

Experimental Evidence for the Truth Conditional Contribution and Shifting Information Status of Appositives

KRISTEN SYRETT

Rutgers, The State University of New Jersey-New Brunswick

TODOR KOEV

University of Stuttgart

Abstract

Appositive constructions (*My friend Sophie, (who is) a classical violinist, performed a piece by Mozart*) have stood at the center of debates concerning the range of possible meanings, and more specifically the status of not-at-issue entailments. However, it remains an open question what precisely their semantic and pragmatic contribution is to the sentence in which they appear. Here, we address this question head-on experimentally. We first investigate the information status of appositives and find that while nominal appositives (e.g. *a classical violinist*) and sentence-medial appositive relative clauses (e.g. *who is a classical violinist*) are largely not at issue, sentence-final appositive relative clauses can become at issue, as witnessed in their becoming the target of a direct rejection and being associated with subsequent questions. We then investigate the truth conditional contribution of appositives to sentences in which they appear, and find that whenever an appositive is false, participants judge the entire sentence False. Reaction times complement truth value ratings to demonstrate that this decision is largely automatic. We discuss possible reasons for the difference among appositive types and sentential positions, and propose that the pattern of results we observe and the strong similarity with conjunction can best be accounted for in a unidimensional semantics which treats appositives as dynamic conjuncts but which also relates linguistic form to the timing of making assertions in discourse.

1 INTRODUCTION

The goal of this experimental study is to investigate the semantics and pragmatics of appositive constructions, such as the underlined part of (1).

- (1) My friend Sophie, (who is) a classical violinist, performed a piece by Mozart.

Discussion of the semantic properties of appositives goes back at least as far as Frege (1892) and has recently gained considerable attention, thanks

in large part to the influential work of Potts (2005). (See also Böer & Lycan 1976; Bach 1999; Chierchia & McConnell-Ginet 2000; Schlenker 2010, 2013; AnderBois *et al.* 2010; Tonhauser 2012; a.o.) The main focus in this discussion has been on the layer of meaning to which appositive content pertains, and the way in which the appositive is related to the meaning of the entire sentence. Researchers have observed that while appositives express commitments that trigger entailments (and thus resemble regular assertions), appositive content is typically not at issue (i.e. is secondary to the main point of the utterance, and typically projects). This latter property makes them bear some resemblance to presuppositions, which are also not at issue, but which—unlike appositives—are not typically used to present new information (but see Gauker 1998, von Stechow 2000 and Simons 2003 for discussion of ‘informative presuppositions’ as notable exceptions). Given this distinction among possible meanings, Potts (2005) presents rather compelling reasons to treat appositives as conventional implicatures. (See, for example, his ‘meaning graph’ in Figure 2.1, 2005.) However, even with more or less general agreement that appositives differ from presuppositions and assertions, there are still extensive discussions of precisely how they differ, and how to account for their semantics and pragmatics formally.

What has been conspicuously missing in the literature on appositives is experimental evidence that could serve to pin down and describe in more fine-grained detail the information status and truth conditional contribution of appositives, and therefore adjudicate between the various approaches to the semantics and pragmatics of appositives.¹ A review of the appositive literature reveals that most approaches treat appositives in English on par and as a uniform class, abstracting away from their syntactic form or position in the sentence, or only restricting attention to one particular type of appositive.² As a result, there has been no systematic manipulation of variables that could affect appositive status. The current work aims to fill this gap by experimentally investigating two core and intimately related properties of appositives—their information status (i.e. whether they are ‘at issue’ or ‘not at issue’) and their truth conditional contribution to sentences in which they occur.

Here, we present a set of five experiments on appositives that manipulate certain variables: the form of the appositive [nominal appositives (NAs) v. appositive relative clauses (ARCs)] and the sentential position of

¹ To our knowledge, the only previous experimental work on the semantics and pragmatics of appositives is Harris & Potts (2009), which is concerned with the perspectival (i.e. subject or speaker) orientation of both appositives and expressives.

² Discussions included in Nouwen (2007) and Potts (2008) are recent exceptions.

the appositive (sentence medial v. final). Previewing our results, we show the following. First, we provide baseline evidence supporting previous intuitions that appositives generally represent not-at-issue content and are best targeted by an indirect rejection. However, sentence-final ARCs in particular *can* be the target of a direct rejection—and therefore do seem to be at issue—nearly a third of the time. Our findings therefore demonstrate that whether or not appositives are treated as at issue may depend on key structural properties. Moreover, sentence-final ARCs are perceived as a possible antecedent (a salient assertion) for ellipsis across sentences. Finally, we turn to an investigation of the truth conditional properties of appositives and present robust evidence that sentences with appositives behave much like conjuncts with respect to the calculation of truth values: false appositive content is reason enough for participants to judge the entire sentence False, and not True or without a clear truth value. Together, these experimental results present novel evidence regarding the role of appositive form and position, and their effect on truth conditions, which any semantic and/or pragmatic approach to appositives must take into account.

This article is structured as follows. Section 2 lays out the theoretical background on semantic approaches to appositives, motivating our interest in experimental work on this construction. In Section 3, we present Experiment 1 as a baseline to establish the difference between main clauses and appositives. We demonstrate, in line with previous intuitions, that an indirect rejection in the form of ‘Hey, wait a minute’ is a more likely choice to target appositive content than a direct ‘That’s not true’ response, and is more likely to be associated with an appositive than main clause content. In §4, we present Experiment 2, which builds upon the results of Experiment 1 to show that while an indirect rejection is the *preferred* choice to target an appositive, appositives *can*, in fact, compete with the main clause to be the target of a direct rejection. Using another diagnostic for at-issueness, in Section 5, we present the results of Experiment 3, showing that sentence-final appositive relative clauses can compete with the main clause to supply an assertion that serves as the antecedent for ellipsis across sentences. In Sections 6 and 7, we present Experiments 4 and 5, which are complementary experiments aimed at evaluating the truth conditional import of appositives, demonstrating what happens when a false appositive combines with a true main clause: the entire sentence containing the appositive and main clause is judged False. Finally, in Section 7, we summarize the combined set of experimental results, and outline a proposal based on a unidimensional semantics, which accounts for these results and allows us to work toward a more fine-grained understanding of the semantics and pragmatics of appositives.

2 THEORETICAL BACKGROUND

2.1 *Surface-level characteristics of appositives*

Two main types of English appositives have been discussed in the semantics literature: nominal appositives (NAs), as in the underlined part of (2), and appositive relative clauses (ARCs), as in the underlined part of (3), which are also known as ‘nonrestrictive relative clauses’.

(2) My friend Sophie, a classical violinist, performed a piece by Mozart. (NA)

(3) My friend Sophie, who is a classical violinist, performed a piece by Mozart. (ARC)

NAs differ from ARCs in that the former have the syntactic form of a Determiner Phrase, whereas the latter have the form of a relative clause headed by a *wh*-word. However, the two constructions share certain key features.

Both types of appositives provide further information about their *anchor*, the DP to their left. This anchor must typically be referential (Stockwell *et al.* 1973), or unique and identifiable, in Rodman (1976)’s terms.³ Both also require (are typically instantiated with) a parenthetical, or comma, intonation, resulting in their status as an ‘intonationally isolated phrase’ (cf. Potts 2005; Dehé 2009). This parenthetical nature may be realized with prosodic breaks before and after the appositive, with the boundary tone aligned to the right edge, and possibly an upward pitch reset at the left edge of the phrase (Nespor & Vogel 1986; Selkirk 2005). Finally, appositives can appear somewhere in the middle of a sentence, as in the examples above, where the appositive modifies the subject anchor, or at the end of the sentence, as in (4).

(4) I introduced him to my friend Sophie, (who is) a classical violinist.

This medial/final distinction will prove crucial for ARCs in our subsequent experimental work.

2.2 *Information status of appositives*

All appositives, no matter their form, are generally seen as representing content that is ancillary to the main point of the utterance (which is typically expressed by the main clause). For example, Chierchia &

³ We should note that there are exceptions to this claim, and in some cases, appositives can be attached to quantificational heads (Del Gobbo 2003) or to an unspecific indefinite in the scope of another operator (Sells 1985).

McConnell-Ginet (2000) say of the sentence in (5) that the assertion is articulated in two parts: the main assertion in the *foreground* and the secondary one (the appositive) in the *background*.

(5) Jill, who lost something on the flight from Ithaca to New York,
likes to travel by train.

(See also Potts 2005; AnderBois *et al.* 2010; Murray 2010; Simons *et al.* 2010.) Following up on this intuition, we will begin by treating the content presented by the appositive as not at issue, although we will ultimately provide evidence that this blanket treatment of appositives falls short.⁴

It will be helpful at this point to make a distinction between *at-issue* content and *not-at-issue* content. By *at-issue*, we mean content that expresses the main point or main assertion of the utterance, and which is ‘on the table’ and therefore directly addresses a salient question under discussion. By *not-at-issue* content, then, we mean content that expresses a secondary point, which may seem parenthetical, and which does not directly address the question under discussion. We therefore have in mind a pragmatic notion of at-issueness. [See also Simons *et al.* (2010) and Tonhauser (2012).]

One of the now-standard tests for diagnosing at-issueness is attempting to target semantic content by a direct rejection. This rejection may take a variety of forms. [See Tonhauser (2012) and references therein.] For example, in (6), any of B’s rejections to A’s utterance are claimed to be understood to apply to the main clause and not the appositive content.

(6) A: My friend Sophie, a classical violinist, performed a piece by Mozart.

B: That’s not true. / I doubt that. / No way!

It has also been said that since a direct rejection should *only* target at-issue content, a speaker’s only choice for targeting appositives and other supplements (as conventional implicatures) is to use ‘some sort of metalinguistic comment or interruption to the flow of conversation’ (Amaral *et al.* 2007, p. 731; see also Karttunen & Peters 1979; Potts 2005). See, for example, (7), which is a combination of (20) and (21) from Amaral *et al.* (2007).

⁴ Not-at-issue content is also introduced by presupposition triggers (Karttunen & Peters 1979; Simons *et al.* 2010), expressives (Potts 2005, 2007), evidentials (Murray 2010), illustrating that it cuts across various kinds of meanings.

- (7) A: Edna, a fearless leader, started the descent.
 B: # No, that's not true—Edna is not a fearless leader.
 B': Hey, wait a minute—Edna is not a fearless leader. She's a coward!

5 Schlenker (2010) also argues that appositive content should be relatively uncontroversial (either in general or relative to the rest of the utterance). Sarkozy's status as Commander in Chief followed from his being the President of France, so the appositive content in (8a) (with our gloss) is uncontroversial. The news that he just murdered his wife, however,
 10 would be controversial, hence the potential infelicity.

- (8) a. Sarkozy, qui est le chef des armées, vient d'assassiner sa femme.
 Sarkozy who is the chief of.the armies has.just murdered his wife
 15 'Sarkozy, who is the commander in chief, has just murdered his wife'
 b. (#) Sarkozy, qui vient d'assassiner sa femme, est le chef des armées.
 Sarkozy who has.just murdered his wife is the chief of.the armies
 20 'Sarkozy, who has just murdered his wife, is the commander in chief'

Schlenker notes that (8b) becomes better if one is already aware of the appositive content.⁵ Even while expressing not-at-issue content, appositives are also assumed to contribute asserted (or entailed) content (see Bach 1999; Chierchia & McConnell-Ginet 2000), and are therefore often referred to as conventional implicatures, in the sense of Potts (2005), following Grice (1975).
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The fact that appositives are secondary assertions, and can present new material, is highlighted in the following obituary notices, in (9)–(10). Here, the appositive content is certainly not inconsequential and may not already be part of the common ground. However, the purpose of the obituary is to honor the person for their accomplishments and summarize key facts about his/her life, so it is the main clause that
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⁵ As a reviewer points out, this observation may appear to stand in direct conflict with Potts's *anti-backgrounding* requirement, which states that appositive content is discourse-new. If the news that Sarkozy murdered his wife is already shared knowledge, should it not be infelicitous to mention it here? It seems that there are cases where shared knowledge can be presented in the form of an appositive in order to make that information salient in the discourse, and perhaps pertinent to the content presented in the main clause.

reflects this focus and connects the sentence to the information that follows.

(9) Nora Ephron, who has died aged 71, was the Oscar-nominated screenwriter, novelist, essayist, columnist, reporter and celebrity blogger behind *When Harry Met Sally...*⁶

(10) Natasha Richardson, who died on March 18 aged 45 after being injured in a skiing accident in Canada, was born into one of Britain's most powerful thespian dynasties and, although she became a star in her own right, often felt haunted by her pedigree.⁷

Potts (2012) further argues that while appositives are not at issue, they can play a crucial role of contextualizing the at-issue content and providing relevance for the utterance. For example, the appositive in the following utterances in (11) [Potts (2012)'s (39)] will have very different import, potentially resulting in a very different reaction from the hearer (and spatial relationship with the door).

- (11) a. Charlie, a pizza delivery person, is at the door!
 b. Charlie, an infamous axe murderer, is at the door!

