10) a. (??) *I don't know who killed Mary, but it's unlikely it was John. If he killed her, he would have used an axe.*

b. (??) *I don't know who killed Mary, but it's unlikely it was John. If he were to have done it, what would have been his motive?*

Let's now turn to Dutch. Just like in English, there are subjunctive conditionals pertaining to the future presupposing unlikelihood rather than falsity of the antecedent, as in (**??**).

(11) *Als ze me een baan aanboden, zou ik meteen ja zeggen.*
if they me a job offer.PST.3SG would I rightwaway yes say.INF
"If they offered me a job, I would accept it right away."

And just like in English, it is not easy to find (or construct) weakly subjunctive conditionals in which the antecedent refers to a possible (but unlikely) event in the present or in the past. But speakers of Dutch have other constructions available allowing them to express that in the unlikely case that φ *is/was* true, ψ *is/was*

true. In such a case the modal auxiliary *mocht* is often employed.[19] An example is given in (**??**).[20]

(12) *Het lijkt me sterk dat hij wel eens in China is*
It seem.PRS.3SG me strong that he ever once in China be.PRS.3SG
geweest. Maar als hij er ooit geweest mocht zijn, dan
be.PTC but if he there ever be.PTC mocht be.INF then
is hij vast heel snel weer teruggekomen.
be.PRS.3SG he sure very fast again return.PTC
"I doubt he has ever been in China. But if he ever 'might' have been there, he must have come back very quickly."

The auxiliary *mocht* cannnot be used when the antecedent is inconsistent with one's knowledge, as illustrated in (**??**).

(13) *# Als ik jou mocht zijn, dan zou ik bij hem weggaan.*
If I you 'might' beINF, then would I at him go-away.INF
"If I were you, I would leave him."

In Palestinian Arabic the situation is much clearer. Since Palestinian Arabic has morpho-syntactic stacking strategies that allow for the additional expression of real tense, it can express unlikelihood for conditionals pertaining to the future, the present, and even the past.

To express the unlikelihood of a present situation in Palestinian Arabic, one can use the default *if* morpheme *iza* and stack the past tense morpheme *kaan* (in addition to an optional subjunctive morpheme) on top of the present tense verb in a conditional.[21]

(14) ma b-a3raf iza b-iħib is-samak, bas iza
NEG *b*-know.IMPFV.1S if *b*-love.IMPFV.3SM the-fish, but if
kaan-no b-iħibb-o, b-ikuun mkayyef
be.PST.3SM-SUBJNC *b*-love..IMPFV.3SM-it.M, *b*-be.IMPFV.3SM overjoyed
bi-qaryet is-sayyadeen.
in-village the-fishermen
"I don't know if he likes fish, but if he does, he's delighted at the fishermen's village!"

[19]In Flemish *moest* is used rather than *mocht* to do the same job. In English one can use *should* in the antecedent of a conditional to express that the antecedent is unlikely—witness *If I should fall behind, wait for me*, and *If I should leave you, try to remember the good times.* We could not find any examples in which this construction is used to refer to something unlikely in the present or the past, though.

[20]Note that the *mocht* construction has indicative morphology in the consequent.

[21]Arabic has null present tense. Here the verb (consisting of the modal morpheme *b-* and the imperfective stem) gets a default present tense interpretation.

Similarly, Palestinian Arabic has no problem expressing the unlikelihood of a past situation, as one can use the default *if* morpheme *iza* and stack the past tense morpheme *kaan* (in addition to an optional subjunctive morpheme) on top of the past tense verb in a conditional, as exemplified in (**??**).

(15) b-astabʕed inno ykuun daaʔ
b-find.far.IMPFV.1SG SUBJNC be.IMPFV.3SM taste.PST.PFV.3SM
il-herring, bas iza **kaan**-no daaʔ-o, kaan
the-herring, but if PST-SUBJNC.3SM taste.PST.PFV.3SM-it.M, PST
ʔakiid ma ʕaad-ha!
sure NEG repeat.PST.PFV.3SM-it.F
"I doubt that he ever tried herring. But if he did, I'm sure he never did it again."[22]

Clearly then, for Palestinian Arabic expressing the unlikelihood of the antecedent is no problem, whether the antecedent pertains to the past, the present or the future.[23,24]

4 The evaluative force of gradable adjectives

4.1 Relative gradable adjectives

This section is about adjectives G with the following properties.

a. G can be used in comparative form. We write G-*er* for the comparative form of G.
b. G has an antonym, $\breve{G}$, which also has a comparative form, $\breve{G}$-*er*.
c. It is logically possible for something to be neither G nor $\breve{G}$—but something 'in-between'.
d. If the object x is G, then it is logically possible for there to be an object y that is G-*er* than x, and an object z that is less G than x. The same holds for $\breve{G}$.

