On the Grounding Status of Appositive Relative Clauses

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Abstract. The prevalent assumption in the literature is that appositive relative clauses (ARCs) contribute asserted but backgrounded content (see Böer & Lycan [4], Chierchia & McConnell-Ginet [5], Bach [3], Dever [7], Potts [14], AnderBois et al. [2]). In this paper I demonstrate that ARCs are not inherently backgrounded. Rather, clause-medial ARCs are backgrounded whereas clause-final ARCs behave like regular foregrounded content. I propose a uniform semantics for ARCs which derives their grounding status from whether they are processed before or after the content contributed by the main clause is accepted by the addressee. The idea is formally implemented in Dynamic Predicate Logic (Groenendijk & Stokhof [11]) enriched with propositional variables (AnderBois et al. [2]).

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1   Introduction

There are two main theories for the semantics of appositive relative clauses (ARCs). On one theory, ARCs are clausal conjuncts and as such are part of the proposition contributed by the whole sentence (see Frege [9], Böer & Lycan [4], Schlenker [16], AnderBois et al. [2]). On another theory, ARCs contribute independent propositions (see Chierchia & McConnell-Ginet [5], Bach [3], Dever [7], Potts [14]). On the former theory, sentences with ARCs are interpreted conjunctively and have a single truth value. On the latter theory, sentences with ARCs represent two-dimensional semantic objects that have two truth values: one contributed by the main clause and another contributed by the ARC. Both theories place extra conditions on the way ARCs are interpreted[1]: ARCs are typically assumed to contribute asserted but *backgrounded* content, i.e. asserted content that is not part of the main point of the utterance.[2] In this respect ARCs differ from main clauses, which contribute asserted and foregrounded content.

In this paper I argue against the claim that ARCs are inherently backgrounded. Rather, what rather seems to be the case is that the grounding status of ARCs depends on their linear position in the clause. ARCs are backgrounded

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[1] Although Frege [9] is an exception.
[2] Backgrounded content is also known as *not at-issue* content.

when they occur clause-medially; however, when they occur clause-finally, ARCs behave like regular foregrounded content.[3] Building on previous accounts (see AnderBois et al. [2] and Murray [13], both of which elaborate on Stalnaker [18]), I assume that backgrounded and foregrounded content differ in how they enter the context set. Content contributed by ARCs imposes conditions on the current context set, i.e. directly restricts the context set. In contrast, content contributed by main clauses puts forward an update proposal, a subset of the current context set, which, if accepted, becomes the new context set. My analysis treats ARCs as conjuncts and interprets them at their surface position. Clause-medial ARCs are interpreted before the update proposal introduced by the main clause has been accepted; hence, they restrict the *old* context set and thus are backgrounded. Clause-final ARCs can be interpreted after the update proposal has been accepted; hence, they restrict the *new* context set. Even though not part of the proposal, clause-final ARCs end up restricting the same set of worlds as the one representing the new proposal and thus behave like foregrounded content. These ideas are formally implemented in Dynamic Predicate Logic (Groenendijk & Stokhof [11]) enriched with propositional variables representing the context set and the update proposal (AnderBois et al. [2]).

The paper is structured as follows. Section 2 defines some terminology. Section 3 presents the main empirical facts on the basis of two tests for backgroundedness: the Direct Reply Test and the Answerability Test. Section 4 presents the formal account. Section 5 provides further evidence for the account coming from sentences with clause-final adjuncts. Section 6 concludes the discussion and situates the proposal in the broader context of apposition and clausal types.

2 Preliminaries

Before diving into the discussion, let us distinguish between clause-medial vs. clause-final ARCs. I propose the following definition (to be revised): An ARC is called *clause-medial/clause-final* if it occurs within/outside the smallest potential clause that contains the anchor of the ARC. To illustrate, the ARC in (1) is clause-medial because the smallest clause that contains the anchor of the appositive, i.e. "Maradona," also contains the ARC. The ARC in (2) is clause-final because the smallest potential clause that contains the anchor excludes the ARC.

(1)   Maradona, *who scored a goal with his hand*, won the Golden Boot.

(2)   Sally admires Maradona, *who scored a goal with his hand*.

It is important to note that the above definition is not meant to imply any claims about the constituency of ARCs.[4] It merely emphasizes the linear position of ARCs on which the semantics proposed below is based.

