

Structured event anaphora and event individuation

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Introduction Events support inter-sentential anaphora: the singular pronoun “it” in (1b) takes the value of John’s running five kilometers in 20 minutes mentioned in (1a).

- (1) a. John run five kilometers in 20 minutes. b. He did **it** a day before the competition.

While this may suggest a parallelism between individual anaphora and event anaphora, a plural pronoun may not support event anaphora (Neale, 1988). Here, note that “it” in (2b) refers back to the sum of Bill’s stumbling event and John’s stumbling event despite its singular marking.

- (2) a. Bill stumbled and John stumbled. b. {It / #they} happened quickly. (Gagnon, 2013)

There are roughly two types of approaches to the unavailability of plural event anaphora (Gagnon, 2013). The *metaphysical* approach (Moltmann, 1997, a.o.) argues that verbs are mass expressions and lack a singular-plural distinction. In contrast, the *discourse-structure* approach (a.o. Webber, 1991) argues that event anaphora is achieved through picking out a single *discourse-segment* instead of plural or mass events. Roughly speaking, the former resorts to the algebraic structure of events and the latter resorts to the discourse dynamics of events. Gagnon (2013) points out problems for the metaphysical approach and argue for the discourse-segment approach. In this talk, I discuss *structured event anaphora*, which is challenging for the discourse-structure approach.

Structured event anaphora It has been noted that distributive universal quantification introduces *subevents*. Schein (1993) points out that the adverb “unharmoniously” modifies the sum event.

- (3) Unharmoniously, every organ student sustained a note in Wurlitzer for sixteen notes.
(Schein, 1993)

One can refer back to this sum event with a singular pronoun “it” in the subsequent discourse.

- (4) a. Every organ student sustained a note on the Wurlitzer for sixteen measures.
b. **It** was unharmonious.

Now, one may distributively refer back to different subevents for different participants if one embed the singular pronoun under the scope of the distributivity operator. In (5b), “it” takes the value of ice-melting event relative to each child, i.e. the subject variable and the event variable *co-vary*.

- (5) a. Every child melted an ice cube on their palm.
b. They each found **it** too slow.

This anaphora is reminiscent of *quantificational subordination* (Karttunen, 1969, a.o.).

- (6) a. Every student wrote a paper. b. They each submitted **it** to a journal.

It is unsurprising that one may have this type of structured event anaphora, considering the thematic relation between an event and its participants. This is rather expected in the metaphysical approach as long as the existential quantifier over events scopes below the universal quantifier over individuals in (5a). However, this approach has an independent problem: mass anaphora disallow the singular pronoun in cases analogous to (2) and uses the plural pronoun when mass terms are conjoined.

- (7) a. Brad drank beer and Sue drank milk. b. # Maud thought **it** was tasty. (Gagnon, 2013)
(8) a. John bought rice and milk. b. He forgot to bring **them** home.
(Gagnon, 2013)

The discourse-structure approach circumvents this issue, but the structured event anaphora is challenging. In this approach, the singularity of event anaphora comes from picking out a single discourse segment. However, (5) suggests that (i) the singular pronoun “it” may be used to refer back to pluralities of events, and (ii) the discourse keeps track of the correspondence between plural events and their participants established in the previous sentence. If one allows a single discourse segment to provide plurality of events, then the solution to (2b) is lost. If one lets “each” quantify over a discourse-segment, this calls for a substantial complication of a theory of discourse segments. Also, this implicitly introduces ‘pluralities of discourse segment’, which also spoils the solution to (2b). What is worse, if one wishes to achieve a uniform treatment of quantificational subordination with individuals and events, one has to ensure that the discourse keeps track of the correspondence between individuals and discourse segments, which is absurd. Thus, while event anaphora through a discourse segment well accounts for the unavailability of plural event anaphora, this very feature prevents it from deriving the structured event anaphora.

Analysis I aim for a uniform analysis of quantificational subordination with individuals and events. I adopt *Plural Compositional DRT* (PCDRT) (Brasoveanu, 2008), which models anaphoric information with *plural information states* (PISs) G, H, \dots , sets of variable assignments g, h, \dots . I refrain from going into the formal details here, but I essentially follow Brasoveanu (2008) except that I take Muskens’s (1996) treatment of variables: I take dynamic variables as constants of type π entities called *registers* (Muskens, 1996). Then, I assume that registers are sorted into individual registers and event registers. I notate individual registers with u_n and event registers with ϵ_n . In this setting, individual variables and event variables obtain their values through the same variable assignments, preserving the previously established individual-event correspondences. This accounts for (5) in parallel with the analysis of quantificational subordination in van den Berg (1996). This can compositionally be done if distributive quantification introduces a new event variable whose value is a subpart of the old event variable. Or, one may combine it with the continued event semantics in Champollion (2015). I refrain from going into the formal details for the space reason.

This uniform analysis is incompatible with the discourse-structure approach and thus indirectly provides novel support for the metaphysical approach. While I have to leave further exploration of the puzzle of plural event anaphora to a future occasion, note that PCDRT provides an additional layer of pluralities: one may obtain pluralities through summing up the values spread across a PIS.

(9) **Value projection:** $G(x) = \{g(x) \mid g \in G\}$ (van den Berg, 1996)

Modeling pluralities with sets, $\cup G(x)$ is the sum of the values spread across G . Informally, even if a mass term itself does not introduce individuated values, one may use this structure in a PIS to individuate mass values, which provides the flexibility required to derive plural mass anaphora in (7) and (8). Conversely, the unavailability of plural event anaphora suggests that the same strategy does not work for event variables. A possible solution is to constrain an event variable so that its value is constant through a PIS, cf. Minor’s (2022) definition of dynamic atomicity. The resultant system still derives structured event anaphora with a distributive quantifier but disallows (9) to create a new layer of pluralities because the value of an event variable outside the scope of a distributive quantifier is constant across a PIS, i.e. $\cup G(\epsilon) = g(\epsilon)$ for any $g \in G$. I leave its examination to future research.

Selected References: **van den Berg, M.** 1996. Some aspects of the internal structure of discourse. the dynamics of nominal anaphora. PhD Thesis, University of Amsterdam. • **Brasoveanu, A.** 2008. Donkey pluralities: Plural information states versus non-atomic individuals. *Linguistics and philosophy* 31:129–209. • **Champollion, L.** 2015. The interaction of compositional semantics

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