On the nature of the epistemic readings of the Italian modal verbs: the relationship between propositionality and inferential discourse relations.

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0. Introduction

The present contribution deals with the epistemic readings of the Italian modal verbs *dovere* ('must') and *potere* ('may'/'can'). The two verbs show striking differences — both quantitative and qualitative — with respect to the possibility of epistemic interpretation, differences which have gone so far completely unnoticed in the — rather scarce — semantic literature on modal verbs in Italian. Even a cursory examination of corpus data shows that, contrary to standard assumptions, the occurrences of *potere* that are unambiguously to be interpreted epistemically, are much rarer than the epistemic/evidential readings of *dovere*, and, at least in the spoken language, tend to be limited to one particular syntactic pattern.

A careful examination of the data shows that the epistemic readings of the two verbs differ systematically along two semantic dimensions:

(1) The presence of an inferential evidential meaning and — consequently— the ability to function as trigger for the establishment of an inferential discourse relation between two discourse units (*evidentiality*).

(2) The belonging of the modal predicate to the propositional (or truth-conditional) part of the meaning of an utterance or to the non propositional (non truth-conditional) part (*propositionality*).

These observations, together with a reconsideration of the relationship between epistemic modality and deixis, lead us to conclude that the (so-called) "epistemic" interpretations of the verbs *potere* and *dovere* belong, in fact, to two semantically distinct kinds of modality and to hypothesise that they arise from different pragmatic processes.

1. "Relative modality" and the basic semantics of the modals

Before embarking in a detailed discussion of the Italian modals *dovere* and *potere* and their epistemic interpretations, I would like to say a few words on the basic semantics I assume for the modals. A sketchy and informal presentation will suffice, since the approach adopted is quite standard and well known and we need only flesh out those details which are really relevant for our point.

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Hughes & Cresswell (1968: 23) characterize absolute (logical or metaphysical) necessity as follows:

> "When we say that a certain proposition is necessary, we do not mean that, things being what they are, or the world being as it is, it cannot fail to be true; but rather that it could not fail to be true no matter how things were, or no matter what the world turned out to be like".

Not surprisingly, natural language necessity expressions such us as necessarily and must (or their Italian equivalents) are never used to convey that absolute meaning (modal logic textbooks excepted). Rather, as philosophers early observed, they are often used in a relative way, to convey the necessity of an entailment.

(1) a. If Alfred is a bachelor, he must be unmarried.
b. Alfred is a bachelor. He must be unmarried.

The utterance in (1.a) does not mean that if Alfred happens to be a bachelor in the actual world then he will be unmarried no matter what the world turns out to be like (2.a), rather it means that no matter what the world turns out to be like, if Alfred is a bachelor he will be unmarried (2.b):

(2) a. $B(a) \rightarrow \Box \neg M(a)$
b. $\Box(B(a) \rightarrow \neg M(a))$

We can regard (1.b) as a more implicit version of (2.b) where the first discourse unit restricts the modality expressed by *must* in the second unit to the worlds where the proposition 'Alfred is a bachelor' holds.

Implicit *relative modality* in discourse had been considered mainly as a source of logical and philosophical errors, until German semanticist A. Kratzer, in a series of seminal articles, made it the basis of an account of the wide variety of interpretations natural language modals receive. Basically, in Kratzer's approach necessity modals are taken to indicate that the argument proposition is necessarily entailed by (that is logically follows from) a set of propositions, called modal base (MB), or conversational background :

(3) Must/ Necessarily $(MB, \varphi) \Leftrightarrow \Box (MB \rightarrow \varphi)$

Likewise, the basic structure of relative possibility can be defined as follows :

(4) May/ Can/ Possibly $(MB, \varphi) \Leftrightarrow \neg\Box (MB \rightarrow \neg\varphi) \Leftrightarrow \Diamond (MB \wedge \varphi)$

A proposition is a possibility relative to a given modal base MB, if and only if the proposition is logically compatible with MB (they form a consistent set

of propositions). Sometimes, the conversational background may be expressed, as Kratzer remarks, by phrases such as *in view of*:

(5) *In view of the laws of our country,* you must pay taxes.

But most of the times the hearer has to infer it from the context and the co-text of the utterance. The various interpretations of the modals and their finer nuances can be expressed in terms of the different conversational backgrounds restricting the modal operator. Different varieties of deontic modality, for instance, can be expressed by appropriate modal bases including moral values, laws, customs, social expectations, etc.

