

A Syntactic Correlate of a Semantic Asymmetry

Bronwyn M. Bjorkman, MIT
bmbjork@mit.edu

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This talk is about the interpretation of *and* when it is used to coordinate clauses:

- (1) a. Water freezes at 0°C, and ethanol freezes at -114°C.
- b. The lights came on and the singer stepped onto the stage.
- c. The sniper shot him and he died.

(1a) = ‘**logical**’ *and*
(1b-c) = ‘**asymmetric**’ *and* (*temporal* or *causal* connection)

Why ‘asymmetric’? (1b-c) do not mean the same thing when their clauses are reversed. This is *not* true of the ‘logical’ *and* in (1a).

- (2) a. Ethanol freezes at -114°C and water freezes at 0°C. (= (1a))
- b. The singer stepped onto the stage and the lights came on. (≠ (1b))
- c. He died and the sniper shot him. (≠ (1c))

The question: How do we account for the difference between logical and asymmetric *and*?

The debate in the literature has assumed that either logical or asymmetric *and* must be basic:

EITHER *and* is inherently symmetric (logical), but pragmatics of language use give rise to asymmetric interpretations.

OR *and* is inherently asymmetric, but can be used under some circumstances to express logical conjunction.

An alternative: The contrast between logical and asymmetric uses of *and* arises from a **structural ambiguity** between CP and TP coordination in matrix contexts.

Evidence comes from embedded clausal coordination in examples like (3), where the difference between CP and TP coordination is visible, and tracks interpretive differences:

- (3) a. The critic reported that the lights came on and (that) the singer stepped onto the stage.
- b. We learned that the sniper shot him and (that) he died.

Outline of the Talk:

§1 background on asymmetric vs. logical *and*; the range of data in need of explanation.

§2 evidence from embedded coordination: asymmetric *and* involves TPs.

§3 preliminary semantic proposals.

1 Details of asymmetric *and*

Representative examples of the temporal/causal interpretations available to *and*:

- (4)
- a. The lights came on and the singer stepped onto the stage.
 - b. The sniper shot him and he died.
 - c. The dam broke and the valley flooded.
 - d. We spent the day in town and I went to Harrods.¹
 - e. The lights were off and I couldn't see.²

Not all of these involve an actual *sequence* of events:

- (4a) involves a sequence of events.
- (4b-c) involve a temporal sequence with an additional causal element.
- (4d) involves a background event within which the second clause is contained.
- (4e) involves a background state-of-affairs of which the second clause is a consequence

Is there anything to explain? The same interpretations are available to sequenced/juxtaposed clauses:

- (5)
- a. The lights came on; the singer stepped onto the stage.
 - b. The sniper shot him; he died.
 - c. The dam broke; the valley flooded.
 - d. We spent the day in town; I went to Harrods.
 - e. The lights were off; I couldn't see.

The sentences in (5) are not syntactically connected, so these interpretations can *only* arise through pragmatic inference.

If pragmatic inference is *able* to produce these interpretations, we should assume it is also responsible for the interpretations in (4), in absence of evidence to the contrary. (Grice, 1975; Schmerling, 1975; Posner, 1980)

However: such evidence to the contrary does exist: *and* is *more restricted* in its temporal/causal interpretations than are juxtaposed sentences (Bar-Lev and Palacas, 1980).

¹Example originally from Carston (1993).

²Example originally from Schmerling (1975).

- (6) Juxtaposed clauses can be reversed and keep the same interpretation (cf. (5)):³
- a. The singer stepped onto the stage; the lights came on.
 - b. He died; the sniper shot him.
 - c. The valley flooded; the dam broke.
 - d. I went to Harrods; we spent the day in town.
 - e. I couldn't see; the lights were off.
- (7) Coordinated clauses *cannot* be reversed and keep the same interpretation (cf. (4)):
- a. The singer stepped onto the stage and the lights came on.
 - b. He died and the sniper shot him.
 - c. The valley flooded and the dam broke.
 - d. I went to Harrods and we spent the day in town.
 - e. I couldn't see and the lights were off.