Thus, the picture that emerges about appositives based on previous theoretical discussions is that they are generally not at issue and are not controversial, but most likely contribute new and informative content that may interact with the at-issue content contributed by the main clause in interesting ways.⁸

2.3 *The shifting at-issue/not-at-issue status of appositives*

Interestingly, it may be the case that *some* appositives *can* be at issue. Recently, some researchers have argued that the sentential position of the appositive—and of ARCs in particular—may have an effect on the availability of certain quantificational readings (cf. Del Gobbo 2003; Nouwen 2007) and on the information status of appositives (AnderBois *et al.* 2010; Koev 2013). AnderBois *et al.* (2010) observe that while ARCs are typically not open to direct rejection, they may be in some circumstances, as in (12)–(13). They note that it is certainly

⁶ Source: *The Telegraph* online, 27 June 27 2012. <http://www.telegraph.co.uk/news/obituaries/culture-obituaries/film-obituaries/9358820/Nora-Ephron.html> (last accessed 21 June 2014).

⁷ Source: *The Telegraph* online, 19 March 2009. <http://www.telegraph.co.uk/news/celebritynews/5013887/Natasha-Richardson-Obituary.html> (last accessed 21 June 2014).

⁸ See also Frege (1892), for further discussion of the relationship between the appositive and main clause content related to causality.

possible to reject the main clause content, as in the (b) examples, but they point out that it also seems possible to reject the appositive content, as in the (c) examples.

- (12) a. He took care of his husband, who had prostate cancer.
 b. No, he took care of his brother.
 c. No, he had lung cancer.
- (13) a. He told her about Luke, who loved to have his picture taken.
 b. No, he told her about Noah.
 c. No, he didn't like that at all.

Crucially, *AnderBois et al. (2010)* note that this only seems possible when the appositive is clause-final, pointing out that similar examples where the appositive is in sentence-medial position seem degraded [cf. (14)–(15)].

- (14) a. His husband, who had prostate cancer, was being treated at the Dominican Hospital.
 b. ??No, he had lung cancer.
- (15) a. Luke, who loved to have his picture taken, was his son.
 b. ??No, he didn't like that at all.

Supporting their claim through a variety of examples, some culled from corpora, they argue that 'there is a persistent asymmetry between clause-final and clause-medial appositives' with final appositives enjoying a 'broader range of possible interpretations, behaving in many respects as though they were conjunctions rather than true appositives'. Though it is not clear from this story what drives this sentence-medial/sentence-final difference or what predicts whether any given final appositive will have this status, they suggest that sentence-final appositives behave similarly to sentential conjuncts.

Based on these observations, we might hypothesize, then, that manipulating the sentential position of the appositive will give rise to differences in its ability to be targeted by rejection. In fact, we might further hypothesize that there might be an NA/ARC difference: given that ARCs have a more clausal or sentence-like form on the surface, they may more clearly than NAs present a proposition that can be the target of a direct rejection. Providing evidence of such a difference within appositives would help us to identify aspects of structure and surface form that contribute to perceived at-issue status (for example, suggesting that it is important to take into consideration the relative recency of an assertion in determining at-issue status), thereby offering

a more fine-grained picture of the range of meanings, and adjudicate between semantic accounts, to which we now turn.

2.4 *Semantic approaches to appositives*

There are, in broad terms, two main approaches to the semantics of appositives. The first approach views appositives as conjoined with the rest of the sentence (cf. Frege 1892; Böer & Lycan 1976; Rodman 1976; Sells 1985). In its most basic form, the *conjunction* approach predicts that appositives are part of the at-issue proposition contributed by the entire sentence and thus play a crucial role in determining the sentence's (single) truth value. Exemplifying this position, Böer & Lycan (1976) say of the following pair of sentences in (16) that if (16b) is false, then accordingly (16a) is false, too. Thus, (16a) should be truth conditionally equivalent to (17).

- (16) a. Dick, who is an expert on Austin, loves the Bonzo Dog Band.
 b. Dick is an expert on Austin.

(17) Dick is an expert on Austin and loves the Bonzo Dog Band.

AnderBois *et al.* (2010), Murray (2010) and Schlenker (2010, 2013) offer updated versions of the conjunction approach. While these accounts preserve the truth conditional nature of appositives, they also make room for the observation (discussed in the previous section) that appositive content is typically not at issue. AnderBois *et al.* (2010) and Murray (2010) achieve a contrast in information status by making different assumptions about the way main clauses and appositives are interpreted: while main clauses introduce a proposal to update the context which can be rejected and thus are at issue, appositives are 'imposed' on the context with little or no room for negotiation, i.e. are not at issue. We will show that while the core predictions of those more elaborate versions of the conjunction approach are confirmed by our experimental findings, the fact that these accounts treat appositives as lexically specified for not-at-issue status runs counter the possibility that appositives are at issue.

Another view is that appositives contribute secondary propositions, which are independent of the at-issue proposition expressed by the main clause (cf. Berckmans 1994; Bach 1999; Chierchia & McConnell-Ginet 2000; Dever 2001; Potts 2005). According to this multidimensional approach, a sentence with an appositive has two truth values: one contributed by the main clause and one contributed by the appositive. This view places appositives into a separate meaning dimension, thereby predicting that appositives are invariably not at issue and also not part of the

truth conditions of the sentence in which they appear. However, multi-dimensional approaches may leave open the possibility that a truth value is assigned later, at the discourse level. Arguing for a multi-rooted syntactic tree for sentences with appositives, Dever (2001) says of sentences
 5 with false appositives that ‘there is something right and something wrong’ about them, and that we should try to avoid a ‘univocal evaluation’—that is, a conjunction analysis. Multidimensional approaches are largely silent on any possible structural or positional influences on the
 10 at-issue status of appositives, such as those discussed in the previous section, precisely because appositives are in a separate dimension and are invariably not at issue.

Bach (1999) also argues vehemently against a conjunction analysis. However, his conclusion about the ultimate truth value of the sentence is different. Bach claims unambiguously that when evaluating sentences
 15 containing an appositive, although speakers assign the appositive a truth value, they *do not* allow that truth value to figure into the calculation of the truth value of the entire sentence. Of his examples in (18) [his (27) and (28)], he says that speakers would ‘tend to ignore’ the truth value of the secondary proposition expressed by the appositive, and that these
 20 truth values are ‘ignored because they are not prominent to count...the proposition expressed by the main clause is the one whose truth value is intuitively judged to bear on that of the whole utterance’ (pp. 345–346).

- (18) a. Ann’s computer, which she bought in 1992, crashes frequently.
 25 b. Beth’s husband, a plumber, never washes the dishes.

Bach thus makes two main claims about how speakers treat appositives. First, these secondary propositions are *overlooked*, and the truth value is simply calculated based on the truth value of the main clause. Second, when evaluating a sentence containing a false appositive
 30 and a true main clause, speakers are forced into a True/False judgment and are *reluctant* to do so (see in particular p. 47) [a point echoed in Dever (2001)]. Clear predictions derive from these claims, which are not only testable, but which we will show in our experimental work, are falsified.⁹

⁹ A third claim from Bach (which we do not address in our experimental work) surfaces in a footnote on p. 346: ‘the longer or more important the material between the commas, the more one is inclined to regard it as relevant to the truth or falsity of the entire utterance... here the material between the commas is important enough to count toward intuitive assessments of truth or falsity. When it is that important, its failure to hold true seems sufficient for the falsity of the entire utterance.’ We find this claim a bit odd, since what counts as *long* and *important* is relative and will therefore vary from context to context and speaker to speaker. What, then, allows us to predict which appositives will be long or important enough to make the entire utterance false? We leave

3 EXPERIMENT 1

The purpose of Experiment 1 is to confirm previous intuitions voiced in the theoretical literature about the default not-at-issue status of appositives and provide a baseline for participants' relative preference of rejecting appositive content with an indirect rejection, rather than a direct rejection targeting its truth conditional content. As a further baseline, we also investigate participants' rejections of main clauses in order to evaluate their willingness to choose direct rejections when responding to content that is uncontroversially allowed to take on at-issue status. While this experiment is not intended to tease apart the theoretical approaches we outlined in the introduction, it provides systematic experimental data in support of intuitions and corpus data that has been collected concerning the difference between appositive and main clause content, thereby providing an important baseline for the experiments to follow.

3.1 Method

3.1.1 Participants 42 university undergraduates (range: 18–21 years), all native speakers of English, participated. Data from three additional participants were excluded, because the participants indicated that they were not native speakers of English.

3.1.2 Stimuli and procedure Items for all experiments reported in this article were presented on an iMac using SuperLab stimulus presentation software and a response pad in a quiet laboratory setting. Participants wore noise-cancelling headphones and were run one or two at a time at separate, individual response stations. Each experiment lasted approximately 15–20 minutes. All participants were undergraduate students in Linguistics recruited from a participant pool.

Experiment 1 and 2 had a similar design. Stimuli consisted of sets of sentences representing a brief dialogue between two speakers (A and B). Each item had the same structure: speaker A delivered an utterance, then B responded with a rejection, as in (19). In Experiment 1, for any given item, B rejected *either* the appositive content (a) *or* the main clause content (b). In each case, participants were given a forced choice between two forms of a rejection: either a direct rejection (B1) or an indirect rejection (B2).

this particular point aside, but note that it could be an interesting avenue for future research on appositives.

(19) A: My friend Sophie, a classical violinist, performed a piece by Mozart.

a. rejection of appositive content

B1: That's not true. Sophie isn't a classical violinist. (direct)

B2: Hey, wait a minute. Sophie isn't a classical violinist. (indirect)

b. rejection of main clause content

B1: That's not true. She didn't perform a piece by Mozart. (direct)

B2: Hey, wait a minute. She didn't perform a piece by Mozart. (indirect)

Based on previous claims in the literature (cf. Chierchia & McConnell-Ginet 2000; Potts 2005; Amaral *et al.* 2007; Beaver *et al.* 2009), we predicted that participants would largely prefer an indirect rejection of appositive content over a direct rejection [i.e. B2 v. B1 in (19) for (a)], and that the percentage of 'That's not true' rejections would be higher for main clause content than for appositive content.

Because NAs and ARCs are often referred to interchangeably in the literature on appositives, we sought to determine whether or not the form of the appositive mattered. We hypothesized that ARCs, which contain whole clauses and thus are more likely to make independent claims than NAs, may be an easier target for a direct rejection. Second, we teased apart ARC aspect, and compared 'eventive' to 'stative' ARCs. Attention to this variable was motivated by observations along the lines of Potts (2005), who refers to NAs as being 'reminiscent of predicative copular clauses with individual-denoting subjects' (p. 131). ARCs can also predicate of the anchor in similar ways [e.g. *Lance, (who is) a cyclist, ...*], allowing NAs and ARCs to be 'stative'. However, ARCs can also be eventive (e.g. *Lance, who won the Tour de France, ...*), whereas NAs cannot be. We sought to determine whether ARC aspect could play a role in the ability of the appositive to be targeted for rejection.

Finally, given the ongoing discussion in the literature about the possibility of the sentence-medial v. sentence-final distinction playing a role in an appositive's at-issue status (cf. Cornilescu 1981; Del Gobbo 2003; Nouwen 2007; AnderBois *et al.* 2010), we also manipulated the sentential position of both NAs and ARCs. It has been claimed that sentence-final appositives can become at issue. If this is the case, then sentence-final appositives might be more likely to receive a 'That's not true' rejection—even if the majority of the time, the rejection of choice is 'Hey, wait a minute'. The flip side of this prediction is that we

predict that sentence-medial NAs will exhibit the lowest percentage of ‘That’s not true’ rejections.

Each test sentence underwent six permutations, for the purpose of manipulating three main target variables: appositive type (NA v. ARC),
5 sentential position of the appositive (medial v. final) and ARC aspect (stative v. eventive). An example set is presented in [Table 1](#).

12 such sets of test items were generated and distributed among six lists in a Latin square fashion, yielding a total of 72 test items, each of which then had the appositive and main clause targeted for rejection
10 (with only one version shown to each participant). Each participant was assigned to one of the six lists and shown 12 test items (12 different sentence exemplars, including two of each sentence type) and 30 control items, in pseudorandomized order, for a total of 42 items per participant. Of the 12 test items, participants were presented with six in
15 which the appositive was targeted, and six in which the main clause was targeted, each of the six being a different sentence type.

Control items were constructed to vary the most natural choice of B’s rejection within the experiment (B1 or B2), and to ensure that participants were sensitive to semantic and pragmatic factors relevant to the issue.
20 There were five types of control items: matrix sentences with a factive verb and a false complement clause (three *discover*, three *learn*); sentences with a singular definite DP subject with failure of presupposition of existence; sentences with a scalar implicature arising from the assertion of a
25 weaker term on the scale (gradable adjective, adverbial modifier of certainty or probability, *begin*, number word); conjunction with one conjunct targeted for rejection; and a simple clause. The full set of stimuli is included in the Appendix. (see [Supplementary Material](#).) Correct responses were counterbalanced between B1 and B2 responses throughout
30 the experiment.

The experimental session began with a brief training session in which participants were introduced to the experimental task, using practice items that did not contain appositives. Participants were told that ‘Person A will deliver a statement, and then Person B will attempt to reject it’, and given practice with non-target items. These items were
35 recorded by two speakers with natural intonation, to reinforce the idea that speakers A and B were having a dialogue, and that B was rejecting something about A’s utterance. However, there was no sound in the actual test session, and participants were made aware of this at the end of the training session.

40 **3.1.3 Results** Our dependent measure was the percentage of ‘Hey, wait a minute’ (v. ‘That’s not true’) responses chosen for each clause

Type	Position	ARC aspect	Sentence (appositive underlined)
NA	Medial	N/A	My friend Sophie, <u>a classical violinist</u> , performed a piece by Mozart.
ARC	Medial	Stative	My friend Sophie, <u>who is a classical violinist</u> , performed a piece by Mozart.
ARC	Medial	Eventive	My friend Sophie, <u>who performed a piece by Mozart</u> , is a classical violinist.
NA	Final	N/A	The symphony hired my friend Sophie, <u>a classical violinist</u> .
ARC	Final	Stative	The symphony hired my friend Sophie, <u>who is a classical violinist</u> .
ARC	Final	Eventive	The symphony hired my friend Sophie, <u>who performed a piece by Mozart</u> .

