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Adverbial clauses*Abstract*

Adverbial clauses are subordinate clauses that modify their superordinate clauses. This modification can occur at various levels (such as verb phrase, tense phrase, mood phrase) and in various dimensions (such as times and worlds) and ways. These variations give rise to a categorization of adverbial clauses (temporal, modal, ...) and a subcategorization according to a range of relations within these dimensions, depending on the subjunction. Thus within the modal category it is customary to distinguish between causal, conditional, purpose, result, and concessive clauses. Sometimes the subjunction does not seem to encode much meaning of its own and the clause acts more like a relative clause, modifying a quantificational adverb or a modal, or specifying an underspecified predicate; sometimes, when there is no subjunction ("free" adjunct clauses), the contribution of the clause is underspecified.

Temporal clauses are treated first, as they present relatively simple and clear-cut cases. Next, modal clauses are addressed, starting with conditional clauses, which are similar to temporal clauses and a key to the meaning of all modal clauses. Instrumental and "free", "absolute" clauses are treated last.

1. *Temporal clauses*

Temporal clauses are a subclass of temporal adverbials; like non-clausal
 50 temporal adverbials, they help situate events or states temporally. But in contrast to most non-clausal temporal adverbials, they do so indirectly, through other events or states. Thus in
 55 (1a), the event described by the verb is placed within the frame of a calendrical year, while in (1b), it is placed within a frame of a year's duration through the state described by the verb of the
 60 "when" clause:

- (1) a. My dad left in 1963.
 b. My dad left when I was 7.

65 Similarly, in (2a), the events described by the verbs are placed in the immediate vicinity of a certain time of the clock, while in (2b), they are placed in the immediate vicinity of a time identified
 70 through the event described by the verb of the "when" clause:

- (2) a. At six in the morning, she got up and started on the long way home from
 75 Ramallah to Jenin.
 b. When day broke, she gathered her children and grandchildren together and hotfooted it the 20 km to safety in Benin.

There are a number of variations on the theme thus exemplified by "when", corresponding to a variety of different temporal subjunctions, some relatively simple, like "when", others with a more complicated semantics.

1.1. Existential "when" and "while" clauses

When the eventuality described by the verb of the existential "when" clause or the verb of the root clause is a state, there is a symmetry between the two clauses in the sense that the temporal interpretation is preserved if they change roles, as in (1b) and (1c).

- (1) a. My dad left in 1963.
 b. My dad left when I was 7.
 c. I was 7 when my dad left.

The same applies when one of the two clauses has imperfective aspect, as observed for English by Partee (1984), cf. (3a/b), and for French by Kamp and Rohrer (1983); cf. the Italian sentence pair (4a/b) (Bonomi 1997) and the Russian sentence pair (5a/b).

- (3) a. Nureyev revisited Russia when his mother was dying.
 b. When Nureyev revisited Russia his mother was dying.

115 (4) a. Ahmad Jamal fu notato da Miles
 Ahmad Jamal was noted by Miles
 Davis quando suonava in un trio.
 Davis when played in a trio
 'Ahmad Jamal was noticed by
 120 Miles Davis when he was playing in a
 trio.'

b. Quando fu notato da Miles
 Davis, Ahmad Jamal suonava in un trio.

125 (5) a. My s Iroj gotovili dokumenty,
 I and Iroj prepared documents
 kogda pozvonil Boris.
 when called Boris
 'Iroj and I were preparing the
 130 documents when Boris called.'

b. Kogda my s Iroj gotovili
 dokumenty, pozvonil Boris.

The two versions may differ with regard
 135 to information structure (background or
 presupposition versus focus) and
 discourse relations, but hardly as far
 as the temporal relation is concerned.
 This symmetry can be accounted for on
 140 natural assumptions about aspect, tense,
 time adverbials, and their interaction.
 Consider (1b). Assume that the phrase "I
 be 7" denotes a set of states, that it
 merges with a covert imperfective aspect
 145 to denote the set of times included in
 the runtime of one of those states, and
 that this merge merges with the past
 tense to denote the set coming from that
 set by filtering out the non-past times.

150 Assume that the phrase "my dad leave"
denotes a set of events, that it merges
with a covert perfective aspect to
denote the set of times including the
runtime of one of those events, and that
155 this merge merges with the past tense to
denote the set coming from that set by
filtering out the non-past times. An
intuitively correct interpretation
results if we treat the subjunction
160 "when" as an existential determiner over
times: There is a nonempty intersection
between the set of past times included
in the runtime of some "I be 7" state on
the one hand and the set of past times
165 including the runtime of some "my dad
leave" event on the other hand. Due to
the symmetry of intersection, the
interpretation of (1c) is the same.
Similarly for (3a) and (3b), where both
170 verb phrases denote sets of events but
"his mother die" merges with an overt
imperfective aspect. Similarly also for
cases of mixed tenses (e.g. past – past
perfect).

175 We can thus use the term "existential"
for "when" clauses when they serve to
relate single eventualities temporally.
In (1) and (3), there is effectively
just one maximal eventuality of the
180 described type. In the general case,
however, the set of past times included
in or including the runtime of some
eventuality of the described type must
be assumed to be restricted to a

185 contextually determined time interval,
 with room only for one eventuality, as
 in (2b). It has often been noted that
 the eventuality described in a temporal
 clause tends to be presupposed, as if
 190 there were a definite description; this
 way, attention is limited to one maximal
 eventuality. Although English "when" is
 indifferent to the number of relevant
 maximal eventualities (see 1.2. on
 195 universal "when" clauses), a subjunction
 may well come with the constraint that
 there is only one to be considered –
 e.g., German "als".

In English, "when" can be used for
 200 both past and future times, cf. (6), but
 it is not uncommon to use two distinct
 subjunctions; thus in German, "als" is
 reserved for past times while "wenn" is
 used for future times (and in universal
 205 temporal and in conditional clauses).

- (6) a. When I am 18 I will volunteer
 to serve in the armed forces.
 b. I will be 18 when we get
 210 married.