The notion of relative modality is also particularly useful in the exploration of what the philosopher William G. Lycan (1994) calls *restricted alethic modalities*, which will turn out to be very important to our discussion. Lycan here uses the term alethic in a much wider sense than what is customary among linguists[1] to indicate those modalities that have to do with what is necessary or possibly the case *in view of facts of such and such kind*. To refer to this type of modal bases other authors, such as Katzer, prefer to speak of *realistic conversational background.*

Restricted alethic modalities range from very general physical or natural necessity (what is possible necessary in view of physical/natural laws) and possibility to very specific restrictions encompassing the full range of dynamic modalities - be they agent oriented (what is necessary possible in view of certain internal features of an agent) or circumstantial (what is necessary possible in view of certain facts of the external world). It is interesting to observe that the fine tuning of the restrictors that apply to each interpretation of the modals - that is the precise content of the modal base - is determined in the context of utterance[2]. Compare the following:

(6) a. Pavarotti can't sing. He has a sore throat.

b. Pavarotti can't sing. He's stuck in a traffic jam.

c. Pavarotti can't sing. The Opera House rescinded the contract.

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1 With the remarkable exception of Kronning (1996 & 2001), who adopts a similarly wide conception of the alethic domain.

2 As Lycan (1994: 195) remarks, "when the context fails to supply any very specific cue" for the determination of the modal base, "a modal assertion is often utterly pointless", as amusingly illustrated in the following quotation: ""And the insurance?" Callaway asked. "When may the beneficiaries expect to have the claim approved?" Dora smiled sweetly. "As soon as possible," she said, and shook his hand. (L. Sanders, The Seventh Commandment, quoted in Lycan 1994)"

To what extent languages encode the types of modal bases that are allowed for a certain modal lexeme remains a fairly open issue. On the one hand, the idea that every possible reading is encoded in the semantics of modal words is simply unrealistic, on the other the idea that modal lexemes are completely underspecified and all the readings are contextually determined seem to be disconfirmed by the fact that certain lexical items disallow certain types of modal bases (Cf. Papafragou 1998 & 2001). Between this two extremes there is still room for a number of alternative views.

2. Asymmetries in the epistemic interpretations of *potere* and *dovere*

Modern Italian grammars, and the few studies on the meaning of the Italian modal verbs (cf. Parisi, Antinucci & Crisari, 1975; Bertinetto 1979) usually discuss the possibility of epistemic interpretation of *potere* and *dovere* in parallel.

(7) a. Devono essere le cinque, visto che si sta facendo buio.
(It must be five p.m., given that it's darkening.)
b. Possono essere le cinque, visto che si sta facendo buio.
(It may be five p.m., given that it's darkening.)
c. Quel tale deve chiamarsi Giovanni.
(That fellow must be named John [= his name must be John]).
d. Quel tale può chiamarsi Giovanni.
(That fellow may be named John [= his name may be John]).

The examples given (the above are taken from Bertinetto, 1979) typically consist of utterances where the present tense indicative modal embeds a proposition relating an event with past reference, or a stative eventuality. As it has been observed in the literature these temporal and aspectual features of the modalized state of affairs should offer the most favourable environment for epistemic interpretations[3]. In fact, while the above examples with *dovere* are easily interpreted as epistemic and seem perfectly natural ways of expressing inferences with varying degrees of confidence, the situation with *potere* seems more complicated.

The examples with *potere*, while intelligible — they are interpreted as conjectures, more or less educated guesses — seem strikingly awkward and unnatural to many native speakers. Other markers of epistemic possibility

[3] With past or stative eventualities the dynamic or deontic interpretations of the modals seem to be ruled out for conceptual reasons (Cf. Papafragou 2001: 103).

such as the adverbs *forse* and *magari* ('maybe/perhaps') in this type of utterances seem much more natural:

(8) a. Forse sono le cinque, visto che si sta facendo buio.

b. Forse quel tale si chiama Giovanni.

Interestingly, the effect of awkwardness disappears when *potere* is not in the usual personal "subject raising" construction, but is found instead in a complementing construction with the modalized state of affairs in a complement clause (usually in the subjunctive mood) and the modal in an impersonal main clause with *essere* 'be' or *darsi* 'occur / be the case' as main verb:

(9) Può darsi che quel tale si chiami Giovanni .

