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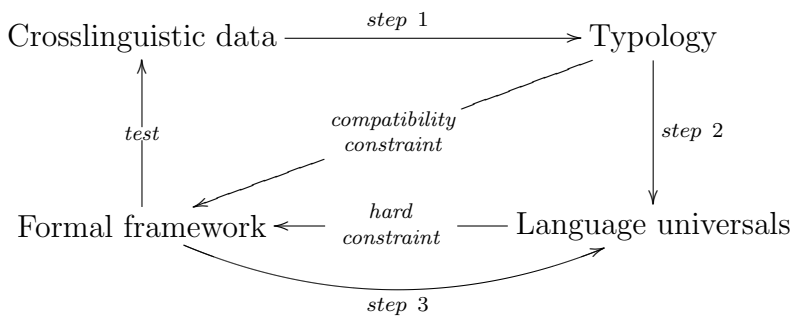
Conclusion

Before formulating in some detail what has been achieved in this dissertation, I will give a short overview based on the comments on the typological approach of section 1.1.3. I therefore repeat here the characterization of this approach by (Croft 2003, p2) and figure 1.1 that incorporates this characterization within the methodology of this dissertation.

1. typological classification based on surface structure (descriptive part)
2. typological generalization (language universals)
3. functional-typological approach (external explanation of the universals)



The first step consisted in the description of the six modal systems and the confirmation that the chosen typology of modality was correctly describing the relevant categories encountered in the data. The second step was to acknowledge the fact that based on this typology we can formulate an unrestricted universal on the combinations of modal items. Finally the last step was to provide a formal semantic framework where the restrictions on combinations of modal items are accounted for.

As promised in the introduction, I will now sketch the last step of this method which consists in making explicit the relationship between on the one hand the data of the languages and on the other the typology and its language universals. The method used to connect both kinds of information is the construction of a semantic map. A semantic map consists of two parts: first the structure of the typology which is represented in a diagram form (called the semantic or conceptual space) and second the language-particular information represented by "bounded regions on the diagram" (Croft 2003, p133). Instead of using the labels of the typology (participant-internal, external, etc...) we can actually use the operators of the last chapter (to which I add the operator *need* as label for the dual of *able* and the epistemic necessity *must* which has been left undefined). The links between the modal meanings express that some modal element in some

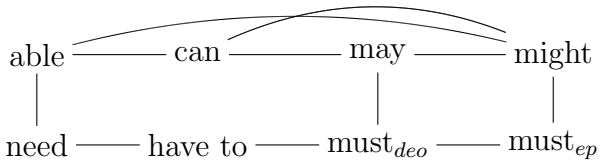
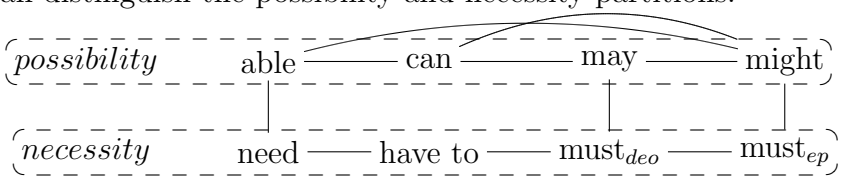
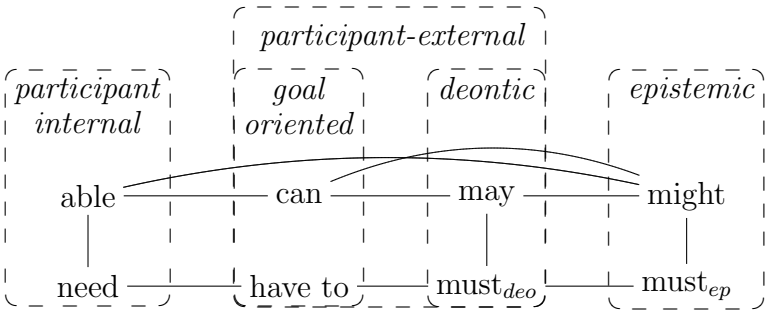


Figure 5.1: Semantic space of modality

language could express both linked meanings. The other way around, if there is no direct link between two values it means that we have not found any language where a modal element only expressed these two meanings without expressing the intermediate meanings too. For instance, there is no direct link between the participant-internal *able* and the deontic possibility *may* as none of the languages of the sample has a modal item expressing both without expressing goal-oriented possibility. The diagram can be partitioned in two different ways. On the vertical axis, we can distinguish the possibility and necessity partitions.