Table 1 Example of six permutations of one test sentence from Experiments 1 and 2, generated by manipulating three variables (appositive type, sentential position of appositive, and ARC aspect)

type (appositive and main clause). Given the binary nature of the responses and the within-subject design, a series of pairwise two-tailed comparisons were conducted (Wilcoxon signed-rank for correlated samples and Mann-Whitney for non-matched samples). Our results revealed the following. Participants were (a) more willing to choose a ‘Hey, wait a minute’ response for appositives than a ‘That’s not true’ response (77% v. 23%) (significance from chance level of $P=0.5$: $t(41) = 6.94$, $P < 0.0001$), and (b) less willing to choose a ‘That’s not true’ for appositives than for main clauses ($W = 5056$, $z = 6.08$, $P < 0.0001$). As a point of comparison, we note that for one group of control sentences—those with a factive verb with a false embedded complement clause to which participants were also asked to choose between ‘Hey, wait a minute’ and ‘That’s not true’, participants chose ‘Hey, wait a minute’ 70% of the time.

We then further analyzed the effect of the variables that we manipulated on the responses to the appositives to determine whether any of these variables had an effect on the responses directed at the appositive content. There was no overall effect of appositive type (i.e. NA v. ARC) ($U_A = 6510$, $z = 1$, $P = 0.32$), position ($W = 0$, $z = 0$, $P = 1.0$), or aspect (i.e. stative v. eventive) ($W = 98$, $z = 1.17$, $P = 0.24$). All other comparisons within these categories were also not significant. Thus, when asked to choose between a ‘Hey, wait a minute’ and a ‘That’s not true’ rejection, participants were pulled strongly towards the former for appositives. However, they also allowed a ‘Hey, wait a minute’ response to target the main clause approximately half of the time (54.4%), a point we return to in the discussion section that follows. This pattern is captured in Figure 1.

3.1.4 Discussion The results of this experiment demonstrate that participants differentiate between appositive and main clause content: given the choice between a ‘Hey, wait a minute’ and a ‘That’s not true’

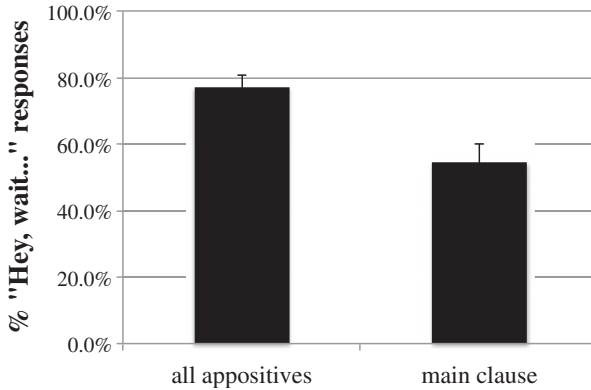


Figure 1 Percentage of ‘Hey, wait a minute’ responses in Experiment 1 targeting appositive or main clause content, collapsing over all appositive types.

rejection, they overwhelmingly choose ‘Hey, wait a minute’ to reject appositive content. If we take the two responses as differing in the kind of information they tap into, and specifically if we treat a ‘That’s not true’ response as picking up on at-issue content (because it is a direct rejection), then these findings may reflect the fact that participants did not see the appositive as what was at issue in the utterance. These results, predicted by most—if not all—of the previous theoretical approaches, allow us to situate the results of our subsequent experiments against this uncontroversial backdrop.

It may seem noteworthy that participants chose the ‘Hey, wait a minute’ response so often to reject main clause content. If this response should be interpreted as testing for presupposed or, more generally, not-at-issue content (cf. Shanon 1976; von Stechow 2004), then why did we observe such a high percentage for main clauses? As others have pointed out, however, it is not safe to assume that the ‘Hey, wait a minute’ test is a diagnostic for (pragmatically) presupposed content. In fact, this response can target content that is presumably at issue for a variety of reasons (cf. Potts 2008; Pearson 2010; Roberts Ms; Smith & Currie Hall 2011; Tonhauser *et al.* 2013). For example, this type of response may be seen as a softened way of voicing a rejection to a conversational partner and indicating speaker’s surprise. Moreover, Potts (2008), points out there are various implementations of the ‘Hey, wait a minute’ test which could deliver different results [see footnote 1 in Potts (2008) for references]. Thus, in this experiment, it is quite possible that participants chose ‘Hey, wait a minute’ over ‘That’s not true’ to reject the main clause content for reasons that have nothing to do with the distinction between at-issue and not-at-issue content. Thus, while the

findings from this experiment confirm a well-attested difference between appositive and main clause content, the high percentage of ‘Hey, wait a minute’ responses to the main clause content does not allow us to tease apart at-issue from not-at-issue content. To do this, we conducted Experiment 2.

4 EXPERIMENT 2

In Experiment 2, we restricted our attention to direct rejections of the form ‘No . . .’, asking participants to choose between the appositive and the main clause when B offered a direct rejection to A’s utterance. This experiment therefore allowed us to probe participants’ willingness to directly reject the content of the appositive, guided by a common assumption that direct rejections target at-issue content (Amaral *et al.* 2007; Beaver *et al.* 2009; AnderBois *et al.* 2010; Xue & Onea 2011; Tonhauser 2012; Koev 2013; see also Cummins *et al.* 2012). Thus, we predicted that if direct rejections target at-issue content, and if appositives invariably provide not-at-issue content, then participants who are given the choice of a direct rejection targeting either the main clause or the appositive should be more likely to choose the main clause as the target. Here, too, we wished to determine whether manipulations of appositive form and content could alter participants’ willingness to target appositive content with a direct rejection.

4.1 Method

4.1.1 *Participants* 38 undergraduates (range: 18–25 years) participated. One additional participant participated, but was excluded from analysis because of native language status.

4.1.2 *Stimuli and procedure* Experiment 2 had a structure similar to that of Experiment 1, included the same number and distribution of items. However, there were three notable differences between Experiments 1 and 2. First, in Experiment 2, we sought to reinforce the difference between the appositive and main clause as distinct parts of A’s utterance. We therefore prerecorded A’s utterances so that they had the typical ‘parenthetical’ feel of an appositive, accomplished with ‘comma’ intonation (cf. Selkirk 1984, 2005; Nespor & Vogel 1986; Potts 2005; Dehé 2009).¹⁰ These sound files were paired with sentences presented on the screen.

¹⁰ Sound files were recorded, sliced and edited for intensity by a native speaker of English (the first author).

Second, in this experiment, B's response *always* took the form of a direct rejection ('No...'), and participants chose whether this direct rejection targeted the appositive or main clause content. Recall that in Experiment 1, participants were asked to choose the best form of B's rejection, given that it targeted either the appositive or the main clause. In Experiment 2, participants were asked to associate the direct 'No' rejection with *either* the appositive or the main clause. Thus, given that in this task, participants were asked to choose between the appositive and the main clause as targets of a direct rejection, their willingness to choose the appositive as the target (as opposed to the main clause competitor) should be taken as strong evidence that an appositive *can* be the target of a direct rejection, and therefore may assert at-issue content.

Third, in order to make it clear which part of A's utterance B's rejection was targeting, we made minimal changes to A's utterances from Experiment 1. Specifically, we ensured that two clauses in A's utterance differed with respect to auxiliary verb (in the case of medial appositives, where the subject of the main clause was also the nominal anchor for the appositive) [cf. (20)–(21)] and/or number marking on the subject (in the case of final appositives, where the nominal anchor of the appositive was the object of the sentence, and therefore different from the main clause subject) [cf. (22)–(23)].

(20) A: My friend Sophie, a classical violinist, performed a piece by Mozart.

B1: No, she's not. (target: appositive)

B2: No, she didn't. (target: main clause)

(21) A: My friend Sophie, who performed a piece by Mozart, is a classical violinist.

B1: No, she's not. (target: main clause)

B2: No, she didn't. (target: appositive)

(22) A: The symphony hired my friend Sophie, a classical violinist.

B1: No, she's not. (target: appositive)

B2: No, they didn't. (target: main clause)

(23) A: The symphony hired my friend Sophie, who performed a piece by Mozart.

B1: No, she didn't. (target: appositive)

B2: No, they didn't. (target: main clause)

The ordering of the rejection targeting the appositive in B1 and B2 was counterbalanced throughout the experiment.

4.1.3 *Results* The dependent measure for this experiment was the percentage of ‘No’ responses targeting the appositive or main clause. We began by comparing the percentage of time a ‘No’ response was chosen to target the appositive, as opposed to the main clause. If both the appositive and main clause were on par with asserting at-issue content, participants would have been at chance when choosing the target of the direct rejection. However, as expected, participants strongly preferred for the direct ‘No’ rejection to target the main clause, rather than the appositive (73.9% v. 26.1%, respectively) and the percentage of direct rejections targeting the appositive were well below chance (binomial probability difference from chance, where chance = 0.5: z -ratio = 10.16, $P < 0.0001$). These results complement those of Experiment 1 by demonstrating that participants recognized the two parts of the utterance as presenting different content. If we take a direct ‘No’ rejection as addressing at-issue content, we can conclude from these findings that participants displaying an overwhelming preference for the main clause, and not the appositive, to present the content that was at issue in the utterance.

That said, in spite of the fact that participants generally perceived the appositive content as not at issue, there was an effect of appositive form and position. As in the previous experiment, we conducted a series of planned pairwise comparisons comparing the variables manipulated within the appositive clause to determine if these variables had an effect on whether the appositive was seen as at issue or not by participants. The percentage of ‘No’ responses for the four main appositive types and main clauses presented in Figure 2.

While there was no *overall* difference between the two appositive types (NA v. ARC) ($U_A = 24\,776$, $z = -1.26$, $P = 0.21$), there *was* a significant effect of medial v. final appositive position ($W = 862$, $z = 2.37$, $P < 0.05$). Within this distinction, there was a significant difference between medial and final ARCs ($W = 471$, $z = 2.21$, $P < 0.05$), with final ARCs more likely to be directly rejected, but there was no difference between medial and final NAs ($W = 55$, $z = 0.88$, $P = 0.38$). Moreover, there was a significant difference between medial NAs and both types of final ARCs (stative: $W = 106$, $z = 2.73$, $P < 0.01$; eventive: $W = 96$, $z = 2.08$, $P < 0.05$), and between medial stative ARCs and both types of final ARCs (stative: $W = 168$, $z = 2.25$, $P < 0.05$; eventive: $W = 101$, $z = 2.02$, $P < 0.05$). There was no overall difference in ARC aspect (i.e. stative v. eventive) ($W = 79$, $z = 0.49$, $P = 0.62$). Thus, sentence-final ARCs were significantly more likely than any other

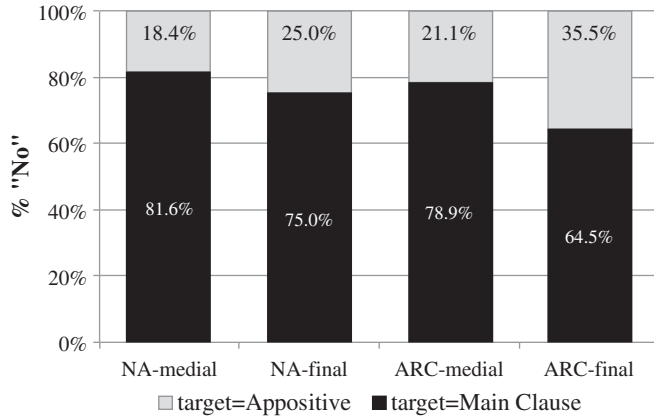


Figure 2 Percentage of ‘No’ responses in Experiment 2 to either the appositive (light bars) or the main clause (dark bars), depending on the four main classifications (NA v. ARC, medial v. final).

appositive to be the target of a direct ‘No’ rejection, approximately a third of the time, regardless of their aspect.¹¹

4.1.4 *Discussion* The results of Experiment 2 revealed that while participants largely resisted a ‘No’ rejection targeting the appositive, there was a striking effect of appositive type and position, with the highest percentage of ‘No’ rejections to appositives surfacing for final ARCs. While these percentages were still below those for ‘No’ rejections targeting the main clause (which averaged 73.9%), they were still higher than what might have been expected if appositives could *never* be the target of a direct rejection and could *never* be at issue.

Moreover, it is rather striking that when participants did choose the appositive as the target of the direct rejection, they did so precisely when they *could have* chosen the main clause instead. Thus, the 30+% of ‘No’ rejections aimed at appositives reflect participants opting to directly reject the appositive, and *not* the main clause. Because previous researchers did not tease apart or systematically manipulate the variables that we manipulated, they were not in a position to uncover the effects of appositive type or position that we uncovered. This experiment thus allowed us to reveal that although appositives are largely not at issue, they *can*, in fact, contribute at-issue content—even when participants are

¹¹ A reviewer asks if we should not predict a bigger difference between the sentence-final ARCs and NAs. We suspect there is not more of a difference because the ARC was pitted against the main clause as the target of the rejection, thereby suppressing the extent to which the sentence-final ARC was perceived as a viable candidate.

given the choice between targeting the appositive or the main clause. Moreover, not all appositives are equal in this regard: final ARCs are the most likely candidates to adopt this status. Having shown that sentence-final ARCs can be the target of a direct rejection, we believe we have

reason to think that these appositives may take on at-issue status, provided we assume that being the target of a direct rejection is one of the main diagnostics for being at issue. (See, for example, [Tonhauser 2012](#).)

