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What is manner modification?

30 Jan 2021

1: Reporting work from the SFB 991 / project B09, University of Düsseldorf, funded by DFG, 2015–2020 2: University of Toronto Scarborough

There is no definition of "manner modifier" in the literature.

- Manner modifiers and the ontological commitments they make (if any) remain not quite understood.
- Classic works, such as Parsons (1990), speak of broad classes of "VP adverbs".
- The Neo-Davidsonian treatment of manner modifiers as predicates of events was originally justified by their logical properties, not in terms of lexical-semantic analysis.
- Lexical semantic works have been unsure about how to delimit the class; for instance, whether result-oriented adverbs (*dress elegantly*) or mental-state adverbs (*calmly*) are distinct from manner adverbs, or form subgroups of manner adverbs (e.g., Bonami et al. 2004).

Why understand manner?

- Better understanding of the lexical semantics of manner.
- Better understanding of the lexical semantics of verbs, via their interaction with manner modifiers.
- Needed to explain alternations between scope-taking "higher" adverbs and scopeless "lower" (VP adverbs, manner) uses. Regularities of this nature seem to involve manner in relation to a second reading.

He stupidly [played the ace first_F]. He played stupidly. (i.e. in playing the ace first)

Representing manner in logical form

- Dik (1975): First proposal that manners are particulars.
- Piñón (2007): "manner functions" mapping event types onto formmanners:
 - The idea is that (e.g.) writing events have a form— imagine **the trajectory of motion of the point of the writing instrument (e.g., a pen) in a writing event. It is this trajectory that may be said to legible or illegible.** This is one manner of a writing event—in fact, it is the formmanner of a writing event.
- Schäfer (2013): Distinguishes between manner as a mapping from events to their manners, and manner as the type of variable in the semantic representation itself.
 - (16) Template for manner adverbials: $\lambda Q \lambda P \lambda x [P(x) \& \exists m [MANNER (x,m) \& Q(m)]]$

Representing manner in logical form

- Landman & Morzycki (2003) propose that manners can be characterized as kinds of events (in a system for kinds based on Carlson (1977)).
- Manner demonstratives (*such/so/tak*) used adverbially are taken to be predicates of events and assert that the event realizes that kind.

(20) $[[tak_i]] = \lambda e$. e realizes k_i $[[so_i]] = \lambda e$. e realizes k_i

 Anderson & Morzycki (2015) show how to build event-kinds (manners) and state-kinds (degrees). Note that not all properties of events make good event-kinds, introduce a hook into the lexical semantics ("distinguished properties").

A problem reflected in sentential semantics: so / like that anaphora to PPs

- Not all adverbials accessible: no temporal or locative adverbials, generally.
 - (24) a. *Maria hat am Dienstag getanzt und Jan hat Mary has on Tuesday danced and John has auch so getanzt. also thus danced
 'Mary danced on Tuesday, and John danced like that too.'
 - (25) a. *Maria hat in Minnesota gegessen und Jan hat Mary has in Minnesota eaten and John has auch so gegessen. also thus eaten
 'Mary ate in Minnesota, and John ate like that too.'
- But then, there seem to be exceptions:
 - (28) Maria schläft in einem Schlafsack und Jan schläft auch so.
 Maria sleeps in a sleeping-bag and Jan sleeps also thus 'Maria sleeps in a sleeping bag, and Jan sleeps like that too.'

Locatives may relate to the event frame in different ways; one construal is a manner-like meaning (more later).

Outline of our position

- Proposal: Manner modification can be understood as an operation that creates event subtypes.
- Manner modification appears as a **non-intersective** operation; appeal to decomposition of lexical semantics to model manners.
- Propose that a frame model (an attribute-value structure) is a good way of formulating the necessary restrictions.
- Specifically, we hypothesize that manner modification will be reflected in an operation on a network of attributes, instead of a single attribute within a frame.

What is to come

- 1. The linguistic behaviour of manner expressions: counting, anaphora.
- 2. The intersective representation, and Frame representations
- 3. What is not a manner? (Especially locatives)
- 4. The puzzle of "event-internal locatives" and of "manner readings"
- 5. Outlook: justifying subtypes

Observations on manner expressions

- Various linguistic properties of manners have been noted.
- Many seem to push in the direction that manners are "dependent" on events in some way.
- For example: How do you count manners? Speaking of "many manners" seems to imply many events (in the example: 20 performances):

On this CD, they perform "La Follia" in 20 different ways/manners.

