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Easy Foreknowledge

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Abstract: This essay introduces and examines the phenomenon of *easy foreknowledge*, cases in which one knows, at an initial time t , that it will be that ϕ , but one does not know, at a later time t' , that it is or was that ϕ , despite no change in one's relevant evidence. I first argue for the existence of such cases on the basis of facts about assertion, and then argue that such cases involve *knowledge loss*: they are cases in which one knows a proposition initially, but one loses that knowledge, despite no change in one's relevant evidence. I then use the phenomenon of easy foreknowledge to motivate a relevant alternatives theory of knowledge in which the notion of a *sufficiently normal future* is used to constrain the possibilities relevant for assessing knowledge attributions.

1 Introduction

We normally think that our knowledge of the past and present is more secure than our knowledge of the future. It is easier to know who won last night's game than it is to know who will win tomorrow's. Of course, knowledge of the distant past is often difficult to obtain, but knowledge of the distant future is arguably even further beyond our grasp. Perhaps this asymmetry stems from the fact that the past and present are settled, while the future is open, as Aristotle thought. Or perhaps it arises because our beliefs about the future are more likely to be based on induction, whereas our beliefs about the past and present may be based on some combination of perception, memory, and testimony. But whatever the source, there does seem to be an asymmetry between how we regard knowledge of the past and present, on the one hand, and knowledge of the future, on the other. It is no accident that history is the site of serious scholarship while futurology is for cranks.¹

Given these observations, it is somewhat surprising to learn that there are cases that seem to pull in the opposite direction, cases in which it appears easier to know that it will be that ϕ than it is to know (at a later time) that it is or was that ϕ . Here, arguably, is one such case:

¹Of course, meteorologists and psephologists attempt to predict the arrival of rain and the outcome of elections, respectively, with about equal success. But, again, it easier to know that it rained yesterday than that it will rain tomorrow, and easier to know who won the last election than who will win the next.

Beth case

Andy is a personal chef to a wealthy entrepreneur, Beth. Andy is making a new dish for Beth's dinner tonight (suppose it is a Friday). Based on his knowledge of the sorts of foods that Beth usually likes, Andy says to his friend Chris,

- (1) Beth will like this when she eats it.

Andy finishes preparing the dish, and heads home for the night, before Beth gets back from work to eat dinner. When Beth returns, she eats the dish Andy has prepared, and thoroughly enjoys it.

The next morning (Saturday), one of Andy's friends asks Andy, *Did Beth enjoy the dish you made for her yesterday?* Andy hasn't heard from Beth or anyone else whether or not she enjoyed the dish.

I think it would seem odd here for Andy to flat-out assert that Beth liked the dish, i.e. to say,

- (2) Yes, she liked it.

In order to make that claim, Andy would need to be more directly connected to the fact that Beth enjoyed the dish in question. For example, Andy would need to have been told by Beth or someone else that she did in fact enjoy the dish. Absent evidence of that sort, it would be better for Andy to hedge in some way, i.e. to say one of the following:

- (3) She probably liked it.
- (4) She must have liked it – it was just the sort of thing she usually likes.²

Of course, this case concerns, in the first instance, what Andy is in a position to *assert*, rather than what he *knows*. But I shall be maintaining that Andy knows, on Friday afternoon, that Beth will like the dish in question, but that he is not in a position to know, on Saturday morning, that she did like it. In other words, I shall be maintaining that this is a *case of easy foreknowledge*, a case in which an agent knows, at an initial time t , that it will be that ϕ , and then is not in a position to know, at a later time t' , that it is or was the case that ϕ , despite not gaining or losing any relevant evidence between t and t' .³

In Sections 2 and 3, I argue for two theses. The first is the one just mentioned: there are cases of easy foreknowledge, the Beth case being one such case (Section 2.1). The second thesis is that cases of easy foreknowledge are cases of *knowledge loss*, cases in which there is a proposition that an agent knows at one time, and is not in a position to know at a later time (Section 2.2). Although this might

²This case was first discussed in AUTHOR (XXb).

³Here, and in what follows, I assume that ϕ is a sentence that is true just in case a certain event occurs at a time t'' such that $t < t'' \leq t'$.

seem to say no more than the first thesis, this is not so, as we shall see. In particular, defending the second thesis requires rejecting some prominent views of the semantics of future operators (Section 3).

If my case for these two theses is accepted, then it would seem that one can lose knowledge simply by moving through time, i.e. without gaining or losing any relevant evidence. But of course this raises a natural question: why, in cases of easy foreknowledge, do the relevant agents lose knowledge? Why, for example, does Andy know, on Friday, that Beth will like the dish, and then not know, on Saturday, that she did like it? I take up these questions in Section 4. I first argue that the concept of knowledge is *time-sensitive* in a particular way (Section 4.1), and then propose a way of modeling this feature of knowledge within the relevant alternatives framework. The novel feature of my proposal is the way in which the notion of a *sufficiently normal future* is used to constrain which possibilities are relevant for assessing knowledge attributions (Sections 4.2–4.3).

2 Easy foreknowledge

2.1 Knowing and asserting

The phenomenon exhibited by the Beth case is quite general. In many cases, an assertion about the future cannot be reiterated (adjusting for tense) at a later time unless the speaker obtains more evidence in the meantime. Here is another example:

Rain case

It's Friday. Ellen has been visiting her friend Frank in Chicago for the last few days, but the visit is over and he is driving her to the airport. He's telling Ellen about a big outdoor concert he's planning to attend tomorrow, but he's worried about the weather. He asks Ellen if she can check the forecast. Ellen looks on her phone, and says,

(5) Bad news – it's going to rain tomorrow.

Frank replies, *Oh, that's too bad.* Ellen catches her flight back to Boston.

It does indeed rain all weekend in Chicago, and Frank's concert gets cancelled.

On Monday, Ellen goes to work and bumps into a co-worker who is also a friend of Frank's. The co-worker also knew about Frank's plan to attend the concert, but he hasn't yet heard whether or not it was cancelled. He asks Ellen what the weather in Chicago was like on Saturday. Ellen hasn't heard from Frank or anyone else what the weekend in Chicago was like.

Again, it seems to me that it would be inappropriate for Ellen to flat-out assert that it rained on Saturday in Chicago, i.e. to say to her co-worker:

(6) Unfortunately, it rained in Chicago on Saturday.

This is so even if she makes it clear what her evidence for that assertion is. If she wants to make a comment about what the weather was like in Chicago over the weekend, she needs to make a hedged assertion, e.g.:

(7) It was supposed to rain on Saturday.

But while the phenomenon here is quite general, I should emphasize that my first thesis is an existential, not a universal, claim. I am not claiming that any case in which (i) one knows, at an initial time t , that it will be the case that ϕ , and (ii) one does not gain or lose any relevant evidence between t and later time t' , is a case in which (iii) one is not in a position to know, at t' , that it is or was the case that ϕ . I am merely claiming that there cases in which (i), (ii), and (iii) all hold. The universal claim is false, a point that I return to later (see Section 4.3).

Returning to the Beth case, suppose that my claims about what Andy is in a position to assert are correct. Suppose further that assertions are subject to the following norm: one must assert p only if one knows p . Then a natural explanation of these claims about assertion is this. On Friday afternoon, Andy is in a position to assert that Beth will like the dish because he knows, on Friday afternoon, that she will like the dish. On Saturday morning, Andy is not in a position to assert that Beth liked the dish because he is not in a position to know, on Saturday morning, that she liked the dish. If this explanation is correct, then my first thesis follows, at least assuming that Andy hasn't gained or lost any relevant evidence.

