
Adverbials and Information Structure

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1

Sentence-level Adverbials

Every sentence-level adverbial involves the interpretation of at least **one** clause:

- (1) **Personally**, I dislike its combination of ponderousness and timidity.
- (2) **Possibly** it would better to decline.
- (3) **Eventually** someone will realise that we're here.

But some involve the answer to another question:

- (4) **Accordingly**, each research project relates a current or potential clinical intervention to a basic science.

According to what?

- (5) **Instead**, let's stay home.

Instead of what?

- (6) **Meanwhile**, they tackle the mounds of paper.

At the same time as what?

3

Outline

- Introduction: Adverbials, Discourse Connectives & Abstract Objects
- Discourse Adverbials as Discourse Connectives
- Clausal Adverbials as Discourse Connectives
- Conclusion

Adverbials are worth more attention.

2

Discourse Structure and Discourse Connectives

Discourse Structure is indicated, in part, by discourse connectives (aka "cue phrases"), including

- Coordinating conjunctions (e.g. "and", "but", "or")
- Subordinating conjunctions (e.g. "because", "when", "although")
- Other coordinators (e.g., "so that", "in order to", "as soon as")
- Various sentence-level adverbials (e.g., "accordingly", "instead", "meanwhile")

[Knott 1996] has culled from text a list of words/phrases that he thinks are discourse connectives.

Of the adverbials, some involve the interpretation of a single clause (*clausal adverbials*) and some, the interpretation of >1 clause (*discourse adverbials*).

4

Adverbials as Discourse Connectives

I. It should be clear that adverbials cannot function as discourse connectives in the same way as conjunctions or other coordinators do, since structurally, they don't relate anything.

II. It should also be clear that *clausal adverbials* cannot function as discourse connectives in the same way as *discourse adverbials*, since they don't express any kind of relation.

What is going on?

5

The same clause can have different AO interpretations, depending on its context:

- (7) Fred was promoted to Vice President for marketing.
- (a) *That's* a lie. (**AO**: ASSERTION)
 - (b) *That's* false. (**AO**: PROPOSITION)
 - (c) *That's* a funny way to describe what happend. (**AO**: DESCRIPTION)
 - (d) When did *that* happen? (**AO**: EVENTUALITY)

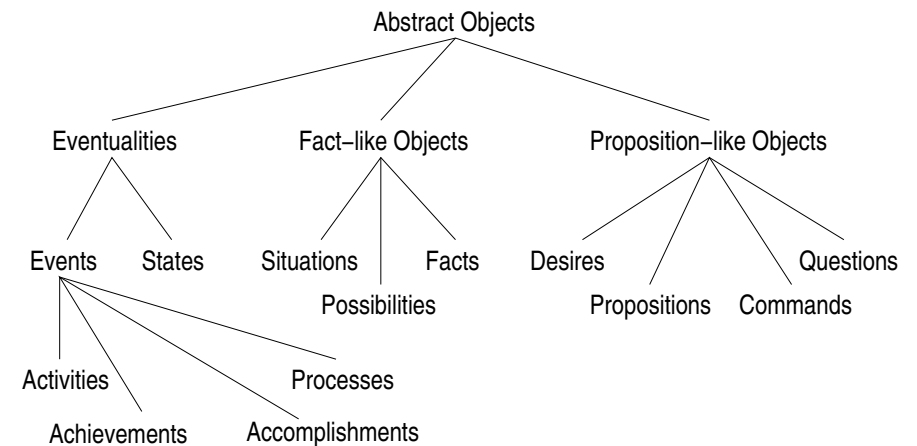
This context can be determined by an adverbial:

- (8) a. *Frequently*, clients express interest in paintings but don't end up bidding, so we don't know who the potential buyer will be. (**AO**: EVENTUALITY)
- b. *In truth*, lacking the capital to write off their mistakes or to build a navy, the banks have no alternative but to go along. (**AO**: PROPOSITION)
- c. *Personally*, I'm irked by its combination of ponderousness and timidity, which adds up to an utter lack of drama. (**AO**: BELIEF)

7

Abstract Objects as Clausal Interpretations

We assume that clauses can be interpreted as *Abstract Objects* [Asher 1993] of a contextually appropriate type.



6

Adverbials and Abstract Objects

Clausal adverbials involve only one AO in their interpretation – ie., the interpretation of their matrix clause.

Discourse adverbials involve two AO's – the interpretation of their matrix clause (**Arg2**) and another (**Arg1**).

We have argued [Webber et al 1999, 2003] that **Arg1** derives from a (usually clausal) constituent in the previous discourse.

The adverbial itself contributes the relation between **Arg1** and **Arg2**. In this way, it functions as a Discourse Connective.