Recall that when the eventuality
 described by the verb of the existential
 "when" clause or the verb of the root
 215 clause is a state, there is a symmetry
 between the two clauses in the sense
 that the temporal interpretation is
 preserved if they change roles. However,
 as has often been noted, once both verbs

220 describe events and have perfective
 aspect, the symmetry breaks down.
 Scholars from Heinämäki (1978) via
 Partee (1984), Hinrichs (1986),
 Sandström (1993) and Bonomi (1997) to
 225 Glasbey (2004) have observed that
 eventive "when" clauses typically 'move
 time forward', introducing a new
 reference time located 'just after' the
 event; "the event described by [the
 230 "when" clause] *precedes* (possibly as a
 cause) the event described by [the main
 clause]" (Bonomi 1997: 496); in the face
 of counterexamples, however, this is
 only "a pragmatic implicature".

235

(7) When she died she left a massive
 doll collection.

(8) Labonte broke his shoulder when he
 240 wrecked at Darlington in March of 1999.

(9) When she died she was buried
 somewhere along the Ho Chi Minh Trail.

245 (10) I will marry him when he gets a
 divorce.

In (7) and (8), the "when" clause event
 and the main clause event plausibly
 250 coincide temporally, or the runtime of
 the former includes that of the latter,
 while in (9) and (10), the former is
 likely to precede the latter. The
 reverse is not possible; the former

255 cannot be taken to succeed the latter.
 Sandström (1993) and Glasbey (2004)
 appeal to discourse relations like
 'consequentiality' or 'reaction' to
 predict the forward-movement use of
 260 "when". It remains an open question,
 though, whether and, in the event, how
 the semantics of "when" should be
 constrained to capture this asymmetry.
 Some scholars prefer to formulate
 265 detailed meaning rules, others would
 rather appeal to more general pragmatic
 principles.

"While" clauses are similar to "when"
 clauses but seem to require that their
 270 predicates are atelic or supplied with
 progressive aspect (if not, as in (11),
 they are still interpreted as atelic),
 so the temporal relation conveyed will
 always be simultaneity, as in (11) and
 275 (12), or inclusion, as in (13).

(11) While I came to I was lying where I
 had fallen.

280 (12) While she worked he was vomiting.

(13) While he slept she glued his
 chesspieces to the board.

285 This will follow if we assume that
 "while" operates on the set of time
 intervals provided by the tense phrase
 to yield the set of maximal elements
 (intervals not properly included in

290 another interval), quantifying
 existentially over this set and the set
 supplied by the tense phrase of the main
 clause; then the content of the
 construction will be neurotic if the
 295 "while" clause predicate is truly telic
 and perfective: We would claim that
 there is a maximal time interval
 including, instead of included in, the
 runtime of an event of the given type.
 300 This is contradictory, unless the
 context provides a finite frame time;
 but then, the "while" clause will not
 serve to restrict that frame. This is
 one way of predicting that "while" only
 305 tolerates sets of intervals included in,
 not including, the runtime of an
 eventuality of a given type; there may
 be alternative ways.

310 1.2. Universal "when" clauses

When the eventuality type described by
 the predicate can have several maximal
 instantiations, the "when" clause can be
 interpreted as a universal quantifier
 315 over times. This is the natural reading
 of sentences like (14a) and (15a).

(14) a. When the customers were rude,
 I was annoyed and wanted to cry.

320

(15) a. When the Moon is rising, it
 seems larger than when it is high in the
 sky.

325 This can be modelled by saying that the
 clause serves to restrict a covert
 habituality operator. Two facts support
 this view. First, a habituality operator
 (or adverb of quantification) can be
 330 overt, as in (14b) and (15b). (As Bonomi
 (1997) points out, while overt adverbs
 of quantification can have different
 forces, the covert adverb is always
 universal or generic.) Second,
 335 habituality can be observed in
 connection with non-clausal temporal
 adverbials as well, cf. (15c).

(14) b. Sometimes when I am alone, I
 340 google myself.

(15) b. When the Moon is rising, it
 often seems larger than when it is high
 in the sky.

345 c. In the evening, the Moon often
 seems larger than in the night.

Such an analysis is not quite simple,
 though. First, as discussed by de Swart
 350 (1991), different temporal subjunctions,
 including "after" and "before", interact
 with overt or covert-universal adverbs,
 hence they convey distinctive temporal
 information of their own which must be
 355 taken account of. Second, as discussed
 by Johnston (1994), it is not invariably
 the case that the temporal clause is the
 restrictor and the main clause is the
 nuclear scope of the adverb; it can be

360 the other way around. This variation can
 be modelled with the help of focus, but
 Johnston derives it from a distinction
 between IP and VP adjunction: If the
 temporal clause is adjoined at IP level,
 365 it serves as the restrictor; if it is
 adjoined at the level of the VP, it
 serves as the nuclear scope.

1.3. "Since" (and "until") clauses

370 "Since" clauses are a subset of "since"
 adverbials, as the word "since" can be
 used as a subjunction and as a
 preposition (the same goes for "until").
 Unlike (existential) "when" and "while"
 375 clauses, "since" (and "until") clauses
 are not directly about times including
 or included in the runtime of a salient
 eventuality of the described type;
 rather, such times serve to delimit a
 380 relevant interval to the left (these
 adverbials are accordingly sometimes
 called boundary adverbials; cf. e.g.
 Fabricius-Hansen 1986: 201). The right
 boundary of the relevant interval – the
 385 interval interacting with the intervals
 coming from the main clause – is an
 evaluation time, the utterance time if
 the main clause is in the present
 perfect (and the "since" clause in the
 390 simple past) tense; cf. (16a) and (17a).
 If the tense of the main (and "since")
 clause is past perfect, as in (16b) and
 (17b), the evaluation time, the right
 boundary of the relevant time span, is a

395 (here) contextually fixed past time.

(16) a. Her life has changed since she
had her baby.

b. Her life had changed since she
400 had had her baby.

(17) a. She has been weepy since she
had her baby.

b. She had been weepy since she
405 had had her baby.

