The DP-CP connection: lessons from mismatching coordinations

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Main take aways

- Unselected CPs can appear in coordination with selected DPs because of their semantic similarity: CPs (typically predicates of contentful individuals) can be **type-shifted** to denote individuals.
- Type-shifted CPs and DPs can participate in **plural conjunction**, thereby smuggling a CP into a DP-position.
- Novel evidence: impossibility of **infinitivals** without a C-layer; **collective** and **presuppositional** interpretation
- General lesson: the strokes of DP-shell analyses are too broad; investigating the kinds of entities clauses can come to denote provides deeper insight

1 DP-CP coordinations

- **Conjuncts and their categories.** Traditionally, the *Law of the Coordination of Likes* (Chomsky 1957:p. 36, Williams 1981:p. 646) states that coordinated phrases must have identical syntactic categories.
- Patejuk & Przepiórkowski (2023); Bruening (2023): the generalization (1) is more on the right track to account for (2) (see also Neeleman et al. 2022)
 - (1) If (and only if) in a given syntactic construction a constituent X can be replaced without change of function by a constituent Y, then it can also be replaced by a coordination of X and Y.

(Huddleston & Pullum 2002:1323)

(2) a. Danny became { $[_{DP} a \text{ political radical}]/ [_{AP} \text{ very antisocial}]/ * [_{PP} under suspicion]}.$

- b. Danny became a [DP a political radical] and [AP very antisocial].
- c. *Danny became [DP a political radical] and [PP under suspicion]
- But apparently, (1) is still too strict: a non-selected CP can appear in a coordination with a selected DP, as in (3) (Sag et al. 1985:165).
 - (3) a. You can depend on [_{DP} my assistant]/*[_{CP} that he will be on time].
 b. You can depend on [_{DP} my assistant] and [_{CP} that he will be on time].
- Selectional mismatches are very restricted: only CPs are licensed in DPenvironments (Bruening & Al Khalaf 2020)¹
- CP-selecting predicates do not tolerate DPs as a second conjunct, (4).
 - (4) *She thinks [[_{CP} that Gereon is an avid cyclist] and [_{NP} another widespread rumor]].
- $\Rightarrow~$ there is something special about CPs that makes them similar enough to DPs for the purposes of coordination
- **The problem.** DP-CP coordinations challenge theories of both selection and coordination.
 - Given that (2) shows that in general, all conjuncts must satisfy selectional

(i) a. the once and future king b. *the once king (Bruening & Al Khalaf 2020:2)

Patejuk & Przepiórkowski (2023); Przepiórkowski & Patejuk (2024) argue that structures like (ib) are attested and rated as acceptable, i.e., they characterize (ia) as the same type of coordination as (2), falling under (1). For now we limit discussion to the more established selection mismatch in DP-CP coordinations.

¹Bruening & Al Khalaf (2020); Bruening (2023) claim that there is one other instance of mismatches in selection: adverbs that can behave like attributive adjectives in coordination, as in (i).

restrictions, the grammaticality of (3b) is mysterious.

At the same time, we know that clauses can exhibit DP-like behaviour, e.g., in their ability to act as subjects (see Koster 1978; Alrenga 2005; Takahashi 2010; Lohndal 2014; Kastner 2015 a.o.). The ability of clauses to behave like nominals has to be restricted in such a way as to exclude the CP in (3a).

Roadmap:

- 1. **✓**DP-CP coordinations
- 2. Non-finite conjuncts and the CP-layer
- 3. Interpretation of DP-CP coordinations
- 4. Analysis
- 5. Conclusion

2 Non-finite conjuncts and the C-layer

- **New observation**: Non-finite clauses aren't generally tolerated in mismatching coordinations, either, (5)
 - (5) a. *You can depend on [_{DP} the organizers of the workshop] and [_{TP} to be served coffee].
 - b. *We talked about $[_{DP}$ Charlie's uncle] and $[_{TP}$ to visit him over Easter].
- This is surprising since they show nominal behavior parallel to finite clauses: both can be subjects, both can be associated with DP-traces etc., see (6).
- (6) a. [TP To be a good teacher] is more difficult than people think.
 b. [TP To raise taxes for the rich] I couldn't convince him of.
- Coordinations of finite and non-finite clauses when only non-finite ones are selected are ruled out, too, (7). Payoff: finite CPs cannot just occur anywhere they aren't selected.
 - (7) *The mayor tried [_{TP} to clean the Seine] and [_{CP} that you can swim in the river].
- **But**: infinitival clauses *can* occur as a mismatching conjunct when they are headed by the complementizer *for*, (8)
 - (8) a. You can depend on [$_{DP}$ the organizers] and [$_{CP}$ for [$_{TP}$ them to serve good coffee]].
 - b. *You can depend on [$_{CP}$ for [$_{TP}$ them to serve good coffee]].
- $\Rightarrow\,$ The C-layer is semantically content ful (see also Bassi & Bondarenko 2021) and somehow connected to no uniness.

