1 Inferring categories and λ-terms

Consider control verbs like want: If Bill wants to be happy, then the thing that Bill wants is that Bill be happy. To a first approximation, the generalization is that a control verb’s grammatical subject serves as a semantic argument to two verbs—the main verb of the sentence, and the verb heading the infinitival complement. In transformational grammar, this is modeled using a silent pro-form, with grammatical restrictions on coindexation of this form with some c-commanding element: Bill₃ wants pro₃ to leave. This differs crucially from raising verbs, where the grammatical subject only serves as argument to the embedded verb. The transformational treatment: Bill seems to be happy = Bill₇ seems t₇ to be happy, where Bill and t₇ form a movement chain. The pre-movement position of Bill is the one that is semantically interpreted (via the somewhat mysterious mechanism of “reconstruction”).

CCG offers a different perspective. Your job in this question is to figure out what want and seem must denote, and what their syntactic categories must be, in order for these derivations to work out as indicated, with no extra syntactic or semantic mechanisms. I’ll fill in the rest of the trees, and your job is to fill in the numbered blanks, in a way that allows the composition to proceed using only left and right functional application. Make sure you check your answers by actually doing the applications and seeing that they yield the terms you see at the top level. Then summarize, in general terms, the syntactic and semantic similarities and differences between these verbs.

(Notes: (1) I’m simplifying by going extensional, which is totally wrong semantically. Please ignore this point: the goal of the exercise is to practice inferring categories and meanings based on other constraints. (2) The treatment of infinitivals is also simplified.)
2 Relative clauses

Propose lexical entries and a step-by-step derivation of boy who Mary gave Rover to and boy who Mary gave Rover. You may assume two homophonous verbs gave for these purposes (which of course are related by rule in the full fragment). Do this

a) on the LF-based approach to relative clauses(Heim & Kratzer ch.6, also reviewed in Jacobson ch.10).

b) using Jacobson’s CCG approach to relative clauses, using either forward composition or the Geach rule (whichever you prefer).

3 Scope ambiguity

Derive truth-conditions for both scopings of Every child kissed some dog using

a) using Jacobson’s (2014: §14) variant of Heim & Kratzer’s QR;

b) using Hendriks’ Flexible Types, with type-shifters applying to the verb. Show all steps of \( \alpha \)-conversion and \( \beta \)-reduction. (See class notes and Barker (2005: §4) for a review. You could get inverse scope using just \( \text{AR1} \), but don’t: use both type-shifters in both cases.)

\[ \text{AR1} = \lambda f \lambda x \lambda y.x(\lambda z.(f(z))(y)), \text{ with syntactic effect } (S[V]/LX)/RX \Rightarrow (S[V]/LX)/RX(S[V]/RX(S[V]/LY)). \]

\[ \text{AR2} = \lambda f \lambda x \lambda y.y(\lambda z.(f(x))(z)), \text{ with syntactic effect } (S[V]/LX)/RX \Rightarrow (S[V]/L(S[V]/RX(S[V]/LY)))/RX. \]

References
