What Are Epistemic Modals Relative to?

Introduction

Even though there is a long-lasting disagreement among philosophers about the semantics of epistemic modals, there is a tacit agreement that epistemic modals are expressions referring to epistemic possibilities relativised to someone's knowledge.[1] In this paper, I will throw doubt on this view and defend instead the understanding-relative account of epistemic modals. The paper is divided into four chapters. In Chapter 1, I will critically present three main approaches that one can take in the debate about the semantics of epistemic modals together with their respective problems. In Chapter 2, I will introduce some properties of Japanese epistemic modals that I will employ in my arguments in Chapter 3. In Chapter 3, I will present three arguments in favour of the understanding-relative account. In Chapter 4, I will explore what consequences the understanding-relative account has for the problems related to the semantics of epistemic modals outlined in Chapter 1.

Chapter 1

The purpose of this chapter is to outline the debate surrounding epistemic modals and introduce three dominant positions (relativism, standard contextualism and cloudy contextualism) taken in this debate.[2]

The standard analysis of epistemic modals is as follows:[3]

Epistemic modals are expressions that quantify over possibilities about how the actual world is that are compatible with someone's information about the actual world. This can be formally expressed as (1).

(1) $EM\ (B, \phi)_{c, w}$

where

EM is an epistemic modality operator.

1 Perhaps the only position that does not endorse this thesis is the expressivism defended by Yalcin (2011) or Schnieder (2010). According to them, the sentences containing epistemic modals do not have truth-value but only express a mental state of the speaker, which does not necessarily have to be knowledge.

2 This list is not exhaustive because there are other approaches to epistemic modals such as expressivism (Yalcin, 2011, Schnieder, 2010) or invariantism (Braun, 2012). However, they are not directly connected to my argument in this paper, so I have decided to set them aside.

3 See for example Kratzer (1977, 1981) or von Fintel and Gilles (2008, p.78)

B is the modal base which restricts the domain of possible worlds over which EM quantifies.
ϕ is a prejacent proposition to which EM applies.
c is a context determining contextually relevant information.

The quantifier domain of EM is restricted by assigning to B a set of possible worlds that are compatible with the c-relevant information in a world *w*. This set of possible worlds can be then symbolised as $[B]_{c, w.}$

The epistemic modality expressions 'might' and 'must' are formally defined as follows:

(2) $[\text{might } (B)(\phi)]_{c, w} = 1$ iff $\exists v \in [B]_{c, w}: [\phi]_{c, v} = 1$

(3) $[\text{must } (B)(\phi)]_{c, w} = 1$ iff $\forall v \in [B]_{c, w}: [\phi]_{c, w} = 1$

The disagreement is about how context determines relevant information. Let us look at three different positions that are commonly taken with respect to this issue.

Standard Contextualism:

The standard contextualism is the earliest semantic approach towards epistemic modals. Its primary proponents are Hacking (1967), Teller (1972) and DeRose (1991). According to them, *c* denotes the *context of utterance. C-relevant information* amounts then to the knowledge of the speaker of a sentence containing an epistemic modal at the time of uttering it. And the content expressed by sentences containing epistemic modals then varies according to the knowledge of the speaker. This is also called *solipsistic contextualism*.

But this view is vulnerable to the objection from rejection and retraction.[4] Consider the following dialogue:

(4)
Bob: The keys might be on the table.
Sally: No, they can't be on the table. I have already looked there and found nothing.
Bob: Then I was wrong.

4 See MacFarlane (2011, pp. 146-148).

According to solipsistic contextualism, Bob's original claim contains at its beginning the silent constituent 'as far as I know' as a part of its content and so can be expressed as: 'As far as I know, the keys might be on the table.' Sally then cannot be warranted in rejecting Bob's claim. This is because even if the possibility that the keys are on the table is excluded for all she knows, this by no means contradicts that it is not excluded for all Bob knows. By the same token, Bob does not have to retract his original claim in response to Sally's rejection because he speaks truly. Yet, both rejection and retraction in this dialogue sound felicitous, which solipsistic contextualism cannot explain.

The common reply to this objection is to adopt the so-called *group contextualism*. According to group contextualism, c-relevant information is the knowledge of the relevant group in the context of a conversation. If it is agreed that the relevant group in the aforementioned dialogue includes both Bob and Sally, then both rejection and retraction become warranted, as Bob's initial claim turns out to be 'as far as I and Sally know, the keys might be on the table' which is false.

Nevertheless, group contextualists face an equally serious problem: How should the relevant group be restricted? The simplest answer would be to say that it includes only the participants of the conversation, but this makes group contextualism susceptible to the original objection in its revised form. Let us imagine that Sam is an accidental eavesdropper of Bob's claim. If he knows that the keys are not on the table, it seems completely natural for him to suddenly interrupt the conversation by saying, 'No, that's wrong.' But, as Bob's claim was not addressed to him, he is not part of the relevant group, so he should be unwarranted in doing so. A possible way to get around this objection is to expand the relevant group to accidental eavesdroppers. However, this option is too demanding. Does Bob really want to commit himself to the knowledge of anyone who could possibly hear his claim? It would be unacceptably presumptuous of him to make such a strong commitment.[5]

Another problem that standard contextualism faces are the embedded occurrences of epistemic modals. Standard contextualism cannot provide us with a satisfactory account of what is their c-relevant information because both of them are committed to the following speaker-inclusion constraint: the speaker of the utterance has to be included in the relevant community. But this constraint seems to be violated when epistemic modals are embedded in attitude reports. Imagine

5 For a larger discussion of eavesdropper cases, see von Fintel and Gilles (2008) and Egan et al (2005).

that Bob, nervously awaiting an exam, says: 'The exam might be too difficult.' His teacher hears that and makes then the following report:

(5) Bob believes that the exam might be too difficult.

According to standard contextualism, (5) is false. This is because given the speaker-inclusion constraint, it should amount to (6) even though Bob does not believe anything which is related to the teacher's knowledge. In fact, he could make the statement even while acknowledging the possibility that the teacher, in fact, knows that the exam is easy.

(6) Bob believes that for all the teacher (or a group including the teacher) knows, the exam might be too difficult.