Question: How do discourse adverbials come to involve a second AO (**Arg1**) in their interpretation?

The answer comes from analysing the the 13823 S-initial S-adjoined ADVP and PP adverbials in the WSJ and Brown corpora [Forbes 2003].

8

Source of a Second AO Argument (Arg1)

1. PP adverbials can have a demonstrative NP internal arg:

- *in that/this case* (25)
- *at that/this point* (21)
- *by that/this time* (13)
- *in that way* (12)
- ...

Referent of that internal arg is the adverbial's Arg1.

- (9) GM is likely to reach the cooperative operating pact it has been seeking in about two weeks, knowledgeable individuals say.

At that point investors may face a long, bumpy ride.

9

3. PP adverbials can have an indefinite/generic relational NP as internal arg:

- *in addition* (204) – *in addition “to that”*
- *for example* (167) – *as an example “of that”*
- *as a result* (84) – *as a result “of that”*
- *for instance* (70) – *as an instance “of that”*
- ...

Missing arg to that relation is the adverbial's Arg1.

- (11) Despite the economic slowdown, there are few clear signs that growth is coming to a halt. As a result, Fed officials may be divided over whether to ease credit.

11

2. PP adverbials can have a definite NP internal arg:

- *at the same time* (71)
- *at the time* (17)
- *in the end* (20),
- *in the meantime* (14)
- ...

Referent of that internal arg is the adverbial's Arg1.

- (10) The debt-laden parent has been under pressure from large shareholders to boost the company's share price. At the same time it has been caught in an earnings squeeze.

10

4. ADV adverbials can be deictic:

- *then* (292) – “*at that point*”
- *now* (189) – “*at this point*”
- *thus* (114) – “*as a result of this*”
- *yet* (80) – “*despite this*”
- *therefore* (48) – “*as a result of this*”
- ...

AO referent of the deictic is the adverbial's Arg1.

- (12) Prosecutors have told Mr. Antar's attorneys that they believe Mr. Antar's allegedly ill-gotten gains are so great that any money he has used to pay attorneys derives from illegal activities. Therefore, they said, the money can be taken from the lawyers even after they are paid.

12

5. ADV adverbials can contain a comparative:

- *moreover* (53) – “more than this/that”
- *furthermore* (31) – “more than this/that”
- *later* (30) – “later than this/that”
- *otherwise* (19) – “other than this/that”
- ...

Target of the comparison is the adverbial's **Arg1**.

- (13) “**Just say the offices are tastefully appointed,**” he says. “Otherwise, the regulators will take it for decadence, and nowadays everything’s got to be pristine.”

13

7. ADV adverbials can evoke a set:

- *finally* (49)
- *first* (34)
- *usually* (14)
- *occasionally* (8)
- *secondly* (5)
- ...

Arg1 is the set to which matrix interpretation belongs.

- (15) **A number of issues still need to be resolved before Canadian regulators give any project the final go-ahead.** First, the price of natural gas will have to almost double.

15

6. ADV adverbials can involve some idiosyncratic relation:

- *similarly* (12) – “similar to this/that”
- *accordingly* (12) – “in accordance with this/that”
- *simultaneously* (8) – “at the same time as this/that”
- *consequently* (8) – “as a consequence of this/that”
- ...

Missing arg to that relation is the adverbial's **Arg1**.

- (14) **UCLA OAIC sponsored research projects share a common theme, “linking interventional research to basic science”.** Accordingly, each research project relates a current or potential clinical intervention to a basic science.

14

Caution: Discourse Adverbials as Discourse Connectives

Since **Arg1** of a discourse adverbial need **not** be its left-adjacent clause/sentence, adjacent clauses may themselves be related by a separate (explicit or implicit) connective:

- (16) **Building powerful national institutions in Iraq** serves the interest of one group – today it is the Shiites – at the expense of the others, and inevitably produces conflict and instability. **Implicit - So** Instead, the administration should concentrate on political arrangements that match the reality in Iraq. [NYRB, 11 August 2005, “Iraq: Bush’s Islamic Republic”, Peter Galbraith, p.9]
- (17) Die cutting is done by hand in a manner similar to the procedure followed when **cutting an internal thread with a tap**, but instead you use a die.

16

Clausal Adverbials as Discourse Connectives

What about clausal adverbials that nevertheless seem to relate a sentence or clause to the previous discourse?

Case 0: “Cue phrases” – *Now, So, Well*, usually followed by a pause.

(18) *Now*, what about Pennsylvania state tax?

(19) *Well*, what should we do about state tax?

(20) *So*, what should we do about state tax?

