**Or and modals**

Sentences in which modal verbs and *or* coordinations interact pose two problems, which we demonstrate by considering their interpretations. First, consider the non-disjunctive reading of modal *or* sentences (in the case of *may/or* sentences, also called the free choice reading). This occurs with both wide or sentences (exs. a.-b., g.-h.), in which *or* conjoins two modal clauses, and narrow or sentences (exs. c.-f., i.), in which a phrasal *or* coordination occurs in the scope of a modal. On this reading, the weak modal sentences a., c. and g. have the “conjunctive” truth conditions represented in (1); sentences b. and e. have the truth conditions in (2):

(1) \( \diamond \text{sing}(j) \land \diamond \text{dance}(j) \)
(2) \( \square \text{(sing}(j) \lor \text{dance}(j)) \)

The first problem is a purely semantic one: the truth conditions in (1) cannot be derived given standard accounts of modals and *or*. The second problem concerns the syntax/semantics interface: how are the truth conditions in (2) derived compositionally from both wide and narrow *or* sentences? This second problem is compounded by the observation that modal *or* sentences (with an exception to be noted below) also have a disjunctive reading. (3) and (4) represent the disjunctive readings of a./c. and b./e., respectively.

(3) \( \diamond \text{sing}(j) \lor \diamond \text{dance}(j) \)
(4) \( \text{\neg sing}(j) \lor \text{\neg dance}(j) \)

We thus must account for an ambiguity in both wide and narrow *or* sentences.

In this paper, I offer a solution to these problems. At the core of the proposal is a novel account of the semantics of *or*: I claim that an *or* coordination denotes the set of the denotations of its disjuncts, and that this set is required to ‘divide up’ some semantically given domain in a way to be specified below. The free choice readings arise by virtue of a requirement that some subset of the relevant set of accessible worlds (ACC) be divided up in accordance with the disjuncts. My solution to the interface problem has both syntactic and semantic components. The semantic component involves the introduction of a new composition rule allowing a function to apply pointwise to the members of a set which is its argument (cf. Winter 1995). The idea of *or* as a set formation operator has recently surfaced in a several papers (e.g. Winter 1995, Eggert 2000, Kratzer & Shimoyma 2002, Aloni 2002). My proposal differs from these in a number of respects.

We turn now to some further details, beginning with the non-disjunctive truth conditions (1) and (2). As noted, I propose that these truth conditions arise from a requirement that some subset of ACC (in the case of permission sentences) or ACC itself (in the case of obligation) be ‘divided up’ into *jane-sing* worlds and *jane-dance* worlds. The notion of ‘dividing up’ is formalized using the set-theoretic concept of a supercover:

(5) A set SC is a supercover of a set S iff (i) every member of SC contains some member of S and (ii) every member of S belongs to some member of SC.

I then capture the observed truth conditions of the non-disjunctive readings by (6)-(7). As I will show, this formulation involves a rather straightforward extension of the standard truth conditions for modal sentences:

(6) Permission sentences: \( \exists S. S \subseteq \text{ACC} \land \{[\text{jane sing}, \text{jane dance}]\} \) is a supercover of S
(7) Obligation sentences: \( \exists S. S = \text{ACC} \land \{[\text{Jane sing}, \text{Jane dance}]\} \) is a supercover of S = \{\text{Jane sing}, \text{Jane dance}\} is a supercover of ACC

But how are the truth conditions in (6) and (7) derived from the syntactic input? In the case of wide *or* sentences, I suggest, roughly following Johnson 1996, that these truth conditions arise when the repeated modal is subjected to ATB movement at LF, resulting in an LF in which a single modal takes scope over a clausal disjunction. To deal with the narrow *or* sentences, I introduce a composition rule which generalizes the standard function-application strategy of composition to cases where the arguments are contained in a set.

To derive disjunctive readings, I propose that when *or* is not in the scope of any operator, the world of evaluation (w*) is required to be a member of the supercovered set. For our modal/or sentences, we derive:

(8) \( \exists S. \text{w*} \in S \land \{[\text{Jane may/must sing}, \text{Jane may/must dance}]\} \) is a supercover of S

This reading is straightforwardly derivable from the syntactic input for the wide *or* sentences. For the narrow *or* sentences, it is derived using the strategy of pointwise composition all the way up, so that the modal, in effect, is brought into the scope of *or*.

To conclude, I will offer an account of an observation due to Zimmerman 2000: that epistemic modal/or sentences (exs. g.-i.) lack disjunctive readings. Following Zimmerman, I connect this fact to the requirement that unembedded disjuncts be epistemic possibilities for the speaker: this is captured by requiring the set (of worlds) which satisfies the truth conditions above to be a subset of the speaker’s epistemic set. I show that this requirement also suffices to explain Zimmerman’s fact.
Examples

a. Jane may sing or she may dance.
b. Jane must sing or she must dance.
c. Jane may sing or dance.
d. Jane may visit Henry or George.
e. Jane must sing or dance.
f. Jane must visit Henry or George.
g. Jane might sing or she might dance.
h. Jane must have sung or she must have danced.
i. Jane might/must have sung or danced.

References

Eggert, Randal (2000). Grammaticality and context with respect to and... and or... respectively. Proceedings of CLS 36.