These are strong, but rather opaque intuitions. It is not easy to figure out clearly what is wrong wit the personal construction of the present indicative of *potere* (henceforth *'personal* potere'). Especially if we test our intuitions with decontextualized constructed examples such as the above.

If we turn to corpus data we have the confirmation that personal *potere* is not a common way of expressing epistemic possibility, at least in the spoken language. If we look at the occurrences of the wordform *può* — the present indicative third person singular of the verb *potere* — in the LIP corpus of spoken Italian (De Mauro et al. 1993), we find that out of 715 occurrences of the word form 53 seem to have an epistemic interpretation (7,41%). Up to this point the figures do not diverge markedly from those of *dovere,* where we find only 25 clearly epistemic readings of the wordform *deve,* out of a total of 489 occurrences (5,11 %). More interesting patterns emerge if we look more closely at the epistemic occurrences of *potere*:

può darsi (che) + subjunctive finite clause:	28
può essere (che)+ subjunctive finite clause:	2
può essere/ può darsi in short replies:	10/4
Other constructions:	9

Jointly, the two impersonal constructions *può essere che* and *può darsi che* total 30 occurrences, with a marked prevalence of the second construction. In other 14 occurrences we find the reduced variants of the above constructions, which typically appear in short replies, such as (13):

(10) A: dipende dal tipo di lavoro che e' B: si' si' *puo' darsi*

(LIP: FA13, 142-143)

(A: It depends on the type of work B: Yes, it may be)

It is only in the remaining 9 occurrences that we find epistemic readings of *potere* more similar to the examples crafted by linguists:

(11) Tirana e' piccola vi ho detto puo' avere un trecentomila abitanti non piu'
(LIP: FD17, 123-124)
(Tirana is small, as I told you, it may have some 300.000 inhabitants, not more)

However, this residuum contains also occurrences, such as the following, which bear a strong resemblance to the impersonal pattern used in the short replies:

(12) A: certamente caso mai [il problema] e' di commerciabilita' del bene
B: ahah
A: quello puo' essere
(LIP: FA10, 118-123)
(A: Certainly. Rather this is a problem concering the marketability of the good B: Ah ah A: That may be)

The hitherto unnoticed prevalence of the two impersonal complementing constructions in the epistemic interpretations of the Italian *potere* has close parallels in other European languages. It is interesting to mention that a corpus investigation of German *können* and Dutch *kunnen* carried out by Nuyts (2000: 189-192) showed that "purely epistemic uses" of these two verbs "are exclusively correlated" with the impersonal constructions [*Es*] *kann sein* (*daß*) / [*Het*] *kan zijn* (*dat*), which are the exact equivalent of the Italian one[4].

3. Evidentiality and inferential discourse relations

It has been observed that the epistemic interpretations of necessity modal verbs like English *must* or French *devoir* have a strong evidential component, in that they are used to report an inference based on presently available evidence[5]. In Italian, epistemic *dovere* behaves just like *must* and

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4 The importance of this type of construction in French is also quite apparent. The complementing construction *Peut-être que* has lexicalized into a full blown sentence adverbial, which, in the spoken language, retains the complementizer *que* only when occurring in sentence initial position (cf. Nølke 1993: 146): *Peut-être que Paul a vendu sa voiture* vs *Paul a peut-être vendu sa voiture.* (Maybe Paul sold his car). Another impersonal construction of *pouvoir* , *il se peut que*, would also deserve close scrutiny, but this exceeds the limits of our present contribution.

5 Some authors such as Dendale (1994) and Nuyts (2000) have claimed that these verbs are primarily evidential rather than modal. The possibility modals aren't

devoir, giving rise to inferential discourse relations between utterances such as in (13),

(13) Luigi è in ritardo. Deve avere perso il treno.
(Louis is late. He must have missed his train)

where epistemic *dovere* helps establishing an inferential discourse relation where the second utterance is regarded as a conclusion derived from the first.

More precisely, the use of epistemic-evidential *dovere* always suggests that the source of speaker's knowledge for the embedded proposition is inference. This evidential meaning can be exploited in order to present the proposition as inferred from some other proposition (premise) in the immediately preceding or following co-text, or from some fact which is part of the contextually shared knowledge of the participants. The speaker may also keep the premises of his/her inference private, at least in part. So, epistemic *dovere* does not *encode* a discourse relation of inference. Rather it imposes a certain number of constraints on context that can be used together with other information to infer a coherence relation of evidence.