Intuitively, in (16) the relevant time
span is claimed to include the runtime
of the main clause eventuality, while in
410 (17) it is the other way around; the
time between her having her baby and now
(then) is claimed to be included in the
runtime of her being weepy. This follows
from simple considerations of the
415 interplay between aspect, tense, and
time adverbials once it is observed that
in (16), the aspect of the main clause
is perfective while in (17) it is
imperfective: The main clause of (16a)
420 can be taken to denote the set of past
times abutting the utterance time (due
to the present perfect) and including
the runtime of a her life changing
event, while that of (17a) can be taken
425 to denote the set of past times abutting
the utterance time and included in the
runtime of a she being weepy state. If
now the "since" clause denotes the time
span stretching from the left boundary

430 (the past runtime of the salient she
 having her baby event) to the right
 boundary (the utterance time), then on
 the most basic of composition rules this
 time is to be a member of the set of
 435 times denoted by the main clause, and
 the result is in accordance with our
 intuitions.

We encounter a slightly different
 usage of e.g. German "seit" in sentences
 440 like (18) or (19), where the tense in
 the subordinate clause is the present
 (or past), not the present (or past)
 perfect.

445 (18) Seit sie Mutter ist (war),
 hat/-te sie Angst vorm Fliegen.

(19) Seit sie alleine lebt, hat sie
 enorme Fortschritte gemacht.

450 Here the subordinate clause does not
 contribute a left boundary to the time
 span relevant for the superordinate
 clause, it contributes the relevant time
 455 span directly, through the runtime of
 the state described – though the
 constraint remains that this time abut
 the utterance, or, in the general case,
 evaluation time. Iatridou and von Stechow
 460 (2005) strive to reconcile this reading,
 where the two eventualities may seem to
 be presented as simultaneous, with the
 'boundary' reading discussed above.

"Since" is restricted to past times;

465 when talking about the future, we use
 the subjunction "until" instead; the use
 of German "seit" in (18) or (19),
 however, is mirrored in the future not
 by "bis" (\approx until) but by "solange" (\approx
 470 as long as). This lexical split might be
 taken to indicate that "seit" is really
 ambiguous.

1.4. "Before" and "after" clauses

475 (20a) is very similar in meaning to
 (16a). (20b) is a bit less similar:

(20) a. Her life has changed after she
 had her baby.

480 b. Her life changed after she had
 her baby.

Here the simple past in the temporal
 clause shows that what corresponds to
 485 the right boundary in the "since" case
 can be properly prior to the utterance
 time. It would seem that "after" just
 expresses a subsequence relation; say,
 the runtime of an event of the type
 490 described in the main clause succeeds
 the runtime of the salient event of the
 type described in the "after" clause.
 And we would expect the subjunction
 "before" to express the converse
 495 relation: that the runtime of an event
 of the type described in the main clause
precedes the runtime of the salient
 event of the type described in the
 "before" clause.

500

(21) She had her baby before her life changed.

As observed in connection with "when" clauses, the information structure, in terms of what is given and what is new, may well be different, but purely semantically, it is difficult to detect a difference between (20b) and (21). We tend to think of "after" and "before" as logical converses, differing only in the direction of the temporal relation. However, closer scrutiny casts doubt on this view. Anscombe (1964) provided evidence which led her to conclude that while "after" involves existential quantification, "before" involves universal quantification. Heinämäki (1978) also proposed truth conditions on which "before" is not only opposite to, but also stronger than "after". In one sense, however, "before" appears to be weaker than "after": the latter, but not the former, is veridical, i.e. the temporal clause is entailed. Thus (22a) means something quite different from (22b).

(22) a. Spermicides destroy sperm before they penetrate the egg.

b. Sperm penetrate the egg after spermicides destroy them.

Beaver and Condoravdi (2003) propose a

535 uniform analysis of "after" and "before"
 differing only in the temporal relation,
 tracing the other differences to this
 asymmetry as it relates to initial parts
 of main clause eventuality runtimes and
 540 branching possible worlds. On this
 analysis, since worlds are identical in
 the backward but not in the forward
 direction, the reversal of the temporal
 order has a modal significance.

545

2. Modal clauses

In their analysis of "before" clauses,
 Beaver and Condoravdi (2003) (see 1.4.)
 utilize possible worlds, similar to but
 550 possibly different from the actual
 world, to explain the non-veridicality
 of "before" and the ensuing non- or even
 counterfactual interpretations. This
 makes "before" clauses partway modal.
 555 Modal clauses relate the superordinate
 clause proposition to the subordinate
 clause proposition through some
 accessibility relation between possible
 worlds. This intensional, mood phrase
 560 modification can take various forms.

2.1. Conditional clauses

Intuitively, the only difference between
 (10), with a temporal "when" clause, and
 565 (23), with a conditional "if" clause, is
 that in (23), the event of him getting a
 divorce is not entailed or presupposed;
 the temporal relation between his
 getting a divorce and my marrying him

570 seems to be the same.

(10) I will marry him when he gets a divorce.

575 (23) I will marry him if he gets a divorce.

So one might think that (23) only makes a prediction about the case where he in fact gets a divorce; in case he doesn't, 580 the sentence is trivially true. However, this notion of conditionals as material implications has by most scholars been considered too weak; (23) does seem to make a claim even if the antecedent is 585 actually false, the same claim, *mutatis mutandis*, as the counterfactual (24).

(24) I would have married him if he had gotten a divorce.

590

Here, the "subjunctive" past tense forms presuppose that the antecedent is false, so for the sentence to be true or false, one has to look beyond the actual world 595 to see whether the consequent is true together with the antecedent.

The possible-world analysis of "if" clauses originated with Stalnaker (1968) and was refined and variously modified 600 by Lewis (1973) and Kratzer (1981), *i.a.* (see article for recent developments and alternative treatments). On Stalnaker's original simple analysis, for (23) to be true in a world w , the consequent (that

605 I marry him) must be true in the world
 closest to w (possibly w itself) where
 the antecedent (that he gets a divorce)
 is true; similarly for (24) (though here
 the closest world must be different from
 610 w and the events are in the past). This
 analysis, treating the "if" clause as a
 definite description over worlds, has
 recently been revived by Schlenker
 (2004).

