PROOF-THEORETIC THEMATIC UNIQUENESS*

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1   Introduction

Despite the field's long-standing interest in raising (1), a phenomenon whose study has flourished since osenbaum (1967), copy raising (2) has not received as much attention in theoretical linguistics.

(1)   Thora seemed to enjoy the game.

(2)   Thora seemed like she enjoyed the game.

The 'copy' pronoun in (2) isn argument in the semantics.
ct that copy raising, like subject-to-subject raising,

game.

te a semantic role that we call   SOU CE for the copy-
existing thematic role STIMULUS, essentially based on
broader theoretical considerations.
red by a paper by Greg Carlson (Carlson 1984), a
s paper, I return to Greg's paper and a problem that it
some puzzling facts about Swedish copy raising. I first
2.1) and on Thematic Uniqueness (§2.2). I then sketch
sufficiently restrictive notion of Thematic Uniqueness
terms of proof theory instead (§4). I conclude with

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2   Background

2.1   Copy Raising

Copy raising is a phenomenon in which a raising verb takes a non-expletive subject and a complement containing an obligatory pronominal 'copy' of the subject, as shown again here for English:

(4)   a.   Thora seems like she's found the chocolate.

         b.   *Thora seems like Alfred's found the chocolate.

   Swedish displays a similar alternation:

(5)   a.   Thora verkar som om hon har hittat chokladen.
                 Thora seems as   if   she has found chocolate.the
                 'Thora seems like she has found the chocolate.'

         b.   * Thora verkar som om Alfred har hittat chokladen.
                 Thora seems as   if   Alfred has found chocolate.the

But Swedish also has the capacity to express the SOU CE in a på- . In that case it cannot also be expressed as a subject:

(6)   a.   Det verkar på Thora som om hon har hittat chokladen.
                 It   seems on Thora as   if   she has found chocolate.the
                 'Thora seems like she has found the chocolate.'

         b.   * Thora verkar på Isak/Thora som om hon har hittat chokladen.
                 Thora seems on Isak/Thora as   if   she has found chocolate.the

   English copy raising was first discussed extensively in work by ogers (1971, 1972, 1973, 1974), although it did receive a brief mention on the first major extended work on raising ostal (1974: 268, fn.1). To our knowledge, Asudeh and Toivonen (2012) is the first work to discuss Swedish copy raising in any detail. For further references on both English and Swedish copy raising, see Asudeh and Toivonen (2012, 2017) and Toivonen (2020).

2.2   Thematic Uniqueness

Carlson (1984: 270–273) discusses the status of thematic roles in the grammar and issues raised by the apparent universal constraint against verbs like the made up verb skick, which takes a subject that is an AGENT and two objects that are both LOCATION (or ATIENT — the exact thematic role doesn't matter).

(7)   John skicked Bill's leg Bill's shin.   (Carlson 1984: 271, (11))

(8)   Unique Role Requirement   (Landman 2000: 38)
          If a thematic role is specified for an event, it is uniquely specified.

The question is how to operationalize this.

      There is a long tradition in the literature that captures the Unique ole equirement in the
model theory by defining thematic roles as partial functions from eventualities to individuals
(Chierchia 1984, 1989, Landman 2000, Champollion 2015, 2017). The underlying explanation
for the ill-formedness of (9) — which is an attempt to use kick as if it were the hypothetical skick
— and (10) is thus potentially the same:

(9)   * John kicked Bill's leg Bill's shin.

(10)   * Tom verkar på obin som om han skrattar.
          Tom seems on   obin as   if he laughs

Carlson assumes that (9) involves an attempt to assign two instances of a LOCATION thematic
role and therefore violates the requirement that each event have at most one instance of a given
role. Under the model-theoretic treatment of the uniquenes

The model-theoretic treatment of the uniqueness requirement on thematic roles does not block this sentence, since the subject and the reflexive are denotationally equivalent. They could both be assigned the thematic role AGENT.

(24) a. It seems like Tom is laughing.

  b. Det verkar som om Tom skrattar.
    It seems as if T. laughs
    `It seems as if Tom is laughing.'

