1 Handling Topicalization and Relative Clauses

(1) Topicalization
   a. I like fish.
   b. Fish, I like.

(2) Relative Clauses 1
   a. the empty bottle
   b. the bottle [which is empty]
   c. the bottle [that is empty]

(3) Base sentence: Sandy met Joey in Oakland.
   a. The person [who, [t met Joey in Oakland]]
   b. The person [who, [Sandy met t, in Oakland]]
   c. The place [where, [Sandy met Joey t,]]

Movement: a way to create predicates from sentences
- a way to create λ-abstractions.

2 Handling Traces

What do traces refer to?
An intuition: the ‘head’ of the NP

Another structure:
3  The Notion of ‘Variable’

Traces are interpreted as variables.

Variables denote individuals, but only with respect to an assignment.

(4) If $\alpha$ is a trace, then, for any assignment $a$, $[\alpha]^a = a$.

• Modifying semantic composition rules to handle variable assignments.

Interpretation independent of variable assignments:

(5) For any tree $\alpha$, $\alpha$ is in the domain of $] \_ \_ \_ \_ \_$ iff for all assignments $a$ and $b$, $[\alpha]^a = [\beta]^b$.

If $\alpha$ is in the domain of $] \_ \_ \_ \_ \_$, then for all assignments $a$, $[\alpha]^a = [\alpha]^a$.

4  Predicate Abstraction

(6) **Predicate Abstraction:**

If $\alpha$ is a branching node, whose daughters are a relative pronoun and $\beta$ then $[\alpha] = \lambda x \in D. [\beta]^x$.

• syncategorematicity

denotations under assignments ≠ denotations applied to assignments

(7) a. $[\text{whom John likes}]_\text{Frank}\neq [\text{whom John likes}]_\text{Tim}$

b. $[\text{sleeps}]_\text{Ann}\neq [\text{sleeps}]_\text{Ann}$

c. $[\text{John likes}]_x\neq [\text{John likes}]_x$

Proof strategy: top-down or bottom-up
5  **such that-relatives**

(8)  
   a. the book such that John bought it.
   b. the book which John bought.

Additional flexibility:

(9)  
   a. the book such that John denied the claim that Mona wrote it
   b. *the book that John denied the claim that Mona wrote.

(10)  **Pronoun Rule**
       If $\alpha$ is a pronoun, then for any assignment $\alpha \in D$, $[\alpha]^\alpha = \alpha$.

(11)  **Predicate Abstraction** (Revised):
       If $\alpha$ is a branching node, with $\beta$ and $\gamma$ as daughters, where $\beta$ is a relative pronoun or such, then $[\alpha] = \lambda x \in D. [\gamma]^x$.

(12)  **Vacuous Binding**
       a. *the man such that Mary is famous.
       b. *the man who Mary is famous.

6  **Nested Relatives**

(13)  the man such that Mary reviewed the book which he wrote

Problem: illegal capture of $he$ by $which$

Solution: co-indexing and assignment functions

(14)  the man such, that Mary reviewed the book which he wrote

(15)  *A variable assignment* is a partial function from N into D.

(16)  **Traces and Pronoun Rule**
       If $\alpha$ is a pronoun or a trace, $\alpha$ is an assignment function and $i \in \text{dom}(\alpha)$, then $[\alpha]^i = \alpha(i)$.

Handling pronouns:

(17)  She$_i$ likes him$_i$. 

5 6
7 Assignment Functions

Modifying assignment functions:

(18) Let $\alpha$ be an assignment function, $i \in N$, and $x \in D$.

$$\alpha^{x,i} = (\alpha \text{ extended/modified to assign } x \text{ to index } i.)$$

(i) $\text{dom}(\alpha^{x,i}) = \text{dom}(\alpha) \cup \{i\}$

(extend the domain of $\alpha$ to cover index $i$)

(ii) $\alpha^{x,i}(i) = x$.

(assign index $i$ to $x$)

(iii) for every $j \in \text{dom}(\alpha^{x,i})$ such that $j \neq i$: $\alpha^{x,i}(j) = \alpha(j)$

(leave everything else untouched)

(19) **Predicate Abstraction:**

If $\alpha$ is a branching node, with $\beta$, and $\gamma$ as daughters, where $\beta$ is a relative pronoun or such, and $i \in N$, then for any variable assignments $\alpha$, then

$$[\alpha]^n = \lambda x \in D_{\gamma}\beta[\alpha]^{n/x}.$$