1 Introduction

A generalization

Indefinite DPs under non-veridical operators such as negation do not usually introduce a discourse referent (dref) that is available for subsequent reference (Karttunen (1969)):

(1) There is [no bathroom] in this house. #It is in a weird place.

Some counterexamples

(2) a. Double negation: (Karttunen (1969); Krahmer and Muskens (1995))
   It’s not true that there is [no bathroom]" in this house. It is just in a weird place.

b. Disjunction: (Krahmer and Muskens (1995))
   Either there is [no bathroom]" in this house, or it is in a weird place.

c. Modal subordination:
   There is [no bathroom]" in this house. It would be easier to find.

 d. Disagreement:
   A: There’s [no bathroom]" in this house.
   B: (What are you talking about?) It is right over there.

Krahmer and Muskens (1995)

Note that standard Discourse Representation Theory (DRT, Kamp (1981); Kamp and Reyle (1993)) (and other classic dynamic semantic frameworks) don’t account for the counterexamples

- Negation is externally static, indefinites in its scope never introduce global drefs
  - In DRT, it introduces a subordinated discourse representation structure (DRS)
  - Only drefs introduced in the same DRS or a superordinate DRS are accessible

K & M introduce an account of double negation and disjunction cases, based on...

- Semantics for negation that symmetrically switches between the extension and anti-extension of an expression
- Semantics for disjunction that analogizes it to conditionals, truth-conditionally and dynamically
- Doesn’t extend to cases w/o overt negation or disjunction (disagreement, modal subordination)

This talk

- Presents an analysis of the above cases in intensional Compositional DRT (CDRT, following Muskens (1996); Brasoveanu (2010)) based on the assumption that a pronoun can be co-referential with a preceding DP only if the referent of the DP exists in the worlds of evaluation of the pronoun
  - Uses analyses of modal subordination in terms of simultaneous reference to sets of possible worlds (propositions) and individuals
    (Stone (1999); Stone and Hardt (1999); Brasoveanu (2007, 2010))
  - Extends them to disjunction, double negation and disagreement cases

2 The account

The intuition behind the analysis

- Counterfactual drefs under negation: Speaker committed to their non-existence (cf. hypothetical drefs in Stone (1999); Stone and Hardt (1999))
- Pronoun presupposes existence of a referent
- Use of a pronoun in veridical contexts is inconsistent with counterfactual dref antecedent
- BUT: Pronoun can co-refer with counterfactual dref if
  - It is in a counterfactual context (Modal subordination)
  - The discourse segments of the antecedent and pronoun do not have to be consistent (disjunction, disagreement)

The account in a nutshell

- Antecedents and pronouns are interpreted relative to their local intensional context
  - Relativizing individual drefs to sets of worlds where they refer (Stone (1999); Stone and Hardt (1999))
    - Gives rise to accessibility condition, capturing that pronouns presuppose existence of a referent and are infelicitous otherwise
- Sentential operators introduce drefs for sets of worlds providing a local context for interpretation of their prejacent
  - Relation between local and global context sets is constrained semantically by the interpretation of linguistic expressions
    Karttunen (1973); Heim (1983)
  - And pragmatically by set of worlds compatible with a speaker’s commitments
2.1 Intensional CDRT

CDRT with propositional discourse referents [Muskens (1996); Brasoveanu (2007, 2010)]

- Four basic types: t (truth-values), e (entities), w (possible worlds), and s (variable assignments)
- Variable assignments
  - Objects manipulated and updated in context
  - In classic static systems: Functions from variables to entities
  - Here: Basic type s (discourse states)
- Discourse referents (drefs)
  - Functions from assignments to referents
  - Individual drefs: type s (we)
  - Variables: ϕ, ϕ₁, ϕ₂, ...
  - Propositional drefs: type s (wt)
  - Drefs for sets of worlds
  - Variables: ϕ, ϕ₁, ϕ₂, ...
- Sentence meanings
  - Conceptualized in terms of their context-change potential
  - Binary relations between discourse states: Type s(st)
  - Anaphoric potential: Updating variable assignments
  - Truth-conditions: Imposing conditions on propositional drefs