- Another puzzle: manner questions only ask for partial answers, and its not even clear how to give a complete answer to a manner question. (Example below from Sæbø 2016).
 - (11) How was she dressed?
 - (i) In blue.
 - (ii) Like you, kind of.
 - (iii) Conservatively, but not to an extreme.
 - (iv) She had on a fur coat of some kind, a palish fur. No hat.

"Manner" is a functional concept

- Other aspects of manner language also interesting to note.
- Manners can be paraphrased with definite descriptions using way and manner.

The way Curt tripped was clumsy. The manner in which Willi signed his name was quick.

- The noun *manner* usually occurs as a singular.
- Must be paraphrased with definite determiner:

the/*a way in which Willi signed his name was hasty

• Looks like a functional concept, in the sense of Löbner (2015). Other functional concepts include *height* and *time*, which require a holder and are unique.

the/*a height of the building the/*a time when humans first walked on the Moon

What can be a manner? Anaphora as a test

- Certain anaphors seem to pick out manners (like that, G. so, PL. tak).
- Not all properties of events (for instance) make good manners.
- Can see this puzzle with manner anaphora such as *like that* (inspired by an example from Rett 2011).

??Floyd cooled his coffee 5 degrees, and Clyde cooled his soup like that.

- No event-kinds (in other words, manners) like RUN-SIX-MILES or COOL-BY-5 DEGREES. Scalar properties such as these are not considered to have the right type of semantic properties for modifiers like *like that*.
- Anaphora like *like that* can be used as a diagnostic for whether a modifier is a manner modifier or not. (And *five degrees* is apparently not.)

Constraints on anaphora to manners

- It's not the case that *like that* anaphora can be anaphoric to any adverbial modifier.
- Anaphora is degraded when the verbs are different.

Curt danced **elegantly**₁, and Willi danced **like that**₁ Curt danced **elegantly**, and Willi **elegantly** jumped the fence.

??Curt danced **elegantly**₁, and Willi jumped the fence **like that**₁ ??Curt ran a race **quickly**₁, and Willi wrote a paper **like that**₁

??Curt walked **slowly**, and Willi opened a bottle **like that**.

 Suggests something more complex than simple set intersection of VP and manner modifier.

What is a manner anaphor anaphoric to?

- Landman & Morzycki (2003): parallelism between kind-related anaphora and manners in some languages (e.g., German so, Polish tak).
- Kind-related:
 - a. *Taki* pies uciekł wczoraj w nocy. (Polish) such.MASC.SG.NOM dog.NOM ran.away yesterday in night
 'Such a dog ran away last night.'
 - b. Takujusobakumy videli.(Russian)such.MASC.SG.ACC dog.SG.ACC we saw'We saw such a dog.'(Russian)
 - c. Wir haben so einen Hund gesehen.
 We have such a dog seen
 'We saw such a dog.'

(German)

Landman & Morzycki (2003)

- Manner anaphora:
 - a. On tańczył *tak*.
 he danced thus
 'He danced like that.'
 - b. On tantseval *tak*.
 he danced thus
 'He danced like that.'
 - c. Er hat *so* getanzt.He has thus danced'He danced like that.'

See some vestiges of this in English. (*So* and *such* are cognate.)

- a. ?He danced (like) so.
- b. Such a dog ran away last night.

(Polish)

(Russian)

(German)

Kinds of individuals and events

- Carlson (1977): English such (and by extension, Polish tak and German so) is anaphoric to kinds.
 - a. People in the next room... ??such people (are obnoxious)
 - b. Elephants that are standing there... ??such elephants
 - c. Men that Jan fired this morning... ??such men
- What kind of kind do the adverbial (manner) uses of so and tak refer to?
- Landman and Morzycki (2003): manners are kinds of events, on a par with kinds of individuals. Kinds as a type of entity. (And see Anderson & Morzycki 2015 for a more recent revision of this idea.)
 - (13) $[[such_i]] = \lambda x$. x realizes k_i
 - (23) $[[tańczyl]] = \lambda e$. e is a dancing $[[tak_i]] = \lambda e$. e realizes k_i $[[tańczyl tak_i]] = \lambda e$. e is a dancing \wedge e realizes k_i

Non-intersectivity of manners

- Lack of intersectivity with manner modifiers, demonstrated with manner anaphora, suggests they're not (simply) predicates of events. Behave like nonintersective modifiers like *skillful* and *good* in their pattern of inferences.
- Common strategy for analyzing the logical form of non-intersective modifiers is to add additional variables.
 - Transparent, compositional way of interacting with lexico-conceptual content.
 - Some modifiers can predicate of an additional variable in the semantic representation of a noun (such as a neo-Davidsonian event variable, see Larson 1998).

