Counterfactual
Donkeys
Don’t
Get High

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New Data

Suppose Allie and Bert think Mary the potter probably didn't make anything yesterday.

(1) Allie: If Mary had made a vase, she would have made it from glass.

Case 1:

(2) Bert: But she could have made a clay vase (and she wouldn't have made that from glass)!

Judgements: (1) (2) ??
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.
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(1)  *Allie:*

(2)  *Bert: But she could have made a clay vase (and she wouldn’t have made that from glass)!*
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

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Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

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**Case 1:** Mary actually made two vases, both from glass.
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

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**Case 1:** Mary actually made two vases, both from glass.

(2) *Bert*: But she could have made a clay vase (and she wouldn’t have made *that* from glass)!

Judgements:  (1) ✓  (2) ??
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

(1) Allie: If Mary had made a vase, she would have made it from glass.

Case 2:
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

(1)  *Allie*: If Mary had made a vase, she would have made it from glass.

Case 2: Mary did not make any vases.
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

(1) **Allie**: If Mary had made a vase, she would have made it from glass.

**Case 2**: Mary did not make any vases.

(2) **Bert**: But she could have made a clay vase (and she wouldn’t have made *that* from glass)!
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

(1)  *Allie*: If Mary had made a vase, she would have made it from glass. \(\times\)

**Case 2:** Mary did not make any vases.

(2)  *Bert*: But she could have made a clay vase (and she wouldn’t have made *that* from glass)!
Suppose Allie and Bert think Mary the potter probably didn’t make anything yesterday.

(1) *Allie*: If Mary had made a vase, she would have made it from glass. \(\times\)

**Case 2:** Mary did not make any vases.

(2) *Bert*: But she could have made a clay vase (and she wouldn’t have made *that* from glass)!

Judgements: (1) \(\times\) (2) \(\checkmark\)
Allie: If Mary had made a vase, she would have made it from glass.

Bert: But she could have made a clay vase (and she wouldn’t have made that from glass)!

Case 1: Mary made two glass vases.
Case 2: Mary did not make any vases.

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
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<tbody>
<tr>
<td>(1)</td>
<td>✓</td>
<td>✗</td>
</tr>
<tr>
<td>(2)</td>
<td>??</td>
<td>✓</td>
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So what?
(3) If Balaam owned a donkey, he would beat it.
Old Data

(3) If Balaam owned a donkey, he would beat it.

Apparent entailments:

(4) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
Old Data

(3) If Balaam owned a donkey, he would beat it.

Apparent entailments:

(4) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
    b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
Old Data

(3) If Balaam owned a donkey, he would beat it.

Apparent entailments:

(4) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
    b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
    c. If Platero were a donkey Balaam owned, Balaam would beat Platero.
Two routes to accounting for universal entailments:

1. Let a special property of the closeness ordering do the work (Walker and Romero (2015) on behalf of Wang (2009)).

2. Bake in universality semantically with a ‘high’ reading on which $\exists x [Px \in Qx] \iff \forall x [Px \in Qx]$ (van Rooij (2006), Walker and Romero (2015)).
Old Data - Two Accounts

Two routes to accounting for universal entailments:

1. let a special property of the closeness ordering do the work


∃x[Px € Qx] ⇔ ∀x[Px € Qx]

(van Rooij (2006), Walker and Romero (2015))
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Two Data - Two Accounts

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   \[
   \exists x[Px \rightarrow Qx] \iff \forall x[Px \rightarrow Qx]
   \]
Two routes to accounting for universal entailments:

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   on which

$$\exists x [Px \rightarrow Qx] \iff \forall x [Px \rightarrow Qx]$$

(van Rooij (2006), Walker and Romero (2015))
We should take Route 1.
We should take Route 1.

The special ordering-based accounts predict the new data.
Thesis

We should take Route 1.

The special ordering-based accounts predict the new data.

High reading accounts don’t.
In other words…

Counterfactual donkeys
In other words…

Counterfactual donkeys don’t get high.
Overview

Accounting for the Old Data
  Ordering Semantics + Dynamic Binding
  Route 1: Special Orderings
  Route 2: High Readings

Returning to the New Data
  The Problem for High Readings
  The Success of Special Orderings

Some Objections and Replies
  Saving High Readings?
  Problem for Special Orderings?

Takeaway
Overview

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Takeaway
Ordering Semantics + Dynamic Binding

Familiar Stalnaker-Lewis style semantics.
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Selection function:

(5) \( f(A, w) = \{ w' : w \in \llbracket A \rrbracket \land \neg \exists w'' (w'' \in \llbracket A \rrbracket \land w'' <_w w') \} \)

The \( A \)-worlds nearest to \( w \), according to \( <_w \).
Familiar Stalnaker-Lewis style semantics.

Selection function:

\[ f(A, w) = \{ w' : w \in \llbracket A \rrbracket \land \neg \exists w'' (w'' \in \llbracket A \rrbracket \land w'' <_w w') \} \]

The \( A \)-worlds nearest to \( w \), according to \( <_w \).

\[ \llbracket A \Box \rightarrow C \rrbracket = \{ w : \forall w' (w' \in f(A, w) \supset w \in \llbracket C \rrbracket) \} \]

\( C \) is true at all the nearest \( A \)-worlds.
DPL with possible worlds (based on Groenendijk and Stokhof (1991) and Groenendijk, Stokhof, and Veltman (1996))
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possibility: ⟨world, assignment⟩
info state s: set of possibilities
update function [·] from a state and sentence to a state
DPL with possible worlds (based on Groenendijk and Stokhof (1991) and Groenendijk, Stokhof, and Veltman (1996))

possibility: \langle \text{world, assignment} \rangle

info state s: set of possibilities

update function \([\cdot]\) from a state and sentence to a state

\[(7) \quad a. \quad s[F(x)] = \{i : i \in s \land w_i \in \llbracket F(g_i(x)) \rrbracket\}\]
Ordering Semantics + Dynamic Binding