The view that knowledge is the norm of assertion view is most closely associated with Williamson (1996, 2000), who takes this norm to be *constitutive* of the speech act of assertion.⁴ But we need only assume that assertion is (necessarily) governed by this norm; we needn't assume that the norm plays a role in individuating the speech act of assertion. Following Gazdar (1979, §3.2), we might regard the norm as one way of construing Grice's Maxim of Quality (Grice 1989). Even with that caveat, the knowledge account of assertion is not entirely uncontroversial.⁵ It would take us too far afield to defend it in detail here, but let me make a couple of pertinent points.

Anyone who denies that knowledge is the norm of assertion should still accept the idea that assertion is subject to some sort of epistemic norm; surely there is something objectionable about baselessly asserting claims that happen to be true. For example, while Lackey (2007) denies that knowledge is the norm of assertion, she nevertheless maintains that assertion is subject to the following

⁴See also Unger (1979).

⁵Influential criticisms of it may be found in Weiner (2005) and Lackey (2007).

rule: one must assert p only if it is reasonable for one to believe p . That will not underwrite my first thesis, but it will yield a parallel claim: there are cases in which it is reasonable for one to believe that it will be the case that ϕ at time t , but not reasonable for one to believe that it is or was the case that ϕ at later time t' , despite the fact that one's relevant evidence doesn't change between t and t' . That claim is similarly interesting, and, I would argue, would support an analogue of my second thesis, so that in cases like the Beth case, the agent loses a reasonable belief despite not gaining or losing any relevant evidence. A parallel question would arise as to how this is possible, and the discussion that occurs later in this essay (Section 4) might well be relevant to that question.

It is sometimes suggested that assertions about the future are particularly problematic for the knowledge account of assertion. For example, Weiner (2005) uses such assertions to cast doubt on the knowledge account. Besson and Hattiangadi (2019), on the other hand, suggest that what norm governs assertion might vary with context (following Goldberg 2015, Ch. 10). They go on to suggest that, in the Beth case, it may be that the knowledge norm is not in effect in Andy's Friday afternoon context, but then *is* in effect in his Saturday morning context. Together, these claims might help to explain why Andy can assert, on Friday afternoon, that Beth will the dish, but then cannot assert, on Saturday morning, that she did like it.

These approaches must contend with the fact that, even when ϕ contains a future operator, sentences of the form ϕ and *I don't know that* ϕ are still infelicitous (Benton 2011). Note, in particular, that the following are both odd in the way Moore-paradoxical sentences usually are:

- (8) Beth will like this, but I don't know that she will like it.
- (9) It is going to rain tomorrow, but I don't know that it is going to rain tomorrow.

That Andy, for example, cannot utter (8) on Friday afternoon suggests that the knowledge norm is in effect even in his Friday afternoon context.

I have sometimes encountered the suggestion that in the Beth case Andy is not *really* asserting that Beth will like the dish when she eats it, but merely that she will *probably* like the dish when she eats it.⁶ Similarly, Ellen is not really asserting that it will rain on Saturday, but only that this is probable. Even assuming the knowledge account of assertion, this dissolves the puzzle, since there is nothing puzzling about knowing, at one time, that something is likely to happen, and then not knowing, at a later time, that it did happen.

I think there is *something* right about this idea, and I shall try to say what that is later in the essay (Section 4.2). But as it stands, this approach does not seem that promising to me. Anyone who takes this line owes us some account of why, when we seem to say that something will be the case, we really only

⁶Thanks to NAME DELETED for raising this issue in discussion. MacFarlane (2014, 230-231) makes a similar suggestion in a slightly different dialectical context. MacFarlane also floats the idea that typical utterances of sentences of the form *will* ϕ are intended to convey that *it will be that* ϕ , provided that certain normal conditions obtain.

say that it is likely to be the case, but when we say that something was the case, we make a claim about how things really were, not merely about how likely it is that they were a certain way. If claims about the past were not standardly interpreted categorically, then it would be mysterious why Andy is not in a position on Saturday to say that Beth liked the dish, given that he is in a position to say that she *probably* liked it. So for some reason, apparently categorical claims about the future are really implicitly probabilistic, whereas apparently categorical claims about the past are what they seem to be. Why is this?

But even if we set that question aside, this line of argument remains doubtful. In the Rain case, Ellen says, *It's going to rain tomorrow*. Suppose Frank then asks whether Ellen would like to bet on whether what she said is true, and Ellen agrees to the bet. If what Ellen said is true, Frank pays her \$10; if what she said is false, Ellen pays Frank \$10. Ellen does not win the bet by simply pointing out that it is likely to rain tomorrow. She wins the bet only if it does rain tomorrow (cf. Prior 1976, 320). That suggests that the content of her assertion is categorical, not implicitly probabilistic.

2.2 Knowledge loss

The second thesis of this section is that that cases of easy foreknowledge are (necessarily) cases of *knowledge loss*, cases in which there is a proposition p that the agent knows at one time and then is not in a position to know at a later time. We get an argument for this thesis from the first thesis if we make some standard assumptions about the crucial sentences that appear in the Beth case.

But before I get to that argument, let me make some stipulations about the Beth case that will help to facilitate our discussion. Assume that Andy's initial utterance of (1), *Beth will like this dish when she eats it*, takes place at 4pm on Friday. And, for the sake of ease, assume that Andy knows throughout the case that Beth eats the dish in question at 7pm on Friday. So his initial utterance of (1) is essentially equivalent to *Beth will like the dish at 7pm*, in the sense that he is in a position to assert the latter just in case he is in a position to assert the former. Finally, assume that the time on Saturday morning at which Andy's friend asks Andy whether Beth liked the dish is 9am. Given these assumptions, we have the following summary of the Beth case:

Friday 4pm: Andy can say, *Beth will like the dish at 7pm*.

Friday 7pm: Beth eats and enjoys the dish in question.

Saturday 9am: Andy can't say, *Beth liked the dish at 7pm*.

My second thesis implies that there is a proposition p such that Andy knows p at 4pm on Friday, but is not in a position to know p at 9am on Saturday. My argument for this claim relies on three assumptions. The first assumption is that propositions – the objects of assertion and knowledge – do not vary in truth value over time; propositions are *tenseless* or *eternal*. I will return to

discuss this assumption presently, but let us simply accept it for the time being. We will additionally suppose that a proposition may be identified with a set of possible worlds. This assumption is mainly for convenience, since it makes it easier to connect the notion of a proposition with standard semantic theories of tense. The discussion in this section could equally well be carried out by taking propositions to be structured entities that are more fine-grained than sets of possible worlds, so long as these structured entities do not vary in truth value over time.