Adjectives with these properties are commonly called relative gradable adjectives (RGA's). Examples are *tall* with its antonym *short*, and *beautiful* with its antonym *ugly*.

Many adjectives do not have a comparative form or antonym. Think of *daily*, that has neither, or of the pair *digital/analogue*, neither of which has a comparative form. Most adjectives with a comparative form have an antonym. Exceptions

[22]Note that the English paraphrases of (**??**) and (**??**) are in the indicative.

[23]To signal that the antecedent is not just incompatible with one's expectations but known to be false, one has to use the counterfactual *if* morpheme *law* in Palestinian Arabic, and not the default *if* morpheme *iza*.

[24]Much of what has been said in this section is treated in more detail in **?**.

are *angry, jealous* and other adjectives referring to emotional states. The pair *precise/imprecise* shows it is possible to have property (a) and (b) without (c). Adjectives with properties (a) and (b), but lacking property (d) are generally called absolute gradable adjectives. Examples are the pair *open/closed*, that does not have property (c) and the pair *full/empty*, that does.

Relative gradable adjectives are called "gradable" because the qualities they describe can vary in intensity—an object can be a little G, rather G, very G. They are called "relative" because the answer to the question whether an object is G heavily depends on context. One can be tall (for a Chinese man) and short (for a basketball player). What matters is the *comparison class*. One can be ugly (as a dancer) and beautiful (as a singer). What matters is the sort of thing we are talking about.

Relative gradable adjectives give imprecise characterisations. If someone asserts a sentence of the form x is G, one can always ask *How G?*, and then often a more precise characterisation can be given. Strangely enough, the other way around is also possible. Sometimes we have a precise characterisation, but we want to have a vague characterisation, too.

(16) a. Mr. A: *I bought this car for 16.000 euro.*
b. Mrs. B: *That's a lot of money.*
c. Mr. A: *For a three-year-old Volvo V40 with less than 40.000 km on the clock it's cheap.*

What this example shows, is that RGA's are not only used to give a rough estimation of something one would want to know more precisely. In (**??**) something vague is predicated of something more precise. 16.000 euro *is* cheap within the comparison class constituted by the prices of three year old Volvo's with less than 40.000 km on the clock. *Cheap* provides an *evaluation* of the price. (The *normal* price for such a car would be around 20.000 euro.)

The evaluative force of RGA's is particularly clear from their use in exclamatives. Compare:

(17) a. *How cheap that is!*
b. *# How 16.000 euro that is!*

Note how weird exclamatives sound with non-gradable or absolute gradable adjectives.

(18) *#What a digital watch this is!*

(19) *#What a closed door this is!*

The question is how do RGA's get their evaluative force.

4.2 Weak and strong evaluatives

All RGA's are evaluative, but not all in the same the way. One has to distinguish between weakly evaluative and strongly evaluative RGA's. *Tall* is an example of the former, *beautiful* of the latter.

The difference is rooted in the ontological status of the partial ordering underlying the comparative. Take *tall* and its comparative *taller than*. A statement of the form *x is taller than y* is objective. There exists a public, empirical procedure settling the question who is the tallest, x or y. For *beautiful* and its comparative *more beautiful than* no such method exists. The statement *x is more beautiful than y* is no less subjective than the statement *x is beautiful*.

The difference between weak and strong evaluatives clearly shows up in evaluative disagreements.