DPL with possible worlds (based on Groenendijk and Stokhof (1991) and Groenendijk, Stokhof, and Veltman (1996))

possibility: \langle \text{world}, \text{assignment} \rangle
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\( (7) \)  
\[ a. \quad s[F(x)] = \{i : i \in s \land w_i \in \llbracket F(g_i(x)) \rrbracket\} \]
\[ b. \quad s[\exists x] = \{i : \exists j \exists d (j \in s \land d \in \mathcal{D} \land w_i = w_j \land g_i = g_{j \to d})\} \]
Ordering Semantics + Dynamic Binding
Ordering Semantics + Dynamic Binding

\[ j \text{ is an } A\text{-possibility for } i \text{ (or } j \in /A/i) \text{ iff } \exists k(g_k = g_i \land j \in \{k\}[A]). \]
Ordering Semantics + Dynamic Binding

j is an $A$-possibility for $i$ (or $j \in /A/i$) iff $\exists k (g_k = g_i \land j \in \{k\}[A])$.

Selection function:

(8) \[ f(A, i) = \{ j : j \in /A/i \land \neg \exists k (k \in /A/i \land w_k <_w w_j) \}. \]

Finds the nearest $A$-possibility, where possibilities are ordered by their worlds.
Ordering Semantics + Dynamic Binding

\( j \) is an \( A \)-possibility for \( i \) (or \( j \in \mathcal{A}/i \)) iff \( \exists k (g_k = g_i \land j \in \{k\}[A]) \).

Selection function:

\[(8) \quad f(A, i) = \{j : j \in \mathcal{A}/i \land \lnot \exists k (k \in \mathcal{A}/i \land w_k < w_i \land w_j)\}.

Finds the nearest \( A \)-possibility, where possibilities are ordered by their worlds.

\[(9) \quad s[A \rightarrow C] = \{i : i \in s \land \forall j (j \in f(A, i) \supset \{j\}[C] \neq \emptyset)\}

\( C \) is verified by all selected possibilities
(3) If Balaam owned a donkey, he would beat it.
If Balaam owned a donkey, he would beat it.

(3) If Balaam owned a donkey, he would beat it.

(10) \( \exists x DBO(x) \Rightarrow BB(x) \)
Dynamic Binding + Ordering Semantics

\[ w_0 \]

- DBO = donkey that Balaam owns
- BB = thing that Balaam beats
- e = Eeyore
- h = Herbert
- p = Platero
$\text{DBO} = \text{donkey that Balaam owns}$
Dynamic Binding + Ordering Semantics

\[ \begin{array}{ccc}
\neg BB & & w_0 \\

\neg DBO & & DBO \\

BB & & \\
\end{array} \]

\( DBO = \) donkey that Balaam owns

\( BB = \) thing that Balaam beats
Dynamic Binding + Ordering Semantics

\[ DBO = \text{donkey that Balaam owns} \]
\[ BB = \text{thing that Balaam beats} \]
\[ e = \text{Eeyore} \]
\[ h = \text{Herbert} \]
\[ p = \text{Platero} \]
\[\langle w_0, gx \rightarrow h \rangle = \langle w_1, gx \rightarrow h \rangle = \langle w_2, gx \rightarrow h \rangle = \langle w_3, gx \rightarrow h \rangle\]
\[
\langle w_0, g \to p \rangle \lor \langle w_0, g \to e \rangle \lor \langle w_0, g \to h \rangle \\
\langle w_1, g \to p \rangle \lor \langle w_1, g \to e \rangle \lor \langle w_1, g \to h \rangle \\
\langle w_2, g \to p \rangle \lor \langle w_2, g \to e \rangle \lor \langle w_2, g \to h \rangle \\
\langle w_3, g \to p \rangle \lor \langle w_3, g \to e \rangle \lor \langle w_3, g \to h \rangle 
\]
\[ \langle w_0, g_x \rightarrow h \rangle \quad \langle w_0, g_x \rightarrow e \rangle \quad \langle w_0, g_x \rightarrow p \rangle \]
\[ \langle w_1, g_x \rightarrow h \rangle \quad \langle w_1, g_x \rightarrow e \rangle \quad \langle w_1, g_x \rightarrow p \rangle \]
\[ \langle w_2, g_x \rightarrow h \rangle \quad \langle w_2, g_x \rightarrow e \rangle \quad \langle w_2, g_x \rightarrow p \rangle \]
\[ \langle w_0, g^{x\to E} \rangle \quad \langle w_0, g^{x\to P} \rangle \]
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<th>$BB$</th>
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<td></td>
<td>$h$</td>
<td></td>
<td>$\langle w_3, g^{x \rightarrow h} \rangle$</td>
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<td></td>
<td></td>
<td>$e$</td>
<td></td>
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<td>$p$</td>
<td></td>
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<td>$p$</td>
<td>$\langle w_0, g^{x \rightarrow p} \rangle$</td>
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\[
\begin{array}{c|c|c}
\neg BB & e & p \\
\hline
BB & h & \Box w_3 \\
\hline
\end{array}
\]

\[
\langle w_3, g^{x \rightarrow h} \rangle = \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle
\]

\[
\begin{array}{c|c|c}
\neg BB & p & e \\
\hline
BB & h & \neg BB \\
\hline
\end{array}
\]