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[3] This fact is noted but not explained in Cornilescu [6] and AnderBois et al. [2].
[4] See de Vries [19] for an overview of the various syntactic theories for ARCs.

I would like to also distinguish backgroundedness from *projection*, the ability of certain implications to arise even when their triggers occur in non-assertive contexts. The two categories are rarely distinguished and some authors try to explain projection in terms of backgroundedness (e.g. Simons et al. [17]). Even though there is a significant overlap between backgroundedness and projection—presupposition being the prime example that comfortably fits both categories—the two categories are distinct. First, meanings can be backgrounded without projecting. E.g., the embedded clause of "Jack imagined that it was raining outside" behaves like backgrounded content: it cannot be directly challenged by "That's not true" and it cannot answer the question "Is it raining outside?" (see Section 3 for a detailed discussion of those two tests for backgroundedness). Also, as Simons et al. [17] themselves observe, there seem to be meanings that project but are not backgrounded, e.g. clause-final ARCs.[5] Whatever the final verdict on the intricate interaction between backgroundedness and projection might be, this paper will only focus on the grounding status of ARCs. Thus, the explanations proposed here need not necessarily extend to the projective properties of ARCs.

Finally, let me comment on the way I mark acceptability judgments. As is standard in the literature, I use ?, ?? and # to mark a decreasing degree of acceptability. For theoretical purposes, I treat unmarked sentences and ?-sentences as acceptable and ??- and #-sentences as unacceptable.

3   Two Tests for Backgroundedness

In this section I discuss two tests for backgroundedness, both of which underscore the inability of backgrounded content to address the main topic of the conversation, or, in Roberts' [15] terms, the *question under discussion*. It is demonstrated that clause-medial and clause-final ARCs pattern differently: the former as backgrounded and the latter as foregrounded content.

3.1   The Direct Reply Test

Since backgrounded content is not part of the primary assertion of a sentence, one would expect that such content is not directly targetable in subsequent discourse. I call this the Direct Reply Test.[6]

(3)   *Direct Reply Test*
Backgrounded content cannot be directly targeted by the hearer, e.g. by replies like "Yes," "No," "That's not true," etc.

One should note that backgrounded content can be targeted but only *indirectly.* Indirect targeting has a more severe effect: it disrupts the natural flow

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[5] See Simons et al. [17] for more discussion.

[6] This test is sometimes called the *cancellation/deniability test.* Since it does not necessarily involve negative replies, I prefer to call it the Direct Reply Test.

of discourse. It also involves different grammatical tools, including "Hey, wait a minute," "actually," "well," etc.

Clause-medial ARCs pass the Direct Reply Test and thus are backgrounded.

(4)   (cf. Amaral et al. [1])
      A: Edna, *who is a fearless leader*, started the descent.
      B: #No, she isn't. She is a coward.

In contrast, clause-final ARCs fail the Direct Reply Test. In this they behave like foregrounded content.

(5)   A: Jack invited Edna, *who is a fearless leader.*
      B: No, she isn't. She is a coward.

The same contrast crops up in cases in which the main clause and the ARC are of a different sentence type.[7] Let us look at cases in which one of the clauses is a declarative and the other an interrogative. (The example in (6A) is due to McCawley [12].)

(6)   A: Has John, *who was talking to Mary a minute ago*, gone home?
      B: No, he hasn't. He is still at the party.
      B': #No, he wasn't. He was talking to Stacy.

(7)   A: Did you see John, *who was talking to Mary a minute ago*?
      B: No, I didn't. I had no idea he was at the party.
      B': ??No, he wasn't. He was talking to Stacy.

(8)   A: Marcia, *who you wanted to meet, didn't you?*, has just arrived.
      B: No, she hasn't. She is still in San Francisco.
      B': ??No, I didn't. I wanted to meet Sarah.

(9)   A: Jack invited Marcia, *who you wanted to meet, didn't you?*
      B: ??No, he didn't. He invited Sarah.
      B': No, I didn't. I wanted to meet Sarah.

One can make sense of this paradigm as follows. Only one direct reply is felicitous in each case: the addressee is not given the choice of directly replying to either the declarative or the interrogative clause. Clause-medial ARCs, whether declarative or interrogative, are backgrounded (7), (9). When the ARC occurs clause-finally, it is foregrounded. If we make the reasonable assumption that answering a question has a higher urgency in discourse than replying to an assertion, we can explain why replying to the assertion in (8) and (10) is blocked. In short, the generalization from above is upheld in these cases too.