As the examples examined in section 2 already suggested, with *potere* in the personal construction it is difficult to establish this type of inferential discourse relations:

(14) Luigi è in ritardo. ?? Può avere perso il treno.
(Louis is late. He may have missed his train.)

The two utterances in (14) simply do not seem to form a coherent piece of discourse. One natural, very simple, line of reasoning to explain this difference between *dovere* and *potere* would be to say that the necessity — or better strong probability — value associated with epistemic *dovere* suggests the inferential relation, while the weaker possibility meaning of *potere* doesn't. This line of reasoning — as we will see presently — isn't entirely wrong, nevertheless it is contradicted *prima facie* by the behavior of the possibility adverbials and the complementing construction *può essere/ darsi che*:

(15) Luigi è in ritardo. Forse ha perso il treno.

(16) Luigi è in ritardo. Può darsi che abbia perso il treno.

With the latter markers it is easily to establish an inferential discourse relation, although this relation is different from the one established by

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generally considered evidential (see Nuyts 2000), but Tasmowski & Dendale (1994) argue for the evidential nature of the epistemic interpretations of French *pouvoir*.

dovere. In (15) and (16) *può darsi* and *forse* are used to introduce a conjecture that provides a hypothetical causal explanation of a datum presented in the preceding utterance[6].
In any case, the relation established by *può darsi* che and *forse* is by no means identical to the one established by *dovere*: the conclusion is put forth by the speaker with a weaker degree of confidence, and the implied "logical" link between the evidence and the conclusion may also be different.
Leaving aside the fine grained typology of discourse relations, we can say that on a more basic level we have to distinguish between epistemic modal expressions that favor the establishment of inferential relations (epistemic *dovere*, the epistemic sentence adverbials, the *può essere/ darsi che* construction) and expressions, such as *potere*, that do not favor the inference of such discourse relations by the hearer[7].

However, the impersonal construction of *potere* seems to convey a commitment that is *stronger* than bare possibility. For example if we try to substitute the impersonal *può darsi* with a personal *potere* construction in the following dialogue from the LIP corpus,

(17) C: mh ma forse un'aspirina? B: forse un'aspirina si' puo' darsi tu abbia ragione

(LIP: FB11, 42-43)

(C: mmh..but maybe an aspirin? B: Maybe an aspirin. Yeah, it may be that you're right!)

(18) C: mh ma forse un'aspirina? B: forse un'aspirina, si' puoi avere ragione

we get, instead of an act of guarded acknowledgment of the advice of the interlocutor, a chilling cold reply on the verge of irony which considers speculatively the bare possibility of A being right.

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6 At a more abstract level their functioning can be compared to that of classic Peircean abduction: (1) The surprising fact C is observed; (2) But if A were true, C would be a matter of course; (3) Hence there is reason to suspect that A is true. This is an inference schema that has been associated by some researchers also with epistemic "necessity" modals such as French *devoir* (Desclés & Guentchéva 2001), while other contend that *devoir* is more likely to be reduced to a deduction schema. In any case, the relation established by *può darsi che* and *forse* is by no means identical to the one established by *dovere*: the conclusion is put forth by the speaker with a weaker degree of confidence, and the implied "logical" link between the evidence and the conclusion may also be different.

7 It is interesting to mention that Nuyts (2001b: 392) remarks that also the complementing costructions of German *können* and Dutch *kunnen* in several occurences "serve to formulate (more or less) "logical" conclusions drawn from evidence or common sense arguments explicitly introduced in the preceding context (hence 'publicly available')."

It remains to be explained why *può darsi* and *forse* convey a stronger conviction than personal *potere*.

4. Negation, propositionality and *focus*

Further differences between the epistemic readings of *potere* and *dovere* emerge in their behaviour with respect to negation:

(19) a. Giovanni **non** deve essere uscito
(I infer that Giovanni hasn't left)
b. Giovanni non può essere uscito
(Giovanni cannot have left)
c. *Non può darsi che Giovanni sia uscito

When interpreted epistemically *dovere* is subject to obligatory neg-raising and cannot be semantically negated (19.a). This contrasts with personal *potere*, where the external negation construction is always interpreted as such, and neg-raising never takes place (19.b). Finally, preposing a negation to a *può darsi* construction results in an ungrammatical sentence (19.c).