(20) a. Mrs. B: *16000 euro! That's expensive.*
b. Mr. A: *No, it's not. 16000 euro is way below the normal price.*

Let's assume that it is clear to both Mr. A and Mrs. B what they are talking about and what the comparison class is. Then as soon as they agree on what should count as a normal price within this comparison class, the issue is settled. And this is generally so in evaluative disagreements involving weak evaluatives: given a comparison class C, the question whether *x is G* reduces to the question whether *x is G-er* than elements of C normally are. And the crux is this: as soon as the contestants agree on what counts as normal, this question is a purely factual question.

Evaluative disagreements involving strong evaluatives are much more difficult to settle.

(21) a. Mr. A: *This cake is tasty.*
b. Mrs. B *No, it's not. It's even worse than the one we had last week.*

The point is this: Even if Mr. A agrees that the cake they had last week was no good, he can still maintain that the one they are having now is much better. Settling a disagreement about the question whether *x is G* for G a strong evaluative, is *not* just a matter of agreeing on a standard. What for one agent is tastier than the 'standard of tastiness'—can there be such a thing?—might very well be less tasty than that standard for another. The question whether or not x is tastier than y is not a purely factual question.[25] Trying to agree on a standard only makes sense if the underlying comparative ordering is the same for all parties.

[25]Cf. **?**. The theory presented there works well for weak evaluatives, but not for strong evaluatives.

4.3 Evaluativity and expectations

So, how do RGA's, weak or strong, get their evaluative force?

This is how things fit together for weakly evaluative RGA's: We start out expecting things to be neither G nor $\breve{G}$—that is the normal case. As long as things are normal, they are not worth mentioning—presumably, other people expect the same. We invoke weak evaluatives and their antonyms to signal something exceptional, unexpected, and therefore noteworthy. That is what weak evaluatives are for. That is how their evaluative force comes about. The *G-er* something is, the more surprising for us. The more surprising, the louder our exclamations—*Hey, look how G x is!*[26]

In the case of strong evaluatives things work differently. Here, *normative* expectations play a prominent role. To explain how this works, we have to compare statements of the form *x is G* with statements of the form *I find x G*. While the former may be subjective in some sense of the word, they are certainly not synonymous to the latter, as the next example shows.

(22) a. *This brand of coffee used to be tasty, but it isn't any more.*
b. *I found this brand of coffee tasty, but I don't anymore.*

Example (**??**) suggests that the coffee has changed, (**??**) just that my assessment changed. Apparently, even though *tasty* is strongly evaluative, we think of the coffee's tastiness as something inherent in the coffee.

Usually, somebody who asserts a statement of the form *x is G* also finds *x G*. Actually, in most contexts[27] one cannot sincerely assert *x is G* if one does not find *x G*. You must have read the book, you must have watched the movie, you must have tasted the pie, and you must have found the first beautiful, the second boring, and the third tasty, before you can sincerely say that the book is beautiful, the movie boring and the pie tasty.

For our concerns in this paper, the most important difference between *I find x G* and *x is G* is this: Unlike sentences of the form *I find x G*, sentences of the form *x is G* come with expectations about what other people[28] should find. People whose assessments are unknown to me, in particular the addressee, are expected to find *x G* as well. These expectations have both descriptive and normative side. If I believe that something is beautiful, I believe that you *must* find it beautiful, just like me—and here "must" does not only mean that I will presume that you will find it beautiful, but also that I think you should find it beautiful. If you don't, I will try to change your mind—or rather your 'taste'.

[26] We are not the first to mention expectations in connection with exclamatives. See for example **?**, and **?**.

[27] There are exceptions to this rule. Again, think of asymmetric situations: the teacher talking to her students in example **??**, or you telling your pet that the new brand of cat food is delicious (cf. **?**).

[28] Here, "People" has to be qualified. We do not expect children to find cognac tasty. Also in the asymmetric cases mentioned in footnote **??**, amendments are needed.

The reader may have recognised some of Kant's ideas[29] in the above:

> ... Whether a garment, a house, a flower is beautiful: no one allows himself to be talked into his judgment about that by means of any grounds or fundamental principles. One wants to submit the object to his own eyes, just as if his satisfaction depended on sensation; and yet, if one then calls the object beautiful, one believes oneself to have a universal voice, and lays claim to the consent of everyone...
>
> **?**, §8

We cannot explain here in detail how the above can be modelled formally, but here is an informal outline of the update rule for sentences of the form *x is G*, for *G* a strongly evaluative adjective, just to summarise what has to be formalised.