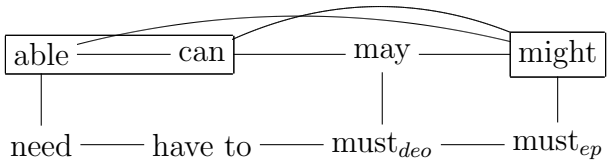


On the horizontal axis we can distinguish the different types of modality discussed in this dissertation.



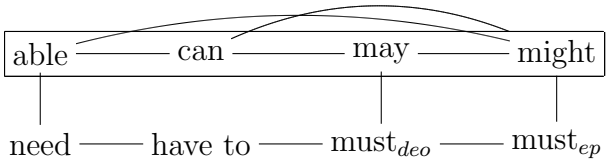
We can now represent language-specific information as bounded regions of the semantic space. I will present one instantiation of the semantic map for every language.

(27) *kunnen* (Dutch):



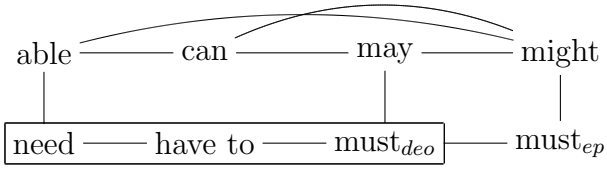
The Dutch possibility modal *kunnen* is the reason why there is a link between the goal-oriented *can* and epistemic *might* in our diagram. This possibility modal does not express deontic modality (the dedicated deontic possibility modal being *mogen*). We can see that the polyfunctionality of a modal item amounts to its domain covering more than one type on the horizontal axis.

(28) *sìgán* (Gbe):



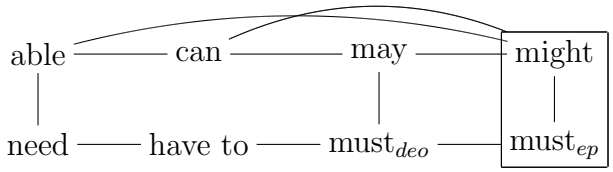
The Gbe possibility modal *sìgán* is a good example of a fully polyfunctional modal item. It covers the whole axis of possibility meanings. The necessity modal *ɖó-ná* follows the same pattern for necessity.

(29) *-ya hata* (Korean):



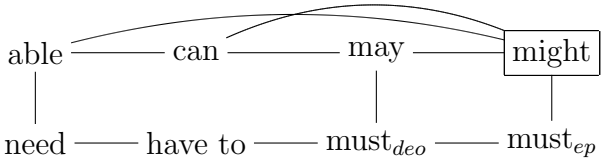
The Korean necessity modal *-ya hata* covers participant-internal and external necessity but does not express epistemic modality. The link between the ability meaning *able* and epistemic *might* accounts for the behavior of the Korean possibility modal *su issta* that in its standard use expresses participant-internal and epistemic modality. However, we have already mentioned that the situation might be more complicated. It is quite certain that this modal cannot express goal-oriented modality but it can express deontic modality, although only to express deontic necessity in special negative constructions (Wymann 1996b, p111-113). The question is thus whether this deontic reading occurs in fossilized constructions (which is the choice made for the current semantic space as *su issta* does not express deontic modality in stand-alone constructions) or whether these constructions can be decomposed into negative elements and a full-fledged deontic modal *su issta* (in which case the link in the semantic space should not be between *able* and *might* but between *able* and *may*).

(30) *-k'a* (Lillooet):



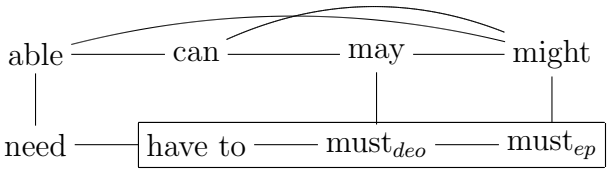
The Lillooet enclitic *-k'a* exemplifies a peculiar behavior with respect to the other languages of the sample. The enclitic is not polyfunctional but instead covers two meanings on the vertical axis: it can express both necessity and possibility. The same is the case for the deontic enclitic *-ka* and for the participant-internal circumfix *ka-...-a*. The problem for our framework will thus be to explain why the necessity reading is the default one.

(31) *herhalde* (Turkish):



The Turkish epistemic possibility adverb *herhalde* covers only one coordinate of the semantic space. This is a very common pattern as we have seen that all the languages of the sample have an equivalent adverb expressing the same meaning. Notice also that the Turkish verbal suffix *-AbIl* is fully polyfunctional. The situation is less clear for the necessity suffix as the epistemic meaning only occurs in verbal constructions. I will leave this decision (whether it is polyfunctional or not) for future work. It is however important to notice that whatever the outcome will be, it can be accounted for in this model.

