

The restrictive potential of weak adjuncts: nominal *as*-phrases and individual quantifiers*

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Abstract

Starting from the observation that weak adjuncts can be interpreted as restricting co-occurring temporal and modal quantifiers, I show by the example of non-clausal, structurally high nominal *as*-phrases (e.g., *as a child*) that they are never understood as restricting individual quantifiers with which they associate. At first glance, this is surprising since the compositional ingredients seem to parallel the temporal and modal cases. I account for this contrast by showing that the structural configuration between *as*-phrases and individual quantifiers, as well as the semantic dependency between those two parts differs in crucial respects from those in the temporal and modal cases. Lastly, I propose an analysis for sentences containing *as*-phrases that associate with individual quantifiers which is based on the assumption that *as*-phrases and their associated constituents are connected via Non-Obligatory Control, which I analyze via discourse anaphora.

1 Introduction

Among the class of “free adjuncts” (i.e., non-clausal adjuncts contributing propositional content and providing additional information on an argument of the main predicate), two subclasses—*strong* vs. *weak*—have to be distinguished based on their interpretational possibilities (see [15]). For strong (free) adjuncts, like *being 10 years old* in (1), only a causal link to the proposition denoted by the remainder of the sentence can be understood regardless of co-occurring temporal or modal quantifiers.¹

- (1) Being 10 years old, Paul would have had to pay a fee.
(\approx Since Paul is 10 years old, he would have had to pay a fee.)

In contrast, weak (free) adjuncts, like the non-clausal, structurally high nominal *as*-phrases in (2), may interact with co-occurring temporal and modal quantifiers (TM quantifiers). In case they interact with these quantifiers, they restrict their domains of quantification to those times/worlds they describe (see [9], [15], [18], [19]). As a result, depending on the quantifier, either a temporal or conditional link between the content contributed by the adjunct and the remainder of the sentence is understood, see (2-b), (2-c). In addition, weak adjuncts always allow for the same causal link found with strong adjuncts, which arises when the former do not interact with a TM quantifier. If the host clause does not contain a TM quantifier, this is also the only available interpretation, see (2-a).²

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¹I use the term “causal” loosely. That is, the adjunct does not necessarily contribute a strict cause, but could also provide a reason/motivation or an explanation. Given that weak adjuncts contribute presuppositional content (shown in Sect. 2 for *as*-phrases), I paraphrase the causal interpretation with a *since*-clause (see [5]). The exact causal relations that can be expressed using free adjuncts are the subject of future work.

²In the causal reading, weak adjunct *as*-phrases are in competition with adjuncts formed with *being*, as in (1), which, being strong adjuncts, are not ambiguous. See [9], [15] for a discussion of these two forms.

- (2) a. As a child, Paul likes sweets.
 (≈ Since Paul is a child, he likes sweets.)
- b. As a child, Paul was happy. ([PAST])
 (≈ When Paul was a child, he was happy.)
 (≈ Since Paul is a child, he was happy.)
- c. As a 10-year-old, Paul would pay a fee. (*would*)
 (≈ If Paul were a 10-year-old, he would pay a fee.)
 (≈ Since Paul is a 10-year-old, he would pay a fee.)

Even though the temporal and conditional interpretations sometimes suggest an additional causal link between the *as*-phrase content and the remainder of the sentence, this additional link is inferred and strongly depends on world knowledge. That is, what the temporal interpretation of *As a child, Paul was miserable* does not express (in contrast to potentially (2-b)), is that Paul was miserable when he was a child since he was a child.

Given that weak adjuncts (i) may restrict TM quantifiers and (ii) depend on the denotation of an argument of the main predicate with which they associate (i.e., *Paul* in (2)), the question arises whether weak adjuncts can restrict individual quantifiers in case they associate with them, as in (3).³ In other words: can weak adjuncts freely restrict quantifiers over any kind of domain, or is their restrictive potential restricted to quantifiers over times and worlds?

- (3) As a child, every guest likes sweets.

I show by the example of *as*-phrases that weak adjuncts cannot be understood as restrictors of individual quantifiers. They do, however, interact with individual quantifiers in a different manner, which I attribute to the way in which free adjuncts are linked to their host clause.