615 To account for the temporal parallel
 between the "when" construction (10) and
 the "if" construction (23), one must say
 that in the closest world to w where
 there is a future time including the
 620 runtime of an event of him getting a
 divorce, one such time includes the
 runtime of an event of me marrying him,
 or something more restricted. This
 amounts to analysing "if" as (modal)
 625 "if" + "when" (Fabricius-Hansen and Sæbø
 1983).

There is a vast literature on
 conditional clauses (see article); they
 have probably been the subject of more
 630 discussion than all the other kinds of
 adverbial clauses taken together. This
 is not accidental: in some way or other,
 they are at the base of the meaning of
 all the other modal clause types.

635

2.2. Result clauses

What is commonly referred to as result
 clauses (or consecutive clauses) come in
 two varieties: Clauses introduced by "so

640 (that)", as in (25) or (26), and clauses
 apparently introduced by "that",
 correlated with "so" modifying a
 gradable adjective in the main clause,
 as in (27) and (28).

645

(25) The walls tumbled down so that the
 Israelites could enter the city.

(26) Villages have been sealed off so
 650 that residents must enter or leave
 through control points.

(27) The wall is so high (that) I cannot
 get over it.

655

(28) In some places the rock face is so
 steep that you have to use a ladder.

Traditionally, result clauses have been
 660 considered to convey a causal relation
 and be closely related to causal clauses
 (see 2.3.). Meier (2000) offers evidence
 against this view, arguing instead that
 the subordinate clause is overtly or
 665 covertly modalized (in (25)-(28) it is
 overtly modalized) and interpreted as a
 hidden, incomplete conditional for which
 the main clause provides the antecedent
 – in Kratzer's theory (e.g. 1991), a
 670 proposition added to the modal base for
 the modal. In addition, the main clause
 is entailed. On this analysis, the (26)
 "that" clause is interpreted as the set
 of propositions p such that (if p) must

675 (residents enter through control posts);
 "so" denotes a relation between a set of
 propositions and a proposition to the
 effect that the latter is true and in
 the former. The result is an
 680 interpretation corresponding to the
 following paraphrase: Villages have been
 sealed off, and if they have, residents
 must enter through control posts.

The analysis of the variant involving
 685 adjectives (cf. (27) and (28)) is more
 complicated (see also Meier 2001);
 simplifying a little, the main clause
 still supplies a conditional antecedent
 for an essentially binary modal overtly
 690 or covertly present in the result
 clause, but now, this proposition
 involves a degree in the actual world; a
 paraphrase of (27) could be: The wall is
 as high as it is (a tautology of course)
 695 and if it is as high as it actually is,
 I cannot get over it.

Meier's work (2000, 2001) is the only
 formal semantic treatment of result
 clauses so far. It makes crucial use of
 700 the theory of modality developed by
 Kratzer (e.g. 1981) and the notion of a
 hidden conditional and even in many
 cases a hidden modal. Kratzer's own
 theory extended to "if" clauses, and
 705 Meier takes it further; ahead might lie
 a conception of other kinds of modal
 clauses, say, causal or purpose clauses,
 serving the purpose of supplying overt
 or covert modals with conversational

710 background propositions. As yet,
 however, there is scarce evidence as to
 whether this is a feasible course.

2.3. Causal clauses

715 Causal clauses are clauses introduced
 by subjunctions like "because", German
 "weil", French "parce que", or Russian
 "potomu chto", clauses which can be used
 for answering "why" questions. The basic
 720 piece of meaning conveyed by these words
 is that the proposition expressed (or
 the event described) in the subordinate
 clause is the cause of, or reason for,
 the proposition expressed (or the event
 725 described) in the main clause, the
 effect, or consequence.

(29) They cannot return to their homes
 because the village has been destroyed.

730

For Meier (2000), one argument against
 ascribing a causal semantics to result
 clauses (see 3.2.) is that a paraphrase
 with a causal term does not make sense
 735 when the sentence represents a symptom
 relation, as in (30):

(30) The light on it is on so (that) it
 is getting power.

740

One would not say that the reason that
 the machine or motor is getting power is
 that the light on it is on. A more
 appropriate paraphrase, and one on which

745 Meier (2000), as we have seen, bases her
analysis, is in terms of conditionals:

(31) If the light on it is on it is
getting power.

750

The same is true of causal clauses too:
They can convey a symptom relation, in
which case a paraphrase in terms of "if"
is appropriate:

755

(32) It is getting power because the
light on it is on.

And in fact, the dominant theory of
760 causality and causal clauses was long
based on, essentially, an implication
from the cause to the effect: Between
1739, when Hume, as Lewis (1973a) put
it, defined causation twice over, and
765 1973, when Lewis revived the second
definition (see below), the first one,
according to which the cause is, given a
set of premises, a sufficient condition
for the effect, ruled the ground (see
770 Sæbø (1991) for a more thorough
discussion of this tradition).

One may be reluctant to call the
regularity instantiated by (32) a causal
regularity; the properly causal relation
775 runs in the other direction, cf. (33):

(33) The light on it is on because it is
getting power.

780 Still, a regularity analysis in terms of
 sufficient conditions and circumstances
 might be appropriate for causal clauses;
 what is in the word "because" might be
 wider than what is in the word "cause".
 785 But the mainstream of "because" analysis
 has assumed a distinction between normal
 and abnormal cases (to put it bluntly):
 (29) and (33) instantiate the standard
 case while (32) instantiates one (the
 790 evidential use) of a range of derived
 cases, where causal clauses are used to
 provide reasons for speech acts (cf.
 e.g. Rutherford 1970).

However, in regard to what has been
 795 considered standard causal clauses, it
 will often seem inadequate to say that
 the cause, together with certain facts
 and rules, is sufficient for the effect.
 (34) might just lend itself to such an
 800 analysis, along the lines of a
 paraphrase like: always, if Constantine,
 or any emperor, embraces Christianity,
 or any novel religion, and relevant laws
 obtain and the circumstances resemble
 805 those obtaining in the case at hand,
 that religion is victorious; but a
 corresponding paraphrase of (35) is
 either implausible or rather vacuous.