Second, we shall make what I take to be fairly standard assumptions about the meaning of the sentence *Beth liked the dish at 7pm*. In particular, I assume that, given a standard semantic theory of past tense and temporal adverbials, we may associate that sentence, considered at 9am on Saturday, with the following proposition:

$$\{w : \text{Beth likes the dish at } f_7 \text{ in } w \text{ and } f_7 < s_9\}$$

(We use “ f_7 ” to abbreviate “7pm on Friday” and “ s_9 ” to abbreviate “9am on Saturday,” etc..) That is, I assume that a standard theory of past tense and temporal adverbials is compatible with the claim that the above proposition is the assertoric content of *Beth liked the dish at 7pm* relative to the context Andy occupies at 9am on Saturday morning.⁷

So the sentence *Beth liked the dish at 7pm*, considered on Saturday at 9am, essentially carries two pieces of information: (i) the (tenseless) proposition that Beth likes the dish at 7pm on Friday, and (ii) the proposition that Friday 7pm is earlier than the time of the context (Saturday 9am). I’m going to mostly ignore the second of these two propositions, which simply relates the event time to the context time, and focus on the first. The first tells us something about the world, namely that Beth likes the dish at 7pm. Let us call this proposition “ β ,” and agree to represent it as follows:

$$\beta := \{w : \text{Beth likes the dish at } f_7 \text{ in } w\}$$

The third assumption of my argument is that future operators are essentially tenses. According to this approach, the content Andy’s utterance, on Friday afternoon, of *Beth will like the dish at 7pm* is the following proposition:

$$\{w : \text{Beth likes the dish at } f_7 \text{ in } w, \text{ and } f_7 \geq f_4\}$$

⁷If we are content to waive some of the compositional complexities that temporal adverbials like *at 7pm* raise (Dowty 1982), then we can represent *Beth liked the dish at 7pm* as follows:

PAST- f_7 (Beth likes the dish)

And we can offer the following semantics for this operator:

$$[\text{PAST-}f_7 \phi]^{c,w,t} = 1 \text{ iff } f_7 < t \text{ and } [\phi]^{c,w,f_7} = 1$$

If we adopt the following definition of assertoric content, we obtain the result mentioned in the text:

The assertoric content of ϕ at c is $\{w : [\phi]^{c,w,t_c} = 1\}$

See AUTHOR (XXa) on the notion of assertoric content.

So Andy's utterance of *Beth will like the dish at 7pm* essentially carries two pieces of information: (i) the proposition that Beth likes the dish at 7pm on Friday, and (ii) the proposition that Friday 7pm is no earlier than the utterance time (Friday 4pm).⁸ The first proposition here is of course just β . So on this approach, *Beth will like the dish at 7pm* considered at 4pm on Friday, and *Beth liked the dish at 7pm* considered at 9am on Saturday, are equivalent, *modulo* the information they contain about how the utterance time relates to the time of Beth's eating.

So, since Andy is in a position to say, *Beth will like the dish at 7pm* at 4pm on Friday, he must know the proposition that sentence expresses at that time, given the knowledge account of assertion. It is short step from this to the claim that he knows β at 4pm on Friday, since β is a trivial consequence of the proposition that that sentence expresses at 4pm on Friday. Now assume that Andy knows, at 9am on Saturday, that 7pm on Friday is earlier than the time at which he is located (9am on Saturday). Then since Andy is not in a position to say, *Beth liked the dish at 7pm*, at 9am on Saturday, a natural explanation of this is that he is no longer in a position to know β at 9am on Saturday morning. At least, this is natural, given our assumption that knowledge is the norm of assertion.

So an instance of our second thesis follows: there is a proposition that Andy knows on Friday afternoon, but is not in a position to know on Saturday morning, despite his not gaining or losing any relevant evidence. The proposition in question is β , the tenseless proposition that Beth likes the dish at 7pm. Of course, this is just one case, and the second thesis concerns what happens in all cases of easy foreknowledge. But the argument above is fairly general, turning mainly on general assumptions about the nature of propositions and the semantics of tense. So it seems safe to conclude that it generalizes to establish that our second thesis follows from our assumptions.

Temporalists – philosophers who hold that propositions may vary in truth value over time – will take issue with my assumption that propositions are eternal. My reason for assuming eternalism is simply that we are interested in comparing what an agent knows or is in a position to assert at various points in time. Such discussions are more easily carried out assuming eternalism, for then they simply reduce to questions about which propositions the agent knows or is in a position to assert at various times. Temporalism complicates the matter, since if temporalism is true, “losing knowledge,” in the intuitive sense, can’t simply be a matter of knowing a proposition at one time and then failing to know it at later time. I know that it’s Thursday today; let p be the object of my knowledge. If temporalism is true, p will be false tomorrow, and so will not be

⁸This result is obtained via three assumptions. First, represent *Beth will like the dish at 7pm* as follows:

$$\text{FUT-}f_7 \text{ (Beth likes the dish)}$$

Second, adopt the following semantics for FUT- f_7 :

$$[\text{FUT-}f_7 \phi]^{c,w,t} = 1 \text{ iff } f_7 \geq t \text{ and } [\phi]^{c,w,f_7} = 1$$

Third, adopt the definition of assertoric content mentioned in footnote 7.

known by anyone tomorrow. So there is something that I know now, but won't know tomorrow. But it doesn't follow that I will have "lost my knowledge" in any intuitive sense; the case is compatible with the possibility that I keep track of time perfectly.

This is not to say that temporalism is false. But if temporalism is tenable, its advocates will have to eventually give us some sort of story about what it is, according to them, for an agent to retain or lose knowledge over time. And once they tell us that story, we could likely restate our second thesis in temporalist-friendly terms.

3 The semantic view

3.1 Future operators as epistemic modals

A more serious challenge to my argument for my second thesis, the claim that cases of easy foreknowledge are case of knowledge loss, challenges my assumption about the meaning of the future oriented sentence *Beth will like the dish at 7pm*. One reason to doubt the account of future operators assumed in the previous section is that future operators exhibit some of the behavior characteristic of *modals* – epistemic modals in particular. This seems potentially relevant in the present context, since it is often observed that the epistemic modal *must* has a weakening effect, in that it is sometimes easier to assert *must* ϕ than it is to flat-out assert ϕ .⁹ Perhaps *will* is similar in this respect, and perhaps this helps to account for our puzzle.

One piece of evidence that suggests that *will* is a modal is that there are non-future uses of *will* that have an "epistemic feel" to them (Palmer 1986, Enç 1997, Winans 2016, Cariani and Santorio 2018). Consider:

- (10) John will be in Paris now.

This sentence implies that John is in Paris *now*, not (merely) that he will be there at some future time. Of course, that by itself wouldn't show that *will* is a modal, for it could equally well be explained by the hypothesis that *will* ϕ is true just in case ϕ obtains *no earlier than* the evaluation time. But Cariani and Santorio (2018, 133) point out that the use of *will* here has an evidential aspect, since it appears to indicate the the speaker is *inferring* John's location from her evidence.¹⁰ They point out that it would be odd to use (10) if, for example, one had just seen John in Paris.

There is further evidence for the claim that future operators like *will* possess an epistemic aspect to their meaning,¹¹ but let us skip over it to consider what

⁹We in effect noted this our description of the Beth case in Section 1. For another example, see AUTHOR (XXb). It is not clear how to square these observations with arguments that seem to show that *must* is "strong" in the sense that *must* ϕ entails ϕ . See von Fintel and Gillies (2010), Lassiter (2016), Goodhue (2017), and Mandelkern (2019) for discussion.

¹⁰See Winans (2016) for a discussion of the sort of inference associated with non-future uses of *will*.