\[
\langle w_2, g^{x \rightarrow h} \rangle = \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle
\]

\[
\begin{array}{c|c|c}
\neg BB & e & p \\
\hline
BB & h & \neg BB \\
\hline
\end{array}
\]

\[
\langle w_1, g^{x \rightarrow h} \rangle = \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle
\]

\[
\begin{array}{c|c|c}
\neg BB & e & p \\
\hline
BB & h & \neg DBO \\
\hline
\end{array}
\]

\[
\langle w_0, g^{x \rightarrow h} \rangle = \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle
\]
\[
\langle w_3, g^{x \rightarrow h} \rangle = \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle
\]

\[
\langle w_2, g^{x \rightarrow h} \rangle = \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle
\]

\[
\langle w_1, g^{x \rightarrow h} \rangle = \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle
\]

\[
\langle w_0, g^{x \rightarrow h} \rangle = \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle
\]
\[
\begin{aligned}
\langle w_3, g^{x \rightarrow h} \rangle &= \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle \\
\langle w_2, g^{x \rightarrow h} \rangle &= \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle \\
\langle w_1, g^{x \rightarrow h} \rangle &= \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle \\
\langle w_0, g^{x \rightarrow h} \rangle &= \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle 
\end{aligned}
\]
\[
\begin{array}{|c|c|}
\hline
\neg BB & \cdot e \cdot p \\
\hline
BB & \cdot e \cdot p \\
\hline
\end{array}
\]

\[\langle w_3, g^{x \rightarrow h} \rangle = \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle\]

\[
\begin{array}{|c|c|}
\hline
\neg BB & \cdot p \cdot e \\
\hline
BB & \cdot p \\
\hline
\end{array}
\]

\[\langle w_2, g^{x \rightarrow h} \rangle = \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle\]

\[
\begin{array}{|c|c|}
\hline
\neg BB & \cdot p \cdot e \\
\hline
BB & \cdot e \\
\hline
\end{array}
\]

\[\langle w_1, g^{x \rightarrow h} \rangle = \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle\]

\[
\begin{array}{|c|c|}
\hline
\neg BB & \cdot e \cdot p \\
\hline
BB & \cdot h \\
\hline
\end{array}
\]

\[\langle w_0, g^{x \rightarrow h} \rangle = \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle\]
\[ \langle w_3, g^{x \rightarrow h} \rangle = \langle w_3, g^{x \rightarrow e} \rangle \neq \langle w_3, g^{x \rightarrow p} \rangle \]

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\[ \langle w_1, g^{x \rightarrow h} \rangle = \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle \]

\[ \langle w_0, g^{x \rightarrow h} \rangle = \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle \]
\[ \exists x \in \mathrm{DBO} \left( x \in \{w, \overline{w}\} \right) \]

\[ \forall j \left( j \in f(A, i) \right) \]

\[ \left( j \in \{\overline{w}\} \right) \cup \emptyset \]

\[ \exists w_1 \in \left[ \{w_1\} \right] \cap \mathrm{BB} \]

\[ \left\{ \langle w_1, g^x \rightarrow h \rangle \right\} \]

\[ = \{\langle w_1, g^x \rightarrow h \rangle\} \cup \emptyset \]
\[ \exists x \text{DBO}(x) \implies \text{BB}(x) \]
\[ \exists x \text{DBO}(x) \implies \text{BB}(x) \]

\[
\begin{array}{cc}
\neg \text{DBO} & \text{DBO} \\
\text{BB} & \text{BB} \\
\neg \text{DBO} & \text{DBO}
\end{array}
\]

\[ \langle w_1, g^{x \rightarrow h} \rangle \]

\[ \forall j (j \in f(A, i) \{ j \} [\text{BB}(x)] \neq \emptyset) \]
\[ \exists x DBO(x) \rightarrow BB(x) \]

\[ \forall j (j \in f(A, i) \{ j \}[BB(x)] \neq \emptyset) \]

\[ \{ \langle w_1, g^{x \rightarrow h} \rangle \}[BB(x)] \]
∃x DBO(x) $\square \to$ BB(x)

∀j (j ∈ f(A, i){j}[BB(x)] ≠ ∅)

{⟨w₁, g^{x→h}⟩}[BB(x)]

w₁ ∈ [BB(h)]?
\[ \exists x \text{DBO}(x) \implies \text{BB}(x) \]

\[
\begin{array}{cc}
\neg \text{BB} & \cdot e \cdot p \\
\text{BB} & \cdot h \\
\neg \text{DBO} & \text{DBO}
\end{array}
\]

\[
\langle w_1, g^{x \rightarrow h} \rangle \\
\{ \langle w_1, g^{x \rightarrow h} \rangle \}[\text{BB}(x)]
\]

\[ w_1 \in \llbracket \text{BB}(h) \rrbracket \]
\[ \exists x \text{DBO}(x) \rightarrow \text{BB}(x) \]

\[
\begin{array}{c|c}
\neg \text{BB} & e \cdot p \\
\hline
\text{BB} & \cdot h \\
\end{array}
\]

\[ \langle w_1, g^{x \rightarrow h} \rangle \]

\[ \forall j (j \in f(A, i) \{j\} [\text{BB}(x)] \neq \emptyset) \]

\[ \{\langle w_1, g^{x \rightarrow h} \rangle\} [\text{BB}(x)] = \{\langle w_1, g^{x \rightarrow h} \rangle\} \neq \emptyset \]

\[ w_1 \in [\text{BB}(h)]? \checkmark \]
\[\exists x DBO(x) \implies BB(x) \]

\[\forall j(j \in f(A, i) \{j\}[BB(x)] \neq \emptyset\]

\[\{\langle w_1, g^{x \rightarrow h} \rangle\}[BB(x)] = \{\langle w_1, g^{x \rightarrow h} \rangle\} \neq \emptyset\]

\[w_1 \in [[BB(h)]]? \]
Ordering Semantics + Dynamic Binding

Problem: no universal entailments
Ordering Semantics + Dynamic Binding

Problem: no universal entailments

(11) If Balaam owned a donkey, he would beat it.