These don't convey a (semantic) relation between parts of a discourse. Rather

- *Now* indicates a (purported) shift to a new topic;
- *So* indicates a (purported) resumption of an existing topic.
- No idea how to describe the discourse role of *well*.

17

But notice that

1. many readers would infer the same implicit *because* here **without** *actually*
(22) Keeping the listed price at a dollar is primarily a convenience. The funds do fluctuate, but beyond the third decimal place.
2. *because* often co-occurs explicitly with *actually* and *in fact*
(23) And probably they had some kind of aquatic cultural system upon which they relied for fish—as well as animal life in the surrounding areas.
Because, in fact, animals would come down and drink from the lake, itself.

Perhaps the clausal adverb simply identifies the **truth** of matrix clause as the basis for its role in an otherwise signalled relation to the previous clause.

19

Case 1: Clausal Adverbials and Implicit Connectives

It has been claimed that clausal adverbials convey through *pragmatic implicature*, that a discourse relation holds between adjacent discourse units.

Consider *actually* and *in fact* [Aijmer & Simon-Vandenberg 2004]: Why assert truth when a speaker's claims are supposed to be true?

Case 1.1

(21) Keeping the listed price at a dollar is primarily a convenience. *Actually*, the funds do fluctuate, but beyond the third decimal place. Rounding-off keeps them at \$1. [wsj_1507]

A&S-V: Asserting truth here implicates that the matrix clause is the basis for the previous claim (i.e., an implicit *because*).

18

Case 1.2

(24) Indeed, as I understand it, the paper considered by the Bureau referred to the Inter-Group on Ageing as having been “recently established”. *In fact*, Mr. President, the Inter-Group on Ageing was established in 1984.

A&S-V: Asserting factuality here implicates that the matrix clause contrasts with the previous claim (i.e., an implicit *but*).

But again, many readers would infer the same implicit *but* here **without** *actually*, and *but* often co-occurs explicitly with *actually* and *in fact*.

Again, perhaps the clausal adverb simply identifies the **truth** of matrix clause as the basis for its role in an otherwise signalled relation to the previous clause.

20

Case 1.3

(25) Virtually word for word, the notes matched questions and answers on the social-studies section of the test the student was taking. *In fact*, the student had the answers to almost all of the 40 questions in that section.

A&S-V: Asserting factuality here implicates that the matrix clause strengthens the previous claim (i.e. an implicit *and moreover*).

Same story?

21

Case 2: Clausal Adverbials and Information Structure

According to Steedman [2000], the intonation pattern of an utterance establishes the following aspects of *Information Structure* (IS):

- a *theme*, conveying presupposed information that can be recovered either from the prior discourse or through accommodation;
- a *rheme*, conveying new information
- given, or *background*, information within the theme or rheme
- new, or *focus*, information within the theme or rheme, distinguishing this information from other alternatives in the context.

IS thus provides other means of linking an utterance to the previous discourse.

[Forbes 2003] shows that if a clausal adverbial is assigned a *theme-related* role in IS, it may appear that its content is what links the interpretation of its matrix clause with the previous discourse, when it is really IS that is doing so – cf.

23

Question

While *So in fact* occurs in text, not clear whether *in fact* alone is ever used with an implicit *so*.

(26) Once you bring them [pesticides] indoors, there's no sunlight, there's no rain, they tend to degrade more slowly, so in fact, it's more important for us to understand them in that environment.

(http://www.pbs.org/now/transcript/transcript117_full.html)

(27) And, luckily, the technology education community does not have the history from psychology of finding out everything in the lab. So in fact, this community is free to come up methodologies where we can find things out in context.

(<http://www.project2061.org/meetings/technology/papers/Kolodner.htm>)

22

Theme Focus

(28) John Cooper Powys used to be a popular writer. What is the current view?

A. **Nowadays**, his books are rarely read.

Contrastive Theme

(29) Robert Ashton Lister, the founder of modern teak furniture, sourced much of the wood he used from old British warships but **nowadays** all the timber comes from managed forests.

In [Steedman 2000], a contrastive theme can require the hearer to accommodate the theme it is being contrasted with, if it is not already in the discourse context. This theme is the other AO to the contrast discourse relation.

24

Conclusion

There are several bases by which sentence-level adverbials serve as Discourse Connectives, enriching both discourse-level semantics and coherence.

- A discourse adverbial has a second (semantic) argument deriving from the previous discourse.
- A clausal adverbial can clarify the basis by which a discourse connective makes its contribution.
- A clausal adverbial can serve as a contrastive theme (one that contrasts with a previous theme), thereby making a link between the two.

The first release of a large corpus of annotated discourse connectives and their arguments will take place in November 2005.

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