There must therefore be something special about *and* that restricts its interpretation.

Generalization: asymmetric *and* can only convey 'forward' temporal/causal relationships between two clauses.

Some (apparent) exceptions:

The character of these exceptions is that it is not *and* that communicates the 'reverse' relation, but some other factor (explicit statement, world knowledge, or listener inference):

1. An explicitly-stated 'backwards' temporal/causal link is possible, as in (8) (Bar-Lev and Palacas, 1980):

- (8) If the old king has died of a heart attack and a republic has been formed, and the latter event has caused the former, then Tom will be upset.

Thus, we can have examples like [[*P and Q*] *and R*] where R asserts that Q caused P.

2. In cases where *and* does not appear to *communicate* a temporal relation, world knowledge can allow us to infer a reverse temporal relation (example adapted from Blakemore and Carston 1999):

- (9) She did her PhD in the US and she did her MA in Canada.

3. Focus in each of the two conjuncts can invite a listener to infer a reverse temporal/causal relation (an observation attributed to Larry Horn by Carston 1993):

- (10) A: Did Bill break the vase?
B: Well, the vase BROKE, and HE dropped it.

While the conjuncts in (10b) are in a reverse order, the sentence straightforwardly conveys that the listener should conclude that it was Bill's dropping the vase that broke it.

³Some of these interpretations, such as (6a) or (6c), do become somewhat less natural in an out-of-the-blue context.

2 Embedding facts

Previous accounts have assumed that logical and asymmetric *and* involve the same syntactic representations, and that either one or the other must count as ‘basic’.

In this section we will see evidence that they actually involve *different* syntactic representations: specifically, that asymmetric *and* involves *smaller* constituents.

Consider the pair of sentences in (11):

- (11) a. The newspaper reported that a new mayor was elected and there was a riot.
 b. The newspaper reported that a new mayor was elected and that there was a riot.

These sentences are *structurally* different.

(11a) involves a single instance of *that*, and an embedding verb that prefers complements introduced by *that*. It therefore appears to involve **TP** coordination of the embedded clauses.⁴

report [_{CP} *that* [_{TP} ...] *and* [_{TP} ...]]

(11b) has two instances of *that*, and so therefore must involve **CP** coordination.

report [_{CP} *that* ...] *and* [_{CP} *that* ...]

These sentences are also *interpretively* different.

Consider the scenario in (12):

- (12) *Scenario: the newspaper ran two unrelated stories yesterday. In the first it reported that the incumbent mayor was defeated in yesterday’s election; in the second it reported on a riot that occurred in the wake of last night’s hockey game.*
- a. #The newspaper reported that a new mayor was elected and there was a riot.
 (= TP coordination)
- b. The newspaper reported that a new mayor was elected and that there was a riot.
 (= CP coordination)

It is not that CP coordination is *ambiguous* as to whether there is a connection between events: the example in (13b) is felt to be less informative than (13a)

- (13) *An engineer said: “The dam broke. As a direct consequence of that, the valley below the dam flooded.”*
- a. The engineer has confirmed that the dam broke and the valley flooded.
 (= TP coordination)
- b. The engineer has confirmed that the dam broke and that the valley flooded.
 (= CP coordination)

⁴Because *report* prefers an overt complementizer for embedded clauses, we might think that the absence of a second complementizer *requires* a TP-coordination parse. However, examples in the literature suggest that English coordinated complements can violate subcategorization requirements:

(i) You can depend on my assistant and that he will arrive on time. (Progovac, 1998, citing Gazdar et. al, 1985)

We therefore cannot necessarily conclude that a TP-coordination parse is *forced* in (11).