Since negatability is usually taken as one of the tests for propositionality, there is a reason to suspect that *dovere* differs from *potere* (and correlates with *può darsi*) also with respect to this dimension.

These results seem confirmed if we look at the behavior of *dovere* and *potere* with respect to dialogical acts of denial, that is to say when we try to establish a dialogical relation of direct contradiction:

(20) a. A: Giovanni deve essere uscito. B: Non è vero. * Non deve esserlo.
b. A: Giovanni può essere uscito. B: Non è vero. Non può esserlo.

In (20.a) the denial (*That's not true.*) cannot take the epistemic modality expressed by dovere as part of its (anaphoric) argument and takes scope only over the embedded proposition (as the impossible continuation **Non deve esserlo* shows), while in (20.b) the modality expressed by *potere* falls under the scope of the denial.

For Lambrecht (1994: 52) the denial test above ("lie-test") singles out "that portion of the utterance which is presented as new, not the portion which is grammatically marked as to be taken for granted". So, the tests in (19) and (20) would show that epistemic *dovere* cannot be part of the *focus* as of the utterance as opposed to its (pragmatic) presupposition[8].

[8] Cf. in Lambrecht (1994) the definitions of 'pragmatic presupposition' (p. 52) and 'focus' (p. 213).

Other data seem to suggest that epistemic *dovere* can be neither included in the presupposed part of the utterance:

(21) a. ?? Che cosa dev'essere successo ieri notte in cortile?

b. Che cosa può essere successo ieri notte in cortile?

(What must/could have happened last night in the courtyard?)

As observed by Kronning (1996) for French *devoir*, epistemic *dovere* cannot appear as the *datum quaestionis* of a wh- question, while *potere* seems acceptable in this function.

In the light of the above observations, the status occupied by epistemic *dovere* with respect to the communicative articulation appears rather special, as it belongs to neither presupposition or focus. A similar status has been attributed, for example by Mel'cuk (2001), to various non-propositional *performative* elements.

While the characterisation above remains true of the vast majority of inferential uses of *dovere*, one can find certain contexts where inferential *dovere* can be the focus of the utterance. These are occurrences in which *dovere* seems to be associated with logical inference and strong conviction:

(22) Se affermo che [una proposizione] e' falsa, la sua negazione DEVE essere vera. (adapted from LIP: FC6, 390-393)

An explanation for this anomaly will be proposed in the next section.

6. Two types of epistemic reading

Propositional epistemic modality as it can be expressed by mental state predicates such as *think* or *believe* - when they are not used parenthetically and do not undergo neg-raising - can be rightly described as a discourse about beliefs. This discourse about beliefs can be about the beliefs of the speakers, the beliefs of the hearer or those of another subject. In the case of personal belief verbs the subject and the person of the verb indicate clearly who is the subject of the mental state.

It is useful to mention these trivialities about the propositional readings of mental state predicates in order to better appreciate how different and how complex is the situation with the epistemic modals.

Epistemic readings of the modals, in contrast with other readings, appear to be *deictic*, in the sense that they always refer to the beliefs of the speaker (excepted free indirect speech and like deictically shifted contexts), and this deixis is completely independent from the personal deixis encoded in the verbal morphology of the modal. In this respect they behave like deictic epistemic sentence adverbials such as *forse* ("perhaps"/ "maybe") or *probabilmente* ("probably").

A. Papafragou (2001: 119) argues that the "element of indexicality" that characterizes epistemic readings , what we called personal deixis, is responsible for the impossibility of the occurrence of epistemic modals within reported speech[9]:

(23) ? Mary told us that Alfred must be secretely seeing Barbara

Papafragou also contends that the fact that epistemic modal verbs "are used for the on-line performance of an inference on the part of the speaker" (ibid.) should explain why epistemic modals cannot occur within the protasis of a conditional:

(24) ? If John must have a high IQ, then his teacher should treat him carefully.

In this case it should be noted that the deixis concerned isn't anymore mere personal deixis: protases containing, for example, *I believe p* are unusual but by no means impossible. What makes conditional embedding impossible is the fact that the speaker presents the modalized proposition as inferred at the moment of the utterance.