Given this pattern of results, we considered the following idea: if a speaker delivers an utterance that makes multiple assertions—one of which is in the ARC and the other of which is in the main clause, then whatever process underlies the effect of position seen with direct rejections should also be sensitive to the position of the ARC for other diagnostics of at-issueness. To pursue this idea, we turned to cases of ellipsis in which an antecedent occurs across sentence boundaries.

(24) **Main Assertion Hypothesis**

Other things equal, comprehenders prefer to relate material in a new sentence to the main assertion in the preceding sentence.

Thus, while the syntactic processor favors more recent material within the sentence and low structural attachments, across sentence boundaries, it is the information structure that matters. The *discourse* processor—and not the *syntactic* processor—favors relations implicating the main assertion of the previous sentence. Thus, given the difference in (25) (their (18) from their Experiment 4), participants in their studies who were asked *What did Mary do?* were more likely to target the embedded clause of the first sentence (*went to Europe*) as the VP antecedent for conjoined sentences than they were for separate sentences (60% v. 45%).

(25) a. Clauses conjoined in a single sentence

John said that Fred went to Europe and Mary did too.

b. Clauses separated by a sentence boundary

John said that Fred went to Europe. Mary did too.

Furthermore, in [Frazier & Clifton \(2005\)](#)'s Experiment 6, participants resolving VP ellipsis were likely to find a suitable VP antecedent in the matrix clause of sentences that had both a matrix and a subordinate clause. For example, when asked *What happened?* after the following sentences, they answered the question by supplying information from the matrix clause over 70% of the time, regardless of the relative matrix-subordinate clause order.

- (26) a. Main clause followed by subordinate ‘after’ clause
 Mary laughed after she made a joke about the supervisor. /
 Then Tina did too.
- b. Main clause following subordinate ‘after’ clause
 5 After Mary laughed, she made a joke about the supervisor. /
 Then Tina did too.

Although Frazier and Clifton did not investigate appositive sentences, we hypothesized that the same process would be at work in these cases. Specifically, we hypothesized that if ARCs can be perceived competing
 10 with the main clause for at-issue status, and if sentential position matters, then participants will allow the assertion expressed by a sentence-final ARC to serve as the antecedent for subsequent ellipsis.¹²

In fact, the Main Assertion Hypothesis is applicable to the results of Experiment 2. Recall that the ‘No’ response choices both involved
 15 ellipsis. In choosing between the two direct rejections, participants were presumably choosing the response whose antecedent expressed the main assertion. To the extent that participants were willing to allow a direct rejection to target an ARC, *and* were identifying the ARC content as the antecedent to resolve the VP ellipsis, it seems
 20 that they saw the ARC as expressing the main assertion, and therefore the at-issue content. In Experiment 3, we sought to provide further evidence for the ARC’s ability to take on at-issue status (and positional effects when doing so) in cases where the ARC is not being directly rejected, but is providing an antecedent for ellipsis.

25 5 EXPERIMENT 3

5.1 *Method*

5.1.1 *Participants* 48 undergraduates (range: 18–27 years) participated. Three additional participants were excluded because of non-native English status.

30 5.1.2 *Stimuli and procedure* There were 10 test items and 10 control items, for a total of 20 items in the experimental session. Both test and control items had the same structure. Each began with a brief description of a scenario, ending with a target sentence. The target sentence always involved a main clause and another clause. For the test items, the
 35 target sentence had a main clause and an ARC. The target sentence of

¹² We thank David Beaver for discussions that led us on the path to this research. A related observation is made in Potts (2012).

the control items involved a main clause and a subordinate complement clause (e.g. *David found out that his dad got a speeding ticket*) or an adverbial phrase (e.g. *After washing the dishes, Marjorie made the cookie batter*).

Two versions of each test item were created: one in which the apposition in the target sentence was sentence-medial (n = 5), and one in which it was sentence-final (n = 5). Participants saw only one version of each sentence, for a total of 10 test sentences. An example of one test item is included in (27).

(27) Target sentence following a sample test item scenario

a. Sentence-Final Appositive

The ‘All Stars’ Dance Company has chosen to audition Chloe, who decided to dress in a classical ballet style.

b. Sentence-Medial Appositive

Chloe, who decided to dress in a classical ballet style, has been chosen to audition for the ‘All Stars’ Dance Company.

The scenario and target sentence was then followed by a one-word question, and a choice between two possible answers, as in (28). The question for the test items was always, *Why?* The question for the control items was, *How?* (n = 4), *When?* (n = 4) or *Where?* (n = 2).

(28) Choices for answer to *Why?* question

a. Main clause target

Because they think Chloe could be a good addition to their company

b. Appositive target

Because she wants to be taken seriously as a classical ballet dancer

Test and control items were pseudo-randomized, with the order of presentation counterbalanced across participants. The full set of stimuli is included in the Appendix (see [Supplementary Material](#)).

If the main clause always carries the main assertion of the target sentence, then participants should overwhelmingly prefer the main clause as the source of the answer to the elliptical question. However, with the test items, assuming that the ‘non-*why*’ portion of the test question is treated as a presupposition [following [Lawler \(1971\)](#) and [Tomioka \(2009\)](#)], then both the ARC and the main clause should be candidates for antecedent status, if both propositions have been accepted. We further predicted an ordering effect, such that answers targeting the ARC should be more likely to be chosen when the ARC is sentence-final than when the ARC is sentence-medial. Given the examples provided above,

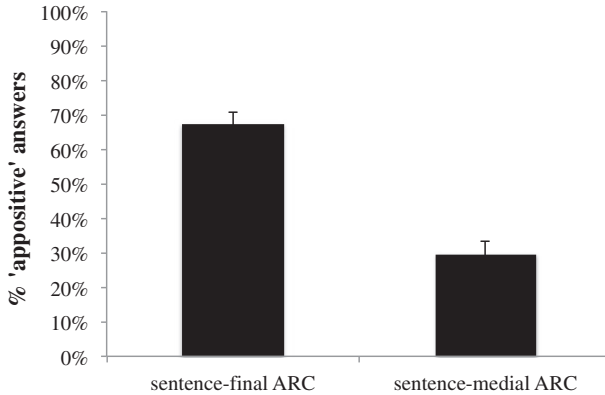


Figure 3 Percentage of responses in Experiment 3 targeting appositive content in the target sentence, depending on ARC position in the sentence (final or medial).

participants presented with a sentence with a final appositive [(a) in (27)] should be more likely to choose the (b) response in (28) than when presented with one with a medial appositive [(b) in (27)]

5.1.3 *Results* Not surprisingly, for the control items, participants overwhelmingly chose an answer targeting the main clause, regardless of the control item type (an average of 81.9% answers targeting the main clause vs. 18.1% answers targeting the subordinate clause). But their responses to the test sentences with ARCs differed dramatically. On average, 51.7% of the responses addressed the main clause content, and 48.3% addressed the appositive content. Thus, participants perceived *both* the main clause and the appositives as possible continuations of the salient *Why?* question, and approximately equally. However, their willingness to select the answer targeting the appositive content varied based on the ARC's sentential position, as shown in Figure 3. The answer linked to the ARC was chosen 67.1% of the time when it was sentence final, and only 29.6% of the time when it was sentence medial ($U_A = 1943$, $z = -5.79$, $P < 0.0001$).

5.1.4 *Discussion* Our results demonstrate that an ARC can provide the main assertion of the sentence, and can compete with the main clause content for this status in a forced-choice task, *but* its position in the sentence matters. ARCs in sentence-final position are significantly more likely to adopt this status. If we assume with Frazier & Clifton (2005) that the discourse processor resolves ellipsis in a sentence by looking back to the previous sentence for the main assertion (or, the at-issue material), then both the sentence-final ARC and the main

clause are perceived as candidates for the antecedent. Note that in this task and in Experiment 2, participants were given a choice between the main clause and the appositive, and we took their choice to signal which of the two was the preferred at-issue assertion. This leaves the door open to the possibility that when they chose the sentence-final ARC, the main clause could also be at issue (although it could be seen as ‘not at issue’ in the sense that the discourse has progressed).

In the first set of experiments, our goal was to address the information status of appositive content—and specifically to probe whether appositives can present at-issue content (as seen in their ability to be the target of a direct rejection or supply the assertion that is associated with a simple *why*-question). In the next set of experiments, we probe the contribution of appositives to the truth conditions of the sentences in which they appear.

6 EXPERIMENT 4

6.1 Method

6.1.1 *Participants* 60 undergraduates (range: 18–25 years) participated. Three additional participants were excluded because of non-native English status. One additional participant was also excluded, because his/her responses and post-experiment debriefing indicated that this participant did not take the study seriously.

6.1.2 *Stimuli* Participants were presented with a series of sentences, and asked to render a judgment for each one. Each test sentence contained an appositive. The truth values of the appositive and main clause were manipulated, giving rise to all four possible truth value combinations for each sentence (True–True, True–False, False–True, False–False). As in the previous experiments, we also manipulated the medial/final position of the false appositive. Finally, we manipulated the type of false content in the appositive, given claims in the literature that appositive content should not be given but cannot be too controversial (cf. Chierchia & McConnell-Ginet 2000; Potts 2005; Schlenker 2010, 2013). We therefore had sentences in which the appositive was merely false, and others in which the false content might be seen as charged or inflammatory (e.g. claiming that a public figure harbors terrorists or is a convicted murderer).

An example of the permutations of one test sentence based on these variables is presented in Table 2.

There were 10 such sets of test sentences, resulting in a total of 60 test sentences. Sentences were then distributed among 10 participant lists

TV combination	Position	sentence (appositive underlined)
$\langle T_{MC}, T_{APP} \rangle$	Medial	Australia, <u>which is a continent</u> , is in the Southern hemisphere.
$\langle T_{MC}, F_{APP-MED} \rangle$	Medial	Australia, <u>which is a planet</u> , is in the Southern hemisphere.
$\langle T_{MC}, F_{APP-MED-!} \rangle$	Medial	Australia, <u>which is part of the Axis of Evil</u> , is in the Southern hemisphere.
$\langle T_{MC}, F_{APP-FIN} \rangle$	Final	There is a continent named Australia, <u>which is in the Northern hemisphere</u> .
$\langle F_{MC}, T_{APP} \rangle$	Medial	Australia, <u>which is a continent</u> , is in the Northern hemisphere.
$\langle F_{MC}, F_{APP} \rangle$	Medial	Australia, <u>which is a planet</u> , is in the Northern hemisphere.

Table 2 Example of six permutations of one test sentence from Experiment 4, generated by manipulating the truth value of the appositive and main clause (T/F), the position of the false appositive (MED/FIN), and the false status of the medial appositive (MED/MED-!)

in a Latin square fashion such that each participant saw each type of sentence based on truth values and appositive position, but only one sentence from each set.

Before running the study proper, we ran a separate norming study to ensure that the content was common knowledge and undergraduates could readily assign the correct truth value to the propositions expressed by the appositives and main clauses. The individual sentences were pseudorandomized, and distributed into 10 separate lists. These lists were then distributed to a separate group of undergraduates (approximately 20 students per list). Where students indicated uncertainty or assigned the opposite truth value from what had been anticipated, we adjusted the sentences accordingly in order to work with clear-cut cases.¹³

The experimental session included 10 test items and 29 control items, all pseudorandomized for sentence type and the expected truth value judgment. There were four types of control items: sentences that were easily judged True or False [cf. (29), n = 6]; sentences with obscure facts that were not easily judged True or False [cf. (30), n = 6]; T/F sentences with an adverbial clause and a comma (intended to resemble sentences with an appositive on the surface) [cf. (31), n = 6]; and 11 non-T/F sentences that asked participants to choose the correct response in order to fill in the blank with content [cf. (32)] (intended to help participants maintain their attention during the session and direct them to focus on the content of the sentences).

¹³ For example, we settled on the proposition *Gay marriage is not legalized by the federal government* in place of *Gay marriage is not recognized by the federal government*, because some students appeared to interpret *recognize* as meaning *acknowledge the existence of*. Likewise, we used the proposition *Harry Potter went to Hogwarts* instead of saying he was *a student* at Hogwarts, because some Harry Potter fans objected to the latter, citing the events that unfolded later in the Harry Potter series, when Harry Potter had left the school.

(29) Spiders have eight legs.

(30) Ratanakiri is a province in northeastern Cambodia.

(31) Twice a year, the U.S. President delivers speeches in Yiddish.

(32) Fish breathe with ____.

- a. gills
- b. lungs

The full set of stimuli is included in the Appendix. (see [Supplementary Material](#).)

6.1.3 *Procedure* The experimental session was preceded by a brief training session, during which participants were acclimated to the experimental procedure. They were shown a series of practice sentences and asked to judge the truth of the sentences, and assess their confidence in their judgment. During the training session, they became accustomed to the following scale:

(33) Rating Scale

- 1: I am NOT AT ALL confident in my answer.
- 2: I am only A LITTLE BIT confident in my answer.
- 3: I am SOMEWHAT confident in my answer.
- 4: I am VERY confident in my answer.
- 5: I am EXTREMELY confident in my answer.

Participants were also trained on the use of the response pad, which had a row of seven clearly-labeled buttons. The first two buttons were used to report T or F, or A or B, respectively (the choice of which depended on the type of question), while the five buttons to the right were used for the confidence rating.