Furthermore, CP coordination does not exclude an inferred reverse temporal/causal interpretation, unlike TP coordination. This can be illustrated by considering the sentences below in the same context as given in (13):

- (14) a. #The engineer has confirmed that the valley flooded and the dam broke.
 (= TP coordination)
 b. The engineer has confirmed that the valley flooded and that the dam broke.
 (= CP coordination)

Generalization:

Embedded **TP** coordination asserts an asymmetric relation between events.
 Embedded **CP** coordination does not assert a temporal/causal relation between events.⁵

These generalizations would be more immediately transparent if complementizers in English were obligatorily overt.

In fact, looking at a language with temporal interpretations for *and* and obligatory complementizers, we can find the same patterns.

Modern Greek is such a language. In the examples in (15), the presence or absence of the second complementizer *oti* determines the availability of the asymmetric interpretation.

- (15) a. Ksero oti o Yanis skondapse ke i Maria ton apelise
 know.1SG COMP DET Yanis tripped.3SG and DET Maria him fired.
 “I know that Yanis tripped and Maria fired him.” (because they’re in a dance troupe)
 b. Ksero oti o Yanis skondapse ke oti i Maria ton apelise
 know.1SG COMP DET Yanis tripped.3SG and DET Maria him fired.
 “I know that Yanis tripped and that Maria fired him.” (the two aren’t necessarily related)

The example in (16) confirms that the second conjunct in (15a) would be ungrammatical on its own without the overt complementizer, indicating that (15a) must involve coordination below the CP level:

- (16) Ksero *(oti) i Maria ton apelise
 know.1SG COMP DET Maria him fired.
 “I know (that) Maria fired him.”

⁵There is also some evidence that this is true of embedded non-finite clauses:

- (i) a. The conspirators planned for the White House to explode and the president to die.
 b. The conspirators planned for the White House to explode and for the president to die.

(ib), but not (ia), seems to be compatible with a plan in which the president is not meant to die in the explosion of the White House.

<p>Extension to matrix contexts:</p> <p>All cases of asymmetric <i>and</i> involve TP coordination.</p> <p>All cases of logical <i>and</i> involve CP coordination.</p>
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Is there anywhere that we can *see* CP coordination in a matrix context, correlated with the ‘logical’ meaning for *and*?

Yes. Consider the example in (17), where focus in each of the two conjuncts can invite a listener to infer a reverse temporal/causal relation (an observation attributed to Larry Horn by Carston 1993):

- (17) A: Did Bill break the vase?
 B: Well, the vase BROKE, and HE dropped it.

While the conjuncts in (17b) are in a reverse order, the sentence straightforwardly conveys that the listener should conclude that it was Bill’s dropping the vase that broke it.

These examples require focus of a particular type in both conjuncts. Many analyses of focus propose that it involves projections in the left periphery (as in, for example, the articulated proposals for the CP layer in Rizzi 1997).

It is reasonable to think that the separate focus in each of the conjuncts in (17) requires that *each* conjunct have a CP layer.

Thus, it is not the case that focus *reverses* the semantic temporal interpretation of *and* – it merely requires CP coordination, which is semantically symmetric and therefore allows reverse temporal/causal inferences to be drawn.

In light of these claims, note that the interpretation of the Horn examples can be paralleled by cases of embedded CP coordination:

- (18) a. WELL, the millionaire DIED, and the butler gave him POISON.
 b. We know that the millionaire died and that the butler gave him poison.
 ... and so we can conclude that the butler intentionally murdered him.

Furthermore, the conjuncts in these focused examples can be reversed while maintaining the same interpretation:

- (19) a. BILL dropped the vase, and it BROKE.
 b. The butler gave the millionaire POISON, and he DIED.

This section has offered evidence that varying interpretations for *and* arise as a result of *structural ambiguity* between TP and CP coordination in matrix contexts.

What remains is to determine whether there can be a single unified meaning for *and* that produces the observed interpretations.

3 Towards a semantics for *and*

We have established that there is a syntactic basis for the contrast between asymmetric and logical *and*.