As Egan et al. (2005, pp.137-138) point out, there are just two options for reconciling this outcome with the speaker-inclusion constraint. Either we will conclude that speakers of attitude reports including epistemic modals express radically false beliefs about other people's attitudes or that while their beliefs are true, they are radically mistaken about the semantics of their reports. Neither option is very attractive.

Relativism:

Let us proceed to the second approach on how to analyse epistemic modals known as *relativism*. Its main proponents are Egan et al (2005), MacFarlane (2014, pp.238-279) and Stephenson (2007). According to the relativist semantics, *c* denotes the context of assessment and c-relevant information is the knowledge of a person who assesses the truth value of statements containing epistemic modals. However, the most dominant relativist view is truth-relativism which differs from standard contextualism not only on what is the denotation of *c*, but also on the way context influences the domain over which epistemic modals quantify. In particular, according to truth relativism, it is not the content of epistemic modals but the truth value of the statements containing them that is sensitive to context.[6] For example, Bob's claim expresses the same proposition, no matter who utters it in what kind of group. So the domain of worlds over which epistemic modal in his statement quantifies remains unsettled (no set is assigned to the modal base) until the point of its

6 Yet, Weatherson (2009) proposes also the content relativism.

truth-evaluation. Once the truth value of the statement is assessed, the domain gets restricted to the possible worlds that are compatible with the knowledge of the assessor.

The chief argument in favour of truth relativism is that, unlike standard contextualism, it can deal with the objection from rejection and retraction both in the original and eavesdropper case. If the possibility of the keys being on the table is incompatible with the knowledge of Sally or eavesdroppers, it is false relative to their context of assessment, and hence they are fully justified in rejecting it. Also, MacFarlane (2014, p.145) stipulates the following retraction rule:

An assertion made at c must be retracted at c' if its content is untrue as used at c and assessed from c'.

This rule sounds sensible because if we deny it, we cannot explain how a speaker can correct her earlier statements once she acquires new information. Specifically, Bob would be incapable of correcting himself if he insisted: 'I was not wrong because even if what is said is false from my present context of assessment, it was true from my past context of assessment.' Given this rule, it follows that Bob is warranted in retracting his earlier claim, once it is rejected by someone.

Nevertheless, relativism also faces its own difficulties. We will mention the two that are relevant to the discussion that will follow later in this paper. Both of them were identified by von Fintel and Gillies (2008, pp.84-92).

To start with, truth relativism predicts that in the case that the prejacent proposition ϕ is false, the later-the context of assessment, the more justified the assessor should be in rejecting the statement '*might* ϕ' as false provided that her knowledge accumulates over the course of time. This is because the set of possible worlds compatible with her knowledge should get smaller, the wider the difference between the time of utterance of the statement and the time of its assessment. But our ordinary linguistic practice sometimes run counter to this prediction. Imagine a detective utters (7) because she does not know that the gardener is not the culprit.

(7) The gardener might be the culprit.

Also, imagine the following two situations. In the first situation, the detective discovers decisive evidence that speaks in favour of the gardener's innocence shortly after uttering (7). In the second

situation, the detective discovers this evidence 20 years after the utterance. In the meantime, she has accumulated evidence against the gardener's guilt. In which situation would she be more justified in saying 'I was wrong about (7)'? There is reason to think that in the former because unlike in the latter she could not defend herself using the line: 'Everything what I knew at that time was compatible with the possibility of the gardener being the culprit.' The relativist account cannot explain this, possibly because it misses some important aspect of what makes the rejections of earlier statements justified.

Next, the relativist semantics appears to be in tension with our ordinary reasoning because it disallows the agent to legitimately employ the method of exclusion in her reasoning. Consider the following case: The Boss and his trustworthy spies Jack and Zack know that precisely one of their comrades A, B, C is a turncoat.

> Jack claims: It must be that either A or B is a turncoat.
> Zack claims: It must be that either B or C is a turncoat.

It is legitimate for The Boss to conclude based on these two claims that B is a turncoat. However, given the relativist analysis, his context of assessment includes possible worlds where A is a turncoat, B is a turncoat and C is a turncoat, respectively. Therefore, both Jack's and Zack's claims are false for him. Consequently, his conclusion turns out to be unwarranted, which is a surprising consequence.

Cloudy Contextualism:

Von Fintel and Gillies (2008, p.94-97) suggest an alternative theory called 'cloudy contextualism' which is supposed to deal with the objection from rejection and retraction without suffering the same problems as relativism. Its semantics remains the same as that of standard contextualism, but its interpretation of what is c-relevant knowledge can be considered as the reconciliation of the solipsistic and group interpretation. To explain, once a sentence containing an epistemic modal is uttered, it is supposed to be contextually vague. That is to say, the speaker puts into play the set of propositions that the sentence means in one of the clouds of admissible contexts *c* with respect to which the sentence might be interpreted.[7] This set of admissible contexts is then restricted by the

7 Formally, in a situation that allows the set of admissible context *C*, the speaker puts into play the set of propositions *P* such that for some $c \in C$: $EM(B, \phi)_{c, w} = P$.

situation in which the sentence is uttered. The speaker is warranted in her utterance if she meant by it at least one of the propositions in the cloud. To give an example, in Bob's and Sally's conversation, Bob's initial utterance puts into play the following set of propositions.

(8) As far as Bob knows, the keys might be on the table.
(9) As far as Sally knows, the keys might be on the table.
(10) As far as Bob and Sally know, the keys might be on the table.

We can explain why Sally is warranted in rejecting Bob's statement and Bob is warranted in retracting it even if Bob originally meant (8) by his initial utterance. This is because Sally can interpret B as saying (10) which is false. Afterwards, Bob might either endorse this interpretation and retract his initial interpretation, or insist that he in fact meant (8) when he uttered it and stick to his guns. His choice depends on whether he thinks that Sally's interpretation matters more for the purpose of conversation than what he originally meant.

Whereas the cloudy contextualism certainly provides a more sophisticated solution to the objection from rejection and retraction, some other objections can be leveled against it.

Firstly, it is not obvious that cloudy contextualism can work against eavesdropping. It can be suggested that eavesdropper's knowledge can be c-relevant information in some contexts that are in the cloud of admissible contexts. But it is by no means clear how the situation restricts whose context is admissible and what constrains admissibility. For example, let us consider the knowledge of potential meta-eavesdroppers who indirectly get to know Bob's claim by eavesdropping Bob's eavesdroppers. Is this knowledge c-relevant in some of the admissible contexts? Unless a clear answer to this question is provided, the cloudy contextualism can be suspected of moving the whole problem only one step backwards.