[[beautiful dancer]] = λx GEN e. dance'(e,x) & beautiful'(e)

If additional variables (beyond event-variables) are present in the VP, that helps to explain properties of manner modification.

Our analysis

- **Our analysis:** "the manner of an event" is a **subtype** of the modified event property.
 - This provides an explanation for several facts:
 - Non-separate countability of manners
 - Many choices of alternative ways of subtyping (cf. Sæbø's example)
 - That manner anaphora is degraded when verbs don't match
 - Manners are functional concepts
- Adopt Frames, recursive attribute-value structures, to represent the meaning of the verb phrase.
 - Decomposition of meaning of verb phrase, can be elaborated into fine detail of the conceptual content (not confined to categories of the syntax interface).
 - Manners then operate on a network of attributes of an event-frame (akin to additional variables or arguments), creating a subtype of event.

2 Event semantics and Frame semantics

• The neo-Davidsonian analysis posits that manner modification is intersective modification with event predicates:

Jones buttered his toast quickly in the bathroom, at midnight.

<u>buttering(e)</u> & Agent(e) = Jones & Theme(e) = the-toast & $\tau(e) = t \& t \subseteq midnight$ & place(e) = $I \& I \subseteq the-bathroom$ & quick(e)

A gentle introduction to Frames*:

 Arguably, the neo-Davidsonian format is already a Frame* analysis in a nutshell: it is made up of functional attributes and sortal statements.

(*in the sense of Barsalou 1992, Petersen 2007, Löbner 2021)

Frames (cf. Löbner 2021)

- Building blocks of a Frame: sortal concepts (**types**) and functional concepts (ATTRIBUTES).
- ATTRIBUTES are functions <e,e>; **types** are sets of entities.
- "man(x)" stands for " $x \in man$ ", "x belongs to the type man"

A man buttered a toast quickly in the bathroom, at midnight.

buttering(e) & AGENT(e) = x & man(x) & THEME(e) = y & toast(y) & TIME(e) = t & midnight(t) & PLACE(e) = I & bathroom-space(I) ... & quick(e)

 Question: Why do locative modifiers correspond to attributes, but manner modifiers don't?

Frames

- It's nothing but a matter of granularity. Representations of the meaning of "quick" in terms of an ATTRIBUTE have also been given: *quickly*
 - → quick(e)
 - → SPEED(e) = r & rate(r)

(Parsons 1990) (Morzycki 2016, cf. already McConnell-Ginet 1982)

- Here, "a rate" is an entity of a particular sort (a measurement). It is the value of a function that links it to the event.
- In general, this indicates that more fine-grained structure would be available where standard neo-Davidsonian notation stops.

Frame diagrams

- Graphical notation for: SPEED(e) = r & rate(r)
- Positive quick as a subtype of rate



 A complete event description starts out from the entity under description (e) and yields a network (not a flat list) of attributes, either orthogonal or in a chain.



Here, SPEED is taken to measure the density of elements in a "stage structure" of the event, a more explicit version of the above (chaining of more elementary functions)

Frames and intersective modification

This representation is not "intersective": it does use the event frame, but not specifically its extension (the set of e's).



An intersective modifier for use in logical form could still be created on the basis of the Frame information: If ∃s,r: STAGE-STRUCTURE(e) = s
 & SPEED(s) = r & quick(r)
then, for short: quick(e)

Frames and subtype creation

 The modifier **quick** creates a subtype of the event under description: When the set of admissible values of some embedded attribute is restricted, this restriction on the image of the function propagates back so as to constrain the pre-image as well. Ultimately, this propagates back to the central node (with the referential argument).



Frames and subtype creation

• More concrete example:



The type statement "blue-eyed" records the history of the chaining of attributes that led to the restriction – "blue person" would have a different meaning.

