Dynamic updates and the semantics of '*otherwise*'

Josh Phillips
Yale University
joshua.phillips@yale.edu

Hadas Kotek
New York University
hadas.kotek@nyu.edu

Linguistics Society of America, 6 January 2018[*]

1 Introduction

- Intuitively, *otherwise* targets a set of worlds in which some *anaphoric* proposition does not hold:

(1) **Some basic examples to get us started:**
 a. You should eat, **otherwise** you won't grow.
 b. He always told Mary everything: he'd call, **otherwise** he'd write.
 (Flament-Boistrancourt, 2011, 131)
 c. Every person selling "The Big Issue" might **otherwise** be asking for spare change. (Webber et al., 2001, 7)

- Roughly, *otherwise* establishes a relation between two propositions, p and q—providing an answer to the question, what would happen if $\neg p$?

 We call p the **antecedent** and q the **consequent**.

(2) **Intuition: *Otherwise* signals nonimplication between p, q**
 $[\![\text{otherwise}]\!]^w = \lambda p_{\langle s,t \rangle} . \lambda q_{\langle s,t \rangle} . \neg p(w) \to q(w)$

 (To be revised and refined later in the talk!)

TODAY:
1. Background and data.
2. An analysis within Roberts's (1996) framework for modal subordination.
3. Finding the antecedent: *otherwise* and complement anaphora.
4. Some predictions: the interaction of *otherwise* with modals.

1

2 Background and data

(3) Students must attend the lecture, *otherwise*...
 a. ...they'll fail the class. $\approx$ if $\neg$ attend...
 b. ...it'll be completely empty. $\approx$ if $\neg \square$ attend...

(4) If the light is red, stop. *Otherwise*...
 a. ...go straight on. $\approx$ if $\neg$ red...
 b. ...you'll get a ticket. $\approx$ if red $\wedge \neg$ stop...
 (Webber et al., 2001, 7)

- In each sentence pair above (3-4), the antecedent of *otherwise* is **a different proposition**.

- The choice of antecedent is **not directly encoded**.

▶ **The puzzle: How is the antecedent determined?**

▶ **The intuition:** The correct antecedent appears to be 'accommodated' by reference to world knowledge and linguistic context.

Some uses of *otherwise* that we will not discuss today
(but feel free to ask us about them):

(5) **'Intraclausal' adverbial usage:**
 a. **Otherwise** what's been happening with you?
 (Flament-Boistrancourt, 2011, 131)
 b. For all the Russians I've met, the one thing I've found to be particularly distinctive is their love for the drink. **Otherwise** they're just like anyone else. (Inkova-Manzotti, 2002, 121)

(6) **Adjectival usage:**
 a. The income they earn from it is likely to be their only source of cash to supplement their **otherwise** subsistence economy.
 b. A: 'Frances, I'm sorry I'm late.'
 B: 'When were you ever **otherwise**?' (OED, *otherwise* c_1, c_2)

2

3 Proposal

- Dynamic approaches to semantics have been fruitful in accounting for anaphor resolution (e.g. Heim 1982; Kamp 1981; Nouwen 2003; Roberts 1989).

- The meaning of an utterance is its context-change potential, accounting for the role of intersentential dependencies for interpretation.

- *If*-clauses induce a temporary update of the common ground with the antecedent proposition, hypothetically restricting the context set. They make an assertion that the consequent holds in all these worlds.

  In other words, *"if p then q"* represents an instruction to eliminate all the $p \wedge \neg q$ worlds from the context set.

- In (4a), *otherwise* targets the set of worlds in which the light is <u>not</u> red, and asserts that in those worlds, you should go straight.

  In (4b), *otherwise* targets that set of worlds where the light is red but you <u>do not</u> stop. It asserts that in those worlds, you'll get a ticket.

3.1 A dynamic semantic account

- **Modal subordination:** (Roberts 1989, extending Kamp's 1981 Discourse Representation Theory, DRT)

  > A phenomenon wherein the interpretation of clause α is taken to involve a modal operator whose force is relativised to some set β of contextually given propositions. (718)

- Roberts (1989, 712*ff*) shows how such subordination relations can be formalised using Kamp's DRT (rather complicated, details omitted).

- **Proposal:** A ∘ relation is employed in the DRS schemata below to represent an 'otherwise' condition.

  - This ∘ can be defined as a **temporary (conditional) update with (¬ antecedent)**—antecedents in thick boxes—followed by update with the consequent.