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[7] McCawley [12] claims that there are two independent speech acts performed in such cases.

3.2 The Answerability Test

Since backgrounded content cannot address the main topic of conversation, it is expected that it cannot answer questions. I call this test the Answerability Test.

(10) *Answerability Test*
Backgrounded content cannot be employed by interlocutors to answer questions.

Both types of ARCs fail the Answerability Test when a singleton question is asked (the examples below are based on AnderBois et al. [2]).

(11) A: What disease did Tammy's husband have?
B: ??Tammy's husband, *who had prostate cancer*, was treated at the Dominican Hospital.

(12) A: What disease did Tammy's husband have?
B: ??The doctors of the Dominican Hospital treated Tammy's husband, *who had prostate cancer*.

However, there seems to be a general problem with the answers in (11B) and (12B): the information contributed by the main clause is not relevant to the question being asked. A way to come around this problem is to frame the dialogue in such a way that it involves conjoined questions.[8] In such contexts the contrast between clause-medial and clause-final ARCs reemerges. Clause-medial ARCs pass the Answerability Test and hence are backgrounded.

(13) A: What did Paula bring and when did she leave the party?
B: ??Paula, *who brought cookies*, left after midnight.

Clause-final ARCs fail the Answerability Test and once again behave like foregrounded content.

(14) A: Who did you meet at the party and what did they bring?
B: I met Paula, *who brought cookies*.

3.3 Intermediate conclusions

I conclude that clause-medial ARCs are heavily restricted in their uses: they cannot address the main topic of conversation, i.e. represent backgrounded content. In contrast, clause-final ARCs can serve any pragmatic purpose that main clauses can serve. In that respect they behave like foregrounded content.

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[8] I owe this observation to Veneeta Dayal.

4   Formal Account

In Stalnaker's [18] view, assertion (of foregrounded content) is an attempt to reduce the context set and the attempt succeeds only if there are no objections on the side of the addressee. One could then argue that foregrounded content is introduced first as a proposal to restrict the context set and then the proposal is accepted by the addressee (see Groenendijk & Roelofsen [10], Farkas & Bruce [8]). This two-step procedure is what makes foregrounded content directly accessible to the addressee. However, backgrounded content is intuitively not directly accessible to the addressee. This intuition could be modeled by the assumption that asserting backgrounded content involves only one step which imposes a restriction on the current context set (see AnderBois et al. [2], Murray [13]). Building on the particular implementation of those ideas proposed in AnderBois et al. [2], the current account derives the contrast between clause-medial and clause-final ARCs from the relative order in which foregrounded and backgrounded content are processed.

4.1   Formal Background

Dynamic Predicate Logic (DPL; see Groenendijk & Stokhof [11]) shares the syntax of first-order logic but has a different semantics. Most importantly, existential quantifiers can bind variables not only in their syntactic scope but also in subsequent conjuncts. Formulas of DPL are interpreted as relations between two information states, represented as assignment functions. AnderBois et al. [2] enrich classical DPL with propositional variables, interpreted as sets of possible worlds. Lexical relations represent atomic formulas that are relativized to propositions in the sense that the formula needs to hold in every world of that proposition.[9]

(15) $\langle g, h \rangle \in [\![R_p(u_1, ..., u_n)]\!]$ iff $g = h$ & $\forall w \in h(p) : \langle h(u_1), ..., h(u_n) \rangle \in [\![R]\!]^w$

Atomic formulas which do not represent lexical relations are interpreted as in classical DPL, i.e. without being relativized to propositions.[10] The rest of the semantics is the same as in classical DPL. I briefly state the rules for formulas that will be used in the examples below. Conjunction is interpreted as relational composition (16). Random assignment, represented as a separate formula, assigns a new value to its variable and keeps all other variable values intact (17).

(16) $\langle g, h \rangle \in [\![\phi \wedge \psi]\!]$ iff $\exists k : \langle g, k \rangle \in [\![\phi]\!]$ & $\langle k, h \rangle \in [\![\psi]\!]$

(17) $\langle g, h \rangle \in [\![\exists u]\!]$ iff $\forall v : v \neq u \Rightarrow g(v) = h(v)$

A formula ϕ is *true* in a model M and with respect to an assignment function g if and only if there is an assignment h such that $\langle g, h \rangle \in [\![\phi]\!]^M$.