The deictic nature of the epistemic readings of the modals seems to be tightly connected with their non-propositionality .

When we move to the alleged epistemic readings of *potere* in the personal construction we have to take into account the fact that these readings are, has we have seen above, clearly propositional. It is therefore natural to ask ourselves if the "epistemic" readings of *potere* can function as a discourse about beliefs like the propositional readings of the mental state predicates. It is also natural to ask if they are deictic, like the non-propositional epistemic *dovere*, and in case they are, how exactly this deixis works. Let us consider one of our initial examples of epistemic *potere*, taken from Bertinetto (1979):

(25) Giovanni può essere uscito.
(Giovanni may have left.)

Both the negative and the interrogative version of this sentence are fully acceptable, and intuitively seem to express the same type of modality of the affirmative sentence:

(26) a. Giovanni non può essere uscito.
b. Giovanni può essere uscito?

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[9] The same line of reasoning could be taken to explain why in Italian epistemic *dovere* cannot be questioned, as asking others about our own beliefs generally does not make much sense.

Is that an epistemic modality? If we take, as linguists normally do, epistemic modality as synonymous of the modality of belief, what some logicians prefer to call *doxastic* modality, epistemic possibility should be construed as the compatibility of the embedded proposition with the set of beliefs forming the epistemic conversational background. Let us refer to this modality as *epistemic-d.*

In other words *Giovanni può essere uscito* is interpreted as saying that the proposition 'Giovanni has left' is consistent with the set of believed propositions that make up the modal base.

Whose beliefs are they? In the affirmative sentence we can maintain that the modality refers to beliefs of the speaker, but in the interrogative this solution becomes incongruous: the speaker cannot be taken as asking someone else about the consistency of a proposition with his own belief set. A possible solution would be saying that in the interrogative the beliefs in question are instead those of the addressee. If this were the right solution we would have a very peculiar change in the type of deixis associated with *potere*, which would refer to speaker's beliefs in the assertive and to addressee beliefs in the interrogative. This unusual shift would indeed account for the coherence of question-answer relations such as the following:

(27) A: Giovanni può essere uscito? = Is 'Giovanni has left' consistent with the beliefs of B?

B: Effettivamente, può essere uscito. = In fact, 'Giovanni has left' IS consistent with the beliefs of B

However, this solution will leave us with a serious problem when faced with assertion-denial relations. If we maintain that in the assertive the modal refers to speaker's beliefs we would have the following:

(28) A: Giovanni può essere uscito = 'Giovanni has left' is consistent with the beliefs of A.

B: No, non può essere uscito. = 'Giovanni has left' IS NOT consistent with the beliefs of B.

This would mean that B isn't in fact negating the proposition asserted by A, but is instead negating another proposition altogether. So, this would not be a denial at all. If we try to fix things by stipulating that somehow in a denial, unlike normal assertives, the modal refers to the beliefs of the addressee, the situation becomes even worse:

(29) A: Giovanni può essere uscito = 'Giovanni has left' is consistent with the beliefs of A.

B: No, non può essere uscito. = 'Giovanni has left' IS NOT consistent with the beliefs of A.

This analysis cannot be correct, as B is clearly not objecting that the proposition is inconsistent with the beliefs of A, as she would be doing if she said something like *No, in fact, you don't believe that Giovanni has left*.

There is a straightforward way to solve our impasse: to admit that the above discourses are not about beliefs but about facts. So, the propositional modalities that we have been discussing are not epistemic-d. If we substitute 'the beliefs of A/B' with 'the facts' in the above paraphrases all the problems disappear. The solution is to say that we are confronted with a particular type of *restricted alethic modality*, or, as Kratzer would say, a *realistic conversational background*.

What type of facts constitute the conversational background of the so-called "epistemic" readings of *potere*?

Sometimes there is a quite clear relevant category of facts with which the modalized proposition is said to be compatible, as in one of the few epistemic-looking examples from the LIP corpus:

(30) Tirana e' piccola vi ho detto puo' avere un trecentomila abitanti non piu' (LIP: FD17, 123-124)

Here the speaker is saying that the size of the town of Tirana is compatible with a population up to 300.000, not more. However, it seems that the set of relevant facts may be left much vaguer, as in our preceding examples.