Secondly, as MacFarlane (2010, p.23) points out, cloudy contextualism violates the following plausible sounding principle of ratification: *A speaker is warranted in issuing an epistemic modal if and only if she would be warranted in assenting to such a claim, were she to hear herself utter it (provided that her knowledge remains the same)*.

Imagine that for some reason, Bob does not consider the falsehood of (10) as the reason for changing his belief about the possibility of the keys being on the table. So his knowledge remains

the same as when he assented to 'the keys might be on the table' by uttering it and meaning (8). Still, cloudy contextualism entails that Bob is also warranted in dissenting to the claim that he himself uttered a moment ago if she interpreted it as (9) or (10). But this seems to be in conflict with the principle of ratification. How could someone be warranted in dissenting to 'p' immediately after uttering 'p' if his knowledge remains the same and only the interpretation of 'p' changes?

The third problem identified by Yanovich (2014, p.93) is that cloudy contextualism makes Bob warranted in sticking to his guns even if his initial claim is clearly unwarranted. Imagine that before Bob says, 'The keys might be on the table,' Sally clearly says to him that she looked there and did not find anything, but Bob recklessly forgets it. Upon that, Sally repeats to him the same thing twice. But Bob insists that he was not wrong in sticking to his original interpretation of the claim. Is Bob really warranted in doing so?

Chapter 2

In this chapter, I will briefly familiarise the reader with the semantics of Japanese epistemic modals, as I will employ them in developing my argument in the next chapter.

We can divide Japanese epistemic modals into two basic types: evidential epistemic modals and non-evidential epistemic modals. There are two key differences between them.

Firstly, evidential epistemic modals are more informative than their non-evidential counterparts. They do not only refer to an epistemic possibility but also indicate the source of justification based on which the belief about this possibility was acquired.

As an example, take the following two sentences:

(11) Ame-ga-furu-daroo (It might rain.)
(12) Ame-ga-furi-soo-da (It seems that it will rain.)

(12) is an evidential counterpart of (11). What makes (12) similar to (11) is that a speaker can use it to express her belief that it is epistemically possible that it will rain. However, (12) differs from (11) because the evidential *soo-da* (*it seems that*) also indicates that this belief is acquired based on some kind of evidence.

Before we proceed to the second difference, we should touch upon one objection that can be raised against the just presented account: If evidentials are epistemic modals, the following conditional must always obtain:

> It seems that H→ It is epistemically possible that H
> where H stands for a proposition.

However, it may be argued that there are cases when this implication is not appropriate. After all, someone who is familiar with Müller-Lyer illusion may utter, 'It seems that the two lines are of different length but they cannot be of different length.'

I believe that this objection stems from the failure to recognise that 'it seems that H' is ambiguous in terms of being an evidential and phenomenological reading. As a *phenomenological* reading 'it seems that H' amounts to 'someone has perceptual experience that H'. This does not guarantee the possibility of H. However, under the *evidential reading*, 'it seems that H' amounts to 'someone has evidence confirming that H'. This ambiguity becomes especially apparent when we consider the sentences in which non-evidential reading is unfeasible, such as (13).

> (13) It seems that if a no-deal Brexit happens, the UK economy will be worse off.

Unlike perceptual experience, evidence can be treated by means of the Bayesian probability theory.[8] Given this theory, evidence can confirm H only if P (H)>0. Therefore, the evidential reading of 'it seems that H' implies that H is epistemically possible.[9] This, together with the fact that 'it seems that H' is uttered only if the truth value of H is unknown, gives us strong reason to consider evidentials as epistemic modals.

The second difference is that, as Takubo (2009, pp.160-165) points out, whereas non-evidential epistemic modals are commonly used in deductive inferences, evidential epistemic modals are commonly used in non-deductive inferences. As an example, consider the following two inferences:

8 Yet, this is not meant to be the rejection of what Williamson (2002, p.173) calls 'the phenomenal conception of evidence'. As Conee and Feldman (2008) point out, perceptual experience can still form an important part of one's evidence.

9 Note that, even if the confirmation of a hypothesis by evidence guarantees that the hypothesis is epistemically possible, it can still happen that the evidence becomes later defeated by different evidence which falsifies the hypothesis (i.e. the hypothesis becomes epistemically impossible).

(14)

Premise 1: Sakuya-ame-ga-futtara-jimen-ga-nurete-iru-*daroo* (If it rained last night, the earth should be wet.)

Premise 2: Sakuya-ame-ga-futta (It rained last night.)

Conclusion: Jimen-ga-nurete-iru-*daroo* (The earth should be wet.)

(15)

Premise 1: Sakuya-ame-ga-futtara-jimen-ga-nurete-iru (If it rained last night, the earth is wet.)

Premise 2: Jimen-ga-nurete-iru (The earth is wet.)

Conclusion: Sakuya-ame-ga-futta-*yoo-da* (It seems that it rained last night.)

Whereas (14) is governed by *modus ponens*, (15) is the example of an inductive inference that predicts a past event based on present evidence. It is plausible that the evidential *yoo-da* is employed in (15), while the non-evidential *daroo* is employed in (14). After all, *yoo-da* indicates that the conclusion was reached based on observable evidence that confirms but does not guarantee its truth. By contrast, the usage of *daroo* does not presuppose the existence of evidence of any kind; it only indicates that we are strongly justified in believing that the earth is wet given that it rained last night. This hypothetical statement remains true even if the proposition that it rained last night remains only a hypothesis and no confirming evidence is actually acquired. This is also the reason why *daroo*, unlike *yoo-da*, can be embedded in the consequent of Premise 1 under the narrow scope. If we tried to embed the evidential *yoo-da* in the consequent of Premise 1, we would fail because in (16), *yoo-da* would automatically take the wide scope over the whole conditional.

(16) Sakuya-ame-ga-futtara-jimen-ga-nurete-iru-*yoo-da* (It seems that if it rained last night, the earth is wet.

Accordingly, evidential epistemic modals are used more frequently in inductive inferences and non-evidentials more in deductive inferences because while the former presuppose that the evidence expressed by Premise 2 was actually acquired, the latter make no such presupposition.