The paper is structured as follows. In Sect. 2, I introduce and modify a recent analysis of weak adjunct *as*-phrases and their interpretational possibilities proposed in [19]. Sect. 3 then discusses why, given the account presented in Sect. 2, it is plausible to expect that *as*-phrases can restrict individual quantifiers with which they associate, and I show that this expectation is not borne out. In Sect. 4, I show that the crucial difference between the interaction between TM quantifiers and *as*-phrases, on the one hand, and individual quantifiers and *as*-phrases, on the other, boils down to the difference between binding and co-reference. The semantic dependency between *as*-phrases and their associated constituents is formed via Non-Obligatory Control, which, in the case of individual quantifiers, behaves like discourse anaphora. The resulting analysis is illustrated for (3) in Sect. 5. Sect. 6 concludes the paper.

2 Syntax and semantics of weak adjunct *as*-phrases

Weak adjunct *as*-phrases, like all free adjuncts, contribute propositional content about a main clause argument (= the “associated constituent”). For *as*-phrases, this content is paraphraseable by a tenseless nominal copular clause: e.g., *as a child* in (2-b), which associates with *Paul*, can be paraphrased as ‘Paul be a child’. To capture this intuition, I assume, as in [19], that *as* takes two arguments: (i) a *Small Clause* that contains a predicatively used DP and (ii) the covert pronoun PRO, which depends for its value on the associated constituent, see (4).⁴

³In this paper, I only discuss *every NP* and *most NP* and focus on the common aspects of their interaction with *as*-phrases. For reasons of space, a thorough comparison of different quantifiers in connection with *as*-phrases has to be left for future work.

⁴For reasons of simplicity, I only use examples with indefinite DPs in the complement of *as* and leave aside other kinds of predicationally used DPs.



Figure 1: Scenarios for examples (14) and (15)

Following [9], I assume that the causal link between the asserted and the presupposed contents in (11) arises via an inferred discourse relation, *Result/Explanation* (see [2]).⁸

3 *As*-phrases do not restrict individual quantifiers

In Sect. 2, I assumed that weak adjuncts restrict TM quantifiers in case they are bound by them via a contextually determined restrictor variable C . The domain of individual quantifiers (e.g., *every NP*, *most NP*) is standardly assumed to be determined both by the NPs that they contain, as well as an additional restrictor variable C , which further cuts down the set of individuals described by the NP to those that are contextually given (see e.g., [8]). That is, *every guest* in (12) quantifies over all contextually given guests determined via C in (13).

(12) Every guest brought a present.

(13) $\llbracket \textit{every} \rrbracket^{g,w_0,t_0} = \lambda Q_{\langle e,ist \rangle} . \lambda P_{\langle e,ist \rangle} . \lambda t . \lambda w . \forall x [(x \in C \wedge P(x)(t)(w)) \rightarrow Q(x)(t)(w)]$

Since (i) we find a semantic dependency between *as*-phrases and their associated constituents, and (ii) individual quantifiers provide a covert restrictor variable (like TM quantifiers), we might expect *as*-phrases to also interact and restrict individual quantifiers. To assess the restrictive potential of weak adjunct *as*-phrases with respect to individual quantifiers, let us consider sentences that do not include any TM quantifier beside the relevant individual quantifier to preclude any alternative interactions, as in (14).

- (14) a. As a child, every guest likes sweets.
b. As tourists, most visitors own cameras.

If the *as*-phrases in (14) were restricting the quantifiers, we would expect (14) to be interpreted like (15), where the *as*-phrase contents are contributed by restrictive relative clauses.

- (15) a. Every guest who is a child likes sweets.
b. Most visitors who are tourists own cameras.

Example (15-a) is true iff the set of contextually given individuals who are guests and children (●) is a subset of the set of contextually given guests who like sweets (LS). Example (15-b) is true iff the set of contextually given individuals who are visitors and tourists and own cameras (● + OC) is larger than the set of contextually given visitors who are tourists and do not own cameras (● + no OC). That is, for (15), the sets of individuals that are guests/visitors but not children/tourists (○ and ○) are irrelevant, see Fig. 1.⁹

In contrast, example (14-a) is intuitively true in a context where the contextually given guests (○ + ●) form a subset of the set of contextually given individuals who like sweets (LS),

⁸The exact source of this inference is not central for the current purposes and is, thus, left for further investigation. See [9] and [15] for discussion.