¹¹See Klecha (2014) and Cariani and Santorio (2018) for details.

this hypothesis might mean for the phenomenon we are investigating. The claim that there is an “epistemic aspect” to the meaning of future operators is an inexact one, and there may be more than one way of precisifying it. Here, I consider two closely related ways of making sense of this idea that can be found in the literature. They treat *will* as a modal operator that quantifies over future possibilities of a certain kind.

To introduce the sort of proposal I have in mind, let us begin with this notion of a *future possibility* (sometimes called a *branching possibility* or a *historical possibility*). Given a possible world w and a time t , a world w' is a *future possibility with respect to w and t* just in case w' is exactly like w up until (and including) t ; w and w' may diverge thereafter. As Lewis (1979) puts it, w and w' “match perfectly in matters of particular fact” up until t . We may require other similarities to hold between w and w' , but we won’t go into more detail on the notion of a future possibility here – I assume the basic idea is familiar enough to the reader.¹² But I assume that the relation \approx_t that w bears to w' just in case w' is a future possibility with respect to w and t is an equivalence relation (it is reflexive, symmetric, and transitive).

The views I want to consider are ones on which *will* quantifies over a distinguished subset of future possibilities, namely those that are *sufficiently likely* (Kaufmann 2005) or *sufficiently normal* (Copley 2009). These are two different proposals: according to the first, *will* quantifies over the future possibilities that are sufficiently likely, and according to the second, over the future possibilities that are sufficiently normal. But the differences between these views will not concern us for the moment, for the main structural feature they have in common is that the actual world need not be amongst the worlds over which *will* quantifies. It is this feature of these accounts that opens up the possibility of a certain kind of explanation of what’s going on in cases of easy foreknowledge.

Let $F_{w,t}$ be the set of future possibilities with respect to w and t . Let $N(F_{w,t})$ be the subset of $F_{w,t}$ that includes all and only the elements of $F_{w,t}$ that are sufficiently likely or sufficiently normal (depending on which theory we are considering). Then although $w \in F_{w,t}$ (since w is just like w up until t), it need not be the case that w is an element of $N(F_{w,t})$. This could happen if something unlikely or abnormal happens after t in w .

We needn’t enter too far into the compositional mechanics of these views. We need only assume that the semantics yields the result that Andy’s utterance at 4pm on Friday of *Beth will like the dish at 7pm* is associated with following proposition:¹³

¹²In a more formal treatment, we might require that $w \approx_t w'$ only if: ϕ is true at t' in w iff ϕ is true at t in w' , for all atomic sentences ϕ and all times $t' \leq t$. See, for example, Montague (1974), Thomason (1984, 146) and MacFarlane (2014, 203).

¹³Suppose we represent *Beth will like the dish at 7pm* as follows:

FUT- f_7 (Beth likes the dish)

and then give the following semantics for FUT- f_7 :

$\llbracket \text{FUT-}f_7 \phi \rrbracket^{c,w,t} = 1$ iff $f_7 \geq t$ and $\forall w' \in N(F_{w,t}) : \llbracket \phi \rrbracket^{c,w',f_7} = 1$

Then we obtain the desired result if we adopt the definition of assertoric content presented in footnote 7.

$$\{w : \forall w' \in N(F_{w,f_4}) : \text{Beth likes the dish at } f_7 \text{ in } w', \text{ and } f_7 \geq f_4\}$$

So, as before, Andy's utterance carries two pieces of information: (i) the proposition that in all sufficiently normal/likely post- f_4 future possibilities, Beth likes the dish at 7pm on Friday, and (ii) the proposition that Friday 7pm is no earlier than the utterance time (Friday 4pm). Let's call this first proposition " α "; so we have:

$$\alpha := \{w : \forall w' \in N(F_{w,f_4}) : \text{Beth likes the dish at } f_7 \text{ in } w'\}$$

Note that, given that β is the proposition that Beth likes the dish at f_7 , we also have:

$$\alpha = \{w : \forall w' \in N(F_{w,f_4}) : w' \in \beta\}$$

For a proposition p is true at a world w iff $w \in p$, and β is true at a world w just in case Beth likes the dish at f_7 in w .

Note how this theory of *will* compares with the one discussed in Section 2.2. On both views, Andy's utterance carries the information that the time of Beth's eating is no earlier than the utterance time. The views differ only on what these utterances "say about the world." In particular, according to the theory of Section 2.2, Andy's utterance carries the information β that Beth likes the dish at 7pm. On the present theory, his utterance instead carries the information α that in all sufficiently normal/likely post- f_4 future possibilities, Beth likes the dish at 7pm. Note that α does not entail β , a point to which we shall return.

This approach yields the following account of the Beth case. At 4pm on Friday, *Beth will like the dish at 7pm* expresses the two propositions mentioned above: the one relating the utterance time to the time of Beth's eating, and proposition α . We may suppose that Andy knows both of these proposition at 4pm on Friday. We may simply stipulate that he knows the first one. That he knows α is independently plausible. Since we are assuming that, on Friday afternoon, Andy knows what sorts of ingredients and preparations Beth typically likes, and knows what he has prepared for her to eat, we may also assume that he knows that, if things unfold normally, and nothing particularly unlikely occurs, Beth likes the dish at 7pm on Friday.

Thus, on Friday afternoon, Andy knows the two proposition that *Beth will like the dish at 7pm* can be thought of as expressing at that time. Thus, given the knowledge account of assertion, it follows that Andy is in a position to utter *Beth will like the dish at 7pm* on Friday afternoon.

Why can't Andy say *Beth liked the dish at 7pm* on Saturday morning? According to the present proposal, this sentence has the semantics we described in Section 2.2. There is no "epistemic aspect" to the meaning of the past tense. So, at 9am on Saturday morning, that sentence can be thought of as expressing two propositions, the proposition that 7pm on Friday is earlier than the utterance time, and proposition β that Beth likes the dish at 7pm.

Now note that it's consistent with what we've said so far that Andy doesn't know β on Saturday morning, even if he retained his knowledge of α as he moves

from Friday afternoon to Saturday morning. This is because α does not entail β . For α could be true at a world w at which Beth does not like the dish at 7pm on Friday. It could be true at such a world w so long as Beth likes the dish at 7pm on Friday in all worlds w' in the set $N(F_{w,t})$, a set which may not include w .

So now imagine that while Andy knows, throughout the story, that Beth likes the dish at 7pm on Friday at all sufficiently normal/likely post- f_4 future possibilities, he does not know (at any point in the story) whether or not something sufficiently abnormal or unlikely occurred just after 4pm on Friday. And if there is a sufficiently abnormal/unlikely $\neg\beta$ -possibility that Andy is not in a position to rule out at any point in the story, then Andy does know β at any point in the story, and so does not know β on Saturday morning. Then, given the knowledge account of assertion, and given that *Beth liked the dish* expresses β (among other things) on Saturday morning, it follows that Andy is not in a position to utter that sentence on Saturday morning.

3.2 Problems

Note that the semantic view is very similar to the “pragmatic view” discussed in Section 2.1, except that the semantic view has a principled answer to the question of why future oriented utterances are interpreted differently from past and present tensed utterances. That said, the ‘betting objection’ we leveled against the pragmatic view would seem to also apply to the semantic view. Imagine that you are about to flip a fair coin. We make the following bet: if sentence (11) is true now, I’ll pay you \$10; if (11) is false now, you pay me \$10.

(11) The coin will land heads.

