On Possibility Modals and NPI Licensing

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Possibility modals such as *may/might* have been taken to be ∃-quantifiers over worlds (Lewis 1973, Kratzer 1986, a.o.). However, this assumption, with the SDE condition on NPI licensing (von Fintel 1999), leads to a wrong prediction regarding the distribution of NPIs in the *if*-clause of conditionals with possibility modals (CPM). With a Lewis/Kratzer-style semantics, I suggest that this can be solved by assuming that ◊-modals are ∀-quantifiers over a set of worlds selected by a modal choice function from the quantificational domain (Rullman et al. 2008).

Background: NPIs such as *any* and *ever* are licensed in the *if*-clause of a necessity conditional.

(1) If he subscribes to <u>any</u> newspaper, he is well-informed.

Building on the assumption that the *if*-clause serves to restrict the modal quantifier in conditionals (which, in the default case, is the covert necessity operator WOULD (Kratzer 1981; a.o.)), von Fintel (1999) suggests that the licensing of NPIs in the *if*-clause of conditionals is captured by the semantics in (2) and the NPI licensing condition in (3). Based on (2), the *if*-clause of a necessity conditional serves to restrict the default ∀-quantifier over worlds that is introduced by WOULD and hence is SDE. Therefore, weak NPIs are licensed in the *if*-clause in (1).

(2) For any $W' \subseteq W$, $[\![\text{WOULD}]\!]^{A,R,w,W'}$(if p)(q) is defined only if i) W′is an admissible sphere in the modal base $\cap A(w)$ with respect to the ordering source R(w), and ii) $W' \cap p \neq \varnothing$; if defined, $[\![\text{WOULD}]\!]^{A,R,w,W'}$(if p)(q)=1 iff $\forall w' \in W' \cap p$: $w' \in q$

(3) The Strawson Downward Entailment (SDE) condition on NPI licensing:
An NPI is only grammatical if it is in the scope of α such that $[\![\alpha]\!]$ is SDE; a function f of type $<\sigma, \tau>$ is SDE iff for all x, y of type σ such that $x \Rightarrow y$ and f(x) is defined: $f(y) \Rightarrow f(x)$

Nevertheless, this account with the widely endorsed assumption that possibility modals (such as *may/might/can*) are ∃-quantifiers leads to a wrong prediction on the distribution of NPIs in a CPM. Since the restrictor of an ∃-quantifier is (S)UE and cannot be SDE, von Fintel's suggestion with the assumption of possibility modals being ∃-quantifiers predicts that NPIs are ungrammatical in the *if*-clause of a CPM. As shown in (4), this prediction is incorrect.

(4) If John had <u>ever</u> been to Paris, he *might* have become a good chef.

The contrast between (4) and (5) further shows that possibility modals behave differently from other quantificational elements that have been taken to be ∃-quantifiers. (5) shows that the Q-adv *sometimes*, unlike possibility modals, fails to license NPIs in the *if*-clause. While, with the assumption that the existential Q-adv *sometimes* in (5) is restricted by the *if*-clause (Lewis 1975; Kamp 1981; Heim 1982; a.o.), the ungrammaticality in (5a) follows from the SDE condition in (3), it is left unexplained why NPIs are licensed in the *if*-clause in a CPM (see (4)).

(5) a. **Sometimes*, if a man feeds a dog <u>any</u> bones, it bites him. (Partee 1993)
b. LF: [[sometimes [a man feeds a dog <u>any</u> bones]][it bites him]]

Proposal: Following Rullman et al. (2008), I suggest that the presented puzzle can be accounted for by treating possibility modals as ∀-quantifiers involving modal choice functions.

Modal Choice Functions: To account for the quantificational variability of modal elements in St'át'imcets (see (6)), Rullman et al. propose that modal elements in St'át'imcets are ∀-quantifiers over a set of worlds selected from the quantificational domain by a modal choice function f, the definition of which is given in (7). According to Rullman et al., with the semantics in (8), the modal element *k'a* gives rise to a necessity meaning when f maps the quantificational domain W' to itself and a possibility meaning when f maps W′ to a non-empty subset of W′.

(6) a. t'ak **k'a** tu7 kents7á ku míxalh *necessity*

go.along INFER then DEIC DET bear ‘A bear must have gone by around here.’

b. plan **k’a** qwatsáts *possibility*

already INFER leave (Context: His car isn’t there.) ‘Maybe he’s already gone.’