⁹I make the simplifying assumption that C only contains individuals describable by the NP inside the quantifier. That is, in Fig. 1, ○ + ● are all guests and ○ + ● are all visitors picked by the respective value of C .

and all guests are children (i.e., there are only \bullet). And example (14-b) is true in a context in which the set of contextually given visitors who own a camera ($\circ + \bullet + \text{OC}$) is bigger than the set of visitors who do not own cameras ($\circ + \bullet + \text{no OC}$), and all visitors are tourists (i.e., there are only \bullet), see Fig. 1.

Comparing the above descriptions, we find that neither (14-a) nor (14-b) is true in the scenarios given for (15-a) and (15-b), respectively, and vice versa. This is a first indication that the *as*-phrase contents, unlike the relative clauses in (15), do not restrict the *Cs* of *every* and *most* in (14).

A second indication is provided by the fact that the examples in (14) are necessarily understood with causal links between the *as*-phrase content and the content of the remainder of the clause: (14-a) expresses that every guest likes sweets since all guests are children, and (14-b) expresses that most visitors own cameras since all visitors are tourists. This causal link persists even if the main clause predicates are changed to properties that are not associated with children or tourists in general, as in (16).

- (16) a. As a child, every guest likes coffee. (odd given world knowledge)
 b. As tourists, most visitors own a black bag.

In sum, we can conclude that the *as*-phrases in (14) have the same causal interpretation that arises in case an *as*-phrase does not interact with a quantifier, and, hence, that *as*-phrases do not restrict individual quantifiers.

Importantly, this finding cannot be the result of a general unavailability of the mechanism outlined in Sect. 2 (“intermediate accommodation”) in the case of individual quantifiers. As (17) shows, if an individual quantifier binds into presupposed content, this content can be understood as restricting its domain of quantification (see [16]).¹⁰

- (17) Every^{*i*} man loves his_{*i*} wife. \gg Every man in *C* has a wife.
 (\approx Every man, who has a wife, loves his wife.)

So, how can the lack of domain restriction with individual quantifiers be explained? How does (18) (repeats (14)) differ from (17)?

- (18) a. As PRO_c a child, every^{*c*} guest likes sweets.
 b. As PRO_c tourists, most^{*c*} visitors own cameras.

As I am going to show in Sect. 4, the crucial differences are (i) that the semantic dependency between the quantifier and the *as*-phrase content that is established via PRO is not one of binding, and (ii) that the *as*-phrase is not evaluated in the scope of its associated individual quantifier. Together, these differences preclude an interaction between *as*-phrases and individual quantifiers that would parallel the interaction between *as*-phrases and TM quantifiers.

4 How *as*-phrases and individual quantifiers interact

4.1 Non-obligatorily controlled PRO is not bound by its controller

In Sect. 2, I assumed, following [1], that PRO, which I posit to model the connection between *as*-phrases and their associated constituents, obtains its semantic value via Non-Obligatory

¹⁰There are further differences between the interaction of *as*-phrases and individual quantifiers, on the one hand, and presuppositions that project from the scope of individual quantifiers (see i.a., [6], [7]), on the other, that, for reasons of space, cannot be discussed at this point.

Control (NOC). This assumption is motivated by (i) the observation that *as*-phrases do not have to be c-commanded by their associated constituents, see (19-a), and (ii) the possibility of *as*-phrases to contain arbitrary PRO, see (19-b).

- (19) a. As PRO_c a child, the presence of a stranger scared her^c. (cf. [17])
 b. As PRO_{arb} a child, life is easy.