Next, both evidential and non-evidential modals in the Japanese language can be divided to several sub-types the meaning of which is similar but which still have different semantic nuances and inferential properties.

Regarding non-epistemic modals, we have the following three basic types: *daroo*, *kamoshirenai* and *ni-chigainai*.

The peculiar feature of *daroo* is that it can be used to express both low and high credence in the truth value of a proposition, which can be seen from that its occurrence can be combined with various types of adverbs as in (17).

(17) *Kitto/tabun/osoraku*-torampu-ga-daitooryoo-ni-erabareru-*daroo*
(Trump will be *certainly/perhaps/probably* elected for the president.)

This distinguishes *daroo* from *kamoshirenai* which can be used to express an epistemic possibility only when credences are sufficiently low and may be thus translated as 'might' as well as from *ni chigainai* that can do the same only when credences are sufficiently high and may be thus translated as 'must' (Kishita, 2013, 189-214).

Next, there are also three basic types of evidential epistemic modals: *rashii*, *soo-da*, and *yoo-da*.
To explain the difference between them, let us first take the evidential sentence (18) and consider its three possible translations to Japanese (19), (20) and (21).

(18) *It seems that* the train has arrived.
(19) Densha-ga-kita-*rashii*
(20) Densha-ga-kita-y*oo-da*
(21) Densha-ga-*ki-soo-da* (It seems that the train will arrive.)

But both (19) and (20) have the meaning that goes beyond the meaning of (18). *Rashii* indicates that the belief about the arrival of the train is justified based on auditory or testimonial evidence by

means of inference.[10] On the other hand, *yoo-da* permits this belief to be acquired based on any observable evidence by either inferential or non-inferential method.[11]

Last but not least, we can also capture the meaning of *soo-da* by considering (21). *Soo-da* also indicates that the belief was acquired based on observable evidence by either inferential or non-inferential method, but, unlike *yoo-da*, it indicates that the speaker's subjective judgement about what is evidence is somehow involved in the assertion of (21). In other words, it is natural to use *soo-da* even if the speaker considers something like a crystal ball to be evidence for the arrival of the train (Ogata and McCready, 2007, p.158).

Chapter 3

In this chapter, I will present some advantages of the understanding-relative account of epistemic modals over the knowledge-relative account.

Firstly, the understanding-relative account can encompass otherwise elusive features of Japanese epistemic modals when we translate them to English.

It was noted in the previous chapter that the epistemic modal *rashii* is not, strictly speaking, equivalent to the epistemic modal *it seems that*, and therefore (18) and (19) are not synonymous. To see the difference in their meanings, consider the following two situations:

Situation 1: The speaker hears the melody signalling the arrival of the train.

Situation 2: The speaker sees how the train is approaching the platform and hears its sound.

(19) can be truly uttered in *Situation 1* but not in *Situation 2*. This is because the speaker in *Situation 1* can come to believe that the train seems to have arrived only with the aid of a supplementary premise such as 'the melody that I hear signals that the train has arrived'. However, in *Situation 2* no such premise is required: the speaker can come to believe that the train seems to have arrived immediately after having a perceptual experience of the arriving train.

10 In accordance with Pryor's formulation (2003, p.3), by inferential justification, we mean the justification to believe a proposition with the assistance of auxiliary beliefs.

11 The reader who is skeptical about the existence of non-inferential justification can, for the sake of discussion, assume that this belief is minimally inferential because it is acquired only with the aid of the beliefs about a perceptual experience, such as the speaker's beliefs that she sees and hears the approaching train.

In contrast, (18) can be truly uttered in both situations. Thus, (18) is not fine-grained enough to reflect the reason why (19) may differ in the truth value depending on how the source of its justification changes. Therefore, our task is to work out a more fine-grained translation of (19).

In what follows, I propose the following three candidates for the translation of (19):

> (22) The speaker has some auditory evidence from which she infers that the train has arrived.
>
> (23) Relative to the speaker's knowledge, it seems that the train has arrived.
>
> (24) Relative to the speaker's understanding, it seems that the train has arrived.

I suggest that (24) is the best available candidate. To see why, let us scrutinise the other two alternatives.

Firstly, (22) explicitly mentions the source of justification the speaker is relying on. This translation would then explain why (19) is false in *Situation 2*, where (22) does not obtain because the justification from auditory evidence is there non-inferential.

However, it is doubtful that this is the right way to look at (19). There is reason to think that (22) over-intellectualises the speaker's awareness of the source of justification and the inferential method which is involved in *rashii*. The source of justification in the inferences with *rashii* does not necessarily have to be auditory. In fact, as Ogata and McCready (2007, p.155) point out, the exact nature of the source of justification can be sometimes unknown to the speaker herself. As an example, they give the following sentence (25).

> (25) Nazeka-yoku-wakaranai-kedo-kore-wa-yoku-ureru-*rashii* (I don't understand why but this thing *seems* to sell well.)

In (25), the speaker obviously does not know what inference from what kind of evidence led her to her belief about selling. Therefore, if we translate (25) by making the inferential method and the

type of evidence that she relies upon explicit, we risk ascribing to the speaker knowledge that she does not have.

Let us move to the other two candidates. What makes (23) and (24) better candidates than (22) is that they are in accordance with the view that the role of evidentials is only to *indicat*e the source of justification rather than to explicitly represent it. Also, both (23) and (24) make it explicit what kind of epistemic attitude the epistemic possibility that the train has arrived is relative to, but they diverge on whether this epistemic attitude is knowledge or understanding. I believe that the *understanding-relative account* involved in (24) has at least two advantages over the *knowledge-relative account* involved in (23).

Firstly, the knowledge-relative account cannot satisfactorily explain why the truth value of (19) changes in *Situation 2*.

On the first attempt, it could be suggested that it changes because the speaker's overall knowledge in the two situations is not identical. After all, in each situation, the speaker includes a different belief about the source of justification in her knowledge. In other words, while in *Situation 1* the speaker acquires the belief that the melody signalling the arrival of the train is being played, in *Situation 2*, the speaker acquires at most the belief that she can see and hear how the train is approaching the platform.