(7) A function $f_{<<s,t>,<s,t>>}$ is a modal choice function iff for any $W_{<s,t>}$, $f(W) \subseteq W$ and $f(W) \neq \varnothing$.

(8) $[\![k\text{'}a]\!]^{W'}(f_{<<s,t>,<s,t>>})(p_{<s,t>})^{w,A,R,W'}=1$ iff $\forall w' \in f(W')$: $p(w')$

Building on Rullman et al., I suggest that English possibility modals *may/might*, just like St’át’imcets modal elements, take a modal choice function as an argument and universally quantify over the set of worlds selected by this function from the quantificational domain (see (9)); unlike Rullman et al., I suggest that the modal choice function f in a possibility statement is obligatorily bound by ∃-closure (cf. Reinhart 1997; Winter 1999; a.o.).

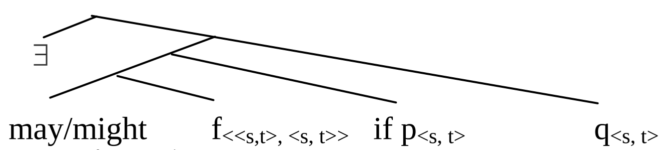
(9) $[\![may/might]\!]^{W'}(f_{<<s,t>,<s,t>>})(p_{<s,t>})=1$ iff $\forall w' \in f(W')$: $p(w)$

The lexical distinction between necessity and possibility modals in English is captured by Neo-Gricean Conversational Principle (Dowty 1980): since *must* is lexically specified as ∀ and unambiguously carries a necessity interpretation but *may/might* is ambiguous between ∀ and ∃ due to the unspecified value of f, *may/might* is blocked by *must* in the case of necessity.

I maintain the assumption that the Q-adv *sometimes* is an ∃-quantifier (Lewis 1975; Kamp 1981, Heim 1982; a.o.). The idea of treating possibility modals as ∀ but *sometimes* as genuinely ∃ is supported by the fact that, in St’át’imcets, the absence of the quantificational strength distinction occurs only in modals and there is a lexical distinction on Q-adverbials.

***Conditionals with Possibility Modals*:** Building on the semantics in (2), I suggest that a CPM has the LF (10a) and semantics (10b). The possibility modal, based on (10), universally quantifies over the set of worlds selected from W′ by the modal choice function f, and, along with a Lewis/Kratzer style semantics, the *if*-clause serves to restrict the possibility modal.

(10) a.



b. $[\![may/might]\!]^{A,R,w,W'}(f)(\text{if } p)(q)$ is defined only if i) W′is admissible and ii) $[f(W') \cap p \neq \varnothing]$; if defined, $[\![may/might]\!]^{A,R,w,W'}(\text{if } p)(q)=1$ iff $[\forall w' \in f(W') \cap p: w' \in q]$

According to (10), the *if*-clause of a CPM is an SDE context; hence, it follows from the SDE condition (3) that NPIs are grammatical in the *if*-clause of a CPM. Since NPIs are subject to local licensing, ∃-closure on f does not affect the licensing of NPIs in the *if*-clause in a CPM.

Final Remarks: Although the semantics for possibility modals proposed here ((9-10)) aims to account for NPI licensing, this proposal preserves the desirable consequences the assumption of possibility modals being ∃ has. As shown in (11), since f(W′) is a subset of W′, the proposed semantics of possibility modals predicts that *must-p* asymmetrically entails *may-p* as well. Furthermore, the proposed semantics also predicts the consistency between the possibility statements in (12a) with respect to inner negation. I will further show that the proposed semantics is compatible with Klinedinst’s analysis (2006, 2007) of free choice disjunction.

(11) a. You must stay. --> You may stay. b. You may stay. -/-> You must stay.

(12) a. You may stay, but also, you may leave. (assuming that *stay*=*not leave*)

b. $\exists f\, [\forall w' \in f(W'): p(w')] \wedge \exists f [\forall w' \in f(W'): \neg p(w')]$

In summary, the proposed semantics provides a solution to the NPI licensing in a CPM and, at the same time, preserves the merits of the assumption of ◊-modals being ∃-quantifiers.

Selected References: *Dowty, D.* 1980. *CLS* 16**.** *von Fintel, K.* 1999. *Journal of Semantics* 16. *Rullman, H., L. Matthewson, and H. Davis*. 2008. *Natural Language semantics* 16.