- *x is G* presupposes that the addressee has tested *x*. (Every strongly evaluative *G* comes with its own test method. In the case of *tasty*, testing amounts to tasting.)
- A necessary condition for the acceptance of *x is G* is that this test had a positive outcome. (If so, the addressee finds *x G*.)
- Accepting the statement *x is G* involves extending the extension of the adjective *G* to the object denoted by *x*. (This relative to the comparison class that might be relevant for the interpretation of the sentence.)
- Accepting the statement *x is G* involves adapting one's expectations so that other people's *G*-test is expected to have a positive outcome. (So that other people are expected to find *x G*).[30]

5 Generic statements

Consider the following argument:

(23)

premise 1	*Tigers have orange-black stripes.*
premise 2	*Shere Khan is a tiger.*
conclusion	*Presumably, Shere Khan has orange-black stripes.*

Everybody who has read Kipling's *Jungle Book*, has been introduced to the tiger Shere Khan. And everybody who has read this book will have done so assuming that Shere Khan has orange black stripes. Yet this is nowhere explicitly mentioned. For all the reader knows, Shere Khan might have some light brown stripes on a near-white coat. Some tigers have that—these so-called white tigers are the result of a recessive mutant gene in the Bengal tiger.

[29] Actually, Kant would not extend what he says about *beautiful* to the case of *tasty*. So we help ourselves from his remarks on *beautiful* and extend them to *tasty*, *pace* Kant.

[30] An extensive discussion of the philosophical aspects of the theory discussed here can be found in **?**. The most recent version of the formal theory is presented in **?**.

Still, if Shere Khan had been one of these white tigers, wouldn't Kipling have told us? White tigers are an exception to the rule, orange-black is the normal case. As we said before, as long as things are normal, they are not noteworthy. Efficient communication is built on the principle that you shouldn't bother your audience with things that are to be expected. One such thing is that Shere Khan has orange-black stripes.

So, it appears that the argument (**??**) is valid, in some sense of the word "valid". If you know that Shere Khan is a tiger, and that tigers have orange-black stripes, you may expect that this also holds for Shere Khan if you have no reason to expect the contrary.

Zoological dictionaries are full of sentences of the form *S's have the property P*—from *Aardvarks have a long thin tongue* to *Zebras have excellent sight and hearing*. Most these so-called generic sentences work as default rules, just like the first premise in (**??**). All of these rules have exceptions, but apparently not enough to make zoologists rewrite their books.

All generic sentences express a generalisation, but it looks like not all of them are equally general. Consider:

(24) a. *Birds can fly.*
b. *Birds lay eggs.*
c. *Dutchmen are good sailors.*

The first thing we learn as children about birds is that they can fly. And as adults, even though we have been confronted with many exceptions to this rule, we still apply this rule to every bird we come across. We expect that it can fly—at least as long as there are no strong reasons to expect otherwise.

The second thing we learn as children about birds is that they lay eggs. It may take a while before we realise that this rule only applies to female birds, but once we have learnt this, we will never, just on the basis of the information that x is a bird, conclude that x presumably lays eggs. Only if we have good reasons to assume that x is female, will we do so.

No child or adult who accepts (**??**) will ever think that this rule applies to all Dutchmen. Somehow we know that (**??**) only licences us to expect a Dutchman to be a good sailor if we have independent reasons to assume that he is a sailor. In other words, all that (**??**) says is that Dutch sailors are good sailors.

The three sentences figuring in (**??**) all have the same syntactic form: *S's have the property P*. Hence, one would think that they have the same logical properties. But the above suggests they don't. It looks like sometimes a sentence of the form *S's have the property P* together with the sentence *x is an S* license the conclusion *Presumably, x has property P*, and sometimes they don't. It looks like the specific contents of the sentences concerned plays a decisive role.

To find our way out here, we have to get a bit more precise. First we lay down how sentences of the form *S's have the property P* affect an agent's intentional

state.