However, both of these beliefs seem to be sufficient for justifying the proposition that the train seems to have arrived, so they do not explain the change in the truth value of (19). Moreover, we can easily think of a situation where the truth value of (19) changes in spite of the fact that the speaker's overall knowledge remains identical to *Situation 1.*

Situation 3: The speaker hears the melody signalling the arrival of the train. Moreover, she knows that the melody signals this arrival, so she has exactly the same body of information as in *Situation 1*. However, her inferential skills are limited because she is too exhausted, and as a result she is not able to infer based on this knowledge that the train seems to have arrived. Therefore, (19) is false.

The puzzle is now: How is it possible that (19) changes its truth value in *Situation 3* in spite of the fact that the speaker's overall knowledge is identical to her knowledge in *Situation 1*?

One could attempt to get around this problem by arguing that even if the speaker's overall knowledge remains the same, the meaning of 'the speaker's knowledge' in (23) is context-sensitive and refers only to the relevant part of her knowledge that was acquired in a certain way.[12] When (23) is the translation of (19), it refers to the knowledge acquired by inference from auditory evidence. For (19) to be true, this knowledge then has to justify the proposition that the train seems to have arrived. However, (19) turns out to be false both in *Situations 2* and *3* because this condition is not satisfied there. In *Situation 2*, the part of the speaker's knowledge acquired by inference from auditory evidence does not contain any belief which justifies the proposition that the train seems to have arrived. In *Situation 3*, this knowledge contains such a belief, but because of the speaker's weak inferential abilities, she is unable to employ it for justifying the given proposition.

The problem with this view is that we can point to the cases where reference to piecemeal knowledge cannot adequately explain how knowledge justifies one's beliefs. Imagine that the speaker gets from one source (the timetable) evidence that the train has arrived. Accordingly, she assents to (26).

(26) Relative to the speaker's knowledge, it seems that the train will arrive soon.

However, from a different source (the testimony of a train conductor) she gets the information that the timetable is outdated. What would be rational for her to do in this situation? Presumably, it would be to abandon her belief in (26) and assent instead to (27).

(27) Relative to the speaker's knowledge, it is not true that it seems that the train will arrive soon.

This is because, relative to her overall knowledge, the belief that she possesses the evidence that the train has arrived is now counteracted by the new belief that this evidence is not genuine.

However, the piecemeal account would predict that the speaker could treat her part of knowledge gained based on the timetable independently from her part of knowledge gained based on testimonies. Accordingly, she could assent to (27) without withholding her belief in (26). After all, (27) and (26) are not contradictions, as 'the speaker's knowledge' is supposed to refer to a different

12 This position should be distinguished from the epistemic contextualism (DeRose, 2009) in which whether we ascribe knowledge to a subject varies according to the epistemic standards that we set for her.

part of her knowledge each time. Yet, it seems that the speaker cannot consistently assent to both (27) and (26) and must give up the belief in one sentence when accepting the second sentence precisely because they are contradictory. Consequently, the piecemeal account predicts the wrong result.

Why do we not get into the same troubles if we endorse (24) as the translation of (19)? As Kvanvig (2003, p.192) argues, understanding does not amount only to believing a set of propositions but also to 'grasping of explanatory and coherence-making relationships' between these propositions. Therefore, even if two people have identical knowledge because of possessing the same body of information, they may still understand this information in a different way by grasping different inferential relations in the background of a different source of justification. This can then explain why the truth value of (19) is different in *Situations 2* and *3* than in *Situation 1*. In *Situation 2*, the speaker directly acquires the belief that the train seems to have arrived without grasping its inferential role in her belief system, so she does not demonstrate the understanding of it. And even though the speaker's knowledge in *Situation 3* remains the same as in *Situation 1*, she is not able to grasp the right inferential relations between the respective beliefs in her knowledge in order to conclude that the train seems to have arrived. The understanding-relative account can thus neatly explain why the truth value of (19) varies across the three situations: it varies because the speaker's understanding of the situations varies as well.

The second reason for treating epistemic modals as being relative to understanding is that we often express epistemically modal statements based on the beliefs that we doubt the truthfulness of. In the previous chapter, we could see that the doubts about the reliability of the source of evidence are especially pertinent in the case of *soo-da* when the selection of the right kind of evidence is solely at the speaker's discretion. For instance, a speaker may want to say that it seems that it will rain tomorrow based on her crystal ball even in a situation when she doubts that this information is reliable. In such a case, it would be appropriate for her to utter (28) instead of (29).

(28) Rikai-shite-iru-kagiri-de-ha-ame-ga-furi-soo-da ('Relative to my understanding, it seems that it will rain.')

(29) Shitte-iru-kagiri-de-ha-ame-ga-furi-soo-da ('Relative to my knowledge, it seems that it will rain.')

It is accepted by many epistemologists that understanding, unlike knowledge, does not have to consist solely of true beliefs. For example, Kvanvig (2003, p.201) argues that a person can understand that something is the case even if she has some peripheral false beliefs about the given matter. Elgin (2009, pp.325-326) goes even further by arguing that understanding can be achieved even if false beliefs stand at the centre of one's belief network. For instance, the ideal gas law is crucial for physicists' understanding of the behaviour of gases, even though it is, strictly speaking, false. Likewise, Zagzebski (2001, p.244) argues that understanding often requires believing significant simplifications that enable the agent to focus on the relevant aspects of the subject matter while ignoring all the irrelevant details, and therefore having true beliefs can be an impediment to understanding if truth is too complex. Accordingly, the understanding-relative account of epistemic modals can better accommodate the cases where the speaker believes that something might be the case while acknowledging that this possibility may be based upon a false belief.

However, this argument faces at least two objections. Firstly, Brogaard (2005, pp.12-13) argues that the proposed difference between knowledge and understanding disappears once we start talking about objectual knowledge and understanding. This is because objectual knowledge does not require that the subject matter is true, as one can, for instance, know Greek mythology.

I think that Brogaard misses one important distinction between knowledge and understanding: while it is taken for granted that there exists propositional knowledge, it is much less obvious that there also exists something like propositional understanding. For instance, Gordon (2012, pp.187-190) argues that propositional attitude reports of understanding are in fact misleading and can be reduced to attitude reports of other mental states without any loss of meaning. Consider a case in which someone utters, 'I understand that the train will arrive at 6 o'clock.' It seems that what she really means is that she believes that the train will arrive at 6 o'clock but has doubts about this belief. In such a case, by the term 'understand', she does not make any implications about whether she holds this belief in the background of any inferential relations and the usage of the term is therefore imprecise.