You are about to flip the coin when I grab your arm and point out that you needn’t flip it at all. For the issue can be settled without flipping the coin: we already know that (11) is false, and that I have won the bet. We know this because we know the coin is fair, and so we know that in some sufficiently normal/likely future possibilities the coin lands heads, and in some it lands tails. From this it follows that (11) is false right now, since (according to the present theory) (11) is true right now just in case in *all* sufficiently normal/likely future possibilities the coin lands heads. So if the present theory is correct, I am in position to demand that you pay me, even prior to your flipping the coin.

But since it seems clear that I am *not* in a position to make this demand, the present theory must be incorrect. We don’t know who will win the bet, because we don’t know whether (11) is true right now. We have to flip the coin to find out. The present theory assigns the wrong truth-conditions to (11), and so should be rejected.

Cariani and Santorio (2018, 137–139) point out a related problem with this approach. The problem arises when we ask how *confident* we should be that (11) is true right now. Intuitively, the answer is that we should be 0.5 confident that it is true right now, since we know that the coin is fair. But we should have (almost) no confidence that in all sufficiently normal/likely future possibilities,

the coin lands heads. This is because we know that the coin is fair, and so we know that the coin lands tails in some sufficiently normal/likely future possibilities. But if (11) asserts that in all sufficiently normal/likely future possibilities, the coin lands heads, then we should have (almost) no confidence that (11) is true right now. Since we ought to be 0.5 confident that it is true right now, it must be that sentence (11) does not have the truth-conditions the present account assigns to it.

Note that the simple semantics for future operators discussed in Section 2.2 faces neither of these problems. Assuming these problems motivate a return to that view, our second thesis is reinstated: cases of easy foreknowledge are cases in which an agent loses knowledge despite not gaining or losing evidence.¹⁴

4 The epistemic view

Let's call the conjunction of my two theses *the epistemic view*. According to the epistemic view, one can lose knowledge simply by moving through the time, without gaining or losing any relevant evidence. How distinctive is this thesis?

Sensitive invariantists would agree that an agent can lose knowledge without gaining or losing any relevant evidence.¹⁵ For on their view, whether an agent x knows p at t may depend on factors other than traditional epistemic factors such as evidence, truth, and belief. For example, according to sensitive invariantists, whether x knows p at t may depend on how important it is for x at t that p be true, or it may depend on how salient certain $\neg p$ -possibilities are to x at t . Both of these factors may change over time even if x 's evidence does not; as a result x may lose knowledge despite not gaining or losing any evidence.

But neither of these factors seems to be the source of knowledge loss in our cases. We may stipulate that the relevant practical stakes do not change for Andy as he moves from Friday afternoon to Saturday morning. And we may likewise stipulate that the possibilities salient to Andy don't change as he moves from Friday to Saturday. Neither stipulation seems to make a difference to what Andy is in a position to assert at those two times.

Philosophers impressed by Harman's cases involving "evidence one does not possess" would also agree that an agent can lose knowledge without gaining or losing any relevant evidence, and even if the practical stakes and the salient possibilities are held fixed.¹⁶ But in Harman's cases, the agent's knowledge is undermined by the presence of easily accessible evidence that, if obtained, would *defeat* the agent's evidence. But this is not – or at least not obviously – a feature of our cases (though see Section 4.1 for further discussion).

¹⁴Of course, something still needs to be said about the data that motivated the modal view of *will* discussed above. Perhaps whatever explains that data would also yield an account of easy foreknowledge. But I myself don't see how such a story would go, and so won't pursue it further here.

¹⁵Sensitive invariantism is discussed in Fantl and McGrath (2002, 2009), Hawthorne (2004), and Stanley (2005). See also Kim (2017) and the references therein.

¹⁶See Harman (1973, 143–144) and Harman (1980, 164–165); see Lycan (1977) for critical discussion.

So perhaps we should reserve the term “easy foreknowledge” for cases in which an agent knows, at t , that it will be that ϕ , and then does not know, at t' , that it is or was that ϕ , despite no changes in: the agent’s relevant evidence, the relevant practical stakes, the salient possibilities, and the availability of defeating evidence. Let’s agree to do that, but let’s also agree to take the last three conjuncts as read.

The question facing the epistemic view now is this: why do agents in cases of easy foreknowledge lose knowledge? Why, for example, does Andy lose his knowledge of the fact that Beth likes the dish simply by moving through time?

4.1 Available evidence

One idea is this. Although the evidence Andy *possesses* doesn’t change as Andy moves through time, the evidence *available* to him does. For example, on Saturday morning, Andy could call up Beth and ask her whether she liked the dish he had prepared for her. She could tell him that she did indeed like it, in which case Andy would know that she liked it (or so it seems to me). Two observations are potentially relevant here. First, it seems that, on Saturday morning, Andy is in a position to get evidence for proposition β that is *stronger* than the evidence he in fact has. This is suggested by the fact that, were Andy to obtain that testimonial evidence, it would be rational for him to increase his confidence in β . Second, the evidence Andy is in a position to get on Saturday morning is of a *different kind* than the evidence he in fact has. The evidence he has is *causally upstream* from the fact that Beth likes the dish: it consists of facts that concern the *causes* of Beth’s liking the dish (her tastes, the nature of the dish). The testimonial evidence he could get, on the other hand, is *causally downstream* from the fact that Beth likes the dish: that evidence would be an *effect* of Beth’s liking the dish.

In contrast, on Friday afternoon, Andy can’t get evidence that is much stronger than the evidence he already has. He could get more evidence, of course: he could learn a bit more about Beth’s tastes, he could learn a bit more about the ingredients he is using. That might make him a bit more confident in β , but it wouldn’t seem to make him much more confident than he already is. And he can’t really get evidence of a different kind, at least not if “kinds” are individuated causally (and we ignore possibilities involving time-travel or divine revelation). The only relevant evidence available to Andy on Friday afternoon is broadly inductive evidence, and he already has evidence of that kind.

We can summarize these points by saying that, on Saturday morning, Andy could be in a much stronger epistemic position with respect to β than he is in fact in, whereas this isn’t true of Andy on Friday afternoon. Perhaps it is this difference that explain why Andy knows β on Friday afternoon, but not on Saturday morning. What one knows is sensitive not just to the evidence one has, but also to the evidence one could get. How strong of an epistemic position with respect to a proposition p one needs to be in in order to know p partly depends on how strong of an epistemic position one could be in with respect to p . “Strength of epistemic position” here may be understood either in a broadly

probabilistic sense, or it may be understood as taking into account the kind of evidence one has, or it may involve some combination of these factors.

We should distinguish two claims. One is the claim that what epistemic position one needs to be in in order to know p depends how strong of an epistemic position one could be in with respect to p . The second claim is that *this* is what explains what's going on in the Beth case. While the first of these claims might be true, I have my doubts about the second.