2.2 Drefs in relation to their local context

DRSs and Relativizing individual drefs
- A DRS contains a list of new drefs (ϕ, ϕ₁, ..., ϕₙ)
  - Where individual drefs are introduced relative to propositional ones
  - and a series of conditions of type st, i.e. properties of the output state (C₁, ..., Cₙ)

Relative variable update

Individual drefs map to an individual for all worlds in which their referent exists, and to an indeterminate value # in all other worlds (cf Stone (1999); Stone and Hardt (1999))

Negation

Negation introduces a counterfactual set of worlds wrt which its prejacent is interpreted

(5) S: Mary doesn’t sleep.

S : (not(Mary sleep)) ~ ~

- New drefs:
  - Matrix ϕ₁
  - not: Embedded ϕ₂
  - Mary: υ

- Conditions:
  - ϕ₁ is entailed by the commitments of S
  - Mary: υ refers to maryₑ
  - not: ϕ₁ and ϕ₂ are complements
  - Verb: υ sleeps in ϕ₂
Accessibility condition on pronominal reference:

- A dref is accessible for reference by a variable, iff the referent exists in the local context of the variable.
- Local context defined wrt the evaluation of DRS conditions:

  (6) Predicates with their arguments as conditions (type st):

  \[ \text{car}_p(v_2) := \lambda i. \forall w \in \phi(i). \text{car}(v_2(i)(w))(w) \]

  \( v_2 \) is a car in \( \phi \) wrt the variable assignment \( i \), iff

  - Each world \( w \) in \( \phi(i) \) is s.t.
    - \( v_2(i)(w) \neq # \) (i.e. a referent of \( v_2 \) wrt \( i \) exists in \( w \) and)
    - \( v_2(i)(w) \) is a car in \( w \)

- A dref is an accessible antecedent for a variable in the context of \( i_e \), \( \phi_{i_e w_1} \) iff the dref refers to something other than # (i.e. an actual individual) in each world in \( \phi \), wrt \( i_e \)

### 2.3 Drefs under negation

#### The non-existent bathroom

(7) \( S: \text{There is [no bathroom]}^{11} \).

| \( \phi_1, \phi_2, \phi_2 : v_1 \) | \( \phi DC_s \subseteq \phi_1 \) |
| \( \phi_1 = \phi_2 \) |
| \( \text{bathroom}_\phi(v_1) \) |

- New drefs:
  - Matrix \( \phi_1 \)
  - Embedded \( \phi_2 \)
  - \( v_1 \) exists in \( \phi_2 \)

- Conditions:
  - Matrix \( \phi_1 \) is entailed by the commitments of \( S (\phi DC_s) \)
  - \( \phi_1 \) and \( \phi_2 \) are complements
  - \( v_1 \) is a bathroom in \( \phi_2 \)

- \( v_1 \) exists in all and only the counterfactual \( \phi_2 \)-worlds
- \( v_1 \) doesn’t exist in any worlds in \( \phi_1 \), the complement of \( \phi_2 \)
- \( v_3 \) is interpreted in the condition \( \text{in}_\phi(v_3, v_2) \)
- For \( v_1 \) to be an antecedent for \( v_3 \), \( v_1 \) needs to exist in all \( \phi_3 \)-worlds
- \( \phi DC_s \) contains only worlds that are in \( \phi_1 \cap \phi_3 \)
- So, there are \( \phi_1 \)-worlds in \( \phi_3 \), i.e. worlds where \( v_1 \) doesn’t exist
- \( v_3 \) can’t refer to \( v_1 \)

#### The hypothetical bathroom

(8) \( S: \text{It would be (more) accessible.} \)

| \( \phi_1, \phi_2, \phi_2 : v_1 \) | \( \phi DC_s \subseteq \phi_1 \) |
| \( \phi_1 = \phi_2 \) |
| \( \text{bathroom}_\phi(v_1) \) |

- Modal subordination: (Stone (1999); Stone and Hardt (1999); Brasoveanu (2007, 2010))
  - \( \text{would} \) is anaphoric to a proposition that is not taken to be true in \( \phi DC_s \), this can be the counterfactual \( \phi_2 \)
  - The local set of worlds for the interpretation of its prejacent is provided compositionally