However, the effect of subtype creation in the central node is independent of the question of which names have to be chosen there.

Frames and subtype creation



- In this way, Frames go beyond k-variables: they show the history of how subtypes are created from attributes. Note that the attribute branches provide orthogonal ways of partitioning the same extension. Subtyping does not *just* correspond to a subset of referents.
- Problem: Technically, *any* value restriction in some attribute leads to a type restriction of the central node. So this does not yet provide "distinguished" subtypes that specifically explain manner modification.

In the following, we point out two sets of observations that may help narrow down the class of manner modifiers:

- H1: Modifiers which concern only a single attribute or argument may contrast with manner (hence, manner might be characterised by involving a network of correlations).
- H2: Modifiers may contrast with manner if they have a localising function – in a broad sense.

H1 Manner as opposed to an isolated attribute

PRICE (of something) makes for an excellent attribute in a frame... but apparently not a manner.

- (i) Sie haben das Öl teuer verkauft. they have the petrol expensive sold
- The modifier "teuer" is not a depictive, cf. sell at high prices.
- What kind of adverbial is this?
- (ii) Sie haben Öl billig einlagern können.
- [?] 1. They were able to stock petrol while it was cheap (depictive)
 - 2. They were able to store the petrol at low cost.
 - ? ...und wir haben es auch **so** eingelagert.

(adverbial)

H1 Manner as opposed to an isolated attribute

iii. Er schrieb rot / unleserlich. — Er las ?? rot / ?? nahezu unleserlich
 He wrote (in) red / illegibly
 He read red / almost illegibly.

- A precondition of modification in a Frame model is compatibility between the modifier and the ontological sort provided by some attribute (e.g. *quick* needs some *r*).
- But this is not a sufficient condition for licensing modification!
- In iii., COLOUR(letter) apparently has to interact with "creation" in order to support modification by *red*.

A variety of modifiers can be viewed as "localisation in a broad sense". All of them contrast with manner modification.

a) Temporal and locative modifiers

...have already been shown not to pattern with manner modifiers

(i) We played Bridge <u>yesterday</u>. TIME(e) = t & t \subset yesterday

b) Position in a sequence of events

He played the ace <u>first.</u>

FIRST(STAGE.STRUCT(e_B)) = e_1



Fig. 7a: Partial frame of "playing the ace of clubs first" in a game of cards

(Geuder ms. 2018)

? If you play(e1) the ace like this, ...

#"being first" is not a possible manner.

Never mind that there is also the variant: If you play(e_B) <u>like this</u>, you'll be down big time (= play the ace in the first trick).

This is about the property of a "big event" to have a stage structure like this.

play the ace first



Fig. 7a: Partial frame of "playing the ace of clubs first" in a game of cards

c) Acting intentionally:

intentionally doing E = the current action E is part of a larger plan.

(Gabrovska & Geuder 2019)-

(i)	<i>Die Rüben wurden <u>ver</u></i> the turnips were unir	<u>sehentlich</u> ntentionally	<i>mitgewaschen</i> washed [together with]	* how
(ii)	(ii) Die Rüben wurden <u>sorgfältig</u> gewaschen the turnips were carefully washed		vaschen shed	<mark>√ how</mark>

Carefully / sorgfältig entails intention -

but also has manner components, and the manner meaning is what goes beyond the pure statement of intentionality.

intentionally turn on the light



From this background, note the puzzle of "Event-internal locatives" (Maienborn 2003).

The puzzles:

- Some event-internal locatives pattern with manner modifiers...
- ...but not all of them

(i) He sat (in the corner) <u>on a chair.</u>
(ii) The robbers escaped <u>on their bicycles.</u>
(iii) Sign the treaty <u>on the last page.</u>
(iv) She prepared the chicken <u>in a marihuana sauce.</u>

? where / * how how / * where where / *how how / *where

4. Manner readings, and the puzzle of eventinternal locatives

"Event-internal locatives"

- Localisation of the whole event is a relation of the event to a reference object which is external to the event frame. (*Buttering the toast in the bathroom*)
- Event-internal locatives relate entities that are independently given in the event frame (cf. Maienborn 2003: 477ff.)

sign the contract [x_{created} on the last page] escape [x_{theme} on bicycles].