The interpretations for these cases are presented here as separate terms (whose proper interaction is captured in the Glue logic side, presented in (26) below):

(25) $\lambda p \lambda s^0.\text{seem}(s^0, p)$

  $\lambda S \lambda s.\exists v[S(s) \wedge \text{PSOURCE}(s) = v]$

Asudeh and Toivonen (2012) argue that the existential closure is obligatory in both English and Swedish subject-to-subject raising and in English expletive examples. The closure is only optional in Swedish expletive examples, to allow composition with the PP adjunct.

These interpretations are embedded in Glue meaning constructors, which pair terms of the meaning language with linear logic terms:

(26) $\lambda p \lambda s^0.\text{seem}(s^0, p)$:
    COMPLEMENT ⊸ PSOURCE ⊸ EVENT ⊸ RESULT

  $\lambda S \lambda s.\exists v[S(s) \wedge \text{PSOURCE}(s) = v]$:
    (PSOURCE ⊸ EVENT ⊸ RESULT) ⊸ (EVENT ⊸ RESULT)

The linear logic terms are provided schematically here, but normally they would be instantiated in terms of some syntactic theory, such as Lexical-Functional Grammar (Bresnan et al. 2016).

Crucially, a linear logic term is introduced for the PSOURCE. This will serve as a resource that must be properly consumed in the lw

In both English and Swedish, the copy-raised subject serves the SOURCE

This is captured by embedding the copy raising verb's meaning in the following meaning constructor:

(32)   *λxλPλs*:seem(s; P(x))

(35)   * Tom verkar på sig själv som om han skrattar.
         T.   seems on him self as if   he laughs

This example is ill-formed for the proof-theoretic reasons just outlined with respect to the proofs (33) and (34) above.

Since Glue proofs are essentially structural representations of the syntax-semantics interface (Asudeh and Crouch 2002a,b), proof-theoretic uniqueness therefore has the desired property of controlling for the linguistic realization of P-SOURCES through the mapping from syntax to semantics, based on the resources underlying contribution of P-SOURCE, rather than controlling for denotational equivalence in the model theory.

5   Conclusion

The basis for proof-theoretic uniqueness is Linguistic Resource Sensitivity, which controls proper argument consumption by predicates. I argued that it is this latter notion that could be responsible for blocking cases involving thematic roles that denotational uniqueness lets slips through, such as unlicensed reflexives. The proof-theoretic control of functor-argument combination effected by Linguistic Resource Sensitivity was generalized to P-SOURCES by assigning them a resource that must be properly consumed in the proof, although in the model-theoretic semantics they are still not treated as arguments.

Proof-theoretic uniqueness is thus a stronger condition than model-theoretic uniqueness, although the independence of the two kinds of uniqueness means that there is no conflict between the two and they can be captured simultaneously in one system, as they have been here, since I still assume that thematic/semantic roles are functions over eventualities, as per Carlson's original pioneering insight.

One problem remains, however. Normally, a strong correspondence is assumed between proofs and models, as captured by the Curry-Howard Isomorphism (Curry and Feys 1958, Howard 1980). The solution sketched here puts some stress on the correspondence if it is construed as a correspondence between the terms in the meaning language and the terms in the Glue logic. It is worth pointing out, though, that the correspondence is preserved between the compositional structure of the proof itself (as captured in proof rules) and the models for the proofs.

References

Asudeh, Ash. 2004.   Resumption as resource management.   Doctoral Dissertation, Stanford University.

Asudeh, Ash. 2012. The logic of pronominal resumption. Oxford: Oxford University Press.

Asudeh, Ash, and Richard Crouch. 2002a.   Coordination and parallelism in Glue Semantics: Integrating discourse cohesion and the element constraint. In Proceedings of the LFG02 conference, ed. Miriam Butt and Tracy Holloway King, 19–39. Stanford, CA: CSLI Publications.

Asudeh, Ash, and Richard Crouch. 2002b.   Derivational parallelism and ellipsis parallelism. In Proceedings of the 21st West Coast Conference on Formal Linguistics, ed. Line Mikkelsen and Christopher Potts, 1–14. Somerville, MA: Cascadilla Press.

Asudeh, Ash, and Ida Toivonen. 2012. Copy raising and perception. Natural Language and Linguistic Theory 30:321–380.