My reason for doubting this second claim is that we can replicate the judgments about the Beth case even if we change the case so that no more relevant evidence is available to Andy on Saturday morning than was available to him on Friday afternoon. To see this, consider the Death case:

Death case

The Death case is exactly like the Beth case, except that Beth dies immediately after eating and enjoying the dish. She leaves no trace of the fact that she enjoyed her last meal. On Saturday morning, Andy learns of Beth's death.¹⁷

I take it that, in respect of what Andy is in a position to assert, the Death case is just like the Beth case. On Friday afternoon, Andy can say, *Beth will like the dish when she eats it*, but on Saturday morning he is not in a position to say, *Beth liked the dish*, even once he learns that Beth is gone. But it doesn't seem that Andy could get into a much stronger position with respect to β on Saturday morning than he is in fact in. What could he do? Beth is gone and has left no trace of the fact that she enjoyed the meal. Despite this, if we accept these claims about what Andy is in a position to assert, it follows from the epistemic view that Andy knows on Friday afternoon that Beth likes the dish at 7pm, but is no longer in a position to know this on Saturday morning. But Andy's loss of knowledge in the Death case cannot be explained by appealing to the fact that the evidence available to him has changed.

According to the available evidence approach, the temporal structure of the Beth case is not, in a certain sense, essential to the underlying phenomenon. For we could have cases in which x knows p at t , but x' does not know p at t , with the only difference between x and x' being that more evidence concerning p is available to the latter than to the former. Or we could have a case in which p concerns x 's past at t , x knows p at t , and x loses this knowledge simply by moving through time to later time t' . This could happen if more evidence became available to x as she moved from t to t' (e.g. a new archive is discovered). Similarly, if evidence was "destroyed," one could *gain* knowledge simply by moving through time.

What the Death case shows, it seems, is that *time matters*. In the Death case, what is the relevant difference between Andy on Friday afternoon and Andy on Saturday morning? Not the evidence Andy possesses, not what's at stake for Andy, not the salient possibilities of error, not the presence of potential defeaters, not the evidence available to Andy. The only relevant difference seems

¹⁷Thanks to NAME DELETED for pressing me to think about this case.

to be Andy’s temporal location with respect to Beth’s meal. If this is right, then the conclusion that presents itself is that one’s location in time by itself can affect whether one knows something. Our concept of knowledge is such that, in some cases, it is simply “harder” to know p when p concerns one’s past or present than it is to know p when p concerns one future.

What exactly does it mean to say that “time matters” in this way? How, for example, would we model a concept of knowledge that was sensitive to time in the way I’m suggesting that ours is? I take up this question in Section 4.2, arguing for an account of knowledge according to which the notion of a sufficiently normal future possibility plays a role in constraining the possibilities relevant for assessing knowledge attributions. In Section 4.3, I consider how this account handles cases of *stable foreknowledge*, cases in which one retains, rather than loses, one’s foreknowledge as one’s moves through time.

4.2 Relevant alternatives and future normality

Earlier I discussed the suggestion that when one says, for example, *It’s going to rain tomorrow*, one is really saying something like: *it’s probably going to rain tomorrow*, or *it will tomorrow rain if things unfold normally*. I first considered this as a suggestion about the “pragmatic content” of utterances about the future (Section 2.1), and then again as a proposal about the semantic content of such utterances (Section 3). I rejected these accounts as accounts of the *truth conditions* of the asserted content of sentences of the form *will* ϕ . Despite this, it seems to me that these accounts might make the right predictions about the *conditions under which it is appropriate to assert* a sentence of the form *will* ϕ . So what we’d like, ideally, is a theory that assigns the aforementioned assertability conditions to sentences of the form *will* ϕ , while leaving in place the simple truth-conditions for such sentences presented in Section 2.2. This is the approach I pursue below.

According to the semantic view of easy foreknowledge (Section 3), in order for Andy to know, on Friday afternoon, that Beth will like the dish, he doesn’t need to be able to eliminate abnormal/unlikely future possibilities in which Beth does not like the dish. But we assumed that, in order for him to know, on Saturday morning, that Beth did like the dish, he does need to be able to eliminate (some) abnormal/unlikely post- f_4 future possibilities in which Beth does not like the dish. This asymmetry is permitted by the Copley/Kaufmann semantics for *will* and for the past tense. But we can mimic this result if we think of probability or normality not as constraining the possibilities over which *will* quantifies, but as constraining which possibilities are relevant for assessing whether Andy *knows* whether Beth likes the dish. The basic idea is that certain abnormal/unlikely possibilities in which Beth does not like the dish may be ignored when those possibilities concern Andy’s future, but may not be ignored when they concern his past.

There is likely more than one way to formulate such an account of knowledge, but I find it convenient to frame the proposal using some ideas familiar from the “relevant alternatives” tradition in epistemology (Dretske 1970, Stine 1976,

Cohen 1988, Lewis 1996). More specifically, the approach taken here is inspired by David Lewis's version of that theory.¹⁸ The basic idea behind the relevant alternatives approach is that in order to know a proposition p , one needn't be able to rule out *all* the possibilities in which p is false; one need only rule out all the *relevant* possibilities in which p is false, where relevance may vary from occasion to occasion. On our approach, the notion of a sufficiently normal/likely future possibility will come into play in constraining relevance.

If we let $E(w, t, x)$ be the set of possibilities that are *not* ruled out by x at t in w , and let $R(w, t, x)$ be the set of possibilities that are relevant for x at t in w , then we can state the basic theory as follows:

RELEVANT ALTERNATIVES

An agent x knows proposition p at time t in world w if and only if:
for all worlds w' , if $w' \in E(w, t, x)$ and $w' \in R(w, t, x)$, then p is true at w' .

In words: one knows p just in case p is true at all relevant possibilities uneliminated by one's evidence.

To give some substance to this theory, we need to say something about the two key notions in play here: *ruling out* and *relevance*. Let's start with the former. The notion of *ruling out a possibility* (where a "possibility" is just a possible world) is sometimes taken to be a primitive notion by relevant alternatives theorists, but Lewis offers a substantive characterization of it, and it will help to at least consider his account. Given an agent x at time t in world w , x 's *evidence at t in w* is the collection of x 's perceptual states and apparent memories at t in w . We then say that *at time t in world w , x 's evidence eliminates a world w'* just in case x 's evidence at time t in w' is distinct from x 's evidence at t in w . Roughly speaking, a world in which things do not phenomenally seem to you just as they seem to you now will be ruled out by your present evidence.

The second key notion is that of a *possibility's being relevant for an agent at a time in a world*. Our approach assumes that for any agent x at a time t in a world w , there is a set of possibilities, $R(w, t, x)$, that are relevant for assessing ascriptions of knowledge to x at t in w . This set will not be the same for all triples (w, t, x) . The factors that go into determining the boundaries of

¹⁸There are various differences between Lewis's approach and my own; perhaps the most salient is that Lewis's theory is *contextualist* whereas mine is a version of *sensitive invariantism*. Discussion of this distinction can be found in numerous places; see, for example, Hawthorne (2004) and Stanley (2005). One reason for theorizing about the present subject matter using the resources of sensitive invariantism instead of those of contextualism is that the former view seems to fit the phenomenon we're discussing more naturally than does the latter view. For we are claiming, within a single utterance context, that in one case (Friday afternoon), Andy knows β , but in another (Saturday morning), he does not, despite no obvious change in his epistemic position. Canonical arguments for contextualism instead involve two utterance contexts that issue in apparently conflicting verdicts about the same situation (the same agent at the same time). This is not to suggest that the phenomenon under discussion poses a problem for contextualism, merely that the phenomenon wouldn't seem to call out for a contextualist treatment *per se*.