> If a state is updated with the sentence *S's have the property P*, the result is a state in which all objects with property S are expected to have the property P rather than the property *not* P.[31]

Default rules are of crucial importance when some decision must be made in circumstances where the facts of the matter are only partly known. They affect an agent's expectations and as such help to narrow down the range of possibilities an agent has to take into account.

Secondly, we should get to grips with the notion of validity that is at stake here. In all the examples we will discuss, the premises consist of some default rules and some specific information about some object. In all cases we are interested in, the question is what may be expected by an agent who has no other information than what is given by these premises.

Within the framework of update semantics, it is not difficult to formalise this using the notion of a *minimal state*, a state in which the agent has no information at all. In our case, this is the state $\mu = \langle W, W, \emptyset \rangle$, in which every logically possible world can be the real world, and in which no world is more likely to be the real world than any other world. Now, we can model what it is to have no other information than what is given by the premises, and stipulate:

> An argument is μ-valid iff the update of the minimal state μ with the premises is defined, and the result is a state that supports the conclusion. Formally:
>
> $\varphi_1, \ldots, \varphi_n \models_\mu \psi$ iff $\mu[\varphi_1] \ldots [\varphi_n]$ is defined and $\mu[\varphi_1] \ldots [\varphi_n] \models \psi$.

Case 1: Imagine an agent who has accepted the rule *S's have the property P*, and suppose that all s/he knows about a certain object x is that *x is an S*. The result of updating the minimal state with these premises will be a state in which the worlds that are most in line with the agent's expectations are worlds in which x has property P. So, the agent concludes *Presumably, x has property P*.

Case 2: Imagine an agent who accepts the following three rules:

(25)

premise 1	*S's have property P.*
premise 2	*M's have property S.*
premise 3	*M's do not have property P.*

Suppose that on top of this the agent knows that *x is an M*. In this case the agent may conclude: *Presumably, x is an S, but x does not have the property P.*

To see how this comes about, it helps to think of default rules as some kind of normative rules—as if the expectations they induce were normative rather

[31] This is not very precise. For a precise definition see **?**.

than descriptive. Think of the premise *S's have the property P* as an obligation imposed on the *S's*—they are expected to have the property *P*. Then the premise *M's do not have property P* can been seen as an exemption clause in which an exception is made for the *M's*. *M's* are expected to be *S's* but unlike ordinary *S's* they are not expected to have the property *P*. They are not subjected to this rule. Actually, for them the opposite holds.

Here is a concrete example.

(26)

premise 1	*Birds can fly.*
premise 2	*Penguins are birds.*
premise 3	*Penguins cannot fly.*
premise 4	*Tweety is a penguin.*
conclusion	*Presumably, Tweety is a bird that cannot fly.*

There may be a difference between normative and descriptive expectations, but they come with the same logic. Given premise 2, premise 3 is an exception clause to premise 1. This means that only the rules in premise 2 and premise 3 apply: in the worlds that are most in line with the agent's expectations, Tweety is a bird but Tweety cannot fly. Hence the agent concludes by default that Tweety cannot fly.

Case 3: This case is the same as the above, but now the agent does not know that x is a penguin. Instead s/he believes that x *may* be a penguin.

(27)

premise 1	*Birds can fly.*
premise 2	*Penguins are birds.*
premise 3	*Penguins cannot fly.*
premise 4	*Tweety is a bird.*
premise 5	*Tweety may be a penguin.*

The agent thinks that Tweety may be a penguin. This means that in some of the worlds that are most in line with the agent's expectations, Tweety is a penguin. Given that the rule that birds fly does not apply to penguins—while both the other rules do—these will be worlds in which Tweety cannot fly. Hence the agent is not allowed to conclude that it is likely that Tweety can fly.

(Premise 5 does not just say that given what the agent *knows*, the possibility is not excluded that Tweety is a penguin. It says something stronger, the agent may *expect* that Tweety is a penguin. It is a possibility s/he has to reckon with. If the premise had just stated that Tweety *might* be a penguin the agent could have seen it as a possibility so unlikely that one does not have to take it into account.)