(12) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
    b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
    c. If Platero were a donkey Balaam owned, Balaam would beat Platero.
Ordering Semantics + Dynamic Binding

Problem: no universal entailments

(11) If Balaam owned a donkey, he would beat it.

(12) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
     b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
     c. If Platero were a donkey Balaam owned, Balaam would beat Platero.
(12-b) If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.

(13) \( DBO(e) \xrightarrow{\Box} BB(e) \)
\begin{align*}
\langle w_3, g^{x \to h} \rangle &= \langle w_3, g^{x \to e} \rangle = \langle w_3, g^{x \to p} \rangle \\
\langle w_2, g^{x \to h} \rangle &= \langle w_2, g^{x \to e} \rangle = \langle w_2, g^{x \to p} \rangle \\
\langle w_1, g^{x \to h} \rangle &= \langle w_1, g^{x \to e} \rangle = \langle w_1, g^{x \to p} \rangle \\
\langle w_0, g^{x \to h} \rangle &= \langle w_0, g^{x \to e} \rangle = \langle w_0, g^{x \to p} \rangle
\end{align*}
\[
\begin{align*}
\langle w_3, g^{x\rightarrow h} \rangle &= \langle w_3, g^{x\rightarrow e} \rangle = \langle w_3, g^{x\rightarrow p} \rangle \\
\langle w_2, g^{x\rightarrow h} \rangle &= \langle w_2, g^{x\rightarrow e} \rangle = \langle w_2, g^{x\rightarrow p} \rangle \\
\langle w_1, g^{x\rightarrow h} \rangle &= \langle w_1, g^{x\rightarrow e} \rangle = \langle w_1, g^{x\rightarrow p} \rangle \\
\langle w_0, g^{x\rightarrow h} \rangle &= \langle w_0, g^{x\rightarrow e} \rangle = \langle w_0, g^{x\rightarrow p} \rangle
\end{align*}
\]
\[ \langle w_3, g^{x \rightarrow h} \rangle = \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle \]

\[ \langle w_2, g^{x \rightarrow h} \rangle = \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle \]

\[ \langle w_1, g^{x \rightarrow h} \rangle = \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle \]

\[ \langle w_0, g^{x \rightarrow h} \rangle = \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle \]
$$
\begin{array}{ccc}
\neg BB & \cdot p & \cdot e \\
BB & \cdot h & \\
\neg DBO & DBO & w_2
\end{array}
$$

$$
\forall j (j \in f(A, i) \{j\} [BB(e)], \emptyset \ w_2 \in \lfloor BB(e) \rfloor)
$$

$$
DBO(e) \square \rightarrow BB(e)
$$

$$
\langle w_2, g^x \rightarrow h \rangle \quad \langle w_2, g^x \rightarrow e \rangle \quad \langle w_2, g^x \rightarrow p \rangle
$$
DBO(e) $\Box \rightarrow$ BB(e)

$\forall j (j \in f(A, i)\{j\}[BB(e)] \neq \emptyset)$
$DBO(e) \implies BB(e)$

$\forall j (j \in f(A, i)\{j\}[BB(e)] \neq \emptyset)$

$w_2 \in [[BB(e)]]$?
$\forall j(j \in f(A, i)\{j\}[BB(e)] \neq \emptyset$

$w_2 \in [BB(e)]? \times$
$DBO(e) \square \rightarrow BB(e)$

$\forall j (j \in f(A, i) \{j\} [BB(e)] \neq \emptyset$

$w_2 \in \llbracket BB(e) \rrbracket$?
Ordering Semantics + Dynamic Binding

Problem: no universal entailments

(14) If Balaam owned a donkey, he would beat it.

(15) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
c. If Platero were a donkey Balaam owned, Balaam would beat Platero.
Ordering Semantics + Dynamic Binding

Problem: no universal entailments

(14) If Balaam owned a donkey, he would beat it.

(15) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
    b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
    c. If Platero were a donkey Balaam owned, Balaam would beat Platero.

How to fix this?
Problem: no universal entailments

(14) If Balaam owned a donkey, he would beat it.

(15) a. If Herbert were a donkey Balaam owned, Balaam would beat Herbert.
   b. If Eeyore were a donkey Balaam owned, Balaam would beat Eeyore.
   c. If Platero were a donkey Balaam owned, Balaam would beat Platero.

How to fix this?

Route 1: special orderings
Route 2: high readings
Route 1: Special Orderings

Walker and Romero (2015): universal entailments would follow from $A \square \rightarrow C$ iff the closeness ordering were such that
Route 1: Special Orderings

Walker and Romero (2015): universal entailments would follow from $A \Box \rightarrow C$ iff the closeness ordering were such that

for any $a, b \in D$, the closest world which combines with $g^{x \rightarrow a}$ to form an $A$-possibility is as close as the closest world which combines with $g^{x \rightarrow b}$ to form an $A$-possibility.
Route 1: Special Orderings

Walker and Romero (2015): universal entailments would follow from $A \square \rightarrow C$ iff the closeness ordering were such that

for any $a, b \in D$, the closest world which combines with $g^{x \rightarrow a}$ to form an $A$-possibility is as close as the closest world which combines with $g^{x \rightarrow b}$ to form an $A$-possibility.