$R(w, t, x)$ for a given triple (w, t, x) are likely to be rather complex, involving a number of different factors (e.g. practical stakes, salience). Lewis doesn't provide a precise definition of this notion, but instead offers what might be seen as a partial theory of the factors that go in to determining this set (for each (w, t, x)). Lewis presents his theory of these factors as a series of "rules of relevance," and we shall follow him in this.

To give you a feel for how this sort of approach works, consider the following three rules of relevance (all due to, or inspired by, Lewis).¹⁹ The following are intended to hold for any agent agent x at any time t in any world w .

RULE OF ACTUALITY: w is a relevant possibility for x at t in w , i.e. $w \in R(w, t, x)$.

RULE OF RELIABLE METHOD: Suppose x has a belief b at t in w , and x came to have b by competently forming it via a reliable method m . Then if w' is a world in which x competently forms b at t via m and in which b is false, then, all else being equal, w' is not a relevant possibility for x at t in w . Examples of reliable methods include perception, memory, testimony, induction, and inference-to-the-best-explanation; more fine-grained methods may also count as reliable methods.

RULE OF ATTENTION: If x ought to attend to a proposition p at t in w , then, all else being equal, some worlds in which p is true at t in w are relevant possibilities for x at t in w .

My proposal takes the form of a further rule of relevance, a rule that is intended to capture the idea that knowledge is time-sensitive in the way alluded to earlier. Recall that $F_{w,t}$ is the set of future possibilities with respect to t and w , i.e. the set of possible worlds w' that are just like w up until t . And recall that $N(F_{w,t})$ is the subset of $F_{w,t}$ that includes all and only the worlds in $F_{w,t}$ are sufficiently likely or sufficiently normal. Let's focus in what follows on the notion of normality rather than probability. This is partly for the sake of simplicity and concreteness, and partly because suspect that normality, rather than probability, is the right notion to use here. In terms of this notion, I propose the following rule of relevance:

RULE OF FUTURE NORMALITY: if w' is distinct from w , then w' is a relevant possibility for x at t in w only if w' is a sufficiently normal future possibility with respect to t and w' .

Equivalently:

If $w' \neq w$, then if $w' \in R(w, t, x)$, $w' \in N(F_{w',t})$.

The rule basically encodes the idea that we enjoy a default entitlement to assume that the future will develop in a relatively normal manner (cf. Goodman and Salow 2018, 191)

¹⁹For a more detailed discussion of various rules of relevance, see Lewis (1996), Cohen (1998), Ichikawa (2011), and Schaffer (2015).

Let's examine how this account handles the Beth case. I want to show two things. First, the foregoing account predicts that from (i) the fact that Beth likes the dish, and (ii) the fact that Andy knows, on Friday afternoon, that in all sufficiently normal future possibilities, Beth likes the dish, it follows that Andy knows, on Friday afternoon, that Beth likes the dish. The second thing I want to show is that this account also offers a plausible account of why Andy is not in a position to know, on Saturday morning, that Beth likes the dish. We take these two points up in turn.

Let v be a nearby world that meets our description of the Beth case. Recall that β is the proposition that Beth likes the dish. Recall that α is the proposition that in all sufficiently normal post- f_4 future possibilities, Beth likes the dish, i.e.:

$$\alpha = \{w : \forall w' \in N(F_{w,f_4}) : w' \in \beta\}$$

We show that from (i) the fact that β is true in v , and (ii) the fact that Andy knows α at f_4 in v , it follows that Andy knows β at f_4 in v . The argument relies on RELEVANT ALTERNATIVES and FUTURE NORMALITY.

Let v' be a world in $E(v, f_4, a) \cap R(v, f_4, a)$, where a is Andy. Given RELEVANT ALTERNATIVES, it will suffice to show that $v' \in \beta$. Note that either $v' = v$ or $v' \neq v$. If $v' = v$, then $v' \in \beta$, since, by (i), $v \in \beta$. So suppose $v' \neq v$. By RELEVANT ALTERNATIVES and (ii), it follows that $v' \in \alpha$. So $\forall v'' \in N(F_{v',f_4}), v'' \in \beta$. Since $v' \neq v$ and $v' \in R(v, f_4, a)$, it follows from FUTURE NORMALITY that $v' \in N(F_{v',f_4})$. So $v' \in \beta$.

That establishes the first point I wanted to make: Beth's liking the dish, and Andy's knowing, on Friday afternoon, that if things proceed normally, Beth will like the dish, suffices for his knowing, on Friday afternoon, that Beth will like the dish. More generally, on this approach, if you know that something will happen if things proceed normally, and that thing does happen, then you count as knowing that it will happen. This is the sense in which the present account predicts the same assertability conditions for sentences of the form *will* ϕ as the two views discussed earlier, the semantic view of Section 3 and the "pragmatic view" of Section 2.1.

That accounts for why Andy knows β on Friday afternoon. But how come he no longer knows that proposition on Saturday morning? Consider a possible world v' which is much like v , but in which something rather abnormal happens after f_4 (Friday 4pm) which causes Beth not to like the dish when she eats it 7pm. Perhaps Beth eats a strong cough drop in v' just before eating Andy's dish, and the effect of the cough drop is to make the food taste too sour to Beth. Or perhaps the temperature in Beth's kitchen unexpectedly rises after f_4 in v' , causing the food to taste funky by the time Beth eats it at 7pm. We might suppose that worlds v' like this are not sufficiently normal after f_4 to be included in $N(F_{v',f_4})$.

Note that there are worlds like this in which things proceed more normally *after* Saturday morning. Something rather abnormal occurs between f_4 and f_7 , but then things begin to develop in a more normal fashion. Let v' one of these worlds. Two observations about what FUTURE NORMALITY says about v' . First,

FUTURE NORMALITY tells us that v' is not relevant for Andy on Friday afternoon (f_4) in v , at least if we continue assume that such worlds are not sufficiently normal after f_4 to be included in $N(F_{v',f_4})$. Second, FUTURE NORMALITY does *not* exclude v' from relevance for Andy on Saturday morning (s_9) in v . For, again by hypothesis, things in v' proceed more normally after s_9 ; so we may suppose that $v' \in N(F_{v',s_9})$. Of course, that doesn't entail that v' is relevant for Andy at s_9 in v , but it is compatible with that claim.

Furthermore, given the stipulation that v' is much like v , it is not implausible to suppose that v' is relevant for Andy on Saturday morning. And since Andy's evidence on Saturday morning would not seem to eliminate v' , if we do suppose that v' is relevant on Saturday morning, it follows that Andy does not know, on Saturday morning, that Beth likes the dish. So let us suppose that v' is relevant for Andy on Saturday morning.

Thus, on this approach, Andy loses knowledge because of the dynamics of relevance: while FUTURE NORMALITY excludes worlds like v' on Friday afternoon, it no longer does so on Saturday morning. FUTURE NORMALITY ensures that we can ignore possibilities in which something sufficiently abnormal happens in the future; it says nothing about the relevance of those same possibilities when their abnormality is a feature of the past. So a possibility which, at one time, is excluded on account of its having a sufficiently abnormal future, may not be excluded at a later time, when that abnormal future turns into an abnormal past. Thus, the account leads us to expect that one can lose knowledge simply by moving forward through time.²⁰

4.3 Stable foreknowledge

As I noted in Section 2.1, I take the Beth and Rain cases to establish an existential claim: there are cases of easy foreknowledge. My reason for making this clear is that not all cases of foreknowledge are cases of *easy* foreknowledge; some are cases of *stable* foreknowledge. That is, there are cases in which one knows p at t , one moves through time without gaining or losing evidence, and one still knows p at later time t' (where p concerns the future at t , and the past or present at t'). Here is an example:

Jack case

²⁰Copley takes the notion of a sufficiently normal future possibility from Dowty (1979), who calls such possibilities *inertia worlds*. This notion plays an important role in his theory of tense and aspect. Dowty's idea is based on a suggestion from David Lewis (p.c. to Dowty): an inertia world w' with respect to w and t is exactly like w up to and including t , and in which a "natural course of events" takes place after t (Dowty 1979, 148).