During the test session, participants were shown each sentence towards the top of the screen, with T and F towards the bottom, and were asked to judge the sentence as True or False (or select A or B, with fill-in-the-blank controls, which had the two choices listed below the target sentence). They then proceeded to the next screen, where they were asked to rate their confidence in their response on a scale of 1–5. The time it took to register a confidence rating was recorded. A schema for this procedure is presented in [Figure 4](#).

6.1.4 *Predictions* When the truth values of the main clause and appositive are both the same (either both True $\langle T_{MC}, T_{APP} \rangle$, or both False $\langle F_{MC}, F_{APP} \rangle$), it is not possible to determine whether the truth values are being combined (to render a true or a false judgment, respectively), or

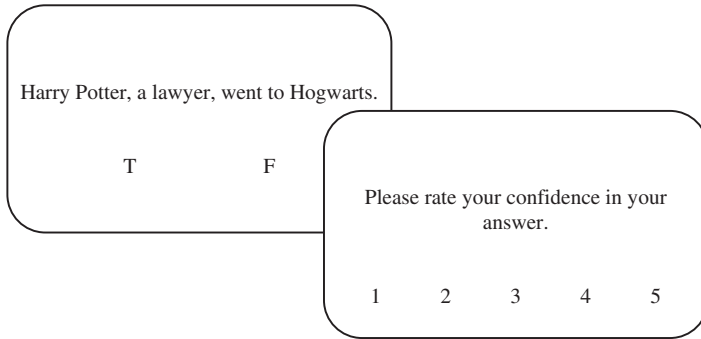


Figure 4 Two sequential computer screens, corresponding to two parts of each trial in Experiment 4 (sentence and truth value judgment, followed by self-assessed confidence rating).

whether participants are disregarding the appositive and basing their decision solely on the main clause. The most interesting cases are therefore the ones in which the truth values of the appositive and main clause are at odds. When the main clause is false and the appositive true ($\langle F_{MC}, T_{APP} \rangle$ sentences), we find it unlikely that a true appositive should be able to salvage the truth of the entire sentence, and predict that the entire sentence will be judged false, since the falsity of the main clause trumps all else. We therefore zero in on the cases where the main clause is true and the appositive is false (the three $\langle T_{MC}, F_{APP} \rangle$ sentences).

Given the results from the previous experiments and the claims in the literature about the secondary status of appositives, three distinct possibilities arise. The first possibility is that sentences with appositives are simply treated similarly to conjunctions with respect to truth conditions, as illustrated in Table 3 (cf. Frege 1892; Boër & Lycan 1976; Rodman 1976; Sells 1985; Kamp & Reyle 1993). If so, then any mismatch in truth values between the appositive and main clause will result in a judgment of False for the entire sentence. Thus, for both $\langle F_{MC}, T_{APP} \rangle$ and $\langle T_{MC}, F_{APP} \rangle$ sentences, participants should render judgments of False. Moreover, if they are performing calculations based on the logic of conjunction, they should exhibit high confidence ratings.

The second possibility is that because appositives are largely seen as not at issue—and because they have been claimed to have a parenthetical status syntactically and semantically—participants may simply see them as *not* contributing to the truth conditions at all. In this case, participants may simply disregard the truth value of the appositive and focus solely on the truth value of the main clause in order to assign a truth value to the entire utterance (cf. Bach 1999). However, building on discussion in Schlenker (2013), we hypothesized that it may be

$p_1 \wedge p_2$	truth value
$1 \wedge 1$	1
$1 \wedge 0$	0
$0 \wedge 1$	0
$0 \wedge 0$	0

Table 3 Classical truth condition table for conjunction of two propositions

harder to disregard the truth value of a charged/inflammatory appositive (the $\langle T_{MC}, F_{APP-MED-!} \rangle$ sentences), since it may be more difficult to overlook the falsity of such content. For these sentences, it is possible that the appositive does become at issue by nature of the proposition it expresses, giving rise to a truth value clash that results in a conjunctive pattern, or that it has the opposite effect—namely, that the content is so clearly false that it is overlooked in favor of the at-issue main clause.

The third possibility is a variation of the second: in spite of a general tendency to disregard the truth value of the appositive, there may be an effect of appositive position, as there was in Experiments 2 and 3 (cf. Schlenker 2013; AnderBois *et al.* 2010). Since the content of final ARCs are more likely than medial ARCs to be considered at issue, these appositives may also be more likely than medial ARCs to interact with main clause content for the calculation of the truth value of the entire utterance.

6.1.5 Results The results for the test items are presented in Table 4. Results for the control items are presented in Table 5.

The $\langle T_{MC}, T_{APP} \rangle$ combination stands apart from all other combinations: it is only when both the appositive and the main clause are *both* true that the entire sentence is robustly assigned a truth value of True. *All other combinations* display extremely low percentage of True responses. Not surprisingly, this pattern is supported by pairwise comparisons between $\langle T_{MC}, T_{APP} \rangle$ sentences and all other sentence types ($\langle T_{MC}, F_{APP-MED} \rangle$: $W = 3916$, $z = 8.15$, $P < 0.0001$; $\langle T_{MC}, F_{APP-MED-!} \rangle$: $W = 3315$, $z = 7.39$, $P < 0.0001$; $\langle T_{MC}, F_{APP-FIN} \rangle$: $W = 4278$, $z = 8.33$, $P < 0.0001$; $\langle F_{MC}, T_{APP} \rangle$: $W = 4186$, $z = 8.28$, $P < 0.0001$; $\langle F_{MC}, F_{APP} \rangle$: $W = 4371$, $z = 8.37$, $P < 0.0001$). Thus, whenever the appositive is false, participants treat the entire sentence as false.

It is somewhat surprising that the $\langle T_{MC}, F_{APP-MED-!} \rangle$ sentences received a higher percentage of true ratings than any of the other sentences besides $\langle T_{MC}, T_{APP} \rangle$. Indeed, while other pairwise comparisons were not significant, this sentence received a higher percentage of True

TV combination	% True	Average CR	Time to provide CR (ms)
$\langle T_{MC}, T_{APP} \rangle$	94.0%	4.7	5606.81
* $\langle T_{MC}, F_{APP-MED} \rangle$	6.0%	4.8	6281.20
* $\langle T_{MC}, F_{APP-MED-!} \rangle$	16.0%	4.6	7045.11
* $\langle T_{MC}, F_{APP-FIN} \rangle$	2.0%	4.9	6102.26
$\langle F_{MC}, T_{APP} \rangle$	3.0%	4.9	5801.85
$\langle F_{MC}, F_{APP} \rangle$	1.0%	5.0	5122.31

^aTimes over 15 000 ms were excluded from all analyses. These data points accounted for under 5% of the total reaction time data. Exclusion of times over 10ms would have resulted in exclusion of almost 14% of the data, but would have yielded a highly similar pattern and comparable times, with the lowest times deriving from $\langle T_{MC}, T_{APP} \rangle$ and $\langle F_{MC}, F_{APP} \rangle$ sentences, and the highest from $\langle T_{MC}, F_{APP-MED-!} \rangle$ sentences.

Table 4 Results for each of the truth value combinations in the test items in Experiment 4, including percentage of true responses, average confidence rating (CR) on a scale of 1–5, and the time to provide a confidence rating.^a Key truth value combinations (true main clause and false appositive) are indicated with a ‘*’

Control type	% correct	Average CR
Unclear T/F	45.3%	2.2
Clear T/F	93.3%	4.6
Non-T/F	98.2%	4.8
T/F adverbials	97.8%	4.8

Table 5 Results for the four control item types in Experiment 3, including percentage of true responses and average confidence rating (CR) on a scale of 1–5

ratings than either $\langle T_{MC}, F_{APP-MED} \rangle$ or $\langle T_{MC}, F_{APP-FIN} \rangle$ ($W = 105$, $z = 1.95$, $P = 0.05$ and $W = 133$, $z = 2.89$, $P < 0.01$, respectively). It is possible that for these sentences, what we considered above occurred occasionally: participants overlooked the clearly false appositive content and based their truth value judgments on the truth of the main clause.

The truth values for the appositive test sentences were accompanied by consistently high confidence ratings. Thus, participants not only judged sentences with appositives as False, but they were quite confident in doing so. Evidence that they used the entire confidence rating scale and were cognizant of those instances in which they were uncertain of response comes from the average confidence rating exhibited for the ‘unclear T/F’ controls—sentences that asked participants to render a T/F judgment about potentially obscure facts. With these sentences, participants performed at chance *and* had a consistently low confidence

rating. (See the first row of Table 4.) Thus, they were uncertain of the answer, and indicated so in their confidence ratings.

A one-way ANOVA comparing the time to provide a confidence rating for the three truth value cases for which we had clear expectations ($\langle T_{MC}, T_{APP} \rangle$, $\langle F_{MC}, F_{APP} \rangle$ and $\langle F_{MC}, T_{APP} \rangle$), revealed no significant difference ($F(2, 291) = 2.25, P = 0.11$). However, a second one-way ANOVA comparing the times for all of the sentences where participants rendered a False judgment revealed a highly significant main effect ($F(4, 479) = 7.74, P < 0.0001$), driven mainly by the much longer time associated with the $\langle T_{MC}, F_{APP-MED-!} \rangle$ sentences. Tukey's HSD post-hoc comparisons confirmed significant differences between these sentences and the $\langle F_{MC}, F_{APP} \rangle$ and $\langle F_{MC}, T_{APP} \rangle$ sentences ($P < 0.01$). However, the effect was also driven by the fact that times for $\langle F_{MC}, F_{APP} \rangle$ sentences were significantly shorter than when the main clause and appositive had different truth values and the appositive was false ($\langle T_{MC}, F_{APP-MED} \rangle$, $\langle T_{MC}, F_{APP-FIN} \rangle$) ($P < 0.05$). Thus, while participants arrived at the same truth values (False), and had similarly high confidence ratings for these sentences, they still appeared to be affected by the mismatch in truth values—and specifically that the appositive's false status conflicted with the true main clause.

6.1.6 *Discussion* The results of Experiment 4 revealed that appositives do indeed have an effect on the truth value of the sentence in which they appear: *a false appositive makes the entire sentence false*. A true appositive and true main clause combine to yield a true proposition of the sentence in which they appear, but any other combination of a main clause and an appositive where either one is false leads to a false proposition. Thus, our experimental participants treated sentences with appositives much like conjunctions, where the truth value of the main clause and the truth value of the appositive combine to yield True or False for the sentence in which they appear, as predicted by the classical truth conditions in Table 3. One could imagine that this pattern would still obtain, but that participants would have been confused by the truth-value mismatch and uncertain of their decision. That this was not the case is reflected in their consistently high confidence ratings.

Interestingly, we observed an increase in the time it took to provide a confidence rating associated with the sentences with a false, charged appositive (coupled with a higher percentage of True judgments). This pattern may be consistent with Schlenker (2013)'s account of 'translucency': appositives must make a 'weak' semantic contribution to the context set, in that the proposition expressed by an appositive should not be entailed by the context but should also be uncontroversial

(p. 70). The proposition expressed by the appositives in the $\langle T_{MC}, F_{APP-MED-!} \rangle$ sentences did not abide by this characterization. Under Schlenker's account, upon hearing the sentence, the hearer should update the original context C to C^+ so as to make the appositive trivial. At this point, the sentence is computed with respect to this new context C^+ . This claim has clear consequences for the processing of these sentences, as Schlenker appears to have been aware: 'the addressee must first find a C^+ that makes the appositive trivial before processing further material.' In our experiments, the increased time it took may reflect the time participants spent attempting to find a suitable C^+ before judging the sentence false.

Now, despite the otherwise uniform findings of this experiment, and the indication that appositives contribute to the truth value of the entire sentence much like conjunction, it still remains an open question whether sentences with appositives should indeed be treated as conjunctions. The reason for this has to do with our experimental design. One could argue that the binary forced-choice design pigeonholed participants into choosing F in instances where they knew they did not want to choose T. That is, because we did not offer them a third choice (i.e. a truth-value gap of neither T nor F), participants may have allowed F to be an umbrella response for all non-T responses. In von Stechow (2004)'s terms, participants chose F as a 'fall-back strategy to fill in the gap'. Thus, it is possible that sentences with appositives were not treated entirely like conjunctions by our participants, but this experiment merely gives the appearance of this pattern. To address this question, we conducted Experiment 5. In this last experiment, we also connected reaction times to the actual truth value ratings, rather than the confidence ratings, in order to evaluate how rapid the assignment of the truth value was in each case.

7 EXPERIMENT 5

7.1 *Method*

7.1.1 *Participants* 25 undergraduates (range: 19–22 years) participated. Five additional students were excluded for reasons of non-native status.

7.1.2 *Stimuli* Test items for Experiment 5 were similar to a subset of those used in Experiment 4; however, in this experiment, we restricted our attention to those sentences in which the main clause was true, but

the appositive false. As before, we varied the sentential position of the appositive, as illustrated in (34).

- (34) a. Harry Potter, a lawyer, is a character created by J.K. Rowling.
 b. J.K. Rowling created the character of Harry Potter, a lawyer.

5 Participants were presented with eight appositive test items (all different sentences), among which were four NAs and four ARCs. Within these appositive types, two had the appositive in sentence-medial position, and two had the appositive in sentence-final position.