An ordering set $S$ is *special* relative to a state $s$ and sentence $A$

iff

\begin{equation}
\forall i(i \in s \supset \forall j(j \in /A/i \supset \exists k(k \in f(A, i) \land g_j = g_k)))
\end{equation}

For all possibilities $i$ in $s$, if $j$ is an $A$-possibility for $i$, then among the nearest (relative to $i$) $A$-possibilities is a possibility which shares an assignment with $j$. 
\[ \neg \text{BB} \cdot e \cdot h \cdot p \quad \text{w}_3 \]

\[ \text{BB} \]

\[ \vee \quad \text{w}_2 \]

\[ \neg \text{BB} \cdot p \cdot e \]

\[ \text{BB} \]

\[ \vee \quad \text{w}_1 \]

\[ \neg \text{BB} \cdot e \cdot p \]

\[ \text{BB} \cdot h \]

\[ \vee \quad \text{w}_0 \]

\[ \neg \text{BB} \cdot e \cdot p \cdot h \]

\[ \text{BB} \]

\[ \neg \text{DBO} \quad \text{DBO} \]
\[
\begin{align*}
\langle w_3, g^{x \rightarrow h} \rangle &= \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle \\
\langle w_2, g^{x \rightarrow h} \rangle &= \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle \\
\langle w_1, g^{x \rightarrow h} \rangle &= \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle \\
\langle w_0, g^{x \rightarrow h} \rangle &= \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle
\end{align*}
\]
\[
\begin{align*}
\langle w_3, g^{x \rightarrow h} \rangle &= \langle w_3, g^{x \rightarrow e} \rangle = \langle w_3, g^{x \rightarrow p} \rangle \\
\langle w_2, g^{x \rightarrow h} \rangle &= \langle w_2, g^{x \rightarrow e} \rangle = \langle w_2, g^{x \rightarrow p} \rangle \\
\langle w_1, g^{x \rightarrow h} \rangle &= \langle w_1, g^{x \rightarrow e} \rangle = \langle w_1, g^{x \rightarrow p} \rangle \\
\langle w_0, g^{x \rightarrow h} \rangle &= \langle w_0, g^{x \rightarrow e} \rangle = \langle w_0, g^{x \rightarrow p} \rangle
\end{align*}
\]
\[ \langle w_1, g^{x \rightarrow h} \rangle \]

\[ \langle w_2, g^{x \rightarrow e} \rangle \]

\[ \langle w_3, g^{x \rightarrow p} \rangle \]
$$\exists x DBO(x) \square \rightarrow BB(x)$$
\[
\exists x \text{DBO}(x) \rightarrow BB(x) \times
\]
Route 2: High Readings

Leave world ordering $\leq$ alone,
Leave world ordering $\leq$ alone, but define an assignment-sensitive similarity ordering $\leq^*$ based on it.

(17) $j \leq^*_i k$ iff $w_j \leq_{w_i} w_k \land g_j = g_k$
Leave world ordering $\leq$ alone, but define an assignment-sensitive similarity ordering $\leq^*$ based on it.

(17) $j \leq_i^* k$ iff $w_j \leq_{w_i} w_k \land g_j = g_k$

(18) $f^*(A, i) = \{j : j \in /A/\_i \land \neg \exists k (k \in /A/\_i \land k <_{w_i}^* j)\}$.

(19) $s[A \rightarrow C] = \{i : i \in s \land \forall j (j \in f^*(A, i) \supset \{j\}[C] \neq \emptyset)\}$
\[
\begin{array}{|c|c|}
\hline
\neg \text{BB} & \cdot e \quad \cdot \ p \quad w_3 \\
\hline
\text{BB} & \langle w_3, g^{x \rightarrow h} \rangle \quad \langle w_3, g^{x \rightarrow e} \rangle \quad \langle w_3, g^{x \rightarrow p} \rangle \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\neg \text{BB} & \quad \cdot p \quad \cdot \ e \\
\hline
\text{BB} & \langle w_2, g^{x \rightarrow h} \rangle \quad \langle w_2, g^{x \rightarrow e} \rangle \quad \langle w_2, g^{x \rightarrow p} \rangle \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\neg \text{BB} & \cdot e \quad \cdot \ p \\
\hline
\text{BB} & \langle w_1, g^{x \rightarrow h} \rangle \quad \langle w_1, g^{x \rightarrow e} \rangle \quad \langle w_1, g^{x \rightarrow p} \rangle \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|}
\hline
\neg \text{BB} & \cdot e \quad \cdot \ p \\
\hline
\text{BB} & \langle w_0, g^{x \rightarrow h} \rangle \quad \langle w_0, g^{x \rightarrow e} \rangle \quad \langle w_0, g^{x \rightarrow p} \rangle \\
\hline
\end{array}
\]
\[
\begin{array}{c|c|c}
\sim BB & e & p \\
\hline
BB & h & \cdot \\
\hline
\vee & & w_3 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\sim BB & p & e \\
\hline
BB & h & \cdot \\
\hline
\vee & & w_2 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\sim BB & e & p \\
\hline
BB & h & \cdot \\
\hline
\vee & & w_1 \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\sim BB & e & p \\
\hline
BB & h & \cdot \\
\hline
\vee & & w_0 \\
\end{array}
\]

\[
\langle w_0, g^x \rightarrow h \rangle \neq \langle w_0, g^x \rightarrow e \rangle \neq \langle w_0, g^x \rightarrow p \rangle
\]