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[9] Whenever possible, I omit reference to models.

[10] Below, I use the identity and the subset relations, interpreted in an obvious way.

Asserting a sentence without appositives amounts to the following. First, a proposal is put forward by introducing a new propositional variable that is included in the current context set and is a candidate for the new context set. Second, the descriptive content is introduced, where lexical relations are relativized to the proposal proposition. Finally, the proposal is accepted by resetting the value of the context set to that of the proposal proposition. This is illustrated in (18), where p represents the proposal proposition and p^{cs} is a distinguished variable representing the current context set at any stage of the conversation.

(18)   a.   Edna is a fearless leader.

       b. $\underbrace{\exists p \wedge p \subseteq p^{cs}}_{\text{proposal}} \wedge \underbrace{\exists x \wedge x = edna \wedge fearless.leader_p(x)}_{\text{descriptive content}} \wedge \underbrace{\exists p^{cs} \wedge p^{cs} = p}_{\text{acceptance}}$

4.2   Account

The context set p^{cs} represents the information that is taken for granted among speech participants and the proposal proposition, say p, represents the current topic of conversation. Following AnderBois et al. [2], I make the crucial assumption that content contributed by ARCs is relativized not to p but directly to p^{cs}. The basic idea is that backgrounded content restricts p^{cs} whereas foregrounded content restricts p.

The incremental processing of sentences with clause-medial ARCs explains why such ARCs are backgrounded. Clause-medial ARCs are processed before the proposal has been accepted and thus impose a condition on the *old* context set. They do not restrict the proposal proposition, i.e. the topic of conversation, and are backgrounded. This is illustrated below, where the acceptance update, underlined for convenience, follows the conjunct contributed by the ARC.

(19)   a.   Edna, *who is a fearless leader*, started the descent.

       b. $\exists p \wedge p \subseteq p^{cs} \wedge \exists x \wedge x = edna \wedge fearless.leader_{p^{cs}}(x) \wedge start.descent_p(x) \wedge$ $\underline{\exists p^{cs} \wedge p^{cs} = p}$

I claim that the same strategy can explain why clause-final ARCs behave like foregrounded content. For this, one additional assumption is added: let us allow for the possibility that the acceptance update optionally precedes the conjuncts contributed by clause-final ARCs.[11] Given this assumption, there are two possibilities for the grounding status of clause-final ARCs. When the acceptance update comes at the very end, clause-final ARCs are backgrounded similarly to clause-medial ARCs. This option accounts for the intuition that clause-final ARCs need not be foregrounded; e.g. they can contribute information that is not picked up in subsequent discourse. More importantly, when the acceptance update precedes the information contributed by the ARC, the ARC imposes a condition on the *new* context set. Even though not part of the proposal proposition, clause-final ARCs end up restricting the same set of worlds as the ones

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[11] This assumption seems intuitive because in some sense the addressee has finished processing the main clause before she starts processing the appositive.

characterized by the proposal proposition and thus behave like foregrounded content. These two options for clause-final ARCs are illustrated on the example in (20a). In (20b) the ARC restricts the context set before it has been reset to the proposal proposition and is thus backgrounded. In (20c) the ARC further restricts the context set after it has been reset to the proposal proposition and behaves like foregrounded content.

(20) a. Jack invited Edna, *who is a fearless leader.*

   b. $\exists p \land p \subseteq p^{cs} \land \exists x \land x = jack \land \exists y \land y = edna \land invite_p(x,y) \land fearless.leader_{p^{cs}}(y) \land \underline{\exists p^{cs} \land p^{cs} = p}$

   c. $\exists p \land p \subseteq p^{cs} \land \exists x \land x = jack \land \exists y \land y = edna \land invite_p(x,y) \land \underline{\exists p^{cs} \land p^{cs} = p} \land fearless.leader_{p^{cs}}(y)$

In short, the puzzling differences in grounding status between clause-medial and clause-final ARCs are amenable to a uniform account if we pay close attention to the order in which foregrounded and backgrounded content is processed.

