1 From conversational backgrounds to accessibility relations

For $W = \{w_1, w_2, w_3\}$, the conversational background $f$ is defined as follows:

$$
\begin{align*}
  f(w_1) &= \{\{w_1, w_2\}, \{w_1, w_2, w_3\}\} \\
  f(w_2) &= \{\{w_2, w_3\}, \{w_1, w_2, w_3\}\} \\
  f(w_3) &= \{\{w_1\}, \{w_1, w_2\}, \{w_1, w_3\}, \{w_1, w_2, w_3\}\}
\end{align*}
$$

From $f$, construct the corresponding accessibility relation (set of pairs of worlds).

2 Simple possibility

The simplest form of possibility is defined as follows (type $\langle cb, \langle \langle s, t \rangle, \langle s, t \rangle \rangle \rangle$, where $cb$ abbreviates $\langle s, \langle \langle s, t \rangle, t \rangle \rangle$):

$$
can = \lambda f \lambda p \lambda w (\exists w' \in \bigcap f(w) \text{ such that } p(w') = T)
$$

Let $f$ be the conversational background defined in part 1, and let $q = \{w_1\}$. What is the characteristic set of the function $[can(f)(q)]^{M,s}$?
3 Scope-taking again

Assume that subjects are associated with a variable $\chi$ inside the VP. When that variable is of type $e$, they scope above the VP. When that variable is of type $\langle e, t \rangle$, they scope below it:

Assume everyone is analyzed as $(\lambda P \lambda w (\forall x : P(x)(w)) : \langle e, \langle s, t \rangle \rangle, \langle s, t \rangle)$, and volunteer : $\langle e, \langle s, t \rangle \rangle$ has the following denotation (the domain of entities is $D_e = \{a, b\}$):

$$\|\text{volunteer}\|^M = \begin{bmatrix}
    a & \mapsto & \begin{bmatrix}
        w_1 & \mapsto & T \\
        w_2 & \mapsto & F \\
        w_3 & \mapsto & T 
    \end{bmatrix} \\
    b & \mapsto & \begin{bmatrix}
        w_1 & \mapsto & F \\
        w_2 & \mapsto & T \\
        w_3 & \mapsto & T 
    \end{bmatrix}
\end{bmatrix}$$

Using the can defined in part 2 and the conversational background defined in part 1, determine which propositions are expressed by the two scope orderings derivable with the LF sketched above. (Follow-up: what does the ‘Epistemic Containment Principle’ (ECP) say about this ambiguity with an epistemic modal like may?)
4 Ordering sources

Assume $W = \{w_1, w_2, w_3, w_4\}$, with a modal base $f =$

\[
\begin{align*}
  f(w_1) &= \{[\text{criminal}(j)]\} \\
  f(w_2) &= \{[\text{criminal}(j)]\} \\
  f(w_3) &= \{[\neg\text{criminal}(j)]\} \\
  f(w_4) &= \{[\neg\text{criminal}(j), \text{jailed}(j)]\}
\end{align*}
\]

where $[\text{criminal}(j)] = \{w_1, w_2\}$ and $[\text{jailed}(j)] = \{w_1, w_3\}$. The ordering source $g$ is such that, for all worlds $w$, $g(w)$ is the set containing the proposition that $x$ is in jail iff $x$ committed a crime and the proposition that John is not a criminal. What set of worlds does \textit{John must be jailed} identify in this scenario (relative to $f$ and $g$)? What is unusual about $w_4$?

5 Comparative possibility

In ‘The notional category of modality’, Kratzer suggests the following:

\[
[\varphi \text{ as likely as } \psi]^{M,f,g,w} \iff \text{for all } w \in f(w) \text{ such that } [\psi]^{M,f,g,w}(w) \text{ there is a world } w' \in f(w) \text{ such that } w' \leq_{g(w)} w \text{ and } [\varphi]^{M,f,g,w}(w')
\]

Suppose the modal base in the world of evaluation @ consists of worlds in which John and his two sisters Ali and Betty each bought exactly one raffle ticket. The ordering source $g$ at @ contains just the three mutually exclusive propositions that Ali wins, that Betty wins, and that John wins. What does the above semantics say about the meanings of \textit{John wins is as likely as Ali wins} and \textit{John wins is as likely as one of his sisters wins}? (These sentences are a bit awkward; just trying to avoid the distractions of nominalizing.) For discussion, see Lassiter (2015), ‘Epistemic comparison, models of uncertainty, and the disjunction puzzle’ and references therein.