The observation that PRO does not have to be c-commanded by its controller speaks against an analysis of NOC in terms of binding.¹¹ In addition, we find that quantifiers in the same clause that are not the associated constituent of an *as*-phrase cannot bind into it. In (20), the possessive pronoun cannot be bound by *every boy* in object position even though this quantifier has to be QRed to a higher position in the clause for reasons of interpretability.¹²

- (20) As PRO_c his_{*i,j} friend, Mary^c invited every boy_i.

That is, *as*-phrases seem to be inaccessible for binding by individual quantifiers occurring in the same clause.

It is commonly assumed for NOC into high adjuncts that the choice of controller is constrained by discourse pragmatic considerations (see [1], [17]). While the proposals in the literature differ with respect to which pragmatic notion is responsible ([1] assumes topicality, while [17] assumes logophoricity), the consensus is that the dependency is not a strictly structurally or lexically determined matter, compare (21-a) and (21-b).

- (21) a. PRO_c having just arrived in town, the grand old hotel impressed Bill^c.
 b. *PRO_c having just arrived in town, the grand old hotel collapsed on Bill^c.
 (examples taken from [17])

Given the pragmatically mediated connection between NOC PRO and its controller, I argue that PRO obtains its value in a discourse-dependent fashion: in case the controller is a quantifier, as in the examples central to this paper, I argue, NOC PRO behaves like a *plural discourse anaphor* (see a.o. [11]).¹³

4.2 Discourse anaphora

Unlike proper names (and other referential expressions), individual quantifiers, being non-referential expressions, do not provide referents that can be picked up by personal pronouns in subsequent sentences, as illustrated in (22).

- (22) a. Paulⁱ came to the party. He_i had a great time.
 b. Everyⁱ student came to the party. *He_i had a great time.

The trouble with (22-b) is that third person singular *he* can be neither bound nor co-referent with *every student*—binding is impossible across sentence boundaries, and *every student* does not introduce a singular referent that could be picked up by *he*. In contrast, third person plural

¹¹Adler [1], in fact, argues that free adjuncts are never c-commanded by their associated constituents. She does not consider quantified associated constituents, though.

¹²Note that a quantifier that occurs in a higher, embedding clause is able to bind into an *as*-phrase, as in (i).

(i) Noⁱ boy believes that as PRO_c his_{i,j} friend, Peter^c will invite Mary.

¹³I thank an anonymous reviewer for suggesting a related line of inquiry.

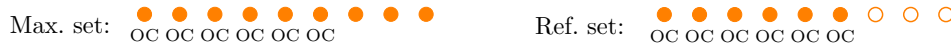


Figure 2: Maximal set scenario (left) and reference set scenario (right) for (25-b)

they in (23) seems to be able to depend on *every student*. Specifically, *every student* intuitively provides the set of all contextually given students as a potential referent for *they*.

(23) Every^{*i*} student came to the party. They_{*i*} had a great time.

As (24) shows, matters are more complicated: *they* may pick up either the set of contextually given MPs that attended the meeting, as in (24-a), the set of contextually given MPs that did not attend the meeting, as in (24-b), or the set of all contextually given MPs, as in (24-c).

- (24) Few^{*i*} MPs attended the meeting. (example from [11])
 a. They_{*i*} decided not to discuss anything important. (→ *reference set*)
 b. They_{*i*} stayed home instead. (→ *complement set*)
 c. But they_{*i*} all had drinks afterwards. (→ *maximal set*)

As [11] shows, the full spectrum of potential referents for *they* illustrated in (24) is not available with all individual quantifiers. While all quantifiers provide their reference set for subsequent discourse anaphora, the maximal set is only available with quantifiers for which the domain of quantification is presupposed to be non-empty (i.e., strong quantifiers, like *every NP*, *all NP*, *most NP*, or *few NP*), and the complement set is only available and accessible via inference with quantifiers that guarantee its non-emptiness (e.g., *few NP*).

4.3 NOC PRO as a discourse anaphor

Connecting back to the *as*-phrase data, I argue that NOC PRO is a discourse anaphor that picks up whichever referent (be it singular or plural) is provided by its chosen controller: if PRO depends on a singular referential expression, as in (2), it behaves like a singular anaphor; if it depends on an individual quantifier, it behaves like a plural anaphor.¹⁴

As shown in the previous subsection, plural discourse anaphora that depend on strong quantifiers, like *every NP* or *most NP* in (25) (repeats (14)), can refer to either the reference set or the maximal set of the quantifier.