- This suggests that:
 - CPs and DPs form a natural class for this phenomenon
 - CPs and non-finite TPs don't
 - non-finite TPs and DPs don't, despite TPs showing nominal properties parallel to finite clause
 - C plays a crucial role

3 Interpretation of DP-CP coordinations

3.1 Collectivity

- In the nominal domain, conjunction can be either Boolean, or non-Boolean (i.e., plural) (Link 1983; Winter 2001, a.m.o.).
- Plural conjunction can be diagnosed using a collective predicate such as 'to be equally unexpected', as in (9a).
 - (9) a. [This outcome and that outcome] are equally unexpected.
 - b. #[This outcome] is equally unexpected.
 - c. [These two outcomes] are equally unexpected.
- Deploying this diagnostic: DP-CP coordinations may be semantically plural.
 - (10) [_{DP} This outcome] and [_{CP} that it would cause a recession] were/*was equally unexpected.
- Obligatory plural agreement: a DP-CP coordination is necessarily grammatically plural (patterns with DP-DP coordination).

3.2 Presuppositionality

- Bruening (2023) develops an analysis of DP-CP coordinations according to which the CP is embedded in a NP headed by a null noun 'fact'; this seems plausible for many of the examples we have considered:
 - (11) You can depend on [$_{DP}$ my assistant] and [$_{CP}$ that he will be on time]. $\Rightarrow My$ assistant will be on time
- Building on parallel observations for sentential subjects and nominalized clauses in Kastner (2015), we observe that although the truth of the CP is often implied, counterexamples can easily be constructed.
- We start with the sentential subject case; here, the predicate contradicts the truth of the CP.

- (12) [_{DP} Graham's idea], and [_{CP} that it explains commonalities between ancient civilizations] are two common misconceptions.
- A similar observation can be made for DP-CP coordinations in object position.
 - (13) Context: Annie is a pathological liar.

A: Annie told me that her uncle works for the Fed, which is obviously false.

B: Right! We also talked about [$_{DP}$ her uncle] and [$_{CP}$ that he works for the Fed].

- We draw two conclusions from this data:
 - 1. CPs in DP-CP coordinations are not obligatorily factive.
 - 2. The inferences associated with CPs in DP-CP coordinations are modulated by contextual factors.

Interim summary: observations

- CPs are allowed as right-conjuncts in DP-positions
- Infinitival clauses are only allowed in those position when they have a C-layer
- DP-CP-coordinations are semantically plural and trigger plural agreement
- CP-conjuncts are not factive (but perhaps presuppositional in a weaker sense; Kastner 2015).

4 Analysis

4.1 Interpretation

- Claim: a CP in a DP-CP coordination comes to denote an *individual*.
- Background: the Kratzerian approach to clausal embedding Kratzer (2006); Moulton (2009); Elliott (2017); Bondarenko (2022), a.o.
- Following Moulton (2009); Elliott (2017), we treat a CP of the form '*that* ϕ ' as denoting a (partial) predicate of contentful entities, such as *facts, rumors, beliefs*, whose content is the proposition expressed by ϕ .

(14)
$$\llbracket \text{that } \phi_{st} \rrbracket = \lambda x_e \,. \, \text{Cont}(x) = \llbracket \phi \rrbracket \qquad \langle e, t \rangle$$

• An individual from a predicative CP denotation via the *iota* type-shifter (Partee, 1986), which we call $THE_{et,e}$.

