Inverse Linking and Telescoping as Polyadic Quantification

Manfred Sailer (Frankfurt a.M.)

We will consider two constellations in which one quantifier is embedded inside another but where the embedded quantifier seems to outscope its embedder. This is the case for inverse linking (IL, (1)) and telescoping (TS, (2)). In telescoping the embedded quantifier must even take scope outside the clause in which it is contained.

(1) [A representative from [every city]] supported the proposal. (**Every > Some**)

(2) [The picture of his$_i$ mother [that every$_i$ soldier kept wrapped in a sock]] was not much use to him$_i$. (quoted from Sternefeld (t.a.))

Rather than assuming a wide scope for the embedded quantifier, we propose a polyadic analysis, in which the two quantifiers form one unit. We present evidence for IL, based on previous literature, and construct analogous evidence for TS. The polyadic account makes interesting predictions that are confirmed by the data and not compatible with previous approaches.

Inverse linking We reinterpret three observations from the literature to support the idea that the quantifiers involved in an IL reading form a semantic unit rather than a sequence of quantifiers. The first two arguments show that the logical behavior of an NP containing an embedded quantifier differs from that of the same NP without embedded quantifier. The third one shows that the two quantifiers cannot be separated.

1) Moltmann (1995) points out that the IL readings for NPs such as *the wife of every president* allow for *except*-phrases (*the wife of every president except Hillary*), even though *except*-phrases are not compatible with singular definites, but very well with universals.

2) Woisetschlaeger (1983) shows with examples like (3) that definite NPs that embed an indefinite NP can occur in existential *there*-clauses, which normally disallow definites.

(3) There is [[a well-known mathematician's] proof] of the theorem on page 642.

3) Larson (1985) observes that no quantifier may take intermediate scope between the two quantifiers that appear inside one NP, i.e., sentence (4) does not have a reading in which **Two** takes scope between **Some** and **Every**, though the relative scope of the other two may vary in principle. This, again, supports an approach that takes the two NP-internal quantifiers as a unit.

(4) Two policemen spy on someone from every city. (Larson, 1985)

The three observations together support the idea, also articulated in Moltmann (1995), that the two quantifiers inside the NP behave as one unit and should be treated as a polyadic quantifier.

Telescoping We use German data to show that the observations supporting a polyadic treatment of IL carry over to TS: *Except*-phrases are possible (5). Occurrence within existential clauses do not show definiteness effects (6). Sentence (7) does not have a split reading of the form **Every > Two > Most**.

(5) [Die Frau, [die jeder$_i$ Präsident geheiratet hat]], außer Hillary Clinton, unterstützt ihn$_i$ ohne eigene politische Ambitionen. 'The woman that every$_i$ president married, except Hilllary Clinton, supports him$_i$ without own political ambitions.'

(6) Es war einmal die Königin *(, die über ein großes Reich herrschte). 'Once upon a time there was the queen (that reigned over a big empire).'

(7) Die meisten Fans, die jeder Popstar hat, hören mindestens zweimal am Tag seinen$_i$ aktuellen Hit. 'Most of the fans that every$_i$ pop star has, listen to his$_i$ current hit at least twice a day.'

Analysis We propose that a syntactic configuration of the form $[_{\mathrm{S}} \ldots [\mathrm{Det}_1\ \mathrm{N}_1\ [\ldots [\mathrm{Det}_2\ \mathrm{N}_2] \ldots]] \ldots]$ is mapped to a semantic representation of the form $\langle \mathrm{Det}_2^* x, \mathrm{Det}_1^* y\rangle\langle \mathrm{N}_2^*, \mathrm{N}_1^*\rangle(\mathrm{S}^*)$ for

IL and TS (where X* stands for the semantic representation of a constituent X). The resulting polyadic quantifier is interpreted in such a way that the Det_1 is integrated into the restrictor of Det_2 (where Det_1's discourse referent is dynamically accessible within the scope ψ).