- (25) a. As PRO_{*c*} a child, every^{*c*} guest likes sweets.
 b. As PRO_{*c*} tourists, most^{*c*} visitors own cameras.

Note, however, that the *as*-phrases in (25) can intuitively only refer to the maximal sets of their associated quantifiers (i.e., the sets of all contextually salient guests or visitors) and, hence, can only describe the maximal set scenario in Fig. 2. The reference set, which is the preferred referent for plural discourse anaphora according to [11], is inaccessible. This is noticeable for (25-b), which cannot express ‘most visitors own cameras since those visitors who own cameras are tourists’, which would be true in the reference set scenario in Fig. 2.

How can we account for the lack of this reading? Given the presuppositional nature of the *as*-phrase content, as well as its sentence-initial position, it is plausible to assume that the *as*-phrase content is checked against the context before the main clause content is evaluated. That

¹⁴This interpretational flexibility is not surprising if we consider that PRO is a covert, morphologically number neutral pronominal element.

is, when the referent for PRO is determined, the reference set of the quantifier has arguably not been computed, yet (see [11]). The maximal set, which *every NP* and *most NP*, as strong quantifiers, presuppose to be contextually determined and non-empty, is therefore the only available referent for PRO.

This line of argumentation is supported by the interpretational restrictions observed for appositive relative clauses (ARCs) (see [12]). It has been observed in the literature that, just like anaphoric pronouns, only plural appositives (including ARCs) can combine with individual quantifiers, see (26).

- (26) a. *Every climber, an experienced adventurer, made it to the summit.
b. Every climber, all experienced adventurers, made it to the summit.

Furthermore, [12] observes that the syntactic placement of ARCs constrains which set provided by the quantifier they can comment on: ARCs that occur sentence-internally, as in (27-a), can only comment on the maximal set (i.e., the set of all contextually salient climbers) while ARCs that occur sentence-finally, as in (27-b), can also comment on the reference set (i.e., the set of all contextually salient climbers that reached the summit).

- (27) a. Less than half the climbers, who were (all) French nationals, made it to the summit.
b. They interviewed less than half the climbers, who were (all) French nationals.

So, the order in which information in a sentence is evaluated arguably constrains which sets can be denoted by discourse anaphora, which accounts for why only the maximal set is an accessible referent for PRO in *as*-phrases.

5 The account: *as a child, every guest likes sweets*

The consensus in the literature is that plural discourse anaphora depending on individual quantifiers can only be adequately captured in a dynamic system (see i.a. [11]). Hence, a fully explicit formal analysis of the *as*-phrase data at issue would require the adoption of a system like those proposed in [4] or [11]. For reasons of space and simplicity, I will summarize the account of the data in the static system adopted in Sect. 2 and informally discuss the necessary dynamic aspects. I discuss the example sentence *As a child, every guest likes sweets*, for which I assume the syntactic structure in (28).¹⁵

- (28) [[*asP* *as* PRO_c a child] [_Y [PRES] [[*every*^c guest] [likes sweets]]]]

Let us first turn to the interpretation of the *as*-phrase. Given that the *as*-phrase contains a singular predicate that can only be true of humans, the only plausible controller for NOC PRO is the quantifier *every guest* in subject position.¹⁶

Since quantifiers are non-referential, PRO acts like a discourse anaphor and picks up a set of individuals connected to this quantifier (see Sect. 4.3). Given that the content contributed by the *as*-phrase is presuppositional and, hence, checked against the available referents in the context of evaluation before the at-issue content of the sentence is evaluated, the only available

¹⁵I do not assume QR of *every guest* in (28). However, in case the quantifier has to be QRed for reasons of interpretability, the binding facts in Sect. 4.1 suggest that it is QRed to a position below the *as*-phrase.