Given that similar doubts about propositional understanding are viable, one important consequence arises: while it is straightforward to claim that objectual knowledge of a set of propositions requires the knowledge of each proposition in the set, it is problematic to claim that objectual understanding of a set of propositions requires propositional understanding. This could explain why understanding is non-factive; one can understand the set of propositions some of which are false by grasping these

propositions and their inferential relations without understanding each of the propositions individually. By contrast, the knowledge of Greek mythology seems to be impossible without the knowledge of the propositions which Greek mythology is comprised of. After all, if someone is asked whether individual propositions from Greek mythology are true, the more frequently she replies that she does not know, the more justified we are in saying that he does not know Greek mythology as a whole. In that case, Brogaard must insist that such a person knows false propositions such as 'Sisyphus was punished by gods' or 'Heracles was the son of Zeus'. But this seems like a reductio ad absurdum of Brogaard's argument because it is contradictory to talk about the knowledge of false propositions. A far more sensible alternative is to argue that Greek mythology consists only of fiction-reporting propositions such as 'in Greek mythology, it was said that Sysiphus was punished by gods' which is in fact true. In that case, the argument that objectual knowledge can be non-factive collapses.

The second potential objection is that the non-factivity of understanding does not suffice to establish the understanding-relative account of epistemic modals because there are also other non-factive candidates such as beliefs. For example, Kochiras (2006, pp.14-17) argues that epistemic modals may sometimes express only a doxastic possibility, i.e. the possibility relative to the speaker's beliefs. This then allows for the cases when a doxatic possibility and an epistemic possibility come apart from each other because some possibility may be inconsistent with everything a person believes while being consistent with everything she knows. In our example, it seems acceptable for the speaker to say that, relative to what she believes, it seems that it will rain while refraining from calling her beliefs 'knowledge'. Why should we then lean towards the understanding-relative account of epistemic modals instead of the belief-relative account?

The advantages of the understanding-relative account will become apparent once we direct our attention to the epistemic possibility of the future states. Consider the following statement.

(30) Tomorrow, the sun might not rise.

According to both knowledge and belief-relative accounts, (30) is true even if c-relevant beliefs contain all beliefs about the past sunrises. Strictly speaking, both accounts make all future epistemic possibilities true and future epistemic necessities false. This is because c-relevant beliefs can provide at most inductive justification of future predictions: no matter how many (true or false) beliefs about past and present state of affairs are c-relevant, they never guarantee the predictions

about future. But should we, therefore, acknowledge that (30) can be never uttered falsely despite the fact that uttering it without any strong evidence against future sunrises seems irresponsible?

On the other hand, relativising (30) to understanding introduces the possibility of its falsehood. Given that one has a decent understanding of the causes of sunrise in terms of Earth's orbits around the sun and no reason to think that they will stop obtaining, the possibility that the sunrise will not happen on the next day would do considerable damage to the coherence of the belief network that constitutes this understanding. Therefore, in the context of scientific discussion, one seems to speak truly if she dismisses such a possibility as incompatible with her understanding.[13] So the understanding-relative account seems to be stronger than belief-relative account in terms of its explanatory power.

The third reason for favouring the understanding-relative account is that it can neatly explain what Dietz (2008) identified as the problem of ignorance. This problem refers to the cases when a layman turns out to be justified in rejecting an epistemic modality claim that an expert assents to only because it is incompatible with her knowledge. Consider the following conversation:

> Sally the Brilliant Mathematician: There cannot be any counterexample to Goldbach's conjecture.
>
> Bob the Layman: You are wrong. There might be a counterexample to Goldbach's conjecture.

The knowledge-relative interpretation of Bob's statement would be:
'You are wrong. Relative to my knowledge, there might be a counterexample to Goldbach's conjecture.'

The understanding-relative interpretation of Bob's statement would be:
'You are wrong. Relative to my understanding, there might be a counterexample to Goldbach's conjecture.'

13 But, of course, this does not imply that (30) is false for someone who understands the causes of sunrise in any context. Wilkenfeld (2013, pp.1007-1009) raises the option of adopting contextualist semantics for understanding attributions and argues that degree and way of understanding may vary depending on what kind of inferences are relevant in a given context. In our case, we can imagine that (30) is true in a philosophical discussion about the problem of induction.

Given that Sally, as a brilliant mathematician, is in a better epistemic position to have any knowledge about Goldbach's conjecture than Bob is and that Bob is not in an epistemic situation where he could know whether Sally has a proof of Goldbach's conjecture, Bob's rejection of Sally's statement seems to be unwarranted. Yet, if we employed the knowledge-relative interpretation of Bob's statement, both contextualist and relativist analyses would sanction it as a true and justified statement. This is because unless Bob knows that Goldbach's conjecture has been proved, the possibility of its counterexample is indeed compatible with his knowledge.

By contrast, the understanding-relative account can explain why Bob's claim is unwarranted. To see why this is the case, we should reiterate that understanding involves also the grasp of inferential relations between the propositions that one believes. One consequence of this is that the way understanding comes in degrees is importantly different from the way knowledge can be said to come in degrees. When someone has a higher degree of knowledge it means nothing more than that she has a greater number of justified true beliefs that possibly meet some further requirement such as sensitivity, safety or indefeasibility. So degree of knowledge can be assessed solely by quantity. But when it comes to understanding, things are no longer so simple. Degree of understanding also depends on such factors as whether someone's beliefs are justified by being coherently interconnected by means of inferential relations in one's belief network. Other candidates for these factors would be inferential and explanatory abilities of the agent, the strength of one's justification etc. The quantity of true and justified beliefs may certainly be regarded as a factor that raises one's degree of understanding but not the *only* factor. So there is reason to believe that degree of understanding is much more intricate in nature than degree of knowledge.

If degrees of understanding encompass more factors than degrees of knowledge, it follows that one's understanding can be also undermined in more diverse ways than one's knowledge. Considering Bob's case, when he discovers that a brilliant mathematician disagrees with him about Goldbach's conjecture, he acquires a reason to think that his degree of knowledge about the conjecture is considerably lower than he thought because there might be a proof of it about which he does not know. Nevertheless, he can still say that the possibility of the existence of a counterexample to Goldbach's conjecture is compatible with everything that he knows. It is true that now he knows that a brilliant mathematician excludes the possibility of a counterexample to Goldbach's conjecture. Nevertheless, given that Goldbach's conjecture presents one of the oldest unsolved problems in mathematics, this information alone disconfirms but does not contradict that the possibility that there is a counterexample to it.

