The DP-CP connection: Lessons from coordination

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1 DP-CP coordinations

Category mismatches in coordination. The *Law of the Coordination of Likes* (Chomsky 1957, p. 36, Williams 1981, p. 646) states that coordinated phrases must have identical syntactic categories. Recent investigations have cast doubt on its validity: Patejuk & Przepiórkowski (2023) argue contra Bruening & Al Khalaf (2020) that conjuncts may have mismatching categories just in case their categories are independently consistent with the selectional properties of the environment (see also Neeleman et al. 2022). For instance, in (1), *become* can select both a DP and an AP, but not a PP (Bruening & Al Khalaf 2023, p. 3). A coordination of DP and AP is licit, while making one of the conjuncts a PP results in ungrammaticality. Bruening (2023) in response concedes that the relation between conjuncts and their distribution is better expressed by the generalization in (2).

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

(2) 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, emphasis added)

The puzzle of unselected conjuncts. This paper addresses data which appears to show that (2) is still too strict: coordinating a DP and CP appears to be sometimes possible in positions where only DPs are permitted, as in (3) (Sag et al. 1985, 165).

(3) a. You can depend on [$_{\text{DP}}$ my assistant]/*[$_{\text{CP}}$ that he will be on time].
 b. You can depend on [$_{\text{DP}}$ my assistant] and [$_{\text{CP}}$ that he will be on time].

DP-CP coordinations challenge theories of both selection and coordination. Given that (1) shows that in general, all conjuncts must satisfy selectional 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; Holmberg 2000; 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).

Bruening & Al Khalaf (2020); Bruening (2023) defend the claim that any mismatch in c-selection between the conjuncts is illicit. They propose analyses (which differ in details that are not relevant) in which the CPs are headed by semantically empty nouns, i.e., the conjuncts are of the same syntactic category. Patejuk & Przepiórkowski (2023) are vague about DP-CP coordinations, claiming only that they are not fully general.

Contribution. We propose a novel analysis of DP-CP coordinations. We argue, contra Bruening, that these CPs are not headed by a covert noun (approx. 'fact'). Instead, we claim that mismatching coordination reveals that clauses exhibit DP-like behavior because of their semantic properties: DPs typically denote individuals (or quantifiers over individuals). CPs on the other hand denote properties of individuals. An independently-motivated semantic operation may type-shift properties back to individuals, allowing DPs and CPs to participate in plurality-forming conjunction. While (2) is generally valid, the structure of plural conjunction allows CPs to be deeply integrated with DPs, such that the predicate selects the resulting plurality as its sole argument, thereby creating the illusion of a selection mismatch.

2 Collectivity and presuppositionality

Existing work on DP-CP coordinations has not addressed the question of how they are interpreted in detail. Here, we make two novel observations: (i) DP-CP coordinations may be *collective*, (ii) DP-CP coordinations give rise to a *presuppositional* interpretation of the embedded CP.
Collectivity. Collective predicates such as 'to be equally unexpected' can be used to diagnose the presence of a plurality. Consider the contrast between (4a) and (4b)—a semantically singular subject with a collective predicate leads to unacceptability.

(4) a. #This outcome is equally unexpected.
b. These two outcomes are equally unexpected.

Compatibility with collective predication, (5), indicates that DP-CP coordinations may be semantically plural. Moreover, note that in (5), the DP-CP coordination obligatorily triggers plural agreement on the predicate; this suggests that the coordination is not just semantically plural but also grammatically plural. Grammatical plurality is a hallmark of DP-DP coordinations, as in (6), suggesting that DP-CP coordinations should be given a parallel treatment.

(5) [$_{DP}$ This outcome] and [$_{CP}$ that it would cause a recession] were/*was equally unexpected.

(6) [$_{DP}$ This outcome] and [$_{DP}$ that outcome] were/*was equally unexpected.