We compared the test sentences that had false appositives to five
 10 types of control sentences that are (broadly speaking) judged to be unacceptable, infelicitous, or false. The controls, presented in Table 6, not only allowed us to make a comparison with appositives, but allowed us to evaluate whether participants patterned in a manner consistent with previous theoretical claims.

15 The first type of control sentences was VP conjuncts with one true and one false proposition. These sentences could be thought of as the closest semantically to the (sentence-medial) appositive sentences: one subject is shared between two clauses, and the truth value depends on the combination of the two propositions. The second type was similar in
 20 form, but differed in pragmatic plausibility: VP conjuncts where the conjuncts were presented in the reverse temporal order of what might be expected based on real-world facts or well-known procedures. These sentences are claimed to encode a conversational implicature with respect to temporal ordering (deriving from Grice's Manner Maxim),
 25 and/or require discourse coherence such that the order of mention should mirror the order in which the events took place (cf. Strawson 1952; Grice 1975; Lascarides & Asher 1993; Noveck & Chevaux 2002; Horn 2005; Noveck *et al.* 2009). Next, we chose a case argued by many to be an instance of conventional implicature: sentences with *therefore*
 30 (Grice 1975; Bach 1999). For these sentences, we created an infelicitous causal connection between the two clauses.

Finally, we chose two types of sentences involving presupposition. The first was *regret* sentences in which the embedded clause was false. Because *regret* is a factive verb, the presupposition of the embedded
 35 clause should project (cf. Kiparsky & Kiparsky 1970; Karttunen 1973). If the embedded clause is false, participants should detect something is awry, but it is an open question what truth value they will ultimately assign, given the presupposition failure. The second type of presupposition sentence involved singular definite DPs in which the
 40 presupposition of existence had been violated (cf. Russell 1905;

Control/filler type	Sentence
VP conjunct	Spiders have two legs <u>and</u> spin complex webs.
<i>Regret</i>	President Obama <u>regrets</u> not running for office in 2008.
Singular definite DP	<u>The state of Boston</u> hosts a marathon every year.
<i>Therefore</i>	Whales live in the ocean, and <u>therefore</u> are mammals.
Reverse order conjunct	Moviegoers watch the end-credits <u>and</u> buy their tickets.
Filler (True)	Chimpanzees are primates and live in jungles.
Filler (no truth value)	The sun and the moon
	When is the semester over?

Table 6 Examples of control sentences and fillers used in Experiment 5

Strawson 1950, 1964). In addition to these controls, there were two types of fillers: those with a clear truth value of True, and those that could not be assigned a truth value (e.g. fragments, questions). The range of controls and fillers encouraged participants to make use of the entire scale.

Each participant judged 8 test items, 20 control items, 10 fillers. All items were pseudorandomized, based on item type and anticipated truth value. Sentences were similar to those used in Experiment 4, and were normed with native informants beforehand, as in Experiment 4. The full set of stimuli is included in the Appendix (see [Supplementary Material](#)).

7.1.3 Procedure The experimental session began with a brief training session, during which participants were acclimated to the task of rating sentences as True, False, or neither True nor False, on a scale of -2 to 2 ($[-2 -1 0 1 2]$), with -2 being False, 2 True, and 0 no truth value. Because we recognized the possibility that within our participant pool, there could be people who judge sentences with presupposition failures as either false or lacking a truth value (i.e. Russellians or Strawsonians), we did not want to force participants to rate sentences similar to our targets or controls as either -2 or 0 . Instead, we had them rate some sentences as clearly true (i.e. *The U.S. is located in the northern hemisphere; Oprah Winfrey is a very successful TV personality and author*) (which could be rated as 1 or 2), some sentences as clearly false (*The Beatles are a group of famous astronauts; Humans are closely related to sharks*) (which could be rated as -1 or -2), and some questions or sentence fragments as not having a truth value (0) (*When was the state of Missouri established? in the middle of the room*). During the training session only, participants could not proceed to the next screen until they responded correctly. During the test session, participants read the sentence on the screen, then

proceeded on to the next screen to provide their truth value rating, using their response pad. As soon as they provided a truth value rating, participants proceeded to the next item. In this way, reaction times in this experiment were linked to the actual judgment itself, rather than the confidence ratings, as in the previous experiment.

If, as in the previous experiment, sentences with false appositives are treated similarly to those with conjunction, then the average rating for the false appositive sentences in this experiment should hover near -2 , and the distribution of ratings across the scale should be skewed toward -2 . In this way, they should also pattern along with the VP conjunct sentences in which one of the propositions was false (which correspondingly should also hover close to -2 , and exhibit ratings skewed towards -2). We predicted that the other control sentences would not stand out as being clearly False. Thus, if participants perceive sentences with a false appositive as similar to sentences with presupposition violation or violation of conventional implicature, then the false appositive sentences should pattern with these sentences instead of with conjunction, given the wide range of possible responses. (See also discussion in [Bach 1999](#); [Dever 2001](#); [Potts 2005](#).)

7.1.4 Results Here we break down our analysis by truth value ratings and by reaction time, then look for correlations between these values.

Truth Value Ratings

The responses for the rating task are presented in [Table 7](#).

Note first that sentences with false appositives—and ARCs in particular—have the lowest overall mean rating, the lowest standard deviation of ratings (roughly speaking, variance), and the highest percentage of -2 ratings. This is the first indication that participants treated these sentences as False, and that they were consistent in their judgments, as in the previous experiment.

We conducted a series of ANOVAs to probe the similarities and differences among the sentence types. A 2×2 repeated measures ANOVA comparing appositive type (NA, ARC) and position (medial, final) revealed a main effect of appositive type ($F(1, 49) = 7.01, P = 0.01$), with ARCs receiving lower overall ratings (i.e. closer to -2). There was no main effect of position ($F(1, 49) = 0.08, P = 0.78$), and no interaction ($F(1, 49) = 0.64, P = 0.43$). A one-way repeated measures ANOVA with a Greenhouse–Geisser correction evaluating the truth value ratings for the two types of appositive test items and the five control items indicated that there was a highly significant effect of sentence type ($F(3.82, 781, 94) = 55.06, P < 0.0001$). Post hoc tests using Bonferroni

Item type	Mean rating	St. dev.	Truth value ratings				
			-2	-1	0	1	2
Appositives (all)	-1.68	0.83	83.0	9.5	0.5	6.5	0.5
ARCs	-1.80	0.59	86.0	11.0	0.0	3.0	0.0
NAs	-1.56	1.00	80.0	8.0	1.0	10.0	1.0
VP conjunct	-1.61	0.85	76.0	17.0	0.0	6.0	1.0
<i>Regret</i>	-1.59	0.75	72.0	18.0	7.0	3.0	0.0
Singular def. DP	-0.89	1.52	60.0	7.0	6.0	16.0	11.0
<i>Therefore</i>	-0.37	1.56	41.0	9.0	10.0	26.0	14.0
Rev. order conjunct	-0.51	1.71	26.0	7.0	4.0	16.0	47.0

Table 7 Mean truth value rating, standard deviation, and distribution of percentages of truth value ratings (-2: False to 2: True) for the appositive test items (in bold) and each of the five control items

correction revealed that there was a marginally significant difference between the mean ratings for the NAs and the ARCs ($P = 0.10$), but no difference between either of the appositive sentence types and the *regret* sentences ($P = 1.0$, $P = 0.53$, respectively), or between either of the appositive sentence types and the VP conjuncts ($P = 1.0$, $P = 0.45$, respectively). Both NA and ARC appositive sentences differed significantly from the singular definite DP sentences ($P < 0.01$, $P < 0.0001$, respectively), from the *therefore* sentences ($P < 0.0001$ for both), and from the reverse order conjunct sentences ($P < 0.0001$ for both). Singular definite DP sentences did not differ significantly from *therefore* sentences ($P = 0.15$), but did differ from reverse order conjuncts ($P < 0.0001$), and the latter two differed significantly from each other ($P = 0.01$). Thus, appositives patterned with the *regret* sentences and VP conjuncts with respect to their truth value ratings: when one clause is False, the entire sentence is False.

The high standard deviation for the singular definite DPs, the *therefore* sentences, and the reverse order conjuncts stems from the fact that there was variability in the truth value ratings within these groups of sentences. For example, for two of the definite DP sentences (the two involving ‘Barack Obama’s husband’ and ‘the King of New Jersey’), participants treated them as False, and ratings hovered around -2, while for two others (the two involving ‘the State of Boston’ and ‘Nebraska’s Pacific Coast’), the ratings were scattered all over the scale. Three of the *therefore* sentences exhibited a wide range of ratings, while one exhibited ratings hovering around -2 (*Diet Pepsi contains no sugar, and is therefore non-alcoholic*). Finally, we observed an interesting split for the reverse order conjuncts, such that the two sentences

involving predication of individuals (Steve Jobs and Barack Obama) in which the order of events was clearly reversed were judged true the vast majority of the time. By contrast, those sentences about habitual procedures with a clear order (*Students graduate from high school and take the SAT; Moviegoers watch the end-credits and buy their tickets*) exhibited a range of ratings. We discuss a possible account of these various items in the discussion section.

Reaction Times

The reaction times (RTs) for each of the sentence types are presented in Table 8.¹⁴

The RTs complement the truth value ratings by demonstrating that participants took the least amount of time to respond to sentences with a false appositive, ostensibly illustrating that they did not deliberate over their -2 ratings: to our participants, these sentences were clearly just False. A 2×2 repeated measures ANOVA comparing appositive type (NA, ARC) and position (medial, final) ANOVA on the reaction times revealed no main effect of appositive type ($F(1, 49) = 0.56, P = 0.46$) or position ($F(1, 49) = 0.80, P = 0.38$), and no interaction ($F(1, 49) = 1.09, P = 0.30$).

A one-way ANOVA revealed a significant difference among sentence types ($F(6, 682) = 17.94, P < 0.0001$). Tukey's post-hoc tests showed that the two types of appositive sentences did not differ significantly from each other ($P = 0.99$), and neither differed from the *regret* sentences (ARC v. *regret*: $P = 0.59$; NA v. *regret*: $P = 0.17$). Interestingly, it was also the case that neither appositive sentence differed from the singular definite DP sentences ($P = 1.0, P = 0.94$, respectively). While ARCs v. VP conjuncts patterned together ($P = 0.17$), the RT for NAs was significantly shorter than the RT for VP conjuncts ($P = 0.02$). Definite DPs and VP conjuncts were not significantly different from each other ($P = 0.34$). The *regret* sentences were not different from the VP conjuncts ($P = 0.99$) or definite DPs ($P = 0.81$). The *therefore* sentences and reverse order conjuncts exhibited the longest RT. These sentence types did not differ from each other ($P = 0.86$), but differed from every other sentence type (*therefore* v. all other types: $P < 0.0001$; reverse order conjuncts v. both appositive types, definite DP: $P < 0.0001$; v. *regret*: $P = 0.001$; v. VP conjunct: $P = 0.01$). Thus, the overall RT means gave rise to a split between *therefore* and reverse order conjuncts with longer RTs on the one hand, and sentences with shorter RTs, including appositive sentences, on the other.

¹⁴ As in the previous experiment, RTs over 15 000 ms were excluded from analysis.

Item type	All RTs (ms)		RTs for -2 ratings (ms)	
	Mean RT	St. dev.	Mean RT	St. dev.
Appositives	4365.14	1990.37	4236.54	1900.35
ARCs	4493.47	1729.72	4332.52	1404.52
NAs	4238.08	2220.06	4133.35	2323.65
VP conjunct	5363.26	2358.43	5234.83	2410.12
<i>Regret</i>	5103.24	2504.26	4513.38	2096.54
Singular definite DP	4612.49	2630.94	4155.73	2619.25
<i>Therefore</i>	7030.77	2695.52	6751.18	2513.28
Reverse order conjunct	6566.89	3006.74	6962.24	2983.13

Table 8 Mean reaction time to provide a truth value (in ms) and standard deviation for the appositive test items (in bold) and each of the five control items, for all truth value judgments (left) and judgments for a -2 rating (right)

We then restricted our analysis to the RTs for -2 ratings so that we could focus exclusively on the time it took participants to render judgments of ‘clearly False’ for each of the sentence types. This one-way ANOVA mirrors the analysis of all RTs, with a significant effect of sentence type ($F(6, 435) = 11.90, P < 0.0001$). As before, Tukey’s post-hoc tests showed that the two types of appositives did not differ significantly from each other ($P = 1.0$), and neither differed from the *regret* sentences ($P = 1.0, P = 0.95$, respectively) or from the singular definite DP sentences ($P = 1.0$ for both). The *therefore* sentences and reverse order conjuncts again exhibited the longest RTs. These sentence types did not differ from each other ($P = 1.0$), but were highly significantly different from both appositive types, *regret* sentences, and definite DPs ($P < 0.0001$), and significantly different from VP conjuncts ($P < 0.02$). Definite DPs were only marginally different from VP conjuncts ($P = 0.09$) and the RTs for NAs were significantly shorter than the RTs for VP conjuncts ($P < 0.05$). The *regret* sentences were not different from the VP conjuncts ($P = 0.46$) or definite DPs ($P = 0.97$).

Thus, the RT means for judgments of ‘clearly False’ (-2) solidified the split between *therefore* and reverse order conjuncts with longer RTs on the one hand, and some combination of shorter RTs on the other, and reinforced the connection between the appositives sentences, VP conjuncts and *regret* sentences, which had been observed with the truth value ratings. That appositives also patterned with definite DPs for False ratings seems to indicate that for those cases in which the presupposition was violated (and potentially easily verifiable), judgments of False were equally automatic.