In comparison, the way Sally's claim undercuts Bob's belief that he has sufficient understanding of Goldbach's conjecture is more drastic. Bob is now supposed to start thinking that he must have missed something. He should ask: 'How could a brilliant mathematician think that there is no counterexample to Goldbach's conjecture if it is unproven? Could she have possibly proved it?' As a result, he gets confused and acquires reason to think that his degree of understanding of the conjecture is lower than he thought. But this time the decrease of the degree of understanding can also affect the compatibility of his understanding with the possibility of a counterexample to the conjecture. His putative understanding may be of a low degree because of being incoherent and containing one or more beliefs that are covertly inconsistent with the rest of his beliefs. But then he can be no longer sure that the possibility of a counterexample to the conjecture is compatible with his understanding; once the internal inconsistency is recognized, its effects can turn out to be far-reaching. No such threat is present with regards to his knowledge because any beliefs that are included in his knowledge must be true and thus mutually consistent. Consequently, it is just too risky for Bob to deny the expert's claim because he can easily say something false.

Chapter 4

In Chapter 1, we could see that both contextualist and relativist analyses of epistemic modals are subject to several problems, and it is thus worth asking whether the same problems persist even under the understanding-relative account. Let us first look at whether the understanding-relative account is compatible with group contextualism.

When we relativise epistemic possibilities to the understanding of a relevant group, we encounter difficulties in teasing out the nature of such collective understanding. In the case of collective knowledge, we could reduce such knowledge only to the union of all propositions that constitute the knowledge of any member of the relevant group. So, what epistemic possibilities are relative to was nothing but the set containing all c-relevant information. Consequently, we did not need to treat knowledge as an attitude which is ascribed to a group. But there is reason to think that a similar analysis of understanding is infeasible. This is especially so if we hold on to our aforementioned description of understanding as a non-factive attitude which cannot be reduced to the sum of beliefs because it also inevitably involves the grasp of inferential relations between these beliefs.[14] One could initially attempt to analyse understanding as inferential relations in set-theoretic terms, i.e. as

14 Inferential relations between one's beliefs certainly play an important role also in the justification of one's knowledge, but they are only in its background.

the sets of ordered tuples of propositions that stand in inferential relations to one another in one's belief system. Yet, to suggest that collective understanding amounts to the union of these sets would be unwieldy. As long as understanding lacks factivity, the union may contain contradictory beliefs. And as long as two people can demonstrate some degree of understanding even if their beliefs are in different inferential relations, two or more tuples representing incompatible inferences may clash in this union. As a result, collective understanding can become incoherent even if individual pieces of understanding of which it is composed are internally coherent: this is an unacceptable consequence.

Furthermore, the other ways to grasp collective understanding look unsuitable as well. If we analysed collective understanding as an intersection of the sets of inferential relations, it could become narrower in terms of its content than individual understanding. But then collective understanding becomes useless in resolving the objection from rejection and retraction: since Bob and Sally do not share beliefs about the possibility of the keys being on the table, that possibility would be compatible with their collective understanding. One could attempt to patch up this problem by proposing that collective understanding is an aggregate attitude governed by the majority rule, the common understanding of the majority in the relevant group. Sally's rejection would be an attempt to demonstrate that Bob's claim is unwarranted because his understanding is not the majority understanding.

Unfortunately, as List and Pettit (2002, pp.43-47) point out, the majority rule can be very deceitful when it comes to collective attitudes. Imagine that Agent 1 believes both P and Q, Agent 2 believes P and disbelieves Q and Agent 3 disbelieves P and believes Q. Then the conjunction introduction rule allows only Agent 1 to derive that $P \wedge Q$, so she is in the minority when drawing this inference. This is counter-intuitive because both beliefs in Q and beliefs in P are in the majority, so the group should be justified in inferring to $P \wedge Q$. Understanding makes this issue even more insuperable because as the understanding of P and Q separately involves the grasp of their mutual inferential relation, it cannot be countered that the group should first make clear what atomic beliefs its majority has and only then apply inferential rules to these beliefs.

It is noteworthy that cloudy contextualism fares here far better than standard contextualism because its explanation of the conversation between Bob and Sally does not depend on the existence of collective understanding. This is because even if cloudy contextualists acknowledge that the interpretation of Bob's claim as (32) is not admissible, Sally's rejection and Bob's retraction is still explainable by means of (31).

(31) As far as Sally understands, the keys might be on the table.

(32) As far as Bob and Sally understand, the keys might be on the table.

That is to say, Sally may reject Bob's claim because of interpreting it as saying the same thing as it would say if she uttered it, i.e. as (31). Bob may either accept this interpretation or reject it depending on whether he considers Sally's understanding as more pertinent to the purpose of the conversation than his own. No reference to (32) is needed. Standard contextualism cannot provide a similar explanation because it permits only one interpretation of Bob's claim from the outset.

Let us now proceed to the problem of embedded epistemic modals. I wish to make the following argument: implausible readings of embedded epistemic modals such as (5) arise because of the assumption that epistemic modals behave similarly like pure indexicals in the sense that there is a semantic rule such as the speaker-inclusion constraint which determines how context restrains their meaning. The understanding-relative account gives us reasons for abandoning this assumption, and thus solves the problem.

It should be granted that the speaker's knowledge/understanding is the most frequent candidate for c-relevant information. This can be partially explained by the fact that the presence of a speaker is a necessary condition for any successful utterance, so the speaker's beliefs present the most stable c-relevant information. But this fact by no means guarantees that the speaker's beliefs are always relevant. Embedded epistemic modals show this most distinctly. Consequently, we are justified in stipulating the speaker-inclusion constraint as a semantic rule only if we fall short of any other explanation which would account for the frequency of the speaker's inclusion as well as for the intuitive pull of the speaker's exclusion in the case of embedded epistemic modals. The transparency of understanding offers precisely such an explanation.