Two basic ways to capture this semantically:

1. Assign CP-coordinating *and* and TP-coordinating *and* different meanings.
2. Assign *and* a single meaning, attribute the variability to difference in how this single meaning interacts with the denotations of CPs and TPs themselves.

In the interests of avoiding unnecessary ambiguity, we should pursue the second of these options.

Where to begin? The interpretation of asymmetric *and*.

Asymmetric *and* expresses a relationship between *events*: the event of the second clause *follows upon* the event of the first clause.

Assume that TPs denote *temporally-located events*.

Idea: *and* says that the object denoted by its first conjunct has some extension such that the object denoted by its second conjunct is also a sub-part of this larger object.

- *TP1 and TP2* asserts that $\llbracket TP1 \rrbracket$ has a minimal extension of which $\llbracket TP2 \rrbracket$ is a sub-part

This definition will not itself produce temporal/causal asymmetries between the coordinated events – nothing so far prevents the extension of the first conjunct from being extended to include temporally/causally *prior* events.⁶

What will introduce the required asymmetry is the idea of ‘extension’ as applied to an event. Suppose that events can be extended only *forward* in time, or *atemporally*.

Put another way, though still imprecisely: looking at an event, you can see how it will *develop*, but you cannot see what it developed *from*.

Consider again the contrast between the sentences in (20), repeated from (4) and (7):

- (20) a. The sniper shot him and he died.
 b. (#) He died and the sniper shot him.

On the present account, both these sentences assert that the event described in the first clause can be extended to encompass the event described in the second clause. What makes (20b) odd is that the properties of events are such that the event described by *he died* cannot be extended backwards to encompass its cause, only forward to encompass its consequences or immediate results.⁷

What about CP coordination and ‘logical’ and

The proposal above for asymmetric *and* hinges on the idea that TPs denote events, and events have asymmetric extensions.

⁶This is a desirable characteristic: were an *and* with these properties to relate sets of individuals, for example, it would not matter which order it combined with the two conjuncts.

⁷If the present account is correct, this may explain the asymmetric interpretations commonly found in VP coordination, catalogued in (Ross, 1967; Goldsmith, 1985; Lakoff, 1986; Postal, 1998).

For CP coordination to lack this asymmetry, CPs must denote objects that lack these properties.

Unfortunately the proposed meaning for *and* given above will not extend easily to CPs.

CPs denote sets of *worlds* (i.e. propositions) – so far so good, because logical *and* is generally thought of as coordinating propositions.

Applied to sets of worlds, however, logical *and* should be equivalent to set *intersection*; the proposed meaning for *and* given above would instead be equivalent to set *union*.

Even were we to get around this and to talk about *and* relating individual worlds to one another, the best we could say is that the above definition of *and* could require *identity* between worlds:

- If worlds are *maximal* situations (following Kratzer, 1989 and others), then they cannot be extended.
- In this case, the only way to satisfy the relation required by *and* above is if two conjuncts denote the *same* entity (in which case the second will indeed be a non-proper subpart of the first).

This is not a faithful description of the meaning of *and*; furthermore, in general *and* cannot be used to connect two elements that denote the same thing:

- (21) a. #I saw my aunt and my mother's sister.
 b. #Water freezes at 0°C and water freezes at 32°F.
 c. #I met a famous actress and I met Helen Mirren.⁸

The analysis of CP coordination remains problematic, but what is key for the present account is that whatever CPs denote, *it not* have the asymmetric extension properties I have attributed to events.

4 Conclusion

This paper has shown that it is possible to find a *syntactic correlate* of the interpretive difference between logical and asymmetric *and* in embedded contexts:

- logical *and* involves coordination of *larger* constituents (**CPs**)
- asymmetric *and* involves coordination of *smaller* constituents (**TPs**)

This has raised the possibility that variability in *and*'s interpretation results from an *invariant* semantics for *and* that combines with constituents of different semantic types.

