Some Remarks on the Degree of Certainty of the English Modals

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I

Until recently there have been many attempts to provide a precise characterization of modality in philosophy as well as in linguistics. Yet it cannot be said that the problems of modality have been thoroughly settled. One of the most problematic phenomena, for instance, with which many scholars have concerned themselves seems to be the semantic equivalence between two modals, or between a modal and an appropriate paraphrase. In particular, the semantic relationship and the related environments between *may* and *can* have been one of the subjects which many linguists have tried to account for without much success.

The purpose of this paper is to offer an explicit account of a degree of certainty of the English modals——among others, *may*, *can*, *must* and *should* in the epistemic sense. I will begin, with regard to this question, by making clear the differences between two alternative views which Leech and Lakoff have taken on this problem of epistemic *may* and *can*. And then I will point out that it would be necessary to revise Leech's proposal in some respects. In addition, my concern will be turned to the compatibilities between *must* and *should* in their epistemic uses within the framework of possible worlds semantics.

II

It is generally assumed that *may* and *can* in the epistemic sense are equivalent to *possible*. Are they then to be derived from the same underling structure? Yet on closer investigation we notice that the following sentences are not precisely synonymous to each other.

(1) a. The road may be blocked.
    b. The road can be blocked.
(2) a. It may fall down tomorrow.
    b. It can fall down tomorrow.

Sentences (1a) and (2a), according to Leech, express the possibility of a fact, whereas (1b) and (2b) express the possibility of an idea.[1] Thus, *may* can be paraphrased by 'It is possible ...', but *can* by 'It is possible for...to ...', as in (3).

1) Leech(1971), p. 75.

(3) a. It is possible that the road is blocked.
b. It is possible for the road to be blocked.

Apparently (3a) and (3b) are not to be related to the same underlying structure. Leech also goes on to claim that factual possibility is stronger than theoretical possibility by illustrating the following examples:[2]

(4) a. The pound may be devalued.
b. The pound can be devalued.

That is, sentence (4a) could be mentioned at a financial crisis, whereas sentence (4b) at any time. This account seems to be almost similar to Ehrman's claim that *can* is used to refer only to circumstance regardless of the occurrence of the action, whereas *may* "always refers to an openness to occurrence."[3]

However, the epistemic modals *may* and *can* are, as Leech himself acknowledges, so often interchangeable that we have much difficulty in drawing a distnction between both of them.[4] Thus it seems too much to say that *may* has a higher degree of certainty than *can* without considering different types of possibility as we shall consider later. In what follows, let us consider the alternative accounts put forward by Lakoff.

(5) a. Football players may be sex maniacs.
b. Football players can be sex maniacs.

Lakoff provides a somewhat plausible account of the semantic difference between *may* and *can* in opposition to Leech's elucidation. According to her,[5] sentence (5a) is truth-neutral, that is to say, it leaves the question of truth and falsehood of the statement open, whereas sentence (5b) implies the truth and falsehood of the statement it contains, and thus it is called truth-committed.

Furthermore, Lakoff shows the semantic difference between *may* and *can* in terms of different kinds of quantification. Sentence (5a) can be represented as (6) by using the quantifiers, and sentence (5b) is atucally triply ambiguous, so represented as (7a) to (7c) respectively.[6]

(6) a. Football players may be sex maniacs.

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2) Ibid., p. 76.
3) Ehrman (1966) tried to account for the meaning of the epistemic *may* in terms of two dimensions, that is, 'occurrence' and 'circumstance'. p. 23.
4) From the diachronic point of view (Visser, p. 1734), this results from the fact that many of the semantic changes of *may* and *can* have occurred through the history of the English language. The original meaning of *may* (OE *magan*) is 'to have the physical capability', the trace of which can be found in the noun *might* (=ability), whereas *can* in Old English (*cunnan*) was used to refer to 'mental or intellectual capability'. Hence, we can say that in the Old English period *may* is stronger than *can* in the epistemic sense.
5) Lakoff (1972), p. 230.
6) Ibid., p. 232.

$(\exists w)\ (\forall x)\ (\forall t)\ SM\ (x,\ t,\ w)$

where x=football players, w=worlds, t=times

(7) a. Any given football player sometimes is, sometimes isn't, a sex maniac.

$(\forall x)\ (\exists t)\ SM\ (x,\ t)$

b. Some football players are always sex maniacs, and some football players aren't.

$(\exists x)\ (\forall t)\ SM\ (x,\ t)$

c. Some football players are sometimes sex maniacs, sometimes not; and some football players are not.