(32) *ttau* (Tuvaluan):



Finally, we conclude this short overview of language-specific modal elements with the Tuvaluan necessity modal *ttau* which can express all the necessity meanings but the participant-internal one. With the help of the semantic map we can now easily compare (parts of) the modal systems of different languages. The modal meanings of our update system form the semantic space and language-particular modals are bounded regions of this space. Based on this representation and our data we can also formulate a new (tentative) unrestricted universal:

> Modal elements can only have more than one meaning along a unique axis of the semantic space: they either vary on the horizontal axis and thus are polyfunctional in the original sense of expressing different types of modality or they vary on the vertical axis and can express possibility and necessity, but they cannot vary on both axes.

I will now recapitulate what has been done in this dissertation. In the first two chapters, I have successively introduced the core ideas of the typological

approach to linguistics, discussed some typologies of modality and presented the modal systems of six languages from different phyla. The sample of languages was chosen so as to show some of the diversity of the syntactic/semantic interface of modal systems. Part of the motivation for the second chapter was to provide a description of the salient features of the modal systems of those six languages and to provide the relevant references in the literature in the hope of facilitating future work on modality. The chosen typology (a simplification of (van der Auwera and Plungian 1998)) proved to be an adequate tool to investigate and classify modal items within languages. Finally, I gave the status of unrestricted universal to the scope order of combinations of modal items:

Epistemic > *Participant-external* > *Participant-internal*.

Obviously, the size of the sample is not consequent enough to treat this claim as a linguistic truth. However I consider this claim to be solid enough (particularly in view of its explanation sketched in the last chapter) to place the burden of proof on anyone who would like to challenge it.

In the third chapter, I presented the truth-conditional framework of modality developed in (Kratzer 1976) up to (Kratzer 1991) and its extensions, in particular the treatment of goal-oriented modality as proposed in (von Fintel and Iatridou 2004). I have presented the following problems for this framework: the unwarranted entailments of ability statements with an embedded disjunction, the entailment of ability sentence from their epistemic counterparts, the presence of deontic sentences in natural candidates as deontic ordering sources, the problem of trivially true conditionals with deontic modality and goal-oriented modality, a problem for goal-oriented possibility and most importantly the problem of combinations of modal items. If there is only one thing to remember from this chapter, it is that the standard framework cannot as it stands account for the pattern of combinations of modal items.

In the last chapter, I presented an update semantics framework of modality. This system is based on the idea that a polysemous framework is better suited to account for the data and that the dependence on the context is relevant across the board but only when a polyfunctional modal is used. Furthermore the different types of modality operate on different layers of the architecture and therefore the pattern of combinations of modals is easily accounted for. Epistemic modality is a type of modality that operates on the top level of the architecture, the information state (which represents all the information an agent is aware of). Participant-external modality operates on the plans of the possibilities of the information state. Participant-internal modality works just as a plain declarative sentence but with an extra consistency check with respect to the goal-oriented modality system. Furthermore this framework solves naturally most of the problems encountered with the standard framework and some more such as free choice permission.

Obviously, the update semantics framework in its current state is just a toy example of what a fully-fledged modal system should look like. The basic archi-

tecture is solid but a lot of additions and improvements are still needed. First some modals and types of modality have just not been discussed in this dissertation and would need to be added to form a more complete picture. I have for instance not treated bouletic modality i.e. the type of modality concerned with desires. Furthermore I have not provided a semantics for epistemic necessity (I just suggested that it should probably be inspired by the treatment of defaults in (Veltman 1996)). Thus far the additions that are needed to complete the coverage of the framework. Furthermore the system needs improvements to become more than a toy example. For instance in the case of participant-external modality we would need to be able to distinguish between different agents.

(33) Malcom must walk the dog and Dewey must clean his room.

In particular, the update with the previous sentence in your information state should result in the update of Malcolm and Dewey's respective deontic plans and not of yours as is the case in the present situation. Our framework only deals at this point with the plans of the addressee and as such cannot distinguish between different agents. Finally, it is necessary to add something to represent information about other agent's information. The obvious way to do that would be to add an information state at some level inside the main information state (probably as an extra element of possibilities) for every relevant agent in some situation. Notice that this does not necessarily lead to problems of circularity in this framework as the embedded information state does not necessarily need to contain information states itself.

All in all it is quite clear that a lot of facets of this framework can be improved. However, with all its faults, the framework is faithful to the idea that any theory of modality should first and foremost be able to describe and account for the language universals concerning modality.