\[
\langle w_1, g^x \rightarrow h \rangle \neq \langle w_1, g^x \rightarrow e \rangle \neq \langle w_1, g^x \rightarrow p \rangle
\]

\[
\langle w_2, g^x \rightarrow h \rangle \neq \langle w_2, g^x \rightarrow e \rangle \neq \langle w_2, g^x \rightarrow p \rangle
\]

\[
\langle w_3, g^x \rightarrow h \rangle \neq \langle w_3, g^x \rightarrow e \rangle \neq \langle w_3, g^x \rightarrow p \rangle
\]
\[ \langle w_0, g^x \rightarrow h \rangle \neq \langle w_0, g^x \rightarrow e \rangle \neq \langle w_0, g^x \rightarrow p \rangle \]

\[ \langle w_1, g^x \rightarrow h \rangle \neq \langle w_1, g^x \rightarrow e \rangle \neq \langle w_1, g^x \rightarrow p \rangle \]

\[ \langle w_2, g^x \rightarrow h \rangle \neq \langle w_2, g^x \rightarrow e \rangle \neq \langle w_2, g^x \rightarrow p \rangle \]

\[ \langle w_3, g^x \rightarrow h \rangle \neq \langle w_3, g^x \rightarrow e \rangle \neq \langle w_3, g^x \rightarrow p \rangle \]
\[
\begin{align*}
\neg BB & \quad \neg BB & \quad \neg BB & \\
. e & \quad . p & \quad . e & \\
. h & \quad . e & \quad . h & \\
. h & \quad . e & \quad . h & \\
BB & \quad BB & \quad BB & \\
\text{\neg DBO} & \quad \text{\neg DBO} & \quad \text{\neg DBO} & \\
\text{DBO} & \quad \text{DBO} & \quad \text{DBO} & \\
\end{align*}
\]

\[\langle w_1, g^x \rightarrow h \rangle, \langle w_2, g^x \rightarrow e \rangle, \langle w_3, g^x \rightarrow p \rangle\]
\[ \exists x \text{DBO}(x) \ifff BB(x) \]
$\exists x DBO(x) \implies BB(x)$
$\exists x DBO(x) \rightarrow BB(x)$  ×
Overview

Accounting for the Old Data
  Ordering Semantics + Dynamic Binding
  Route 1: Special Orderings
  Route 2: High Readings

Returning to the New Data
  The Problem for High Readings
  The Success of Special Orderings

Some Objections and Replies
  Saving High Readings?
  Problem for Special Orderings?

Takeaway
New Data - Summary

(1)  *Allie*: If Mary had made a vase, she would have made it from glass.

(2)  *Bert*: But she could have made a clay vase (and she wouldn’t have made *that* from glass)!

**Case 1**: Mary made two glass vases.

**Case 2**: Mary did not make any vases.

<table>
<thead>
<tr>
<th></th>
<th>Case 1</th>
<th>Case 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>✅</td>
<td>✗</td>
</tr>
<tr>
<td>(2)</td>
<td>??</td>
<td>✅</td>
</tr>
</tbody>
</table>
Problem for High Readings

\[ \langle w_0, g_x \rightarrow g_1 \rangle, \langle w_1, g_x \rightarrow g_2 \rangle, \langle w_1, g_x \rightarrow c \rangle \]

\[ \exists x \forall VMM \left( x \in G(\cdot) \right) \]

\[ w_1 \in \left[ G(\cdot) \right] \]
Problem for High Readings

\[ \langle w_0, g^x \rightarrow g_1 \rangle \]
\[ \langle w_0, g^x \rightarrow g_2 \rangle \]
\[ \langle w_1, g^x \rightarrow g_1 \rangle \]
\[ \langle w_1, g^x \rightarrow g_2 \rangle \]

\[ \exists x \ VMM \ (x) \in G (x) \]

\[ -G \]
\[ G \]

\[ V \]

\[ -G \cdot g_2 \cdot g_1 \]

\[ \neg VMM \quad VMM \]
Problem for High Readings

\[
\begin{array}{c|c}
\neg G & \cdot g_2 \\
G & \cdot g_1 \\
\end{array}
\]

\[
\begin{array}{c|c}
\neg G & \cdot g_2 \\
G & \cdot g_1 \\
\end{array}
\]

\[
\begin{array}{c|c}
\neg VMM & VMM \\
\end{array}
\]
Problem for High Readings

\[ \langle w_0, g^x \rightarrow g_1 \rangle \quad \langle w_0, g^x \rightarrow g_2 \rangle \quad \langle w_0, g^x \rightarrow c \rangle \]
Problem for High Readings

\[
\begin{array}{c|c|c}
\neg G & g_2 & c \\
G & g_1 & \\
\hline
\lor \\
\hline
\neg G & g_2 & g_1 \\
G & g_1 & \\
\hline
\neg \text{VMM} & \text{VMM} & \\
\end{array}
\]

\[
\langle w_0, g^{x \rightarrow g_1} \rangle
\]

\[
\langle w_0, g^{x \rightarrow g_2} \rangle
\]

\[
\langle w_0, g^{x \rightarrow c} \rangle
\]

\[
\langle w_1, g^{x \rightarrow g_1} \rangle
\]

\[
\langle w_1, g^{x \rightarrow g_2} \rangle
\]

\[
\langle w_1, g^{x \rightarrow c} \rangle
\]
Problem for High Readings

\[
\begin{array}{c|c|c|c}
\neg G & g_2 & c & w_1 \\
\hline
G & g_1 & & \\
\hline
\lor & & g_2 & g_1 \\
\hline
\neg VMM & VMM & & \\
\end{array}
\]