810 (34) Christianity was victorious because
 Constantine embraced it.

(35) Christianity was victorious because
 Constantine defeated Maxentius in 312.

815

On the other hand, the counterfactual analysis, the seminal paper of which is Lewis (1973a), is well equipped to cope with this kind of examples, where laws are less relevant than our particular beliefs about possible worlds. This is Hume's (1739) second definition: If the cause were not, nor would the effect be. As applied to (35), this analysis predicts the paraphrase (36):

825

(36) Christianity would not have been victorious if Constantine had not defeated Maxentius in 312.

830

This is a plausible paraphrase, and it has been widely embraced as an adequate basis for the semantics of "because" and other causal and causative expressions. Essentially, "q because p" is reduced to the counterfactual "not q if not p", and this counterfactual is, in turn, given a ceteris-paribus analysis; the consequent is to hold in such possible worlds where the antecedent holds but where ideally all other facts about the world remain. To be explicit, "because" is assigned the following denotation in a world w: That relation between two propositions p and q such that (i) both are true in w and (ii) in the closest world to w where p is false, q is false as well. (This is the semantics for conditionals according to Stalnaker (1968) and a simplification

845

850 of the semantics for conditionals
according to Lewis (1973).)

There are ways in which this analysis
can be refined so as to explain further
facts about causal clauses: First, they
855 should not refer to a time posterior to
the time referred to by the main clause,
cf. (37), and this can be made to follow
from the counterfactual analysis if the
similarity relation between worlds is
860 explicated in terms of branching time
(in a similar way as the nonveridicality
of "before" as opposed to "after" could
be explained by Beaver and Condoravdi
(2003); see 1.4.) (cf. Sæbø 1980).

865
(37) # The settlements perished around
1400 because the supply ships stopped
coming around 1420.

870 It is reasonable to assume that the
world closest to the actual world w
where the supply ships went on coming
around 1420 was identical to w around
1400, so that there is a contradiction:
875 the settlements are to have perished and
not to have perished around 1400.

Second, causal clauses seem stronger
than corresponding counterfactuals, in
particular concerning **causal selection**:
880 A fact may depend counterfactually on
many other facts, yet only some of them
are likely to count as causes. Thus (38)
seems to be contradicted by (39),
although the two corresponding

885 counterfactuals are compatible:

(38) She got the job because she applied for it.

(39) She got the job because she was
890 qualified for it.

One solution to this problem, proposed by Dowty (1979: 106ff.), citing Abbott (1974), is to say that for a causal
895 factor to be a (the) cause, it must be false in a relatively close world: "It does seem that often, if not always, we select as the "cause" of an event that one of the various causal conditions
900 that we can most easily imagine to have been otherwise, that is, one whose "deletion" from the actual course of events would result in the least departure from the actual world." (Dowty
905 1979: 107) This idea might also be used to account for the differences between causes expressed by causal clause modifiers like "partly" and "mainly":

910 (40) She is an A student partly because she has private tutors, but mostly because she studies diligently.

It is not obviously plausible, however,
915 that the "mostly because" fact is in this case a more labile fact than the "partly because" fact. Rather, it would seem that the main clause fact depends more heavily on the "mostly" cause, in

920 the sense that if the "partly" cause
 were false and the "mostly" cause true,
 she would be, say, a B student, whereas
 if the "mostly" cause were false but the
 "partly" cause true, she would be, say,
 925 a C student. Let us say that "a partly
 because b but mostly because c" entails
 "a because b and because c" and, in
 addition, "if not b (but still c),
 almost a" and "if not c (but still b),
 930 far from a", where "almost" and "far
 from" have a modal meaning along the
 lines of Rapp and von Stechow (1999),
 i.e. in terms of world similarities.
 Assume that f assigns to the world w and
 935 the proposition p the closest world to w
 where p is true; the different status
 between b and c could be captured by
 stating that the distance between
 $f(w, \sim b)$ and $f(f(w, \sim b), a)$ (where w is the
 940 actual world) is significantly shorter
 than that between $f(w, \sim c)$ and
 $f(f(w, \sim c), a)$.

This may not be the final answer to
 how constructions like (40) should be
 945 treated, but the suggestion illustrates
 how the framework of counterfactual
 dependence and possible world similarity
 can be exploited to express such subtle
 distinctions as causal clauses in
 950 natural languages appear to call for.

As for the non-standard cases referred
 to above, where causal clauses are used
 for giving reasons for speech acts, and
 not necessarily assertives, there have

955 been several attempts at assimilating
 them to the standard case, ranging from
 the performative hypothesis (Ross 1970)
 to pragmatically oriented approaches
 (cf. Sæbø 1991: 629f. for a more
 960 thorough discussion). One may note that
 while English "because" clauses can be
 used for giving reasons for directives
 or interrogatives, in other languages
 this is mainly done with subjunctives
 965 corresponding to "since", where the
 causal relation is arguably presupposed,
 or with causal conjunctions like French
 "car" or German "denn" (cf. Scheffler
 2005 for a recent treatment of "denn").

970

2.4. Purpose clauses

As observed by Aristotle (*Metaphysics*,
 Book 5, Chapter 2), causal clauses are
 not the only ones that can answer "why"
 975 questions; purpose clauses can too.
 Purposes, or ends, figure as his fourth
 type of cause:

"'Cause' means [...] (4) The end, i.e.
 980 that for the sake of which a thing is;
 e.g. health is the cause of walking. For
 'Why does one walk?' we say; 'that one
 may be healthy'; and in speaking thus we
 think we have given the cause."

985

Now clearly, a purpose clause does not
 answer a "why" question in the same way
 as a causal clause; (41) and (42) (in
 Classical Greek) are far from

990 synonymous:

(41) Peripatei hina hugiainêi.

'I walk in order to be healthy.'

(42) Peripatei epeidê hugiainei.

995 'I walk because I am healthy.'