Truth Value Ratings and Reaction Times

In Figure 5, we present scatterplots of truth value ratings and RTs for each of the sentence types. These plots reinforce the connection between appositives, VP conjuncts and *regret* sentences on the one hand, and singular definite DPs, *therefore* sentences, and reverse order conjuncts on the other. For the first set of sentences, ratings are clustered toward the left of the x -axis (toward False ratings), whereas for the others, ratings are spread across the axis.

The correlations between ratings and RTs are, however, somewhat challenging to interpret. While there was a correlation between the reaction time and truth value ratings for the *regret* sentences ($r^2 = 0.127$, $t(97) = 3.75$, $P < 0.001$) and the reverse order conjuncts ($r^2 = 0.044$, $t(95) = -2.09$, $P < 0.05$), there was not for the other sentence types (appositives: $r^2 = 0.007$, $t(197) = 1.2$, $P = 0.23$; VP conjuncts: $r^2 = 0.016$, $t(96) = 1.26$, $P = 0.21$; singular definite DPs: $r^2 = 0.008$, $t(96) = 0.85$, $P = 0.40$; *therefore* sentences: $r^2 = 0.0004$, $t(90) = 0.19$, $P = 0.85$), making it somewhat harder to make a parsimonious statement about the other cases.

7.1.5 *Discussion* This experiment supported the previous experiment by revealing that sentences with false appositives are judged to be clearly False, and that this decision appears to be fairly automatic. While the pattern for our test items is quite robust and fairly clear, at the same time, the findings are fairly complex, in light of the way that participants responded to the control items. What one might have expected to find is that sentences containing false asserted content (regular asserted content or conventionally implicated content)—i.e. sentences with false appositives, sentences with false VPs and sentences with infelicitous uses of *therefore*—to receive the highest percentage of False responses. However, what we found instead was that certain sentences with false presuppositions are more likely to be judged False than sentences with certain conventional implicatures, and that *regret* sentences with false complements are almost as likely to be given a False response as are sentences with false conjuncts. Indeed, participants were incredibly consistent in their judgments about sentences with false appositives, *regret* sentences with false complements, and VP conjuncts with one false proposition—and not so with the other sentences. Others have also observed variability in projection behavior in experimental investigations of presupposition triggers (e.g. Smith & Currie Hall 2011; Xue & Onea 2011).

We would like to entertain the possibility that the variability we observe among the truth value ratings for the singular definite DP

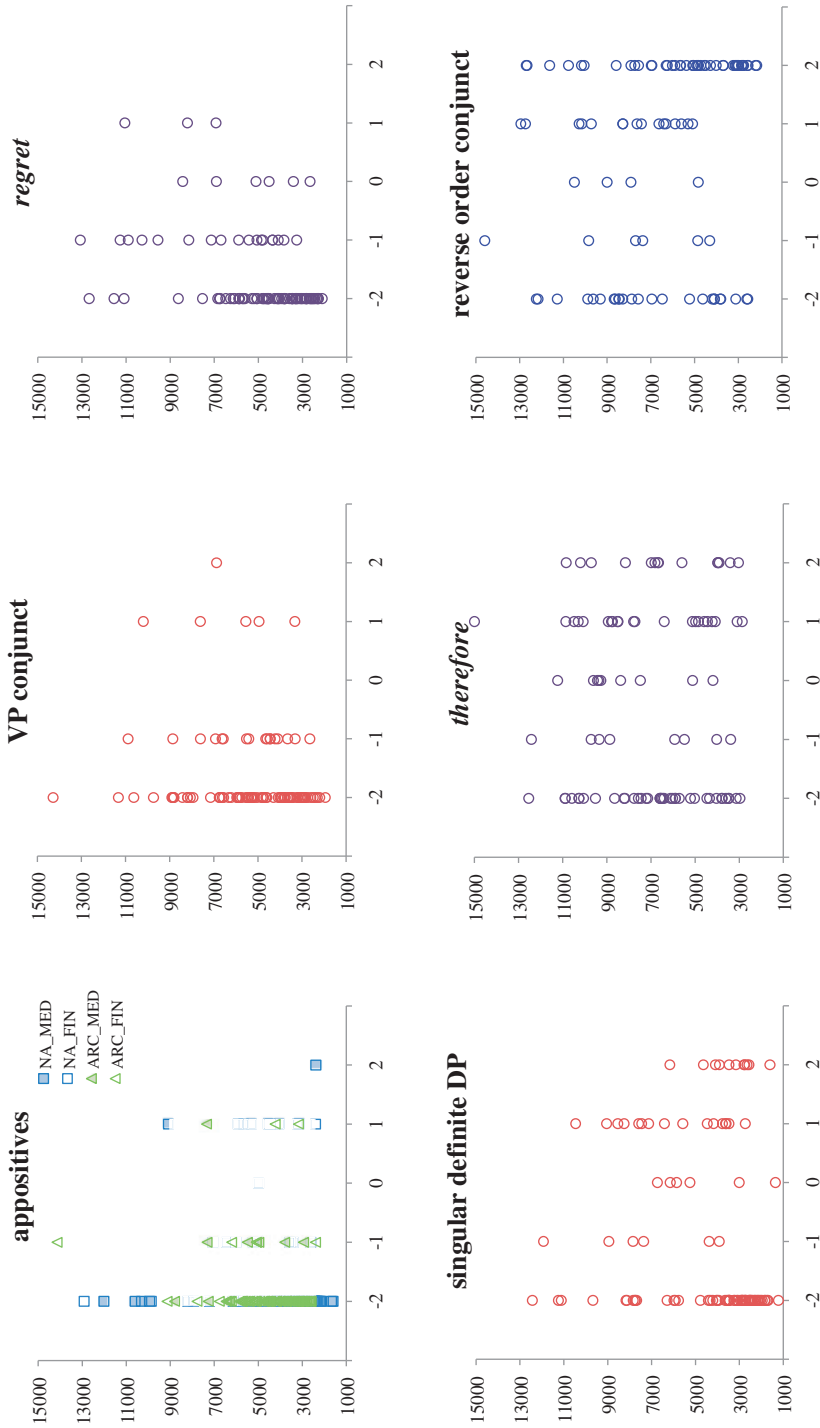


Figure 5 Scatterplots presenting truth value ratings and reaction times for the appositive test items and each of the five control items. Each dot is one data point.

sentences, the *therefore* sentences, and the reverse order conjuncts reflects the fact that an evaluation of the truth value of these sentences is heavily dependent on the context. By contrast, an evaluation of the truth value of appositive sentences, sentences with *regret* and an embedded clause and conjunctions is invariably tied to the truth or falsity of lexical content: *given a false proposition, the entire sentence becomes false*. Thus, appositives and VP conjuncts patterned together, as expected, but so did *regret* sentences, because the embedded false presupposition made the entire sentence False (see also Chemla & Bott 2013). Thus, items containing lexical content that expresses false information are more likely to be judged False (−2) whereas sentences that are false or infelicitous due to functional syntactic structure or extragrammatical factors are more likely to be judged as neither True nor False (0) and exhibit variability among ratings.

8 GENERAL DISCUSSION

In this article, we presented five experiments that addressed two major questions: (i) What is the information status of appositives (Experiments 1–3), and (ii) What is the contribution of appositives to the truth value of the entire sentence (Experiments 4–5)? Our experimental investigations revealed the following. First, Experiment 1 demonstrated that direct rejections are largely dispreferred when targeting appositives, furnishing evidence in support of previous intuitions that appositives generally contribute not-at-issue content. While this finding is in and of itself not entirely surprising, it provided us with a baseline for Experiment 2, which demonstrated that among different appositive types and positions, sentence-final ARCs can compete with the main clause as the target of a direct rejection and acquire at-issue status. Experiment 3 further highlighted the privileged status of sentence-final ARCs by demonstrating that they can compete with the main clause to provide the at-issue assertion that associates with ellipsis in the following discourse. Finally, Experiments 4 and 5 showed that false appositive content has an incontrovertible effect on the truth value of the entire sentence: a false appositive is reason enough for participants to judge the entire sentence False. Thus, appositives contribute to the overall truth conditions of the sentence in a manner similar to that of conjunction.

In Section 2, we outlined two approaches to the semantics of appositives: the conjunction approach and the multidimensional approach. In this section, we link the predictions of those two approaches to our

experimental results and point out that none can fully capture the patterns we uncovered. We then sketch an alternative approach, which we think can best explain the data.

Recall that according to the conjunction approach (Frege 1892; Böer & Lycan 1976; Rodman 1976; Sells 1985), appositives contribute content that is conjoined with the main clause content. Thus, the sentence with the appositive in (35) should be interpreted the same way as the conjunction in (36).

(35) My friend Sophie, (who is) a classical violinist, performed a piece by Mozart.

(36) My friend Sophie is a classical violinist and she performed a piece by Mozart.

By virtue of the standard rule for conjunction, both sentences are true just in case the two claims about the sentential subject are true; otherwise both sentences are false. According to the conjunction approach, then, sentences with appositives have a single truth value, of which appositive content is a vital part. This prediction is fully in line with the results of Experiments 4 and 5. However, if appositives were just regular conjuncts, it would not be clear why their content is often considered to be not at issue, as demonstrated in Experiments 1–3. A purely conjunctive approach seems to lack the tools necessary to distinguish between at-issue and not-at-issue content in general and therefore fails to capture the way in which sentences with appositives are interpreted.

The accounts of AnderBois *et al.* (2010) and Murray (2010) (see also Schlenker 2010, 2013) enrich the conjunction approach by assuming that appositives are assertions that represent a special type of context update. These authors distinguish between two types of assertive content: one that *directly* updates the context (e.g. content introduced by appositives), and one that introduces an update *proposal*, which can be accepted or rejected by the conversational participants (e.g. content introduced by main clauses). Thus, while appositives have an immediate effect on the context and hence are not at issue, main clauses only potentially update the context and hence are at issue. By aligning the appositive and main clause content as both affecting the truth conditions, but allowing them to differ in their information status, this version of the conjunction approach can account for our findings in Experiments 1, 4 and 5.

However, what is still left unresolved by these approaches is the ability of sentence-final ARCs to become at issue, observed in

Experiments 2 and 3. [AnderBois et al. \(2010\)](#) were well aware of this problem, and discussed examples illustrating the shifting status of final appositives. Indeed, in their footnote 9 (p. 17), they acknowledged that they had yet to account for such examples, and entertained the possibility (suggested to them by Nicholas Asher p.c.) that sentence-final appositives can ‘enter into matrix-level discourse relations in a discourse structure’.¹⁵ Medial appositives, they proposed, would be subject to more constraints on interpretation, because they are discourse-subordinate to the clause to which they are attached. While this suggestion may be on the right track, it crucially does not draw a distinction between ARCs and NAs, and therefore cannot explain why sentence-final ARCs are the only appositives (in our experiments, at least) that display this characteristic.

According to the multidimensional approach ([Berckmans 1994](#); [Bach 1999](#); [Chierchia & McConnell-Ginet 2000](#); [Dever 2001](#); [Potts 2005](#)), appositives contribute secondary propositions that are fully independent of the primary proposition expressed by the main clause. The multidimensional approach could straightforwardly account for the predominantly not-at-issue status of appositives in Experiments 1 and 2 by saying that only the meaning dimension associated with the main clause is at issue, while supplements (e.g. appositive content) are not at issue. It is less clear, however, how this approach could handle the key set of results from Experiments 2 and 3, where sentence-final ARCs were able to take on at-issue status.

Moreover, it is an open question how the multidimensional approach would handle the results of Experiments 4 and 5, where sentences with conjuncts pattern much like conjunctions. Inherent to the multidimensional approach is the idea that the truth values attributed to the two meaning dimensions are *not* semantically combined. While propositions introduced by appositives, when taken in isolation, do have truth conditions, these propositions are seen as independent and therefore cannot contribute to the truth conditions in the same direct way primary propositions do. Thus, when participants are forced into a binary judgment, the prediction is that they might disregard the appositive or exhibit reluctance when rendering their judgment. However, the results of Experiments 4 and 5 showed that sentences with appositives were treated much like conjunctions. The truth value of our appositives (both NAs and ARCs) was *not* overlooked [as would have been predicted by [Bach \(1999\)](#)] and did not seem to elicit additional deliberation

¹⁵ [AnderBois et al. \(2010\)](#) do not distinguish here between ARCs and NAs, but discuss ARCs in particular in their examples.

on the part of the experimental participants [as Dever (2001) would have it].

A reviewer alerts us to the following intriguing possibility: even though the multidimensional approach may not predict that the truth values of the appositive and the main clause are combined in the *semantics*, they might be combined at the *discourse level*, e.g. by sequentially updating the context with the two types of content. Indeed, if this move is made, the predictions of the multidimensional approach with respect to truth value judgments would not be much different from the predictions of the conjunction approach (since the truth values of the appositive and main clause would still be combined at some level). However, the details of how multidimensionality and discourse dynamics are integrated still need to be worked out, and the influence of appositive position and shifting at-issue status would still need to be accounted for.¹⁶

In what follows, we outline a version of the conjunction approach that we think can best account for the observed interpretational properties of appositives. We assume that appositives represent regular truth conditional content (similar to conjuncts) but that, in addition, they are *illocutionarily independent*, i.e. the speech act associated with an appositive is independent from the speech act associated with the rest of the sentence (cf. Thorne 1972; McCawley 1988; Potts 2005; Arnold 2007). This observation also provides support for our argument that an approach derived solely from conjunction is insufficient.