Presuppositionality. Bruening (2023) develops an analysis of DP-CP coordinations according to which the CP is embedded in an NP headed by a null noun interpreted as 'fact', in order to capture the intuition that DP-CP coordinations typically imply the truth of the embedded CP. While this is often the case, we demonstrate that this is contextually conditioned. Concretely, it is possible to construct cases in which the truth of the embedded CP is not implied, but rather something weaker. In (7) the continuation explicitly contradicts the embedded CP, but nevertheless the discourse is felt to be coherent. Nevertheless, we suggest that a DP-CP coordination presupposes the embedded CP in a weak sense, i.e., this requirement is met if the embedded CP has merely been mentioned, as in (7) (see Kastner 2015 for a parallel claim regarding sentential subjects). When this requirement isn't met, a DP-CP coordination leads to infelicity, as shown in (8).

(7) We talked about [$_{DP}$ Annie's uncle] and [$_{CP}$ that he works for the Fed]
....but Annie is a pathological liar, so of course he doesn't

(8) Context: *the possibility that Annie's uncle works for the Fed hasn't been raised.*
#Let's talk about [$_{DP}$ Annie's uncle] and [$_{CP}$ that he works for the Fed]

3 Non-finite conjuncts and the CP-layer

Selectional mismatches seem to be restricted to CPs licensed in DP-only environments. For example, Bruening & Al Khalaf (2020) show that verbs that select only CPs do not permit a DP (NP in their analysis) as a second conjunct, (9a), and verbs that only select nouns do not permit prepositional conjuncts, (9b). This suggests that there is something special about DPs and CPs that makes them similar enough to each other for the purposes of coordination.

(9) a. *She thinks [[$_{\text{CP}}$ that the world is flat] and [$_{\text{NP}}$ another discredited thing]].
b. *The Persians destroyed [[$_{\text{NP}}$ Babylon] and [$_{\text{PP}}$ of Nineveh]].
(Bruening & Al Khalaf 2020, p. 16)

We observe that non-finite clauses suggest that the CP-layer plays a crucial role in this. In general, infinitival clauses show nominal behavior parallel to finite clauses: both can be subjects, both can be associated with DP-traces etc., see (10).

(10) a. [$_{\text{TP}}$ To be a good teacher] is more difficult than people think.
b. [$_{\text{TP}}$ To lower taxes for the rich] I couldn't convince him of.

But crucially, bare infinitives cannot be conjuncts in coordination with DPs where they are not selected, (11).

(11) a. *You can depend on [$_{\text{DP}}$ the organizers of the workshop] and [$_{\text{TP}}$ to be served coffee].
b. *We talked about [$_{\text{DP}}$ Charlie's uncle] and [$_{\text{TP}}$ to visit him over Easter].

(11) could be bad because infinitivals have stricter licensing requirements and can occur in fewer positions than finite clauses, i.e., finite CPs are independently more promiscuous. However, (12) shows that when the infinitival is selected and a finite CP is not, the structure is ungrammatical.

(12) *The mayor tried [$_{\text{TP}}$ to clean the Seine] and [$_{\text{CP}}$ that you can swim in the river].

This indicates that (i) despite showing nominal properties parallel to finite clause, non-finite clauses as in (11) are not as nominal as finite clauses for the purposes of coordination with DP, and (ii) finite CPs are similar enough to DPs to be allowed in DP-coordinations, but are not similar enough to infinitivals, which we assume are TPs, to be allowed in non-finite clausal positions.

Crucially, infinitivals *can* occur in coordination with DPs when they are headed by a complementizer *for*, (13). This observation is in line with recent work that suggests that the C-layer can be semantically contentful (Bassi & Bondarenko 2021).

(13) a. You can depend on [$_{\text{DP}}$ the organizers] and [$_{\text{CP}}$ for [$_{\text{TP}}$ them to serve good coffee]].
b. *You can depend on [$_{\text{CP}}$ for [$_{\text{TP}}$ them to serve good coffee]].

4 Analysis

Based on evidence from non-finite clauses that the CP-layer is crucially implicated in the composition of DP-CP coordinations, our starting point is Kratzer's (2006; 2013, etc.) contention that the declarative complementizer is semantically contentful, and shifts embedded clauses from a propositional to a predicative meaning. Concretely, we follow Moulton (2009); Elliott (2017) in adopting the denotation in (14a). The complementizer composes an embedded clause expressing a proposition p, returning a predicate of individuals whose 'propositional content' is p, as in (14b). See especially Moulton (2009) for independent evidence that is is necessary from CP modifiers to nouns.