Notions of normality are employed in a number of places in linguistics and philosophy. See, for example, Nickel (2008) (generics), Yalcin (2016) (modality), and Reutlinger *et al.* (2019) (*ceteris paribus* laws). Of particular relevance are applications of normality in epistemology: see, for example, Smith (2010, 2017), Goodman and Salow (2018), and Beddar and Pavese (2018). The approach of Goodman and Salow, in particular, bears certain similarities to the approach taken here (though their approach is not "time-sensitive"). Their approach also indicates how a rule of future normality might be incorporated into a safety-theoretic conception of knowledge (see also Beddar and Pavese 2018).

Jack tells me on Thursday morning that he's leaving tomorrow to go to New York for the weekend.

On Thursday evening, I run into Jill, a mutual friend of mine and Jack's. She asks me how Jack is doing. I reply by saying, *He's great. He's going to spend the weekend in New York.*

Jack spends the weekend in New York, though I don't hear from him (and didn't expect to). On Monday morning, Jane, another mutual friend of mine and Jack's, also asks me how Jack is doing. Here it seems fine for me to say, *He's great. He spent the weekend in New York.*

Given the knowledge account of assertion, it seems natural to say that I know that Jack is in New York on the relevant weekend both on Thursday (prior to the weekend in question) and on Monday (after the weekend in question).

One thing that is potentially interesting about this case is it involves what Moran (2004, 46) calls *practical foreknowledge*: knowledge of the future that is based on knowledge of one's own intentions. On Thursday, Jack knows that he's going to spend the weekend in New York simply because he has *decided* to spend the weekend in New York. When Jack tells me on Thursday that he's going to New York for the weekend, he's not issuing a *prediction*; he's stating an *intention*. Now, of course, *my* knowledge is not an instance of practical foreknowledge, but my knowledge is based on a testimonial chain that ultimately terminates in an instance of practical foreknowledge. I suspect that foreknowledge of this sort often constitutes stable foreknowledge.

But stable foreknowledge is not limited to foreknowledge that traces back to practical foreknowledge. Here are two other examples. (I) I know on Friday that my brother will not buy fifty TV's on the following day. I move forward through time two days to Sunday without gaining or losing any relevant evidence. I still know on Sunday that he didn't buy fifty TV's on the previous day. (II) I know that there will be smoke coming out of my chimney in ten minutes (I just lit the fire for my family). I leave the house, and twenty minutes pass. I know that there was smoke coming out of my chimney ten minutes previously.

These cases are like the Beth case in that we do not gain or lose any relevant evidence between the two relevant times. But in the Beth case we lose knowledge, while in these cases we retain it. What's the difference?

Recall the following rule of RELIABLE METHOD. Reliability is not an all-or-nothing property of course; some methods may be more reliable than others. So the reference to reliable methods in that rule is really a reference to *sufficiently reliable* methods. Now we may suppose the following. The true beliefs involved in the cases above are formed via sufficiently reliable methods. Thus, worlds in which (i) I form the belief that Jack spends the relevant weekend in New York based on his testimony, and (ii) this belief turns out to be false, will normally be ruled out by RELIABLE METHOD. Note that RELIABLE METHOD makes no mention of how the time of the belief formation and the time that figures in the content of the belief are related. Thus, if such worlds are irrelevant for

me on Thursday, they will remain irrelevant for me on Monday (holding other relevance-affecting factors fixed).

But why doesn't this approach predict that Andy knows that Beth likes the dish on Saturday morning? After all, Andy would seem to have used a reliable method of belief formation. His belief is based on his long experience as a chef, his knowledge of Beth's tastes, and his knowledge of the meal he prepared. That is correct. But perhaps all this shows is that Andy's belief was formed by a method that is reliable *to some degree*. But it may not be *sufficiently* reliable for RELIABLE METHOD to exclude as irrelevant worlds in which Andy forms his belief in the same way, and yet that belief turns out to be false, perhaps for reasons Andy couldn't have anticipated. The rule of FUTURE NORMALITY is thus needed to secure his knowledge on Friday afternoon, but that rule is powerless to secure that knowledge again on Saturday morning, as we have discussed.

The proposal here is obviously not as explanatory as we would like. I have no general account of "sufficiently reliable" that will explain why, for example, my belief in the Jack case counts as sufficiently reliable, but Andy's belief in the Beth case does not. That said, the distinction surely exists, which means that, on the general theory I am offering, we should expect some cases of foreknowledge to be easy, some to be stable. And this is indeed just what we find.

5 Conclusion

According to the theory advocated here, it is generally harder to know that it will be that ϕ at time t than to know that it is or was that ϕ at later time t' . But why is this? Or, rather, why do we have a concept of knowledge with this feature? What purpose does it serve? These questions are important for understanding the significance of the phenomenon explored in this essay, but ones I will have to leave as a matter for future inquiry. Instead, I will close with a few remarks that bear on this issue.

The way evidence evolves over time typically results in there being more evidence for a fact when that fact concerns the past or present than when it concerns the future. I say "typically" because this isn't always true, as our discussion of the Death case revealed. But there is still a general tendency here, one that may constitute a significant fact about our epistemic lives. Another way to think of the matter is not in terms of evidence, but in terms of what epistemologists sometimes call *epistemic sources* (e.g. perception, memory, induction).

Our access to facts about the future is largely limited to what we can discover via induction, what we can know on the basis of our plans and intentions (practical foreknowledge), and what we can know on the basis of testimonial chains that terminate in such sources. Induction and intentions may also play a role in learning about the past and present, but we of course have additional routes to these facts: perception, memory, and testimonial chains that eventually terminate in perception and memory. In contrast, we can't directly perceive

the future, nor can we remember events that have yet to occur.²¹

This asymmetry would seem to underwrite the asymmetry with which we began the essay: the fact that we tend to think our knowledge of the past and present more secure than our knowledge of the future. But this asymmetry would also seem to make the phenomenon of easy foreknowledge less surprising than it might have initially seemed. For if our access to the fact that ϕ is, generally speaking, better when ϕ concerns the past or present than when ϕ concerns the future, it is not so surprising that we should demand more of those who claim to know that it is or was that ϕ that those who claimed to know that it would be that ϕ . For it is not so surprising that what is required should be sensitive to what is (usually) possible.

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²¹These claims may not hold for all possible agents at all times. Perhaps clairvoyance is a non-inductive route to foreknowledge in some possible worlds. Perhaps an actual deity perceives the future directly. Perhaps a time-traveller can remember events that have yet to occur. But for most of us, as we are presently constituted in this world (and in nearby worlds), this asymmetry between our access to the future, on the one hand, and our access to the past and present, on the other, seems quite stable.

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