The illocutionary independence of appositives is empirically supported by the fact that appositives accept speech act adverbials or ‘utterance modifiers’ (Potts 2005) like *hands down*, as in our example in (37), or can express a different type of speech act whose illocutionary force differs from that expressed by the main clause, e.g. a statement versus a question, as in (38).

(37) We rented *The Good, the Bad, and the Ugly*, hands down the best Clint Eastwood movie ever made.

(38) Has Cameron, who was talking to Gloria a minute ago, gone home?

Given the truth conditional nature of appositives and their illocutionary independence, we propose to account for the shifting status of ARCs observed in Experiments 2 and 3 by assuming that ARCs can compete with main clauses for at-issue status (that is, either is in principle a

¹⁶ See Potts (2005, p. 95) and Koev (2013, p. 123–125) for further discussion on this point.

candidate for at-issue status), and by relating the ordering of the appositive assertion and the main clause assertion to the overall flow of discourse.

We first assume that sentence-medial ARCs (and NAs) are obligatorily attached to their anchor, as illustrated in (39).

(39) my friend [_{DP} Sophie [_{CP} who is a classical violinist]] performed a piece by Mozart

Given that appositives are interpreted in their syntactic structural position, it follows that the assertion associated with the medial ARC below is introduced hand in hand with the anchor *before* the assertion associated with the main clause is completed. If direct rejections and elliptical *Why?* questions primarily target the assertion that has been performed last, it becomes clear why in sentences with medial appositives, only the main clause is at issue, while the appositive is treated as not at issue.¹⁷

Sentences with final ARCs are different. We assume that they are structurally ambiguous: the ARC can be attached to either the anchor or the root node of the sentence.¹⁸ If the ARC is attached to the anchor, as in (40), the appositive assertion is made *before* the completion of the main clause assertion (since it is embedded in it by virtue of being attached to the anchor DP), and consequently the main clause is at issue in such sentences.¹⁹ However, when the final ARC is attached to the root node of the sentence, as in (41), the ARC is attached at a level along with the main clause and the appositive content is asserted *last*, allowing the ARC to be at issue.²⁰ In this second case, the discourse

¹⁷ Sentence-medial ARCs are certainly open to *indirect* rejections. However, such rejections have a negative effect on the flow of discourse, as they require a repair of the context set. A reviewer asked about our predictions for other languages, given, for example, Cinque (2008)'s claims that English ARCs are always attached at the sentence level, but in languages like Italian or French, ARCs could be attached at the DP or CP level. We would expect that 'integrated' non-restrictive relative clauses pattern much like restrictive relative clauses in English, while 'nonintegrated' non-restrictive relative clauses in French or Italian are similar to ARCs in English in that they are at issue only if they are CP-level. We leave this interesting investigation of the cross-linguistic typology of appositive content to future research.

¹⁸ Local attachment of appositives is proposed in Jackendoff (1977), Kayne (1994), Potts (2005), de Vries (2006), a.o. For global or late attachment accounts, see, for example, Emonds (1979), McCawley (1982, 1988), Ross (1967) and Safir (1986).

¹⁹ A reviewer points out that when the appositive attaches to the root node of the sentence, then its anchor should not be accessible anymore for composition with the appositive. Koev (2013) provides compositional rules that accommodate appositives in either position, with the idea that appositives are related to their anchors via discourse anaphora and thus there is no requirement for a local configuration between the two elements.

²⁰ One might expect that the difference between (40) and (41) might be reflected in a different prosodic delivery. At this point, we are unsure of what that might be, if any. Our proposal may call into question the syntactic position of parentheticals, which are typically treated as not at issue, a point we leave aside in this article.

effect is similar that of having two independent sentences that follow upon each other.

(40) the symphony hired my friend [_{DP} Sophie [_{CP} who is a classical violinist]]

5 (41) [_{CP1} the symphony hired my friend Sophie] [_{CP2} who is a classical violinist]

This distinction between the possibilities for appositive attachment and sentential position lays the groundwork for the shifting at-issue/not-at-issue status of ARCs, and provides us with an explanation for the results of Experiments 2 and 3.

10 The view that the recency of an assertion exerts an effect on its at-issue status finds independent support in the minimal pair presented in (42)–(43). In (42), there are two independent sentences and thus two separate assertions. The second sentence seems to be a more natural target for ‘That’s not true’ responses or ‘Why?’ questions. In (43), by contrast, the two conjuncts are part of a *single* assertion, and this preference for targeting the second assertion seems to disappear (or at least, decrease).

(42) Ryan lives in Boston. Sarah moved there a month ago.

20 (43) Ryan lives in Boston and Sarah moved there a month ago.

If, as we suggest, appositives and main clauses make separate assertions, two questions immediately arise. First, if ARCs have the potential to be at issue, why are they not considered at issue more often? Recall that in Experiment 2, sentence-final ARCs were only treated as targets of a direct rejection approximately one third of the time. Second, why were we only able to observe positional effects with ARCs, but not with NAs, in Experiment 2?

30 In regard to the first question, recall that participants in Experiment 2 were given a choice between directly rejecting the main clause or the sentence-final ARC. Thus, given a forced choice between two potential targets of a ‘No’ rejection, participants demonstrated a preference for the main clause over the appositive. This difference may arise from a difference in frequency: not only are main clauses overwhelmingly more common than appositives, but we suspect (although we cannot address this possibility within the space of the current research) that of all appositive types, (sentence-final) ARCs might be among the least frequent of all appositive constructions, carving out only a small portion of all possible appositive forms. In other words, we suspect that the deck is

stacked against them. Of course, the data we present here are silent on such frequency trends, but we think this would be an interesting project for future research.

This brings us to the second question: why can final ARCs, like main clauses, gain at-issue status, while final NAs cannot? It is possible that certain surface-level features of ARCs (their tense/mood marking, their clausal status, the presence of a *wh*-word signaling the presence of a CP, etc.) make them better candidates for at-issueness. The *wh*-word, in particular, establishes a discourse-anaphoric dependency between the ARC and its anchor (cf. Demirdache 1991; Sells 1985; Del Gobbo 2003), allowing non-locally attached ARCs to remain linked to their DP anchors. Arguably, NAs, which lack *wh*-words, may need to be in a local configuration with the anchor, from which it would follow that they are invariably not at issue. This discussion raises the possibility that there may be a way for NAs to take on at-issue status if they could adopt some of the properties of ARCs. For example, supplementing a sentence-final NA with a restrictive relative clause, could induce a shift in their information status. We leave investigation of this possibility to further research.

More generally, however, we may ask about the status of NAs: are they like ARCs in that they make independent assertions whose information status is primarily determined by the relative order with the main clause assertion, or are they (unlike ARCs) specified for not-at-issue status? If the latter is correct, then NAs and ARCs do not share the same status, and we have introduced an inherent split within the class of appositives between ARCs and NAs. This distinction may not be entirely unreasonable, given their difference in surface form and the results of Experiment 2. However, one might find such a distinction somewhat unparsimonious, given the otherwise uniform behavior of appositives, and further ask whether sentence-final NAs could be coerced into behaving like sentence-final ARCs under certain conditions.

We would like to entertain the possibility that all appositives (both NAs and ARCs) and main clauses introduce independent assertions. But because NAs and sentence-medial ARCs are locally attached to their anchors in the syntax, assertions introduced by such appositives are non-final and are not in a position to acquire at-issue status. As a result, NAs and sentence-medial ARCs are treated as not-at-issue content. When ARCs are sentence-final, these ARCs have two attachment sites available: the anchor or the entire sentence. As with NAs and sentence-medial ARCs, when the attachment site is the anchor, ARCs are not at issue, while the main clause is. When the ARC is attached to the root sentence, however, the ARC can, like the main clause, acquire at-issue

status. This approach to appositives has the potential to derive all the desired properties of appositives, including the required flexibility to explain why sentence-final ARCs can shift their information status.

Before closing, we wish to address two additional issues, which were raised by reviewers and which are related to the topic of at-issueness. The first is how to diagnose at-issue status. The second is the connection between at-issueness and projection, or the scopal properties of the appositive.

In the experiments reported in this article, we made use of direct rejections and elliptical questions as tests for at-issueness. Another test discussed in depth by *Simons et al. (2010)* and *Tonhauser (2012)* is the ability of content to address the Question Under Discussion (QUD) (*Ginzburg 1996; Roberts 1996; Büring 2003; Farkas & Bruce 2010*). A reviewer used the following contrast between (44) and (45) as evidence that only at-issue content can address the QUD, and therefore that the appositive in (45) cannot be at issue, as the main clause in (44) is, since it cannot serve as answer to the QUD.

(44) Q: What did John do?

A: John took care of his husband, who had prostate cancer.

(45) Q: What illness did John's husband have?

A: #John took care of his husband, who had prostate cancer.

We agree that the sentence with the appositive in (45) does not provide a suitable answer to the question preceding it. However, we do not think that this set of examples illustrates that appositives cannot address *any* QUD. For example, the appositive content in (46) helps to provide an answer to either of the two QUDs preceding it.

(46) Q1: Why was John out of the office for so long?

Q2: Why is John fundraising for the upcoming Walk for Cancer?

A: He took care of his husband, who had prostate cancer.

In addition, *Koev (2013)* points out that final ARCs can naturally address one part of a coordinated QUD, as we further illustrate in (47).

(47) Q: Who did you see at the potluck and what dish did they bring?

A: I saw Renée, who brought an artichoke dip.

To us, such data suggest that appositives are not barred from addressing QUDs. Moreover, if they are shown to address *some* QUDs, and the ability to provide an answer to a QUD is a diagnosis for at-issueness (as are the ability to be subject to direct rejection and provide the main

assertion for subsequent ellipsis), then the examples we have provided above are further evidence that appositives *can* be at issue.

The second issue concerns the fact that appositives are known to project past propositional operators such as negation, modals or attitude verbs.²¹ Recent work by Tonhauser *et al.* (2012) and Simons *et al.* (2010) has argued quite convincingly that the range of content that projects past such operators goes beyond presupposed content. Instead, projective content is content that is not at issue, and propositional operators only target at-issue content. Appositive content projects and is typically construed as a commitment on the part of the speaker, as seen in (48). Here, the speaker seems to be committed to the opinion that Sue is a movie aficionado; this content projects past the attitude verb *believe*, and cannot be canceled later.

(48) Ed believes that Sue, a movie aficionado, has never seen *Singin' in the Rain*.
#But Sue isn't a movie aficionado.

Thus, one might wonder how we can reconcile the at-issueness of appositives as witnessed in our experiments with their robust projection behavior.²²

One way of getting around this apparent inconsistency is to say that propositional operators target material in their syntactic scope selectively. Thus even when in the syntactic scope of an operator, appositives are predicted to project, because of their illocutionary independence.²³ We would also like to point out that given the observation that appositives are typically not at issue and project, it does not necessarily follow that *because* they project, they *cannot* be at issue. A possible example of this is in (49), where the appositive projects past the modal *might*, but nevertheless can be targeted by B's direct rejection.

²¹ See Chierchia & McConnell-Ginet (2000) and Potts (2005) on the projection behavior of appositives. Amaral *et al.* (2007), Harris & Potts (2009), Potts (2009), Schlenker (2010, 2013) and Wang *et al.* (2006) discuss several (apparent) exceptions to appositive projection. It is an interesting question whether such interpretations are accompanied by a shift in information status.

²² Simons *et al.* (2010, p. 323) do discuss instances of 'apparently at-issue NRRCs' in which the partial answer to a question is contained in the appositive, but the appositive still seems to project.

(27) Q: Who's coming to the dinner tonight?

A: Well, I haven't talked to Charles, who probably won't be able to come, but I did talk to Sally, who is coming.

They argue that with such examples, an implicit question must be reconstructed.

²³ See Koev (2013) for a dynamic implementation that derives the projection behavior of appositives directly from their illocutionary independence.

- (49) A: Liz might be with her husband, who has prostate cancer.
B: That's not true—he has lung cancer.

We have shown that appositives pass multiple tests for at-issue status (they can be the target of a direct rejection, can provide the main assertion for ellipsis in a following sentence, and can address a QUD), and we do not dispute that they typically project past entailment-canceling operators. Instead, we regard the projection behavior of appositives as independent from their at-issue status and take the precise relationship between projective content and information status as a very exciting avenue for future research.

9 CONCLUSION

The combined findings of our experiments demonstrate that appositives—while typically not at issue—can take on at-issue status, as seen in the ability of sentence-final ARCs to be directly rejected and be associated with an elliptical question, and that appositives do contribute to the truth conditions of the sentence in which they appear, making the sentence False if the appositive content is deemed False. However, we also saw that appositives do not pattern as a uniform class with respect to their information status. Differences based on surface-level position and syntactic form, which are linked to their role in the flow of discourse and their relation to the anchor, give rise to differences in whether appositives are considered to be at issue or not. The potentially at-issue status of sentence-final ARCs demonstrates a previously unrecognized interplay between conventionalized meaning of an appositive and its salience relative to the rest of the sentence, and one which we hope will result in further research in this area.

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Supplementary Data

Supplementary data are available at *Journal of Semantics* online.

KRISTEN SYRETT

Department of Linguistics

Rutgers, The State University of New Jersey-

New Brunswick, 18 Seminary Place

NJ 08901

e-mail: kristen.syrett@rutgers.edu

TODOR KOEV

Institute of Linguistics

University of Stuttgart

Keplerstraße 17, 70174 Stuttgart, Germany

e-mail: tkoev@scarletmail.rutgers.edu

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