¹⁶In case more than one argument of the main clause predicate are plausible controllers, the controller is chosen based on a pragmatically determined hierarchy (see [1]). A corpus study reported in [10] shows that the majority of controllers of weak adjuncts are in subject position.

referent is the maximal set containing all contextually given guests, see (29). Since *every guest* is a strong quantifier, this set is presupposed to be non-empty.

$$(29) \quad g(c) = \{x : \llbracket \text{guest} \rrbracket^{g,w_0,t_0}(x)(w_0) \wedge x \in C\}$$

As a result, PRO denotes a set of single individuals, i.e., a plural individual (see a.o. [14]).

At first glance, the next step, combining the plural individual denoted by PRO with the predicationally used singular DP *a child*, appears to be problematic: morphosyntactically singular predicates cannot combine with morphosyntactically plural subjects (e.g., **the boys eats*). Note, though, that the number mismatch in our case is different since PRO is morphosyntactically number neutral and semantically plural. We encounter a similar semantic mismatch with group nouns, see (30), which are morphosyntactically singular and semantically plural.

$$(30) \quad \textit{Committee A is tall.} \qquad \qquad \qquad \text{(example taken from [13])}$$

So, to derive the interpretation for the *as*-phrase in (32), I loosely follow the account for group nouns put forth in [13] and assume an operator \mathbb{P} that turns a singular predicate into the corresponding, distributive plural predicate, see (31).

$$(31) \quad \mathbb{P}(\llbracket \text{a child} \rrbracket^{g,w_0,t_0}) = \lambda X.\lambda t.\lambda w.\forall x \in X[\llbracket \text{child} \rrbracket^{g,w_0,t_0}(x)(t)(w) = 1]$$

$$(32) \quad \llbracket \text{as PRO}_c \text{ a child} \rrbracket^{g,w_0,t_0} = \lambda p_{\langle i,st \rangle}.\lambda t'.\lambda w' : \forall y \in \{x : \text{guest}'(x)(t_0)(w_0) \wedge x \in C\}[\text{child}'(y)(t')(w') = 1]. p(t')(w')$$

To derive the interpretation of the sister of asP (i.e., the Y-node in (28)), I assume (i) the denotation of *every* in (13), and (ii) that [PRES] is an identity function on propositions (i.e., unlike [PAST], [PRES] has no effect on the temporal evaluation of its argument, see [3]). The resulting denotation—i.e., the propositional argument of (32)—is given in (33).

$$(33) \quad \llbracket Y \rrbracket^{g,w_0,t_0} = \lambda t.\lambda w.\forall x[(\text{guest}'(x)(t)(w) \wedge x \in C) \rightarrow \text{likes-sweets}'(x)(t)(w)]$$

After combining (32) with (33), the sentence *as a child, every guest likes sweets* is analyzed to contribute the presuppositional and truth-conditional content in (34).

$$(34) \quad \llbracket \text{as a child, every guest likes sweets} \rrbracket^{g,w_0,t_0} \text{ is defined if}$$

- i) $\{x : \text{guest}'(x)(t_0)(w_0) \wedge x \in C\} \neq \emptyset$
- ii) $\forall y \in \{x : \text{guest}'(x)(t_0)(w_0) \wedge x \in C\}[\text{child}'(y)(t_0)(w_0) = 1]$

and if defined = 1 iff

- iii) $\forall x[(\text{guest}'(x)(t_0)(w_0) \wedge x \in C) \rightarrow \text{likes-sweets}'(x)(t_0)(w_0)]$

As stated in Sect. 2, the presuppositional *as*-phrase content in ii) and the truth-conditional content in iii) are inferred to be related pragmatically by the discourse relation *Result/Explanation*. Hence, using this sentence, a speaker not only asserts that all guests like sweets but also conveys that they do so because they are children.

6 Conclusion

In this paper, I have shown by the example of non-clausal, structurally high *as*-phrases that weak adjuncts cannot be understood as restricting the domain of individual quantifiers with which they associate. I account for this lack of domain restriction by semantically analyzing the dependency between the *as*-phrase and its associated constituent, which I take to be

Non-Obligatory control, as co-reference, specifically discourse anaphora, rather than binding. Lastly, I provided an analysis of sentences containing *as*-phrases that associate with individual quantifiers which accounts for their attested interpretation.

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