Both clauses may serve to give a cause,
but not the same type of cause. Causal
(“epeidê”) clauses give a source-of-
1000 motion cause, a *causa efficiens*, while
purpose (“hina”) clauses give a cause-
as-end, a *causa finalis*:

1005 “[...] as [causes] are spoken of in
several senses it follows [...] that
things can be causes of one another
(e.g. exercise of good condition, and
the latter of exercise; not, however, in
the same way, but the one as end and the
1010 other as source of movement).”

This seems to imply that (41) is closely
related to the reversal of (42), (43):

1015 (43) Hugiainei epeidê peripatei.

'I am healthy because I walk.'

One analysis of purpose clauses has been
based on this relation: v. Wright (1971)
1020 proposed that a sentence like (44)
entails that the agent believes (45):

(44) Viegan vai bivan. (North Sami)

'I run in-order-that I keep warm'

1025 (45) Bivan dainna go viegan.

'I keep warm because I run'

"If...I say that he ran in order to catch the train, I intimate that he
1030 thought it...necessary, and maybe sufficient, to run, if he was going to reach the station before the departure of the train." (v. Wright 1971: 84)

"We ask 'Why?' The answer often is
1035 simply: 'In order to bring about p.' It is then taken for granted that the agent considers the behavior which we are trying to explain causally relevant to the bringing about of p..." (p. 96f.)

1040

Consider the following paraphrase of "a does m in order to e": "a wants to e and a does m and a believes that doing m is the best way to e". It seems convincing,
1045 but unfortunately, it is too weak: It fails to distinguish between two ends where one counts as the purpose and the other is just a pleasant side-effect:

1050 (46) MS sponsors us to spur development.

(47) MS sponsors us to save taxes.

Both (46) and (47) could come out true on the analysis inspired by von Wright,
1055 even if one might be inclined to reject either (46) or (47).

But there is another way of relating purpose clauses to causal clauses, suggested by von Wright (1971: 192):

1060 (48) might "depend on the truth of a
 nomic connection between his 'anxiety to
 catch the train' ... and his running."
 This analysis, which has been subscribed
 to by many linguists (e.g. von Stechow,
 1065 Krasikova and Penka 2006: 153), predicts
 that (48) and (49) are synonymous:

(48) He ran in order to catch the train.

(49) He ran because he wanted to catch
 1070 the train.

More generally, it seems possible to
 equate "q in order that p" with "q
 because the agent wants that p", -
 1075 which, in turn, would be evaluated via
 the counterfactual "not q if the agent
 did not want that p".

This will distinguish between (46) and
 (47) if MS wants to spur development and
 1080 to save taxes and considers it necessary
 for both ends to sponsor us but only one
 end is such that MS would not sponsor us
 if it did not want that end.

Note that one cannot assume that "the
 1085 agent" is the agent of the eventuality
 described in q – this eventuality is not
 invariably an action, or even an event:

(50) From time to time, the bridge goes
 1090 up in order that a ship may pass beneath
 it.

(51) The bridge is so high in order that
 ships may pass beneath it.

1095

Here the agent must be the causer of the event or state described in q. The next pair of examples show that in addition, (s)he must be required to deliberately cause that event or state: (52) only has a reading on which the main clause event is agentive, but (53) also has a reading on which the main clause event is nonagentive.

1105

(52) We started an avalanche to reach the summit.

(53) We started an avalanche because we wanted to reach the summit.

1110

2.5. Concessive clauses

Concessive clauses, introduced by subjunctives like English "although", are like causal clauses in that they are factive with respect to the subordinate clause and the main clause, but unlike causal clauses in that they cannot have narrow scope vis-à-vis other operators; negation, say, will unambiguously affect the main clause, not the concessive relation, in a sentence like (54):

1120

(54) The burglars were not monitored although there were cameras around them.

1125

(55) The burglars were not caught because they were monitored (but because...).

1130 As observed by König (1988) and by
 Haspelmath and König (1998), concessive
 subjunctives are often related to
 conditional subjunctives in combination
 with scalar particles ("even though"),
 1135 and this is suggestive of their meaning:
 They seem to imply that the main clause
 proposition would *a fortiori* be true if
 the concessive clause proposition were
 not true, that is to say, "q although p"
 1140 seems to entail p and q and, moreover,
 to imply that q would surely hold were p
 not to hold; cp. (56) and (57):

(56) The burglars were caught although
 1145 they were not monitored.

(57) The burglars were caught; they were
 not monitored; and if they had been
 monitored, they would have been caught.

1150 This analysis, advocated by i.a. König
 (1991) and by König and Siemund (2000),
 means that the concessive "q although p"
 implies the same counterfactual as that
 1155 entailed by the causal "~q because p".
 As observed by König and Siemund (2000),
 a sentence like (56) can be paraphrased
 by a sentence like (58), where negation
 has wide scope but is taken to affect
 1160 the main clause ('it is not the case
 that the burglars were not caught
 because they were not monitored'):

(58) The burglars did not escape because

1165 they were not monitored.

In this case, it is reasonable to assume that the causal, counterfactual relation and the causal clause proposition are
 1170 presupposed, escaping negation. What must evidently be stipulated is that this semantic structure is the only possible structure for concessives: the concessive counterfactual relation is
 1175 systematically out of focus.

3. Instrumental and free adjunct clauses

The types of adverbial clauses treated in 1. and 2. leave a residue of mostly
 1180 nonfinite adjunct clauses expressing a wide variety of meanings. Often, these meanings are underspecified, depending on contextual factors for specification.

1185 3.1. Instrumental clauses

The common notion of instrumental clauses is that they present one action as an "instrument" of another; they are often formed by a preposition and a
 1190 gerund phrase, as in (59) and the French translation (60), but they can also be formed by a subjunction and a finite clause, as in the German version (61):

1195 (59) Rosa Parks stood up by remaining seated.

(60) Elle s'est levée en restant assise.

(61) Sie stand auf, indem sie sitzen blieb.