$(\exists x)\ (\exists t)\ SM\ (x,\ t)$

As these examples demonstrate, with *may* there is quantification over possible worlds, but not with *can*. And the use of *can* implies truth in the speaker's own world, so it is falsifiable given the contrary evidence. Hence, Lakoff claims that *can* is stronger than *may* with regard to a degree of certainty, as opposed to Leech's accounts. What, then, makes two alternative views seem contradictory to each other? In the following section, our special attention will be paid to explicating this question more clearly.

III

Now let us consider the following sentences that show the use of *may*, in which possibility is expressed together with the element of doubt.

(8) a. It may rain tomorrow.

b. He said he thought it might rain.

c. I may be away from home tomorrow.

d. The news may, or may not, be true.

Evidently sentences such as (8a) to (8d) illustrate that it would be necessary to refine Leech's claim that the sentences which contain *may* have a higher degree of certainty than those which contain *can* in a straightforward way. This problem, then, leads to the necessity of subdividing the concept of possibility which epistemic modals *may* and *can* express.

Let us now turn our attention to the following that demonstrate the use of *may* to indicate a possibility that arises naturally, or as the result of arrangement. We notice, in this case, little or no element of uncertainty unlike the sentences in (8).

(9) a. You may go from A to B by changing trains at C.

b. Specimen copies of these of these books may be obtained on application to the publisher.

c. A plan of the new housing estate may be seen at the offices of the Town Council.

We can replace *may* by *can* in the case where the epistemic *may* refers to a possibility with no indication of doubt or uncertainty:

(10) a. You can go from A to B by changing trains at C.

b. Specimen copies of these books can be obtained on application to the publisher.

c. A plan of the new housing estate can be seen at the offices of the Town Council.

Judging from the sentences given so far, it follows that we can draw a distinction between general possibility as shown in (9) and (10) and occasional possibility as in (8). This is true of the epistemic modal *can*. It is possible that the epistemic *can* falls into two different types: general possibility and occasional possibility as shown in (11) and (12), respectvely.

(11) a. You can ski on the hills (because there is enough snow).
b. You can't bathe here on account of the sharks (*ie*, it isn't safe).
c. Can you get to the top of the mountain in one day? (That is, is it possible?)

(12) a. Measles can be dangerous. (Sometimes it is for it to be quite dangerous/sometimes it is quite dangerous.)
b. The Straits of Dover can be very rough. (It is possible for the Straits of Dover to be rough; this sometimes happens.)

The sentences (11a) to (11c) indicating general possibility show that the epistemic modal *can* seems to be stronger than *may* with reference to a degree of certainty. For this is quite different from the kind of possibility expressed by *may*. Since the use of the epistemic *can*, as Lakoff claims, generally implies truth in the speaker's own world, it can be falsifiable in natunal languages. With *may*, however, there can be no possibility of verification in other possible worlds.

Consider the following examples:

(13) a. A situation like this may occur from time to time.
b. A situation like this can occur from time to time.

These sententences illustrate that *may* and *can* are used to refer to actions that sometimes happen, that is, to indicate occasional possibility.[7] In this case, we cannot easily judge which of both modals has a higher degree of certainty. In fact, *may* and *can* in the epistemic sense can be, as Palmer points out[8], so often interchangeable because of the negative notion of 'no obstacle', and thus in this respect it seems to revise Leech's claim that *may* is stronger than *can*, with reference to a degree of possibility.

From what we have so far observed, we may draw the following conclusion: when the epistemic modals *may* and *can* are used to refer to occasional possibility, both modals have the same degree of certainty, but when they refer to general possibility, in particular as shown in (11), *can* has a higher degree of certainty than *may*. In other words, the epis-

7) Palmer (1979, p. 153) claims that *can* is never used for epistemic modality in assertive utterances in which only *may* is appropriate. Thus he treats *can* in (13b) as existential modality. For instance,
(a) Roses can be mauve. (Some roses are mauve.)
(b) The weather can be awful. (Sometimes the weather is awful.)
However, it seems to me that this is far from being obvious in all contexts.

8) Palmer (1974), p. 118.

temic *can* implies the speaker's own world, and we can, therefore, easily verify the truth of the statement, whereas *may* implies every possible world, which prevents us from confirming the truth of the given statement. Hence, we can say that Leech's suggestion appears to be too strong to accept, since the distinction between *may* and *can*, with reference to a degree of certainty, depends simply upon the factual/theoretical relationship.

In the following section, I will consider the compatabilities between *must* and *should* within the framework of possible worlds semantics. In their epistemic uses, *must* and *should* are semantically equivalent with a slight difference of meaning, according to the traditional accounts. Yet this is far from being obvious in a large number of contexts, and thus it would be necessary to explore this question any further.