One might want to say that the modality expressed by *potere* is an *epistemic* modality in the logician's sense, as opposed to *doxastic* modality. In this acception, a proposition is epistemically possible when it is consistent with *what is known*, that is to say with *those beliefs which are true*, or, to put it in another way, with *those facts which are known facts*. As Kratzer (1981) points out, such an epistemic conversational background, let us call it *epistemic-k*, is a subset of the realistic conversational background.

However, an epistemic-k conversational background may not be the right one to account for the truth conditions of *Giovanni può essere uscito*. In fact, in an exchange such as (28-29) B may very well contradict *Giovanni può essere uscito* when this proposition turns out to be incompatible with some new fact that was unknown to A. In this case the truth-conditions of *potere* would be better accounted for by a looser, more flexible notion of *available facts*.

In any case, the so called "epistemic" interpretations of *potere* in the personal subject rising construction have an *alethic, realistic* modal base.

In fact, to the extent to which it really occurs, the use of personal *potere* as an expression of an epistemic attitude of the speaker towards a proposition

may well be seen as arising from an implicature[10]. Under certain contextual conditions , from the fact that the speaker asserts 'p is compatible with a certain set of real world facts', the hearer may be entitled to infer that the speaker intends to communicate his/her degree of commitment towards the truth of proposition p, and more precisely that he/she does not subscribe to the falsity of p. The restricted alethic modality giving rise to such an implicature may be either a dynamic modality or a more abstract alethic modality.

If we move to considering the epistemic interpretation of the Italian necessity modal *dovere* we can remark two relevant facts:

(1) Since epistemic *dovere* is non-propositional it cannot be questioned and cannot be in the target of a dialogical contradiction. This means that we do not encounter the problems that lead us to conclude that "epistemic" *potere* is not about beliefs and to hypothesize a restricted alethic conversational background for it.

(2) The hypothesis of an alethic conversational background for epistemic *dovere* not only is unnecessary, but is also squarely incompatible with the way epistemic *dovere* is interpreted in actual discourse.

In the case of *potere*, if we consider a proposition p to be consistent with the set of known facts, the addition of a new previously unknown fact to the base can still make it inconsistent. This is in accordance with our intuition that the propositions modalized by *potere* are not established facts. On the contrary if we take *dovere* as expressing that the modalized proposition p logically follows from (is necessarily entailed by) the set of known facts, p will always continue (monotonically) to be a consequence of the modal base, no matter how this base is augmented with new facts. According to this interpretation, propositions modalized by epistemic *dovere*, would correspond to the highest degree of certainty, which is not the case. The conclusions marked by epistemic *dovere* have a degree of certainty which is considerably weaker than that of simple non-modalized conclusions.

How can we account for the weakness o epistemic dovere? Is it possible to maintain that the basic semantics for necessity modals holds also in the case of epistemic *dovere*?.

It is possible to maintain the basic semantics of necessity verbs if we consider epistemic *dovere* as a means of presenting a proposition p as logically following from a particular type of epistemic-d modal base containing not only propositions that are firmly believed by the speaker, but also a wide range of assumptions to which the speaker subscribes with a varying degree of certainty. We follow Papafragou (1998 & 2001) in

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[10] A similar hypothesis has been formulated, on partially different grounds, to explain the diachronic development of the English modal *may*. Cf. Bybee, Pagliuca & Perkins (1994: 197-199).

considering these epistemic uses a particular case of *metarepresentation* where the proposition p is not used " as a truth conditional representation of a state of affairs in the external world but as a representation of an abstract hypothesis, which is considered to be [...] entailed by the speaker's set of beliefs" (Papafragou 2001: 70).

In fact, focusing the attention on the relations between our beliefs as such rather than simply presenting relations between facts within our representation of the world, can be relevant exactly when we want to deal with beliefs we subscribe to with only a limited degree of certainty and that we want to keep apart from facts.

For the modals, as opposed to the belief state predicates, the possibility to refer to beliefs as such is tightly connected with non-propositionality[11]: the so-called epistemic *potere* is propositional and cannot refer deictically to the beliefs of the speaker, while epistemic *dovere* seems to be able to refer deictically to speaker's beliefs exactly because it is non-propositional.