1200

The "instrument" relation is difficult to make precise. The main clause action type tends to be relatively unspecific, the subordinate clause elaborating on it by providing more specific content. The above examples are instructive in this regard: At one level, the instrumental clause contradicts the main clause; but the latter's predicate is to be read not in the literal, concrete sense but in the derived, abstract sense, and the instrumental clause predicate serves to specify what makes the act of Rosa Parks an act of standing up (to injustice) – namely, being a remaining seated act.

1205

1210

1215

There is a strong intuition, going back to Anscombe (1957), that the "by" phrase predicate and the superordinate clause predicate describe one event in two ways. The immediate problem facing an analysis based on this intuition is that it easily predicts a symmetry between the two predicates; crucially, however, the structure is asymmetric:

1220

1225

(62) ? Rosa Parks remained seated by standing up.

According to Bennett (1994), this asymmetry falsifies the "Anscombe thesis". On the other hand, attempts at ascribing an asymmetric relation to the instrumental preposition or subjunction are likely to run into problems as well.

1230

1235 It is tempting, for example, to assume a
causal relation between two events or
propositions; but when the main clause
predicate is causative, as it often is,
it will not do to give a causal meaning
1240 to the preposition or subjunction, since
this will result in a duplication of the
causal relation already expressed, in
(63) by "change the course of history".

1245 (63) By remaining seated, Rosa Parks
changed the course of history.

It is useful to note that a verb like
"change" is a manner-neutral causative
1250 in that it does not specify the way in
which the change is brought about, and
intuitively, the "by" phrase predicate
fills this slot, specifying the causing
event type. Similarly, predicates like
1255 "stand up (to injustice)" or "defy the
bus driver", called *criterion predicates*
by Kearns (2003), can be said to open a
slot for the event type that meets the
relevant – conventional or intentional –
1260 criteria. These observations underlie
the analysis proposed by Sæbø (2007),
where the causative or criterial,
abstract predicates are decomposed to
lay bare an argument place for a
1265 concrete predicate, merging with the
"by" phrase predicate by unification.
This or a similar analysis would carry
over to "en" gerund phrases in French
and to corresponding instrumentals in

1270 other languages.

But, as observed by Fabricius-Hansen and Behrens (2001), German "indem" clauses have a wider field of use than English "by" or French "en" phrases; although "indem" typically establishes a relation of Elaboration between main and subordinate clause, it is not always obvious that the main clause predicate at some level of decomposition involves the subordinate clause predicate as a kind of argument. Translation studies reveal that "indem" clauses are often translated by "free" gerund clauses, without a preposition, into English, and vice versa; a form of adjunct known to cover a wide spectrum of relations, to be treated in the next section.

3.2. Participial clauses

1290 When there is no subjunction or preposition to signal a relation, so that nonfiniteness is the only sign of subordination, an adjunct clause may be expected to modify its main clause in a quite unspecific way. In large measure, this is borne out: Present (gerund) or past participial clauses allow for a wide array of interpretations (cf. Kortmann 1995 and König 1995). However, as shown by e.g. Behrens (1998), a clear tendency can be observed to maximize the interpretational options offered by the lexical content and the context, ranging from mere 'accompanying circumstance' to

1305 more 'semantical' discourse relations.

Consider first a few cases similar, but not identical, to the "instrumental" cases considered above: In (64)-(67), it will not do to interpose the preposition
 1310 "by", yet the relation between the two event types is not very different from the relation between the two event types in (59) or (63).

1315 (64) The trout struggled, wriggling and writhing.

(65) I drove cautiously, looking out for danger on the road.

1320

(66) A fellow traveller was playing guitar, using a knife for a slide.

(67) She did the job with the tools at
 1325 hand, using a chisel for a pry bar.

The reason that an instrumental "by" is not appropriate here seems to be that the main predicate does not provide a
 1330 variable for the adjunct predicate; still, the latter is taken to elaborate on the former, and, as argued by Behrens (1998), building on Asher (1993), elaboration here seems to mean that the
 1335 adjunct event is a subevent of the main event. Thus in (64), the wriggling and the writhing are to be interpreted as subactivities of the struggling. According to König (1995), the two

1340 "converbs" and the main verb describe
two aspects or dimensions of one event.

Behrens (1998) identifies a distinct
form of event unification induced by
postposed *-ing* adjuncts with causative
1345 verbs, as in (68):

(68) A passenger train carrying Kenyans
and hundreds of tourists from abroad to
the coastal port of Mombasa derailed at
1350 high speed on Wednesday, killing at
least 32 people, including five
foreigners.

While the subject of an *-ing* adjunct is
1355 generally assumed to be coreferent with
the subject of the main clause, maybe
through a subject controlled PRO, in
(68) this is not intuitively correct:
The train is not what killed the people;
1360 rather, it is the event of the train's
derailment. On the analysis proposed by
Behrens (1998: 113ff.), the subject PRO
is in such cases an event PRO,
controlled by the main clause event and
1365 equal to the unspecified causing event.

Preposed *-ing* adjuncts provide
particular interpretational options.
Under given conditions, the adjunct can
be intended to convey largely the same
1370 relations as a conditional, "if" clause
(Stump 1985), cf. (69) and (70), a
causal, "because" clause, cf. (71), or a
temporal, "when" or "while" clause; cf.
(72)-(74):

1375

(69) Driving slowly through Thorpe, you will see signs for Dovedale on the way.

1380

(70) Looking out abeam, we would see a hollow like a tunnel formed as the crest of a big wave toppled over on to the swelling body of water.

1385

(71) Having confessed to having sex with the girl, the man was sentenced to one year on an abandoned island.

1390

(72) Reaching the coast, they sought to prevent departure from their homeland by rising in rebellion.

(73) Reaching the coast, they pick up the scent of their home river.

1395

(74) Investigating a murder, Chief Inspector Maigret has difficulty penetrating the wall of silence maintained by the family involved.

1400

Generally, as argued by Behrens (1998), free -ing adjuncts seem to lend themselves to the strongest relation relevant and plausible in view of the lexical items at hand and the context.