  - Modeled on Roberts's (1996) approach to modals and conditionals.

3.2 An implementation

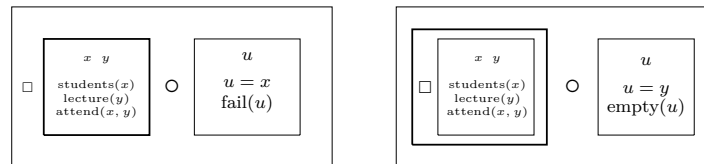**Figure 1.** The accommodation of different antecedents in (3a–b).

Figure 2. In (4a), the antecedent of *otherwise* is the <u>antecedent of the conditional</u>.
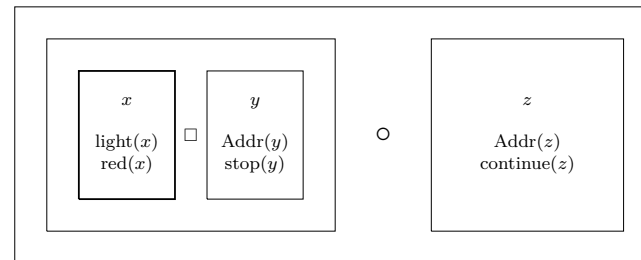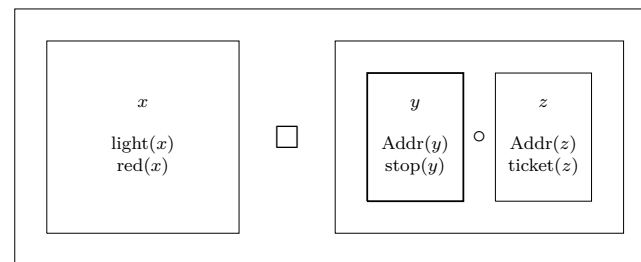

Figure 3. In (4b), the antecedent of *otherwise* is the <u>consequent of the conditional</u>, both subordinate to the temporary conditional update.

- ▶ Appealing to Roberts' notion of modal subordination within DRT allows us to develop intuitions about the constraints on interclausal dependencies for the interpretation of the modal component of *otherwise*.

4 Finding the antecedent

▶ How, then, do we resolve potential ambiguities in the choice of antecedent when multiple preceding updates are available?

4.1 Complement anaphora

Quantifiers such as *few, less than half, hardly any* can allow reference to a 'complement set' (Moxey and Sanford 1986, Nouwen 2003 a.o.).

(7) Few congressmen admire Kennedy. (Nouwen 2003)
    a. *They* are (all) very junior.   REFERENCE SET: $A \cap B$
    b. *They* think he's incompetent.   COMPLEMENT SET: $A \setminus B$

▶ **Proposal:** Just as pronouns can refer to a complement set of individuals, following certain quantifiers, *otherwise* picks out a complement set of worlds.

- **Prediction:** Adopting an E-type anaphora analysis (e.g. Nouwen 2003), discourse referents can be made salient for reference in subordinate DRSs/across dynamic updates:

    (8) Every person selling "The Big Issue" might *otherwise* be asking for spare change. (Webber *et al.* 2001, p.7)

- Here, for every (relevant) person, *otherwise* picks the set of worlds where they are <u>not</u> selling "The Big Issue," and asserts that in those worlds, they might be begging.

Note: similar effects in the temporal domain?

(9) Senators *rarely* vote their conscience.
    They do what the party tells them to.

4.2 *Otherwise* requires eliminated worlds

▶ **Prediction:** *Otherwise* is not well-defined in cases where no worlds have been eliminated from consideration by prior discourse updates.

Indeed, possibility modals do not support the use of *otherwise*.[1]

(10)   a. I have to go to school,
        b. *otherwise* I'll get in trouble.   ≈ if I don't go...
        (i): All non-school worlds *(temporarily) eliminated*.
        (ii): <u>For those worlds 'eliminated' in (i)</u>, I'll get in trouble.

(11)   ^{??} a. I can go to school,
        b. *otherwise* I'll get in trouble.   Intended: ≈ if I don't go...
        (i): The possibility modal asserts that the context set contains school worlds; it does not eliminate any worlds.
        (ii): *Otherwise* fails to identify previously eliminated worlds.