(15)
$$\operatorname{THE}(P_{et}) = \iota x[P(x) = 1] \qquad \langle et, e \rangle$$

- Assuming that THE can freely apply in order to repair a type mismatch, CPs can be shifted to contentful individuals; this feeds plural conjunction.
 - (16) $\llbracket \operatorname{and}_{\operatorname{Link}} \rrbracket = \lambda x_e \cdot \lambda y_e \cdot y \oplus x$ $\langle e, \langle e, e \rangle \rangle$
 - (17) $\llbracket DP \text{ and } [THE [that <math>\phi]] \rrbracket = \llbracket DP \rrbracket \oplus \iota x [Cont(x) = \llbracket \phi \rrbracket]$
- N.b., conjunction generally places a strict type-matching requirement on the two conjuncts; here both must be of type *e*.
- In practice, the presupposition introduced by THE—that there is a *unique* individual with content ϕ —will be difficult to satisfy.²
- Since the inference associated with the CP is contextually modulated, it is natural to blame the weakening of the presupposition on *contextual domain restriction* (von Fintel 1994).
- We model this concretely as an implicit, contextually modulated predicate C, which composes with the CP as an intersective modifier (see, e.g., Stanley & Gendler Szabó 2000).
 - (18) $[\![THE [C [that \phi]]]\!] = \iota x [C(x) \land Cont(x) = [\![\phi]\!]]$ Only defined if: there exists a unique x s.t., C(x) and $Cont(x) = [\![\phi]\!]$
 - If C restricts the individuals in question to $\mathit{facts},$ then the truth of the embedded CP will be implied.
 - If C restricts the individuals in question to *rumors* or other speech acts, the truth of the embedded CP will not be implied.
- The final predicted interpretation for a DP-CP coordination is as follows:
 - (19) [[my assistant and that he will be on time]]

= my-assistant $\oplus \iota x[C(x) \land Cont(x) =$ that he will be on time]

• This accounts for the collective behavior of DP-CP coordinations.

4.2 Distribution

- **No category shifting**. THE has the semantics of a definite article, but does not affect the syntactic category³
 - (20) *I depend on [_{CP} that my assistant is on time].

 $^{^2 {\}rm For}$ example, as soon as two distinct individuals believe $\phi,$ the presupposition is not satisfied.

³There are two ways of cashing this out: (i) THE is a lexical item with a *null* realization, that takes a CP and projects a CP; (ii) THE is a post-syntactic rescue operation. We do not have concrete evidence which bears on this choice; our proposal is compatible with either perspective.

(21)

- It follows that coordination (at least in its plural guise) allows for genuine category mismatches.
- We cash this out by adopting Munn's (1993) adjunction analysis of coordination.



- This coordination structure allows the result of the coordination to be a DP syntactically. A predicate selects this resulting **plurality** as its argument, creating the illusion of a selection mismatch.⁴
- Adjunction structures can be diagnosed by extraction asymmetries (Neeleman & Tanaka 2024; Weisser 2015). DP-CP coordinations pass this test: you can extract (out of) the initial, selected conjunct, but not the following, adjoined ones, (22)⁵
 - (22) a. My assistant_i, I do definitely depend on [t_i and [(especially) that he will arrive on time today]].
 - b. *Lois_i, I do definitely depend on [[my assistant] and [that he will bring t_i today]].
- With this analysis, we're able to formulate a **novel generalization** about the distribution of unselected DP-CP coordinations:
 - (23) Distribution of DP-CP-coordinations $[_{XP} [DP and CP]]$ is possible only if environment XP is semantically compatible with a contentful argument.
- This accounts for (24).
- (24) a. *Danny became a political radical and that he was met with suspicion.
 - b. *The rumor became the murder of his sister.
 - c. Danny laughed at *(this ridiculous rumor and) that he is supposed to be 3 million in debt.

d. They insist on *(this clause and) that they will get a 30 day term of payment.

– Summary of analysis –

- CPs can be freely type-shifted to individuals. They then denote individuals with propositional content. That makes them similar enough to DPs for the semantic composition with \oplus .
- Plural coordination $\oplus,$ The, and contextual domain restriction account for the collective and presuppositional interpretation of DP-CP coordinations
- Coordination-as-adjunction, the lack of category-shifting and the meaning of CPs accounts for their distribution.

5 Conclusion

- Syntactic category alone (i.e., DP vs. CP) is too blunt a tool for capturing the distribution of mixed-category coordinations and clauses in nominal positions.
- CPs display a particular affinity with DPs, because they can naturally be shifted to *individuals with propositional content*.
- **Outlook.** We haven't said anything about the interpretation of infinitival TPs, which despite resisting coordination with DPs are nevertheless possible in certain DP-only environments.
- What's important for our purposes is that, even if infinitivals can be shifted into individuals, they can't be used to express *contentful* individuals, (25).
 - (25) John's belief is *to wake up early/ that he should wake up early.
- So, what kind of things can infinitivals denote? Infinitivals in subject position seem to have eventive properties, (26)
 - (26) To fry an egg takes only two minutes.
- Our hope is that distinguishing between the kinds of entities that different clause-types can come to denote constitutes an essential tool for understanding distributional restrictions.