5   Further Support for the Account: Clause-final Adjuncts

The current account turns out to predict that if a constituent contributes old information, i.e. information that is already contained in the current context set, it should be able to follow an ARC without disrupting its foregrounded status. This, it seems, is exactly what we find with clause-final adjuncts. The ARC in (21B), where the locative adverbial is informative, is much harder to directly challenge than the ARC in (22B), where the same adverbial is old information (and spoken with flat intonation). Similarly, the ARC in (23B), where the adverbial is new information, is not able to address questions but the ARC in (24B), where the adverbial is previously given, can marginally do so.

(21) A: So, what happened next?
      B: Howard met Bernadette, *who is Canadian*, at the Vancouver airport.
      C: ??Not really—Bernadette was born in the US.

(22) A: Who did Howard meet at the Vancouver airport?
      B: He met Bernadette, *who is Canadian*, at the Vancouver airport.
      C: ?Not really—Bernadette was born in the US.

(23) A: Who did you meet and what did they bring?
      B: #I met Jimmy, *who brought tuna salad*, in the hallway.

(24) A: Who did you meet in the hallway and what did they bring?
      B: ?I met Jimmy, *who brought tuna salad*, in the hallway.

The foregrounded status of clause-final ARCs thus falls out as a special case of the broader generalization that ARCs become foregrounded only if they are the last *informative* constituent in the clause.

On the current account, the data above can be explained as follows. When a clause-final adverbial contributes new information, this information is part of the proposal and the acceptance needs to come last. This has as a consequence that any ARC that precedes the adverbial will be backgrounded. When, however, a clause-final adverbial contributes old information, this information is not part of the proposal and the acceptance can precede the update contributed by the ARC. This has as a consequence that the ARC behaves like foregrounded content, similarly to genuinely clause-final ARCs. Those two options are illustrated on the sentence in (25a), where the adjunct contributes new information in (25b) but old information in (25c).

(25) a. Howard met Bernadette, *who is Canadian*, at the Vancouver airport.

   b. $\exists p \wedge p \subseteq p^{cs} \wedge \exists x \wedge x = howard \wedge \exists y \wedge y = bernadette \wedge meet_p(e, x, y) \wedge canadian_{p^{cs}}(y) \wedge at.vancouver.airport_p(e) \wedge \underline{\exists p^{cs} \wedge p^{cs} = p}$

   c. $\exists p \wedge p \subseteq p^{cs} \wedge \exists x \wedge x = howard \wedge \exists y \wedge y = bernadette \wedge meet_p(e, x, y) \wedge \underline{\exists p^{cs} \wedge p^{cs} = p} \wedge canadian_{p^{cs}}(y) \wedge at.vancouver.airport_p(e)$

We could uphold the terminology of clause-medial vs. clause-final ARCs if we revise the definition from Section 2 along the following lines: An ARC is called *clause-final* if it occurs either outside or else is the last informative constituent within the smallest potential clause that contains the anchor of the ARC. An ARC is called *clause-medial* if it is not clause-final.

6 Conclusion and Beyond

In this paper I have shown that clause-medial ARCs are backgrounded whereas clause-final ARCs can be foregrounded. This shift in grounding status was explained by (i) the assumption that ARCs impose a condition on the current context set and (ii) the relative order in which ARCs and foregrounded content are processed. The current proposal lends further support for the conjunctive theory of ARCs as two-dimensional theories predict no difference in grounding status between clause-medial and clause-final ARCs. At the same time, it maintains a uniform semantic mechanism for both clause-medial and clause-final ARCs. My hope is that paying attention to the conditions under which ARCs shift their grounding status would bring us closer to an explanation of the notion of backgroundedness.

   Still, further questions remain. First, how do other clauses behave with respect to backgroundedness? Assuming that ARCs have a main clause-like status (see de Vries [19] and literature cited therein), the main vs. subordinate clause divide does not seem to correctly characterize the foregrounded vs. backgrounded content divide. E.g., restrictive relative clauses (unless inside a definite DP, in which case they contribute presupposed content) behave like foregrounded asserted content independently from their surface position: the relative clause in both "A woman who works for Apple invited me for dinner" and "I had dinner

with a woman who works for Apple" seems to fail both tests for background-edness. Second, can other types of appositives shift their grounding status depending on linear position? Nominal appositives apparently cannot: both "Mike Stewart, a comedian from New Jersey, was at the party last night" and "I talked to Mike Stewart, a comedian from New Jersey" seem to pass the two tests for backgroundedness, a fact that might be due to their non-clausal status. I leave both questions to further research.

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