\[
\langle w_0, g^{x \rightarrow g_1} \rangle \neq \langle w_1, g^{x \rightarrow g_2} \rangle \neq \langle w_1, g^{x \rightarrow c} \rangle \\
\langle w_0, g^{x \rightarrow g_1} \rangle \neq \langle w_0, g^{x \rightarrow g_2} \rangle \neq \langle w_0, g^{x \rightarrow c} \rangle \\
\]

\[w_1 \in \langle G(c) \rangle \]
Problem for High Readings

\[
\begin{array}{c|cc}
\neg G & g_2 & c \\
G & g_1 & \ \ \ \ \ \ V \\
\end{array}
\]

\[
\begin{array}{c|cc}
\neg G & g_2 & g_1 \\
G & \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ V \\
\end{array}
\]

\[
\begin{array}{c|cc}
\neg \text{VMM} & \text{VMM} \\
\end{array}
\]

\[
\exists x \text{VMM}(x) \in G(x)
\]

\[
\langle w_1, g^x \mapsto g_1 \rangle \neq \langle w_1, g^x \mapsto g_2 \rangle \neq \langle w_1, g^x \mapsto c \rangle
\]

\[
\langle w_0, g^x \mapsto g_1 \rangle \neq \langle w_0, g^x \mapsto g_2 \rangle \neq \langle w_0, g^x \mapsto c \rangle
\]
Problem for High Readings

\[ \exists x \text{VMM}(x) \quad \square \rightarrow G(x) \]

\[ \langle w_1, g^x \rightarrow g_1 \rangle \neq \langle w_1, g^x \rightarrow g_2 \rangle \neq \langle w_1, g^x \rightarrow c \rangle \]

\[ \langle w_0, g^x \rightarrow g_1 \rangle \neq \langle w_0, g^x \rightarrow g_2 \rangle \neq \langle w_0, g^x \rightarrow c \rangle \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \implies G(x) \]

\[ \langle w_1, g^{x \to g_1} \rangle \neq \langle w_1, g^{x \to g_2} \rangle \neq \langle w_1, g^{x \to c} \rangle \]

\[ \langle w_0, g^{x \to g_1} \rangle \neq \langle w_0, g^{x \to g_2} \rangle \neq \langle w_0, g^{x \to c} \rangle \]

\[ w_1 \]

\[ w_0 \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \rightarrow G(x) \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \rightarrow G(x) \]

\[ \begin{array}{c|c|c}
\neg G & \cdot g_2 & \cdot c \\
G & \cdot g_1 & \\
\hline
\lor & w_1 & w_0 \\
\hline
\neg G & \cdot g_2 & \cdot g_1 \\
G & \\
\hline
\neg \text{VMM} & \text{VMM} & \\
\end{array} \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \quad \square \rightarrow G(x) \]

\[ \langle w_0, g^{x \rightarrow g_1} \rangle \neq \langle w_0, g^{x \rightarrow g_2} \rangle \neq \langle w_0, g^{x \rightarrow c} \rangle \]

\[ \langle w_1, g^{x \rightarrow g_1} \rangle \neq \langle w_1, g^{x \rightarrow g_2} \rangle \neq \langle w_1, g^{x \rightarrow c} \rangle \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \square \rightarrow G(x) \]

\[
\begin{array}{c|c|c}
\neg G & G \\
\hline
\neg G & \cdot g_2 & \cdot c \\
G & \cdot g_1 & \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\neg G & G \\
\hline
\neg G & \cdot g_2 & \cdot g_1 \\
G & \cdot g_1 & \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c}
\neg G & G & \neg \text{VMM} & \text{VMM} \\
\hline
\neg G & \cdot g_2 & \cdot c & \cdot g_1 \\
G & \cdot g_1 & & \\
\end{array}
\]

\[ \langle w_0, g^x \rightarrow g_1 \rangle \neq \langle w_1, g^x \rightarrow g_2 \rangle \neq \langle w_1, g^x \rightarrow c \rangle \neq \langle w_0, g^x \rightarrow g_2 \rangle \neq \langle w_0, g^x \rightarrow c \rangle \neq \langle w_1, g^x \rightarrow c \rangle \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \quad \square \rightarrow G(x) \]

\[ \langle w_1, g^x \rightarrow g_1 \rangle \neq \langle w_1, g^x \rightarrow g_2 \rangle \neq \langle w_1, g^x \rightarrow c \rangle \]

\[ \langle w_0, g^x \rightarrow g_1 \rangle \neq \langle w_0, g^x \rightarrow g_2 \rangle \neq \langle w_0, g^x \rightarrow c \rangle \]
Problem for High Readings

\[ \exists x \text{VMM}(x) \implies G(x) \quad w_1 \in \mathbb{G}(c)? \]

\[ \langle w_0, g^{x \rightarrow g_1} \rangle \neq \langle w_1, g^{x \rightarrow g_1} \rangle \]

\[ \langle w_0, g^{x \rightarrow g_1} \rangle \neq \langle w_0, g^{x \rightarrow g_2} \rangle \]

\[ \langle w_0, g^{x \rightarrow c} \rangle \neq \langle w_1, g^{x \rightarrow c} \rangle \]
Problem for High Readings

\[ \exists x VMM(x) \square \to G(x) \quad w_1 \in \llbracket G(c) \rrbracket? \quad \times \]

\begin{align*}
\langle w_0, g^{x \to g_1} \rangle &\neq \langle w_1, g^{x \to g_2} \rangle &\neq \langle w_1, g^{x \to c} \rangle \\
\langle w_0, g^{x \to g_1} \rangle &\neq \langle w_0, g^{x \to g_2} \rangle &\neq \langle w_0, g^{x \to c} \rangle
\end{align*}
Success of Special Orderings