Consider examples with "may not," which is ambiguous between $\neg > \Diamond$(deontic) and $\Diamond$(epistemic) $> \neg$. Only $\neg > \Diamond$(deontic) eliminates worlds and supports *otherwise*.

(12) <u>Context:</u> Ashley got horrible grades in college and is very clumsy.
    a. She may not be a doctor. $\neg > \Diamond$(deontic)
    b. *Otherwise*, she might kill someone.
        ≈ If she does become a doctor...

(13) <u>Context:</u> Ashley works at a hospital and wears a white coat, but I don't know what she actually does.
    a. She may not be a doctor. $\Diamond$(epistemic) $> \neg$
    b. # *Otherwise*, she might be a surgeon.
        Intended: ≈ If she's not not a doctor...

---

[1]Cf the *Emptiness* principle (Hendriks and de Hoop, 2001): "As the antecedent of an expression, do not choose a set which is potentially empty, except when this set is the reference set of a quantificational sentence".

Consider the apparent counterexample in (14b) with *might*:

(14) a. She must be sick, *otherwise* she'd be here.
    b. She might be sick, *otherwise* she'd be here.

Might in (14b) receives a 'weak necessity' interpretation (see Rubinstein 2012). Roughly: "there are no worlds I am considering where she isn't here and isn't sick (but I do not claim to have access to all relevant worlds)."[2]

5 Conclusion

1 *Otherwise* is a (sentential) operator relating two clauses, p and q: if $\neg p$, then q.

2 The antecedent p is chosen from the preceding context, mediated by world knowledge.

3 An implementation building on *modal subordination* within DRT.

4 *Otherwise* is dependent on *preceding eliminated worlds* — parallel to complement anaphora to individuals.

---

[2]Or, more formally, *might* is accompanied by some presupposition that the attitude holder's doxastic state is restricting the quantificational domain of the modal. (This resembles the approach to weak necessity of Rubinstein 2012, von Fintel and Iatridou 2008.)

References

von Fintel, Kai, and Sabine Iatridou. 2008. *How to say ouught in foreign: The composition of weak necessity modals*, 115–141. Studies in Language and Linguistic Theory. New York: Springer.

Flament-Boistrancourt, Danièle. 2011. *Sinon* vs *autrement*: si proches, si loin. *Langages* 4:129–146.

Heim, Irene. 1982. The semantics of definite and indefinite noun phrases. Doctoral Dissertation, University of Massachusetts.

Hendriks, Petra, and Helen de Hoop. 2001. Optimality theoretic semantics. *Linguistics and Philosophy* 24:1–32.

Inkova-Manzotti, Olga. 2002. Les connecteurs accommodants : le cas de autrement. In *Cahiers de linguistique Française*, volume 24, 109–141.

Kamp, Hans. 1981. A theory of truth and semantic representation. In *Formal Methods in the Study of Language; Mathematical Centre Tracts 135*, ed. Jeroen et al Groenendijk, 277–322. Amsterdam.

Kruijff-Korbayova, Ivana, and Bonnie L. Webber. 2001. Information structure and the interpretation of otherwise. In *Proceedings of ESSLLI 2001 Workshop on Information Structure, Discourse Structure and Discourse Semantics*.

Moxey, Laura, and Anthony Sanford. 1986. Quantifiers and focus. *Journal of Semantics* 5:189–206.

Nouwen, Rick. 2003. Complement anaphora and interpretation. *Journal of Semantics* 20:73–113.

Roberts, Craige. 1989. Modal subordination and pronominal anaphora in discourse. *Linguistics and Philosophy* 12:683–721.

Roberts, Craige. 1996. Information structure: Towards an integrated formal theory of pragmatics. In *OSU working papers in linguistics: Papers in semantics*, ed. J.H Yoon and A. Kathol, volume 49, 91–136. The Ohio State University Department of Linguistics.

Rubinstein, Aynat. 2012. Roots of modality. Doctoral Dissertation, University of Massachusetts Amherst.

Stalnaker, Robert. 1979. Assertion. In *Syntax and semantics*, ed. Peter Cole. New York: Academic Press.

Walker, Marylin, Aravind Joshi, and Ellen Prince, ed. 1998. *Centering theory in discourse*. Oxford University Press.

Webber, Bonnie L., Matthew Stone, Aravind Joshi, and Alistair Knott. 2001. Anaphora and discourse semantics. In *IRCS Technical Reports Series*, volume 30. University of Pennsylvania ScholarlyCommons.