IV

Just as *may* and *can* are put toghter in their epistemic uses, so *should* and *must* are both considered equivalent to *probable* in the same way. As a rule, the epistemic *should* has been assumed to be a weaker equivalent of *must*. This assumption as it stands, however, should be more explicitly investigated than has been generally considered.

First let us have a closer look at the following sentences:

(14) a. He must be home by now.
b. He should be home by now.
(15) a. He should be there, but he isn't.
b. *He must be there, he isn't.
(16) a. He works very hard, so he should pass his exam easily next year.
b. *He works very hard, so he must pass his exam easily next year.
(17) a. He looks quite exhausted, and he must have had no sleep last night.
b. *He looks quite exhausted, and he should have had no sleep last night.

As these examples show, sentences such as (14a) and (14b) are so often interchangeable, of course, with a slight difference of meaning; that is to say, *must* expresses a somewhat higher degree of certainty than *should*. Thus (14a) and (14b) are paraphrased by (18a) and (18b), respectively.

(18) a. I am sure that he is at home by now.
b. It is probable that he is at home by now.

Yet the epistemic modals *should* and *must* cannot be always replaced by each other, as shown in (15), (16) and (17). Hence, it seems necessary to examine more explicitly a variety of verbal and situational contexts in order to provide a precise characterization of semantic equivalence or difference between *should* and *must*.

The following examples illustrate that there are environments in which only one of both modals is appropriate.

(19) a. You must be crazy!

b. *You should be crazy!

c. This should be done by later this afternoon.

d. *This must be done by later this afternoon.

The epistemic ***should*** is, according to Lakff, used in the case of a probability based upon future expectation, whereas ***must*** in the case of a probability based upon present conjecture.[9] Similarly, in (16b) ***must*** cannot be used to refer to the probability an event located in the future.

Now let us consider the appropriate contextual environments of the epistemic modals ***should*** and ***must*** within the framework of possible worlds semantics. When a certain sentence which contains the epistemic modal ***should*** or ***must*** is generated by means of syntactic rules, the corresponding semantic machinery assigns a meaning to it. And the entity of a meaning assigned to the sentence is what we may call a 'proposition'. But in in this paper, I am interested, with regard to a proposition, only in the fact that it is either true or false in a possible world.

(20) a. It had started to rain.

b. They stopped playing tennis.

These two sentences demonstrate the relation of 'causality' between two propositions. In other words, sentence (20a) is the cause of (20b). In addition, it is possible to draw sentences (22a), (22b) and (23a), but not (23b) fram sentence (21).

(21) a. He has had no sleep for 48 hours.

b. He is quite exhausted.

(22) a. He has had no sleep for 48 hours, so he must be quite exhausted.

b. He has had no sleep for 48 hours, so he should be quite exhausted.

(23) a. He is quite exhausted and he must have had no sleep for 48 hours.

b. *He is quite exhausted and he should have had no sleep for 48 hours.

The sentences like (22) and (23) consist of two prpositions: the asserted proposition and the inferred proposition. If the speaker states the truth of a fact in the asserted proposition as in (22), it can be inferred from this that the event mentioned in the inferred proposition, has a good chance of realization. But he cannot state that clalm unequivocally, because he expresses his hypothesis in terms of a high degree of probability, rather than certainty.

Judging from the iliustrations given so far, it seems that with ***must*** the relation of inference can, as Rivière points out, work either from cause to consequence of from consequence to cause, exemplified by (22a) and (23a) respectively.[10] In contrast, with ***should*** the realtion of inference can work from cause to consequence as shown in (22b), but not from consequence to cause as in (23b). As have been mentioned earlier, the

9) Lakoff, p. 234.

10) Rivière (1981), p. 183.

epistemic modals *must* and *should* in their uses have much to do with time specification; that is, *must* and *should* are based upon present conjecture and future expectation, respectively. In general, time specification involves three notions of time: speech time, reference time and event time. Speech time is the time at which the utterance is made. Refernece time is the time from which the speaker invites his audience to consider the occurrence of the event. Event time refers to the time at which the speaker asserts the event described in the sentence to occur.

Now let us return to the examples such as (14), (15), (16) and (17) and have a closer look at them in terms of the relation of causality and temporal specification we have just assumed. When both *must* and *should* are permitted, as in (14) and (22), the inferred proposition is consequence. And the time of event is either simultaneous with or anterior to the time of speech in both of these sentences. Thus the relation between the temporal points associated with utterance of sentence (14) may be represented roughly as follows:

(24) S: Present RT: now RT=ST ET←ST, ET=ST
where RT, ST, and ET represent respectively the times of reference, speech, and event, and the arrow indicates anteriority.

Moreover, in such cases as (14) and (22) in which both *must* and *should* are allowed, it can be held that *should* or *ought to* is a weaker equivalent of *must*. In other cases, however, in which only one of both modals is appropriate, it seems necessary to explore in greater detail this problem of a degree of certainty between *must* and *should* in the epistemic sense.