Assumption: $\leq$ is strongly centered: $w_0 <_{w_0} w_1$
Success of Special Orderings
Success of Special Orderings

\( w_{0} \lor w_{1} \)

\[ \neg G \]

\[ G \]

\[ \neg G \]

\[ G \]

\[ \neg VMM \]

\[ VMM \]
Success of Special Orderings

\[ \langle w_1, g \rangle \rightarrow c \]

\[ \neg w_0 < w_0 w_1 \]
Success of Special Orderings

\[
\begin{array}{c|c|c}
\neg G & g_2 & c \\
G & g_1 & \\
\end{array}
\]

\[
\begin{array}{c|c|c}
\neg G & g_2 & g_1 \\
G & \neg VMM & VMM \\
\end{array}
\]

\[
\wedge w_0
\]

\[
\bigvee \langle w_1, g_x \rightarrow c \rangle
\]
Success of Special Orderings

\[ w_0 \rightarrow w_1 \]

\[ \neg G \cdot g_2 \cdot c \]

\[ G \cdot g_1 \]

\[ \lor \]

\[ \neg VMM \]

\[ VMM \]
Success of Special Orderings

\[ \neg G \cdot g_2 \cdot c \]

\[ G \cdot g_1 \]

\[ \lor \]

\[ \neg G \cdot g_2 \cdot g_1 \]

\[ \neg \nu_0 \prec \nu_0 \nu_1 \]
Success of Special Orderings

Assumption: \( \leq \) is strongly centered: \( w_0 <_{w_0} w_1 \)
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Result: no special order in Case 1.
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(Possibly) universal entailments for (1) in Case 2.
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(Possibly) universal entailments for (1) in Case 2.

Right predictions about the new data.
Overview

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Problem for Special Orderings?

Takeaway
Saving High Readings: Weak?

Objection: the high reading accounts have ways of dealing with weak/low readings as well.

(20) a. If I had a dime, I would put it in the meter.
    b. If I had picked a number, I would have picked 3.
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No. Consider

Case 3: Mary made one glass vase and one clay vase.
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This vase case is just one of those.

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**Case 3:** Mary made one glass vase and one clay vase.

(1) false in this case, which is not what we’d expect on a weak/low reading.
c in Case 1 gets ignored due to quantifier domain restriction.
Saving High Readings: QDR?

c in Case 1 gets ignored due to quantifier domain restriction.

Maybe, but how can this get Case 2 right?
$c$ in Case 1 gets ignored due to quantifier domain restriction.

Maybe, but how can this get Case 2 right? Shouldn’t the possible clay vase be irrelevant still?
Problem for Special Orderings?

Walker and Romero (2015): cases of universal entailments without special order.

(21) Scenario: Balaam took part in a game show which had the following format. If you win the easy first round, you win Herbert, an obnoxious and disobedient donkey. The reward for the much more difficult second and third rounds are the well-mannered and obedient donkeys Eeyore and Platero, respectively. Losing a round of the game eliminates the player, keeping them from advancing to any later rounds. Balaam was eliminated in the first round, and so remains donkeyless.
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Problem for Special Orderings?

John, only aware of the game’s first round, asserts (22), since he knows about Balaam’s short temper.

(22) If Balaam owned a donkey, he would beat it.
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Sarah, who has more information about the game, corrects him with (23).

(23) No, Balaam could have won Platero or Eeyore too, and he wouldn’t beat either of them if he owned them.
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Seems like Sarah is right, so there are universal entailments. But intuitively, the world where Balaam wins only one round is more similar to the actual world than ones where he wins two or three. So no special order.
Problem for Special Orderings?

Response part 1:

Recall Fine (1975):

(a) If Nixon pressed the button, there would have been a nuclear holocaust.

(b) If Nixon had pressed the button, the wire would have miraculously malfunctioned.

Disaster for ordering semantics?

Lewis (1979): weight violations of law more than disparities in other facts.

We still need a theory of the closeness ordering that predicts special orderings in the right cases, but nothing has ruled this out yet.
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Response part 1: closeness ordering need not correspond to intuitive ordering.  
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Problem for Special Orderings?

Response part 2: actually, the high reading account needs special orderings too.
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(25) Scenario: Cory, who is donkeyless, is a bit crazy. He’s disposed to take out his anger on his most prized possession. He also took part in the game show described in (21), but also lost in the first round. Had he won any rounds, the prize from the most advanced round he won would have become his prized possession, and he would have beaten it, but he wouldn’t beat anything else.

Now consider the following.

(26) If Cory owned a donkey, he would beat it.
Problem for Special Orderings?

Response part 2: actually, the high reading account needs special orderings too.

(25) Scenario: Cory, who is donkeyless, is a bit crazy. He’s disposed to take out his anger on his most prized possession. He also took part in the game show described in (21), but also lost in the first round. Had he won any rounds, the prize from the most advanced round he won would have become his prized possession, and he would have beaten it, but he wouldn’t beat anything else.

Now consider the following.

(26) If Cory owned a donkey, he would beat it.

In this scenario, the salient reading of (26) seems false. If Cory had owned Eeyore, he would own but not beat Herbert.
Problem for Special Orderings?

To get this right, the high reading account needs the worlds where Cory wins 2 or 3 donkeys to be as close as the one where he wins 1. It needs a special ordering.

But then we can get the right results from the special ordering alone, without the high reading.
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Takeaway
Counterfactual donkey sentences have universal entailments, but not of the sort we’d expect from high reading accounts.

The special ordering account seems to get things right. But we still need a theory of how these orderings arise.
Thanks!
References