Further topics for investigation

- Details of the semantic implementation of *and*
- Cross-linguistic properties of asymmetric *and*
- Extension to other asymmetric uses of *and*: conditional/causal *and* (see Appendix A), VP coordination

⁸Example adapted from Carston (1993).

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A Extension to conditional *and*

One advantage of this general approach to asymmetric *and* is that it might open up a path to unification with another non-‘logical’ use of *and* that has heretofore seemed exotically unlike other uses of *and*: this is “left-subordinating *and*” (Culicover and Jackendoff, 1997).

This is a use of *and* in sentences that appear to have a *conditional* interpretation:

- (22) a. The sniper shoots him and he’ll die.
 b. I lose my travel documents and my visa will be voided.
 c. Big Louie sees you with the loot and he puts a contract out on you.⁹

This construction has been discussed most extensively in light of the fact that its first conjunct can be an *imperative* (Bolinger, 1967; Han, 2000; Russell, 2007; Schwager, 2005), and its other odd properties include the ability to take a DP as its first conjunct (Culicover, 1970) and the limitation of modals in the first conjunct to sufficiency modals (von Stechow and Iatridou, 2007).

- (23) a. Move and I’ll shoot!
 b. One more drink and I’m heading home.
 c. You *(only) have to pay attention and you’ll get a good grade in that class.

A full understanding of left-subordinating *and* must account for these types of examples, but our concern here is with cases like those in (22), where both clauses are simple declaratives.

These show a number of similarities to the temporal/causal *and* that has been the focus of this paper:

1. left-subordinating *and* shares asymmetric *and*’s limitation to TP coordination.
2. minimal pairs can be created between asymmetric and left-subordinating *and* by controlling the interpretation of the tense in the first clause.

Culicover and Jackendoff observed that in a sentence like (24), the conditional interpretation is available *only* in the absence of the second *that*:

- (24) You realize, of course, that you have one more drink and (*that) you’ll be kicked out.

This is exactly parallel to what we saw in section 2 regarding the embedding of asymmetric *and*.

Furthermore, if we take the sentences from (22) and alter the tenses involved, we easily convert these to cases of asymmetric *and*:

- (25) a. The sniper shot him and he died.
 b. I lost my travel documents and my visa was voided.
 c. Big Louie saw you with the loot and he put a contract out on you.¹⁰

The main difference between the sentences in (22) and (25) is that left-subordinating *and* requires a tense in the first conjunct that is interpreted *generically*

⁹Example drawn from Culicover and Jackendoff (1997).

This suggests the following connection between the two uses of *and*:

left-subordinating *and* = asymmetric *and* + generic operator

- if we're talking about a single event, *and* can say that that event lead to another event.
- interpreted generically, this asserts that events of a certain time *always* (or rather *generically*) lead to events of another type.

The latter is very similar to a conditional interpretation. While details of this unification remain to be worked out, and depend on a more exact development of the analysis in the previous section, this provides greater chance at unification than previous analyses of left-subordinating *and*, which have rested on the idea that *and* is essentially semantically vacuous in these constructions.¹¹

What it might allow is an explanation of an observation due to Bolinger (1967), only good when the second conjunct is an *intrinsic consequence* of the first conjunct (examples adapted from von Fintel and Iatridou 2009):

- (26) a. A dog has blue eyes and it's probably a husky.
 b. #A dog has blue eyes and it's intelligent.
- (27) a. A man buys a horse and it's his.
 b. #A man buys a horse and he pays cash for it.

The oddness of the (b) examples here can be ameliorated if we imagine a context in which it becomes a general truth that the second conjunct follows from the first conjunct.

We can understand this contrast as following from the fact that the causal/conditional interpretation of *and* in these cases requires a *generic* interpretation. Relationships that do not hold generically (or generically within a restricted domain) cannot be communicated using left-subordinating *and*.

¹¹Forthcoming work by Sabine Iatridou and Kai von Fintel.