The fact that it is possible to focalise *dovere* in the rare instances where it is used to express a demonstrative inference strictly based on a logical consequence turns out to be consistent with our hypothesis. Occurences such as (xx) examined above, while signaling an inference on the part of the speaker, can be seen as instances of epistemic-k necessity and are therefore perfectly compatible with alethic necessity (restricted by the conditional) and do not need to refer to speaker's beliefs qua beliefs. When the modality expressed it is clearly not compatible with an alethic reading focalisation is squarely impossible:

(31) *Luigi DEVE avere si e no trent'anni.
(Luigi must be around thirty, at most)

Also the fact that non-propositional markers of epistemic possibility tend to signal a degree of certainty stronger than bare possibility can be accomodated quite naturally in the picture that is emerging from our data.

One of the effects of non-propositionality seems to be that, in a certain sense, the proposition which is the argument of the modal can be taken as an independent act of communication. Back in the Seventies, Joan Hooper introduced the notion of *assertive predicates* (Hooper 1975) to characterize the behavior of this type of non-propositional epistemic markers: an

[11] This move of a linguistic item from describing real-world relations to signalling inferential relations has been characterised by many authors as an instance of subjectification, understood as the synchronic or diachronic tendency to develop meanings "based in the speaker's subjective belief state or attitude toward what is being said and how it is being said" (Traugott 1999: 1). According to various authors, an outer sign of the subjectification of a meaning is its becoming non-propositional.

epistemic predicate is a predicate whose propositional argument is taken as being asserted by the speaker with a varying degree of conviction. One interesting side-effect of *assertiveness* on the interpretation of the non-propositional *Può darsi che* complementing construction, is that it cannot normally be taken as indicating a very remote possibility.

8. Conclusions and open issues

It is now time to present the conclusions we can draw from the analyses carried out above, tentative, partial and provisional as they may be.

(1) The Italian modal verbs never express epistemic modality propositionally. To put it in a more intuitive way, this means above all that Italian modals cannot be used to make statements about the speaker's knowledge, beliefs and cognitive processes. This sets apart the modals from mental state or mental operation predicates, which can be used to describe the cognitive states of the speaker and those of other subjects — even if they are not always used that way .

When the Italian modal verbs do express epistemic modality this happens in two distinct ways. With the verb *potere* in its personal construction epistemic modality appears as an invited inference of certain, more or less generic, alethic readings. In these occurences the basic modality expressed propositionally by the verb remains squarely alethic (non doxastic), what is asserted — and can be debated — is the compatibility between a certain set of relevant facts and the state of affairs presented in the embedded proposition.

With the verb *dovere* and the impersonal constructions *può essere/darsi che* a certain type of epistemic modality, which I would call doxastic-evidential appears as a consequence of the non propositional status of the modal: the embedded proposition acquires the autonomous state of an asserted propositional content, and the modal functions as (a partial manifestation of) an higher level predicate which situates the proposition on the backdrop of the inferential processes of the speaker and, if it is the case, relates it with other utterances in the text [12]. This operation, which can take place in different ways. In the case of *dovere* the acquisition of a non-propositional meaning appears to be mainly or exclusively a fact of pragmatic interpretation[13], while

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[12] This means that the epistemic modal assumes a pragmatic role that resembles to that of the 'rhetorical predicates' or 'rhetorical relations' in the theories of discourse relations. This is an important theoretical point we cannot elaborate on here. See Rigotti and Rocci (2001) for a theoretical discussion of these *pragmatic* predicates.

[13] Epistemic readings have consequences on the scope of negation, and, more generally on topic-focus articulation, but do not seem to be encoded in syntax proper.

in the case of *può essere/darsi che* we are most probably in the presence of a *construction* in the technical sense of a conventional form-meaning association characterized by lexical, syntactic, semantic and "pragmatic" features. While epistemic *dovere* is obligatorily subject to neg-raising the *può essere/darsi che* construction is simply syntactically non negatable.
A further degree of grammaticalization of non-propositionality, which does not directly concern the Italian modals, is the true syntactic parentheticality — or "syntactic orphanage" — that characterizes sentence adverbials such as French *peut-être (que)*. At this stage the non-propositionality of the element is fully encoded in the syntax.

In closing, I would like to mention one of the many interesting issues that were not addressed in this paper. I did not discuss the issue of the inferential interpretations of the Italian modals in the conditional mood: both *dovrebbe* and *potrebbe* allow for a certain type of inferential reading, which seem however quite different from that of their indicative counterparts.

The discussion of these readings would require further considerations on the complications brought in by the conditional element and I save it for another occasion.

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