(14) a. $[\![\text{that}]\!] = \lambda p_{st} \,.\, \lambda x_e \,.\, \textsc{Cont}(x) = p$
b. $[\![\text{that he arrives on time}]\!] = \lambda x_e \,.\, \textsc{Cont}(x) = [\lambda w \,.\, \textit{he arrives on time in } w]$

As demonstrated in §2, DP-CP coordinations are compatible with collective predicates, which we take to diagnose plurality-forming conjunction. We adopt the standard, mereological analysis of semantic plurality (Link, 1983); plurality-forming 'and' denotes mereological sum-formation, as in (15).

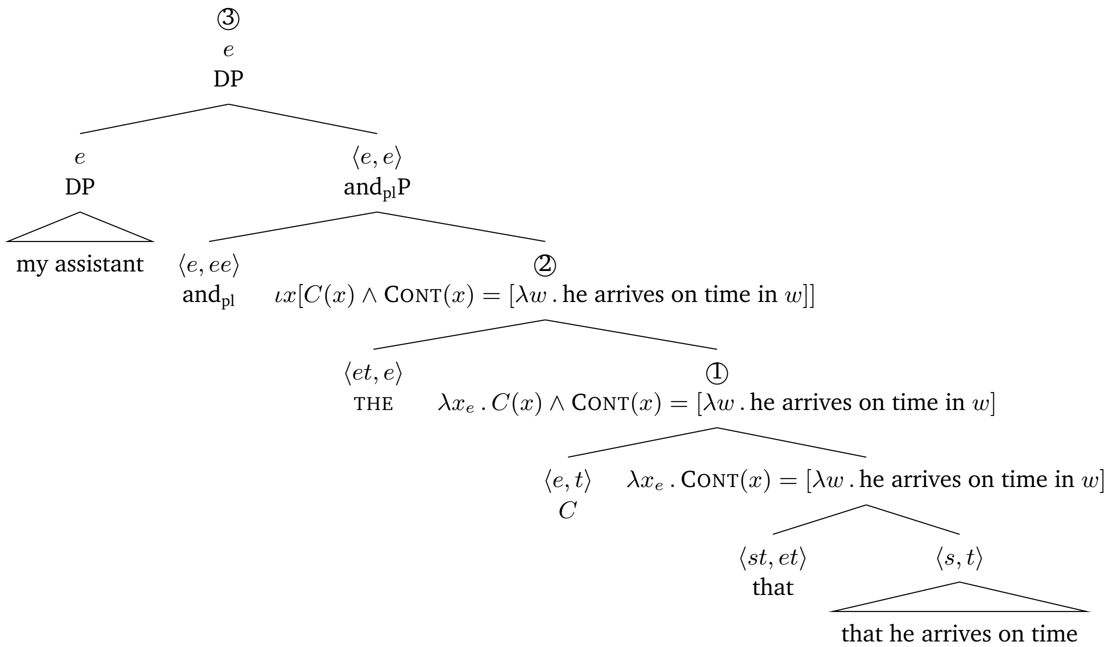
(15) $[\![\text{and}_{\text{pl}}]\!] = \lambda x_e \,.\, \lambda y_e \,.\, y \oplus x$

These independently-motivated components are already suggestive of how DP-CP coordinations arise—the declarative complementizer shifts the CP to the individual domain (specifically, a predicate of individuals with propositional content). Plurality-forming *and* provides the means to compose two individuals, forming a plurality. The final missing piece is an operation to shift the predicate of individuals denoted by the CP to an individual. We propose that this operation is manifested by a silent counterpart to the definite article, THE. THE takes a predicate P of type $\langle e, t\rangle$, is defined only if there is a unique individual satisfying P, and if defined returns that individual (Partee, 1986).