(8) $[\![\langle \text{Det}_2^* x, \text{Det}_1^* y\rangle \langle \phi_2, \phi_1\rangle(\psi)]\!] = 1$ iff
for Det_2 x such that (x is in $[\![\phi_1]\!]$ and for Det_1 y in $[\![\phi_2]\!]$), x and that y are in $[\![\psi]\!]$.

As suggested by the data, the two determiners form a unit in this analysis and, semantically, the embedded one (Det_2) has prominence over the syntactically higher one (Det_1). The interpretation of the two quantifiers is not iterative but via a complex restrictor. So, *The wife of every president was invited* can be true if some presidents are not married and *One apple in every basket is rotten* only states something about baskets that contain apples.

Predictions We will point to interesting predictions of our theory, one for IL, one for TS.

1) Champollion and Sauerland (2011) predict the same readings as our account, but do not form a complex restrictor. Example (9) shows that the NPI *je* (*ever*) is not licensed inside the restrictor of a universal quantifier if it is embedded within a definite NP.

(9) [Jeder Politiker [des Landes, das (*je) dem Bündnis angehört hat]], fährt zur Konferenz.
'Every politician of the country that (ever) belonged to the union, goes to the conf.'

In IL, however, the NPI-licensing potential of the universal quantifier extends into the restrictor associated with the definite, i.e., the quantifier $\langle \textbf{Every}\, x, \textbf{The}\, y\rangle \langle \phi_2, \phi_1\rangle$ also licenses NPIs in ϕ_1, (10). This is not compatible with Champollion and Sauerland's analysis.

(10) Auf dieser Liste wurde [der Name$_i$ *(jeder Politikerin)] vermerkt,
[der$_i$ je im Zusammenhang mit dem Skandal genannt wurde].
'On this list, the name$_i$ *(of every politician) was noted that$_i$ had ever been mentioned in connection with the scandal.'

2) While Barker (2012) and Sternefeld (t.a.) contribute to a growing awareness of the existence of TS, its exact empirical limits have not been investigated. We will present German data and show that TS is excluded from clauses that are dependents of verbs, including subject clauses, complement clauses, and adjunct clauses. Within the nominal domain, while relative clauses are open for TS, complement clauses (usually "content clauses") are not. Example (11) illustrates the non-availability of TS readings with a quantifier in a subject clause.

(11) *[Dass jeder$_i$ Student die Prüfung bestanden hat], überrascht seinen$_i$ Dozenten.
'[That every$_i$ student passed the exam] surprised his$_i$ professor.'

Barker's or Sternefeld's continuation-based approach can derive a wide-scope reading for the embedded universal in (2), but it is not clear how they would prevent wide-scope in (11). The restriction follows immediately in the polyadic approach: There is no higher determiner that can be fused with the embedded determiner in the case of dependent clauses of verbs.

Conclusion A polyadic analysis of inverse linking offers a new look on known phenomena. The analogical behavior of telescoping has not been documented before. Our analysis captures the unit-like behavior of a higher and an embedded quantifier in a direct way. In addition, it makes correct predictions for phenomena that have not been systematically explored: the NPI-licensing facts with inverse linking readings and the impossibility of telescoping from dependent clauses of verbs. While the aim of the talk is to motivate the polyadic semantic analysis, we will shortly point out which concepts of the syntax-semantics interface are compatible with it.

References **Barker**, C. (2012). Quantificational binding does not require c-command. *LI* 43, 614–633. **Champollion**, L. & U. Sauerland (2011). Move and accommodate. *EISS* 8, 27–51. **Larson**, R.K. (1985). Quantifying into NP. Ms. semlab5.sbs.sunysb.edu/∼rlarson/qnp.pdf. **Moltmann**, F. (1995). Exception sentences and polyadic quantification. *L&P* 18, 223–280. **Sternefeld**, W. (t.a.). Telescoping by delayed binding. In Krifka et al. (eds), *Reconstruction Effects in Relative Clauses*. Berlin. **Woisetschlaeger**, E. (1983). On the question of definiteness in "an old man's book". *LI* 14, 137–154.