Deriving wide-scoping operators in an associative Lambek categorial grammar

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In (1), a tensed clause and a tenseless clause seem to be coordinated, but the modal *can't* in the first conjunct scopes semantically over both clauses: "It cannot be the case that (a) Ward eats caviar, and (b) his guest gets only beans."

(1) [Ward **can't** eat caviar] and [his guest get only beans].

Previous analyses of sentences like (1) take them to be coordinations of two tenseless clauses. To account for the position of the modal, Siegel (1987) proposes a wrapping operation to insert it into the first clause while allowing it to scope over both; Johnson (2000), Hulsey (2006), and others analyze (1) as a kind of gapping (compare *Ward ate caviar and his guest beans*).

However, similar examples exist in which the first conjunct is a tensed clause or VP, making the previous analyses inapplicable to them. The modal *might* in (2a) and the negation *wasn't* in (2b) scope over both conjuncts: the intended meanings are "It might be the case that they escaped and she didn't notice," and "someone for whom it was not the case that he was stodgy and wanted to call it quits."

(2) a. [They **might** have escaped] and [she didn't notice].
b. "It was fun to run into someone who [**wasn't** stodgy] and [thought at some point you should call it quits]," remembered Ellen. "He never thought there was some point where you had to call it quits." (Gary Kinder, *Ship of Gold in the Deep Blue Sea,* 1998, p. 89.)

Furthermore, the examples in (3) show that sentences like those in (1) and (2) are part of a larger landscape of coordinations, in which material that is syntactically part the first conjunct scopes semantically over both conjuncts. In (3a), the polar question marking (in the subject-auxiliary inversion *Have you*) is intended to scope over both clauses, so that the meaning is "Is it the case that [you've tried everything and your back still hurts]?" In (3b), the question of 'why' applies to both clauses; the meaning is, "Why is it that these two propositions – me working and you sitting there – are both true?" In (3c), the quantifier *no one* scopes wide; the meaning is, "There is no person *x* such that: [*x* measures your IQ and you are paired with employees of your mental ability]." In (3d), the adverb *only* scopes over both conjuncts of the *if*-clause. The narrator would not be lucky if Papa and Mamma didn't speak to him for a month; he would be lucky if that and losing his allowance were the *only* things that happened. In (3e), the polar question marking (*Do you*) and the lexical verb *want* together scope over both clauses; the meaning is, "Do you want it to be the case that [you wash and I dry]?"

(3) a. [**Have you** tried everything] and [your back still hurts]? (newspaper ad)
b. [**Why am I** working] and [you're just sitting there]?

c. [**No one** measures I.Q. when you apply for a job] and [you are then paired with employees of your mental ability]. (listserv concerning autism)
d. I would be lucky if [I **only** lost my allowance for six months] and [Papa and Mamma didn't speak to me for a month]. (John D. Fitzgerald, *The Great Brain Reforms*, 1972, p. 15)
e. [**Do you want** to wash] and [I'll dry]?

Previous analyses of wide-scoping operators fall short when it comes to examples like these. An associative Lambek categorial grammar (LCG), in contrast, generates all these examples, with the adoption of a suitable category for coordinating conjunctions.

The first part of the analysis will be the choice of a category for conjunctions. It has traditionally been assumed that the syntactic categories of the elements joined by a conjunction must be the same, but many exceptions over the years have been noted, including coordination of unlikes and Across the Board (ATB) violations. I adopt an analysis proposed by Zhang (2010) (and influenced by Johannessen 1998), in which the conjuncts need not be of like categories, but the category of the coordinate structure as a whole will be the same as that of one of the conjuncts. Specifically:

- the conjunction is the head of a coordinate structure;
- one conjunct is the specifier; the other is the complement;
- it is the specifier that determines the category of the entire coordinate structure.

English being a head-initial language, the second conjunct will be the complement, and the first one the specifier. Although categories need not match syntactically, semantic types must be the same in order for semantic composition to proceed. In categorial terms, this will mean that any category for a conjunction will be of form (X\X)/Y. The complement conjunct, Y, is to the right of the slash. The category for the specifier conjunct, X, is the same category as the resulting structure once both conjuncts have been integrated into the structure.