We are now in a position in which we can understand why we do not infer from the premises *Birds lay eggs* and *Tweety is a bird* that it is likely that Tweety lays eggs. Actually, if the only thing we knew about birds and about Tweety was just this, and maybe also that birds can fly—as was possibly the case at some point

in our childhood—, then it would follow. But now we know much more, and this should also be taken into account:

(28)

premise 1	*Birds lay eggs.*
premise 2	*Male birds are birds.*
premise 3	*Male birds do not lay eggs.*
premise 4	*Tweety is a bird.*
premise 5	*Tweety may be a male bird.*

Notice that the premises of (**??**) have the very same form as the premises of (**??**). In the case of (**??**) it was not μ-valid to conclude that Tweety can presumably fly. In the case of (**??**) it is not μ-valid to conclude that Tweety presumably lays eggs.[32]

This example shows that in dealing with a non-monotonic notion of validity, one must be very careful when it comes to judging the 'intuitive' validity of an argument. One must be sure that the premises faithfully represent everything that may be relevant to the conclusion, because in a non-monotonic logic adding premises can turn a valid argument into an invalid argument. *Birds lay eggs* and *Birds can fly* have the same logical properties. The reason why we are ready to infer that Tweety can fly from the premise *Tweety is a bird* and the rule *Birds can fly* is because nothing that we know about birds forbids this. But as we have shown in the case of *Birds lay eggs* there is a lot more to take into account. When we made this explicit in by adding premise 2, 3, and 5, we could no longer infer that Tweety presumably lays eggs.

More importantly, this example also shows that one cannot judge the acceptability—or the truth—of a generic sentence in isolation. The rule *Birds lay eggs* is acceptable despite the fact that at least half of all birds never lay an egg, because we know so many other things about birds and about laying eggs, all of which plays a role when we reason about particular birds. All these rules taken together enforce that the rule *Birds lay eggs* is only applicable in cases in which we are dealing with female birds. If the sentence *Birds lay eggs* deserves the truth value True, its truth is certainly a matter of coherence.

Let's now take a closer look at example (**??**): *Dutchmen are good sailors.* How come that it does not follow from this sentence that Dutchmen are sailors? How come this sentence is about Dutch sailors rather than Dutchmen in general?

Below, we will show that *Dutchmen are good sailors* means the same as *Dutch sailors are good sailors.*

The key is in the relative gradable adjective *good.*[33] This adjective has the property that a sentence of the form *x is a good P* presupposes the sentence *x is*

[32] A nice exercise is now to explain how *Lions have manes and give birth to live young* can be acceptable even though no single lion does both.

[33] What we say here about "good" only scratches the surface. See **?**, in particular section 9.2, for a thorough analysis.

a P. The reason for this is that *x is good* needs for its interpretation something that *x* can be good at. Being a good cook, being a good mathematician, being a good piano player, each of these properties *P* comes with its own criteria for being a good *P*, and thus each gives different directions for interpreting *good*. An agent cannot interpret the adjective *good* if it is not clear which property *P* is at stake. That is why *x is a good P* presupposes that *x is a P*.[34] Given that *x is a good sailor* presupposes *x is a sailor*, it follows that *x is not a good sailor* implies *x is a sailor*.

Now, recall the update rule formulated above: If a state is updated with the sentence *S's have property P*, the result is a state in which all objects with property *S* are expected to have the property *P* rather than the property *not P*. In the case of *Dutchmen are good sailors*, this operation leads only to changes of the agent's expectations about Dutch sailors, not about other Dutchmen, because *S's* that do have the property *P* are in this case Dutchmen that are good sailors, and the *S's* that do not have the property *P* are Dutchmen that aren't good sailors—in both cases it concerns sailors. Therefore, updating one's state with the sentence *Dutchmen are good sailors* leads only to a change of one's expectations about Dutch sailors, not about Dutch non-sailors. In other words, the result of updating a state with the rule *Dutchmen are good sailors* is the same as the result of updating a state with the rule *Dutch sailors are good sailors.* Q.E.D.

6 For further discussion

Consider the following sentences:

(29)
- *Boys don't cry.*
- *Friends don't let friends drive drunk.*
- *Mothers don't jump off buildings.*[35]

Somehow these sentences express a norm. Boys shouldn't cry, friends shouldn't let their friends drive drunk, mothers shouldn't jump off buildings. Recently, several philosophers have raised the question how these sentences acquire their normative impact.[36] How can what is statistically normal become the norm?