(16) $[\![\text{THE}]\!] = \lambda P_{et} \,.\, \iota x[P(x)]$

Our analysis of the structure of DP-CP coordinations relies on two key syntactic assumptions: (i) THE is not category shifting, (ii) (plural) conjunction has an adjunction structure. We elaborate on these syntactic claims in the remainder of the section, but first, we provide the LF we assume for a DP-CP coordination.

(17) ...[$_{\text{DP}}$ my assistant] and [$_{\text{CP}}$ that he arrives on time].



Capturing presuppositionality. Prior to the et to e shift induced by THE, we assume that CPs are subject to an additional contextual domain restriction, modeled as a contextually-provided predicate C, which composes with the CP as an intersective modifier ①. This parallels an influential analysis of quantificational domain restriction in the nominal domain (see, e.g., Stanley & Gendler Szabó 2000). This means that, when the predicate of contentful individuals is shifted to an individual via THE, it gives rise to the presupposition that *there is a unique individual* x *s.t., the content of* x *is that he arrives on time, and* $C(x)$, where C is some contextually salient property. Contextual domain restriction explains the variable nature of the interpretation of the embedded CP. If C restricts the individuals in question *facts*, then the truth of the embedded CP will be implied, whereas if C restricts the individuals in question to *rumors* or other speech acts, the truth of the embedded CP will not be implied.

Capturing collectivity. After shifting via THE, the embedded CP comes to denote an individual with propositional content. This individual feeds into plurality-forming conjunction: *and*$_{pl}$ takes both this individual, and the individual denoted by the initial DP, and returns the mereological sum of both individuals. The final denotation of the DP-CP coordination, at stage ③, is a mereological sum consisting of (i) my assistant, and (ii) the unique individual that is C and whose propositional content is *that my assistant arrives on time*. This captures our observation that DP-CP coordinations may be plural-denoting.

Capturing distributional restrictions. We crucially assume that THE is not category-shifting. There are two different ways of cashing this out: either THE is a dedicated null lexical item which selects a CP and projects a CP, or (ii) THE is a post-syntactic 'rescue' operation which amnesties the type mismatch between the CP and the coordination. We do not have concrete evidence which bears on this choice, and so our proposal is compatible with either perspective. The fact that THE is not-category shifting explains why CPs, absent a coordination structure, cannot appear in DP-only positions, as in (18). Assuming that the preposition 'on' selects for a DP, inserting THE does nothing to amnesty the c-selectional violation in (18).

(18) *I depend on [$_{\text{CP}}$ that my assistant is on time].

We have also assumed that (at least plural) coordinations have an adjunction structure (building on Munn 1993), meaning that coordinations inherit the category of the initial conjunct. This explains why DP-CP coordinations have the syntactic distribution of DPs, and furthermore explains an apparent linear-order effect discussed by Bruening (2023), illustrated below.

(19) *I depend on [CP that Harry arrives on time] and [DP my assistant].

CP-DP coordinations are not licensed in positions where DP-CP coordinations nevertheless are. For us, this is because CP-DP coordinations are predicted the be syntactically CPs. Due to the adjunction structure of (plural) coordination, the syntactic category of the initial conjunct—here, CP—projects.

An apparent issue for our analysis is that it seemingly predicts that CP-DP coordinations should be possible with verbs that c-select CPs but not DPs, such as 'think'. This turns out not to be possible, as shown in (20).

(20) *I think [$_{\text{CP}}$ that it's raining] and [$_{\text{DP}}$ your claim].

Our response, following Elliott (2017); Bondarenko (2022), is that CPs aren't c-selected by such verbs, but rather compose as intersective event modifiers. Type-shifting the CP via THE in (20) would thereby result in a type-clash, since 'think' is, by conjecture, incompatible with a type e argument. Mismatched coordinations are thereby correctly predicted to only arise under verbs which select for a DP argument.

5 Conclusion

Our central claim is that DP-CP coordinations are exceptionally possible due to a semantic parallelism between CPs and DPs. The embedded clause in a DP-CP coordination is syntactically a CP, but is type-shifted via a conspiracy of independently motivated semantic operations. The resulting contentful individual may feed into plurality-forming conjunction, giving rise to DP-CP coordinations with collective interpretations.

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