1405

This is not to deny that in many cases, the strongest relation there is license to infer is that of an 'accompanying circumstance', or connectedness; the adjunct and the main clause are about

1410 the same time, the same place, and the
same subject, cf. (75) and (76).

(75) Smiling, she said, "I'll miss you."

1415 (76) He walked out of the woods carrying
an axe.

Such a relation is characteristic of yet
another underspecified adverbial clause

1420 type: Absolute constructions, to be
treated in the next section.

3.3. Absolute clauses

While the "converb constructions"
1425 (Haspelmath and König 1995) discussed
above mostly display participle verbs
with empty subjects, this term is also
used to cover "absolute" small clauses
like those in (77):

1430

(77) Dazed and shaking he pulled himself
up, his left arm hurting him.

Such adverbial small clauses can be
1435 augmented with the preposition "with",
without much of a change in meaning:

(78) She woke up in the middle of the
night with her arm hurting her.

1440

(79) He woke up that Thursday morning
with a gun pointing at him.

Furthermore, the absolute small clause

1445 can have an adjective or a prepositional
phrase as its predicate:

(80) Cécile woke with a start, her neck
stiff from having fallen asleep in a
1450 straight-backed chair.

(81) Cécile is standing with a gun in
her hand and her finger on the trigger.

1455 Semantically, what unites these cases
is, unspecified as the relation between
the main clause (host) eventuality and
the SC (supplement) eventuality may be,
the notion of a concomitant eventuality,
1460 attended by T(ime)-S(pace)-
P(articipant)-connectedness (Rothstein
2003, Fabricius-Hansen 2006): The two
eventualities manifest a unity of time
and place and thus a “perceptual unity”
1465 (König 1995), and, some participant of
the host event must bind an explicit or
implicit anaphor in the supplement. In
(77)-(81), the subject of the host binds
an explicit possessive or nonpossessive
1470 anaphor in the subject or predicate of
the supplement.

TSP-connectedness can hold across
sequences of autonomous sentences; what
absolute constructions will provide is a
1475 guarantee of TSP-connectedness. However,
Fabricius-Hansen (2006) argues that in
addition to conveying such relations,
such constructions serve to build groups
of events or states, expressing that the

1480 host and supplement eventualities form
 interesting sums of eventualities, an
 idea going back to Pusch (1975).
 According to this analysis, in (77) the
 core event and the co-eventualities all
 1485 add up to one super-, group eventuality.
 Thus, even adverbial clauses without any
 overt sign of the mode of modification
 will modify their main, host clauses
 semantically in a nontrivial way.

1490

3. Conclusions

The range of phenomena bundled together
 under the label *adverbial clauses* is so
 diverse as to defy easy generalization.
 1495 What can safely be said, though, is that
 any adverbial clause serves to modify
 some aspect of the main clause meaning:
 At some level between, from below, the
 verb phrase, denoting a set of events or
 1500 states, the tense phrase, denoting a set
 of times, and the mood phrase, taken to
 denote a set of worlds, the subordinate
 clause merges with the main clause to
 further identify its denotation, whether
 1505 by functional application, intersection,
 quantification, or unification.

Generally, this proceeds by way of the
 meaning of the subordinate clause at the
 relevant level. Thus a "free", nonfinite
 1510 clause can be considered to contribute a
 set of eventualities, a temporal clause
 contributes a set of times, and a modal
 clause contributes a set of worlds; the
 subjunction (or relevant interpretive

1515 mechanism) then relates this to the
 corresponding dimension of the meaning
 of the main clause, in the lexically (or
 discourse structurally) determined way.
 In the simplest cases, the subjunction
 1520 can be likened to a definite,
 indefinite, or universal determiner,
 turning the modal ("if") or temporal
 ("when") clause set of worlds or times
 into a definite world or a quantifier
 1525 over times (a set of set of times).

Elsewhere, more elaborate relations
 are involved; some temporal subjunctions
 define intervals stretching to or from
 the evaluation time ("since", "until")
 1530 or convey precedence relations ("after",
 before"), modal subjunctions may involve
 negation ("because", "although") or
 intention ("in order that"). In yet
 other, notably instrumental, cases, it
 1535 is less clear what relation between two
 sets of eventualities is encoded in the
 subjunction; and in "free", nonfinite
 adjunct clauses, there is no lexical
 sign of the relation. Although often,
 1540 there is ample reason to infer a modal
 or a temporal relation or a relation of
 elaboration as event inclusion, often
 enough all that can be inferred is an
 "attendant (accompanying) circumstance",
 1545 where main clause and subordinate clause
 eventualities can be assumed to add up
 to a more comprehensive, super-event.

Subjunctions vary in two dimensions:
 Specificity and complexity (of meaning).

1550 One might expect semantic simplicity vs.
 complexity to correlate with lexical, or
 morphological, simplicity or complexity;
 - this, however, is easily falsified:
 The Ancient Greek ("hina") or North Sami
 1555 ("vai") purpose subjunctions testify to
 an advanced level of grammaticalization
 while expressing one of the most
 elaborate semantic relations.

Several subjunctions do double duty in
 1560 the sense that they underspecify the
 semantic relation they encode – they
 correspond to two (or more) subjunctions
 in another language. For example,
 English "when" can be universal or
 1565 existential in the past or future;
 German "wenn" can be conditional or
 temporal (universal or existential in
 the future). This attests to (1) the
 interrelatedness of the temporal and the
 1570 modal dimension (also indicated by the
 use of past forms in counterfactual
 environments, cf. Iatridou 2000), and
 (2) the role of the context of utterance
 in clarifying what relation is meant by
 1575 a certain adverbial clause.

So what are, again, adverbial clauses
 – is a common characterization so vague
 as to be vacuous? Probably not; for one
 thing, they differ from other adverbials
 1580 in utilizing the same kind of material
 they serve to modify (basically, things
 that clauses can express); and second,
 they differ from other subordinate
 clauses in carrying a more or less

1585 complex and specific semantic relation
 on their own, - even when the relation
 is, by itself, highly unspecific,
 contextual and pragmatic factors
 conspire to narrow it down.

1590

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