In sentence (16), on the other hand, which allows only *should*, but not *must*, the inferred proposition is, beyond question, consequence. As we have seen earlier, *must* cannot be used to refer to the possibility of an event in the future. And this can be accounted for in terms of the relation of causality and time specification between two propositions as in the above cases. But it is the time relation between the speech time and the event time that determines the acceptatibility of (16a) and the unacceptability of (16b), In other words, with *must* in (16b) the time of event is posterior to the time of speech. We can represent the relation between the temporal points associated with the utterance of (16b) like this:

(25) *S: Future RT: next year RT→ST ET→ST ET: next year

The arrow in this representation stands for posteriority. Hence, it follows that the epistemic *must* cannot be used to refer to the actuality of an action which is based upon future expectation.

Now let us turn to the cases in which the inferred proposition containing *must* and *should* is the cause of the asserted proposition as opposed to the cases as in (16). The following examples show that only *must* is possible in these cases.

(26) a. He was absent from school today, and he must have caught a bad cold.
b. *He was absent from school today, and he should have caught a bad cold.
(27) a. An ambulance stops at his door, and he must be ill.
b. *An ambulance stops at his door, and he should be ill.

From the above sentences we notice that, since *should* and *ought to* allow of the possibility of non-occurrence, the inferred proposition which indicate the cause of the asserted propositions cannot contain the epistemic *should* and *ought to.*

To sum up, the semantic difference between *must* and *should* does not merely lie in the fact that the former has a higher degree of certainty than the latter in all environments; but rather, both modals are closely associated with the notion of causality and with the time specification, by which their uses are determined and the distinction between both modals can be drawn more explicitly, as we have already seen. And with regard to a degree of certainty, we are able to argue for the fact that certainty of the epistemic modal is the highest in degree when only *must* is allowed, as shown in (17) and (23), compared with the other cases.

V

As we have thus far observed, the epistemic modals can be aligned according to the degree of certainty that the speaker feels, ranging from necessity in the case of *must* to mere possibility in the case of *can* and *may.* In this paper I have argued, with reference to the question of the degree of certainty between *may* and *can* and between *must* and *should* in their epistemic uses, that there needs to be some further elaboration in order to provide a more explicit account of this problem. In particular, I suggest that the meaning of possibility which the epistemic *may* and *can* express, should fall into two different types: general possibility and occasioal possibility, since Leech's assertion that *may* is stronger than *can* seems to be too strong to accept in all situations. In addition to this, I have demonstrated that it would be necessary to investigate various cases any further so as to explicate the semantic difference between *must* and *should* in a consistent way.

References

Anderson, J. "Some proposals concerning the modal verb in English." In A. J. Aitken, A. McIntosh and H. Pálsson, eds., *Edinburgh Studies in English and Scots.* London: Longman, 1971. pp. 69-120.

Close, R. A. *A Referential Grammar for Students of English.* London: Longman, 1975.

Ehrman, M. E. *The Meaning of the Modals in Present-day American English.* The Hague: Mouton, 1966.

Greenbaum, S., G. Leech and J. Svartvik, eds. *Studies in English Linguistics for Randolph Quirk.* London: Longman, 1979.

Hornby, A. S. *Guide to Patterns and Usage in English.* London: Oxford University Press,

1976 (2nd. edn.).

Kratzer, A. "What 'must' and 'can' must and can mean." *Linguistics and Philosophy*, 1 (1977), pp. 337-355.

Lakoff, R. "The pragmatics of modality." *Papers from the Eighth Regional Meeting, Chicago Linguistic Society* (1972), pp. 229-246.

Leech, G. N. *Meaning and the English Verb.* London: Longman, 1971.

Leech, G. N. and J. Coates. "Semantic indeterminacy and the modals," In S. Greenbaum et al., eds. *Studies in English Linguistics for Randolph Quirk.* London: Longman, 1979. pp. 79-90.

Palmer, F. R. *The English Verb.* London: Longman, 1974.

Palmer, F. R. *Modality and the English Modals.* London: Longman, 1979.

Rivière, C. "Is *should* a weaker *must*?" *Journal of Linguistics*, 17(1981), pp. 179-195.

Smith. C. S. "The syntax and interpretation of temporal expressions in English." *Linguistics and Philosophy* 2(1978), pp. 43-99.

Thomson, A. J. and A. V. Martinet. *A Practical English Grammar.* London: Oxford University Press, 1980(3rd. edn.).

Visser, F. Th. *An Historical Syntax of the English Language.* Vol. 3. Leiden: Brill, 1978 (repr.).