- Now we have accessible \( \phi_{i_e w_2} \), so we get \( v_1 = v_2 \)

#### The optional bathroom

(10) \( S: \text{Either there is [no bathroom]}^{11}, \text{or } i_{v_1 = v_2} \text{ is in a weird place.} \)

| \( \phi_1, \phi_2, \phi_3, \phi_4, \phi_4 : v_1, \phi_3 : v_2 \) | \( \phi DC_s \subseteq \phi_4 \) |
| \( \phi_1 = \phi_2 \) |
| \( \phi_2 = \phi_4 \) |
| \( \text{bathroom}_\phi(v_1) \) |
| \( \text{place}_\phi(v_2) \) |
| \( \text{weird}_\phi(v_2) \) |
| \( \text{in}_\phi(v_3, v_2) \) |

- Assertion compatible with speaker’s commitments
- Disjunction introduces two local sets of worlds that don’t have to be compatible
- First disjunct: Analogous to the above negative sentences
  - \( v_1 \) exists in all and only the \( \phi_1 \)-worlds, and in none of the worlds in \( \phi_2 \)
- Second disjunct:
  - For \( v_1 \) to be an antecedent for \( v_3 \), \( v_1 \) needs to exist in all \( \phi_3 \)-worlds
  - Compatible with an output discourse state, s.t. \( v_1 \) exists in \( \phi_3 \), i.e. the one where \( \phi_2 \cap \phi_3 = \emptyset \), and \( v_3 \) can be resolved as \( v_1 \)
The Anaphoric Potential of Indefinites under Negation and Disjunction
Lisa Hofmann

The contested bathroom

(7) S: There is [no bathroom]₁.
(11) B: It₁ is (right over) there.

| $\phi_{DC_S}$ $\subseteq$ $\phi_1$ | $\phi_{DC_B}$ $\subseteq$ $\phi_3$
| $\phi_1 = \phi_2$ | there$_{\phi_3}$ $\{v_2\}$ |

- Since the two speakers disagree, $\phi_{DC_S}$ $\subseteq$ $\phi_1$ and $\phi_{DC_B}$ $\subseteq$ $\phi_2$ don’t have to be compatible with each other
- This allows for the possibility that $v_1$ exists in $\phi_3$, i.e. the one where $\phi_1$ $\cap$ $\phi_3 = \emptyset$, similar to the disjunction case

3 Discussion

Upshot

An indefinite in the scope of negation is available for subsequent reference only if the pronoun making reference to it is interpreted wrt a set of worlds in which the referent of the indefinite exists

- That can be the case, if
  - Anaphoric would anaphorically retrieves a hypothetical (/counterfactual) set of worlds for the interpretation of its prejacent (like in Stone (1999) analysis of modal subordination).
  - The discourse segments including the pronoun and the anaphor aren’t required to be compatible with each other (like in the disjunction or disagreement cases).

3.1 Propositional anaphora under negation and disjunction

Propositional anaphora present a challenge:

(12) a. If Mary is sick, she knows that.
    b. Either Mary is not sick, or she #is and) knows that.

- We might expect the propositional dref in the scope of negation (where Mary is sick) to be accessible in the second disjunct
- Krahmer and Muskens (1995): Disjunctions and conditionals are dynamically equivalent, asymmetry ruled out
- Present account leaves room for an explanation, since disjunctions and conditionals have distinct semantic representations
- Therefore provides a vantage point over asymmetries between individual and propositional anaphora, to be explored in future research

4 Conclusion

- The paper presents an analysis results in a flat-update dynamic semantics that globally introduces anti-veridical drefs along with the information about the sets of worlds in which they exist
- The analysis provides an understanding of when the surrounding context allows for an anaphoric relation between expressions introducing anaphora and potential antecedents
- It constitutes a step forward from previous approaches to anaphoric accessibility in classical DRT (Kamp and Reyle (1993)), as well as analyses of modal subordination (Stone (1999)) and the double negation and disjunction cases (Krahmer and Muskens (1995)), by extending the empirical coverage.

References