As Zagzebski (2001, p.246) notes, understanding differs from knowledge in one important respect: whereas knowledge is the subject of the internalist-externalist debate over whether epistemic justifiers of knowledge must be accessible to the subject, it is hardly conceivable that someone understands something while not being aware of her understanding. Hence, it seems sensible to say that understanding is transparent to the subject.

The following explanation now offers itself: the speaker of an utterance containing an epistemic modal most frequently refers to her own understanding because only then she expresses a belief about a possibility that is internally transparent. If she instead expressed a belief about a possibility that is relative to someone else's understanding, she would risk saying something false since an epistemic possibility, as it is grasped in other people's minds, is not well accessible to her. However, when an epistemic modal is embedded in a propositional attitude, it is clearly not supposed to express the speaker's belief about an epistemic possibility but rather to mention this possibility as being grasped by the subject whose attitude is reported, so the speaker can relativise it to the subject's understanding without facing a similar risk.[15]

Two things should be remarked in anticipation of possible objections to this argument. Firstly, even if Zagzebski's proposal of transparency is doubted on the lines that one often has an illusion of understanding and thus cannot be fully certain about its transparency[16], it still remains true that ascribing transparency to understanding is less problematic than ascribing it to knowledge. Secondly, the objection that this analysis makes all statements referring to a speaker's understanding immune to error, and therefore impossible to be false is misguided. Immunity to error means at most that the statement cannot be uttered falsely by the speaker, not that the very statement cannot be false. Whether the impossibility of being uttered falsely implies the impossibility of being false could be a serious question if I argued that Bob's claim is, in fact, the first-person indexical claim 'relative to my understanding, the keys might be on the table'. But this is not what I argue for. I can content myself with Bob's claim meaning 'Relative to Bob's understanding, the keys might be on the table'. Hence, the transparency of understanding does not entail that most of the claims containing epistemic modals are necessarily true.

Next, let us ask how the understanding-relative account sits with the problems faced by relativists.

First, the understanding-relative account neatly resolves the time lag problem. (7) is more difficult to reject as time passes because the possibility of the gardener being the culprit is about the distant past to the details of which the detective no longer has transparent access. That is to say, the detective no longer remembers the circumstances in which (7) was uttered and how the possibility of the gardener being the culprit was justified within her understanding of the events at that time.

15 It can be also said that embedded epistemic modals become contextually parasitic on the context of the subject's belief. It is not unusual for context sensitive expressions to behave like this. As Humberstone and Cappelen (2006, p.316) note, even the expression 'local' in 'my daughter confirmed that the local street food is indeed unsafe' remains parasitic on the daughter's context rather than on the context of the reporter.

16 See Grimm (2016, pp.516-518).

Hence, the detective is reluctant to reject (7) not because the expressed possibility would be compatible with her current understanding, but because she does not feel entitled to make that possibility the part of the content of her understanding.

Secondly, given that understanding has inferential structure, it can accommodate the inferential process that The Boss executes in his reasoning about Jack's and Zack's claims. The view that the only way he can inferentially employ these two claims is by accepting them as his beliefs seems to be short-sighted. Instead, we can turn to Foley's suggestion (2009) that attitudes involved in reasoning are not beliefs but assumptions. In that case, The Boss can only assume that his spies' claims are true in order to see what logical consequence they lead to. Afterwards, he can either accept this consequence as his belief and thereby reject his belief that A or C might be a turncoat, or reject it and reconsider instead his beliefs about the trustworthiness of his spies. Whichever decision would make his understanding consistent in terms of its inferential structure. Knowledge as a mere accumulation of true beliefs would not allow The Boss to manipulate his beliefs in such a structural manner.

Last but not least, the understanding-relative account also brings the prospect of treating the problems faced by cloudy contextualism. One tentative way to stop the regress in eavesdropper cases would be to set a minimal degree of understanding that anyone whose understanding can be c-relevant must possess. What degree is chosen can then ultimately depend upon the context of us, the attributors. If we adopt the contextual semantics for understanding-attributions, the complexity of factors that contribute to one's degree of understanding enables us to find such a degree which is met by the persons whose understanding we want to be c-relevant but unmet by the others. Presumably, this would give us greater flexibility than if we were supposed to set a tailor-made epistemic standard of knowledge-attributions that would be low enough so that, for example, the eavesdroppers and participants of the conversation would meet it, yet high enough so that meta-eavesdroppers would not meet it.

It should also be questioned whether cloudy contextualism still violates the principle of ratification even when it is modified to the following form:

A speaker is warranted in issuing an epistemic modal iff she would be warranted in assenting to such a claim, were she to hear herself utter it (provided that her knowledge and understanding remains the same).

This modification seems plausible because, on the example of *Situation 3* in the previous chapter, we could see that the belief in epistemic possibility can change also as the result of the change of understanding even if knowledge remains the same. Presumably, Bob can change his original interpretation of the claim only if his understanding of the matter changes somehow in response to Sally's claim. That cloudy contextualism invites him to do so is in full accordance with the modified principle. In a similar vein, we can explain why Bob is not warranted in sticking to his original interpretation of the claim after forgetting about Sally's claim. It is legitimate for him to insist on the original interpretation if his understanding of the matter remains the same even after Sally's reaction. However, unless Bob considers Sally's claim as completely irrelevant, which he does not, he is reasonably expected to change his understanding, so his interpretation should change as well. Forgetting Sally's claim and then sticking to his original interpretation presents the violation of these expectations.

Conclusion

In summation, this paper was an attempt to shed new light on the debate about the semantics of epistemic modals by proposing the so-far unexplored understanding-relative analysis of them. My strategy was to first present some reasons for preferring this analysis over the knowledge-relative analysis that should be persuasive for the proponent of any semantic approach to these expressions. I argued that, because of being an inferentially structured and non-factive attitude that comes in degrees, understanding can help us in resolving such issues as the translatability of Japanese epistemic modals, unreliable claims about epistemic possibilities or the problem of ignorance. Upon that, I tried to show that the understanding-relative analysis deserves more attention also because it re-frames the problems faced by the three main semantic approaches to epistemic modals. As we could see, group contextualism, as a type of standard contextualism that is immune to the objection from rejection and retraction, fails under this analysis unless a cogent account of collective understanding is provided. On the other hand, the analysis seems to be useful in dealing with the problems related to relativism and cloudy contextualism. I leave it as an open question which of these two theories the understanding-relative analysis fits in with better.

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