For example, to derive (2a), we start by giving *and* the category $(S_{base}\backslash S_{base})/S_{finite}$, as shown in (4a). We derive *she didn't notice* as an S_{finite}. This tensed clause serves as the complement conjunct for *and*, and the resulting string *and she didn't notice* has category $S_{base}\backslash S_{base}$.

(4a) Derivation of *and she didn't notice* as $S_{base}\backslash S_{base}$

and: $(S_{base}\backslash S_{base})/S_{finite}$ *she didn't notice*: S_{finite}

_____/E

and • (*no one noticed*): $S_{base}\backslash S_{base}$

For the specifier conjunct, we take NOT the clause *They might have escaped,* but the $NP\backslash S_{base}$ *have escaped*, as shown in (4b). We derive this string as an S_{base} by hypothesizing a subject.

(4b) Derivation of *have escaped* as S_{base}

[*e*: NP] *have escaped*: $NP\backslash S_{base}$

\E

e • (*have escaped*): S_{base}

When this specifier conjunct joins with *and she didn't notice*, as in (4c), the resulting phrase *have escaped and she didn't notice* has the same category as the specifier conjunct: S_{base}. At this point, the associativity of the system allows us to withdraw the hypothesized subject of *have escaped*, yielding $NP\backslash S_{base}$.

(4c) Derivation of *have escaped and she didn't notice* as $NP\backslash S_{base}$

e • (*have escaped*): S_{base} *and she didn't notice*: $S_{base}\backslash S_{base}$

\E

(*e* • (*have escaped*)) • (*and she didn't notice*): S_{base}

Assoc

e • ((*have escaped*) • (*and she didn't notice*)): S_{base}

\I

(*have escaped*) • (*and she didn't notice*): $NP\backslash S_{base}$

In (4d), the *must*, which seeks an $NP\backslash S_{base}$, takes *have escaped and she didn't notice* as its argument and returns an $NP\backslash S_{finite}$. The resulting phrase combines with *they* to produce an S_{finite}.

(4d) Derivation of *They must have escaped and she didn't notice* as S_{finite}

they: NP *must*: $(NP\backslash S_{finite})/(NP\backslash S_{base})$ (*have escaped*) • (*and she didn't notice*): $NP\backslash S_{base}$

/E

must • ((*have escaped*) • (*and she didn't notice*)): $NP\backslash S_{finite}$

\E

they • (*must* • ((*have escaped*) • (*and she didn't notice*))): S_{finite}

The other examples can be derived with the same strategy of leaving out of the conjuncts the widescoping material. Beyond this similarity, the derivations may differ in whether the conjuncts have unlike categories (derivations for (2a,b) and (3a,b,c,d,e,) do), and in whether they make use of hypothetical reasoning (derivations for (1), (2a), and (3a,b,e) do). The close linkage of syntax and semantics in an LCG provides an explicit means of arriving at the desired semantics. In addition to unifying several kinds of coordination with wide-scoping operators, this analysis also provides further evidence that conjuncts in a coordinate structure need not have like syntactic categories, and supports the hypothesis that the category of a coordinate structure is identical to that of its specifier conjunct, rather than a special category just for coordinate structures.

In addition to being able to derive coordinations with wide-scoping operators, this strategy will also generate some non-ATB extractions; for example, *a guy who thinks he's funny but he's not*, and *the script she sat down and wrote*. Unfortunately, the

analysis in its current state both undergenerates and overgenerates. On the undergeneration side, it will not license *a guy I like but he doesn't know I exist*, because here, the gap is not on the left periphery. Nor will it license *How many beers can you drink and not get drunk?*, because the gap after *drink* is not on the periphery.

On the overgeneration side, to mention just a few ungrammatical coordinations that are licensed (those marked with # are grammatical, but not with the wide-scoping semantics that can be generated):

(5) a. *Do you want to wash and will I dry? #He must have escaped and did they notice?
b. #He must have escaped and did they notice?
c. *She likes them [stodgy and wants-to-quit].
d. #I hope he wasn't a jerk and everyone hated him.

Even so, the analysis makes it tempting to move further and further into the territory of non-parallel coordinations. There are ordinary gapping sentences, "SGF" sentences in German where V2 effects encapsulate a wide-scoping subject in a clausal conjunct; similar sentences in English. I would like to think that a whole landscape of non-parallel coordinations could be covered under a suitable extension of this analysis, but if it's possible at all, there's a long way to go.

References

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