 $^{^4(21)}$ also accounts for the fact that CP-DP coordinations don't have the distribution of DPs (Bruening, 2023). This is simply because CP-DP coordinations are syntactically CPs.

⁽i) $$\ ^*I$ depend on [_{CP}$ that Harry arrives on time] and [_{DP}$ my assistant].$

 $^{^5\}mathrm{We}\mathrm{'re}$ grateful to an anonymous reviewer for pointing this out.

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Appendix A: Supporting evidence from Greek

- In Greek, declarative CPs may be nominalized using an overt determiner (Roussou, 1991).⁶
- This allows CPs to appear in otherwise DP-only environments, in which they receive a presuppositional interpretation.
 - (27) *O Yannis vasizete [oti o voithos tou erxete stin ora tou] The John depends [that he helper Poss comes P+D time Poss]
 - (28) O Yannis vasizete **sto** [oti o voithos tou erxete stin ora tou] The John depends P+D [that he helper Poss comes P+D time Poss]
- Payoff: in Greek, THE corresponds to an overtly realized lexical item, that projects a DP-layer.
- Prediction: an overt clausal determiner is obligatory in an DP-CP coordination.
 - (29) *O Yannis vasizete ston voitho tou kai [oti ...] The John depends P+D helper Poss and [that ...]
 - (30) O Yannis vasizete ston voitho tou kai **sto** [oti ...] The John depends P+D helper Poss and P+D [that...]
- The distribution of the Greek clausal determiner tracks the distribution of covert THE in English; the difference being that the Greek clausal determiner, unlike covert THE, is category shifting.

Appendix B: CP-DP coordinations

- An apparent issue: CP-DP coordinations in CP-only positions.
 - (31) *I think [$_{CP}$ that it's raining] and [$_{DP}$ your claim].
- This can be resolved if, following Elliott (2017), CPs compose with verbs like *think* as intersective modifiers.⁷

⁶We're grateful to Alexandros Kalomoiros (p.c.) for providing the data in this section.

⁷Making sense of this compositionally simply requires shifting to a polymorphic type for the declarative complementizer, together with a (neo-)Davidsonian semantics for attitude verbs. See Elliott (2017) for details.

b.

- On this view, 'think' simply isn't compatible with a type e internal argument.
- **Bonus round:** as Elliott (2017) discusses, the interpretation of 'explain' depends on whether it composes with a CP (i.e., an event modifier) or a DP (a bona fide type e internal argument).
- (32) a. Kim explained that Harry is upset. *explanans*
 - Kim explained the fact that Harry is upset. *explanandum*
- A CP-DP coordination is predicted to be possible with 'explain', but it should force an *explanandum* interpretation.
 - (33) Kim explained (both) [CP that Harry is upset] and [DP his boundless optimism]. \Rightarrow Kim provided an explanation for Harry's being upset

Appendix C: DP-CP disjunctions

- DP-CP disjunctions are also acceptable, even in DP-only environments.⁸
 - (34) ?I refuse to depend on [DP Sue's assistant] or [CP that she'll be on time].
- Absent collectivity, it's difficult to make a strong case that this patterns with DP-DP disjunction.
- Nevertheless, there is a straightforward way of giving it a parallel treatmeant. We can assume the following entry for individual-level disjunction.
- (35) $\llbracket \mathbf{or}_e \rrbracket = \lambda x \, . \, \lambda y \, . \, \lambda k_{et} \, . \, \exists z \in \{x, y\}, k(x) = 1$
- The LF for the DP-CP disjunction is as follows:
- (36) $[_{DP} \text{ Sue's assistant}] \text{ or}_e [\text{the } [_{CP} \text{ that she'll be on time}]] \\ = \lambda k_{et} . \exists z \in \{ \text{S's assistant}, \iota y[C(y), \text{Cont}(y) = \phi] \}, k(z) = 1$
- The derived existential quantifier, ranging over an ordinary and a contentful individual, can then take scope, for example underneath 'refuse'.

 $^{^{8}\}mbox{We're}$ grateful to an anonymous reviewer for pressing us on how disjunction fits into the general picture.