Here, expectations provide the connecting link. As discussed in section **??**, expectations can be descriptive or normative. The generic sentences discussed in the previous section express descriptive expectations. The generic sentences cited

[34]There are more adjectives that have the property that *x is a G P* presupposes that *x is a P*: *skilful*, *talented*, and all other adjectives that can be combined with an adverbial phrase starting with *as*—skilful *as* a carpenter, talented *as* an actor, good *as* a cook. See **?** for further discussion.

[35]This is the title of documentary directed by Elena Lindemans about requests for medically-assisted rational suicide.

[36]What we have to say about this question is meant as a note to what Sara-Jane Leslie and Sally Haslanger wrote about it. See in particular **?** and **?**.

above express normative expectations. As we already hinted at in the previous section, they come with the same logic. The step from *Boys don't cry* as a descriptive generalisation to *Boys don't cry* as a normative rule is not that big. If a mother reminds her son, who is on the verge of tears, that boys don't cry, she expects him not to start crying. It hardly matters whether these expectations are induced by a descriptive or a normative rule—in either case she'll be equally disappointed if he bursts into tears anyway.

One thing we do not know is what is the best way of modelling here: Keep descriptive and normative expectations apart, or treat them as one thing. So far we used the phrase "mixed up" for the latter, but perhaps it should just be "mixed". It does not look too far-fetched to assume that our distant ancestors made no difference between normative laws and descriptive laws. Both were imposed by the gods, the first on human beings, the second on nature.[37] That is a rather primitive way of thinking, but maybe it is part of the conceptual scheme that our language is built on. If so, it is better to work with one kind of expectations, fed by natural laws and descriptive laws alike.

A final point concerns the term "expressivist". We have tried to show that one cannot explain the meaning of generic sentences, relative gradable adjectives, and weak subjunctive conditionals without explaining how they affect people's expectations. Or to use a phrase of Alan Gibbard, we "explain[ed] the meaning of these terms by saying what state of mind they express."[38] Maybe that is a good reason to call our theory expressivist. We do not object, provided it is clear that the kind of expressivism at stake here has little in common with expressivism *à la* Ayer. Most importantly, the expectations involved are often open to rational justification and refutation. We think it is justified to expect a tiger to have orange-black stripes. We even think that sentences containing evaluative adjectives—weakly evaluative and strongly evaluative—are open to justification and refutation. We can imagine that the reader disagrees, in particular when it comes to strong evaluatives. However, this is not the place to discuss this issue. What matters here, is that this issue is independent from our "expressivist" take on the semantics of these adjectives.

Moreover, the kind of expressivism at stake here does not suffer from the Frege-Geach problem. Even though we do not assign truth values to sentences, in most cases there is enough (Boolean) structure available in our states to let negation, conjunction and disjunction do their job. Admittedly, in some cases the theory predicts that it is impossible to put a negation in front of a given sentence, or to connect two sentences by a disjunction. But rightly so. Take for

[37] A few years before the condemnation of the Copernican doctrine by the church Galileo wrote the following in a letter to Castelli (1613): "The Holy Writ and Nature both originate in the Divine Word, the former as a dictation of the Holy Ghost, the latter as *an executor of God's orders*." (the italics are ours). See **?** for many more examples.

[38] See **?**, p 8. Gibbard was mainly thinking of normative language. Yalcin suggested to use the term "expressivism" in a broader context. See in particular **?** and **?**.

example, sentences starting with *presumably*. Try to fill the dots, so that the result makes sense.

(30) *Presumably . . . , or presumably . . .*

One does not find such disjunctions in the wild. But if you assign truth values to sentences starting with *presumably*, there should be nothing wrong with them. So, there is a converse Frege-Geach problem for the non-expressivists here. Given that their theory predicts that such disjunctions make perfect sense, what's so odd about them?

Acknowledgement. We want to thank Nicholas Asher, Derek Ball, Cleo Condoravdi, Thony Gillies, Simon Goldstein, Sabine Iatridou, Josep Quer, Floris Roelofsen, Robert van Rooij, Martin Stokhof, and Hedde Zeijlstra for their helpful questions and comments.