Event-internal locatives: Maienborn (2003)

Modification template in Maienborn (2003: 487):
 MOD': λQ λP λx [P(x) & part-of(x, v) & Q(v)]

Otherwise, the template already suggests the same picture as in our introduction to Frames... it is just wrapped in an extensional framework. Instead of the term "part", we would read: "v is a value of some attribute in the frame that describes x" (=e, in this case).

- Maienborn presents the problem as determining those abductive inferences that identify the implicit located individual.
- Input: They escaped on bicycles

Outcome: escape [x_{theme} on bicycles].

Event-internal locatives: Maienborn (2003)

 What the abductive reasoning is based on, is a frame of the event: escape involves change-of-place and method attributes, method involves transport, and this in turn a vehicle, etc.



Event-internal locatives

- Maienborn (2003) basically says: event-internal locatives are always locatives, but if one of their arguments also has other roles in the event, this creates the perception of an additional semantic flavour of the locative (here: instrument).
- In one respect, this seems problematic: shouldn't where-questions be possible throughout then?
- In another respect, this looks promising: the factor is whether other relations (in the frame) connect to the entities in the locative PP.

Proposal: this view should be generalised. Develop an analysis in which the "manner" flavour derives from the fact that the entities embedded in the locative PP simultaneously enter into a larger network of attributes, values, constraints and correlations.

Event-internal locatives

Directions for an analysis: How did they escape? - On their bikes.

Proposal: In such a manner (!) statement, we observe a conceptual network involving covariation of values across different attributes. As an illustration of such covariation across frame nodes, consider the μ -function in Rothstein's (2004) model of accomplishments:



The mapping function µ imposes an homomorphism between the progression of the activity (here: movement method) and the progression of the change of place.

We expect that **methods** will in turn be frames with a complex internal structure that is in turn marked by various covariation constraints.

Event-internal locatives

They escaped on their bicycles. — How? Prepare the chicken in marihuana sauce — How? Sign the contract on the last page. — Where?

In contrast, in a pure locative statement, the arguments of the locative may still occur in other attributes, but without being connected to values in other attributes via covariation constraints:

sign the contract on the last page:

All occurrences of "last page" connect to localising attributes:

PRODUCT(e) = signature & PLACE(signature) = | & | ⊆ SPACE(page_n)

&. THEME(e) = contr. & PART-STRUCT(contr) = seq & LAST(seq) = page_n

While the analysis still needs to be worked out, we want to point out that such a type of solution for the manner problem is to be expected for independent reasons.

Why to expect a "network" model of manner

5

Anderson & Morzycki (2015): A notion of "distinguished" properties is needed to constrain the use of k-variables in that theory: only certain kinds in a technical sense are also natural kinds.

...We don't talk about events chiefly to measure them. We talk about them chiefly to characterize or explain them.

- This suggests that manner, as subtype formation, exists for the same reason why event concepts exist to begin with.
- Concepts differ from properties in being "multi-dimensional" (Gärdenfors 2000). Hence, they essentially are about correlations.
- Hence, a nameworthy subtype is one which differs in a whole correlational pattern

What is manner?

• A "feature space" à la Gärdenfors (2000, 2014)...





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Umbach & Gust's (2014) similarity spaces

- This also ties in with the work of Umbach & Gust (2014): German so anaphora is analysed in terms of equivalence classes, based on similarity
- Adjectives and nouns are associated with multidimensional measure functions, e.g.

Dimensions of "The Apple space"

1:ORIGIN × 2:COLOUR × 3:HAPTICS × 4:TASTE × ...



ents ticle pedia **Belle de Boskoop** (also called **Goudrener**, **Goudreinet** or **Goudreinnette**) is an apple cultivar which originated in Boskoop, Netherlands, where it began as a chance seedling in 1856. Variants include Boskoop red, yellow and green. This rustic apple is firm, tart and fragrant. Greenish-gray tinged with red, the apple stands up well to cooking. Generally Boskoop varieties are very high in acid content and can contain more than four times the vitamin C of Granny Smith or Golden Delicious.^[1]

The apple grows well in Normandy, France [2]

- A subspecies is usually justified by a characteristic pattern of value correlations, i.e. a distinctive profile across the whole feature space, not by a single attribute.
- If "manner modification" is subtype formation, the same should apply there.

6 Conclusion

The perspective is then: distinguish between

- the semantic domain that a lexical item belongs to,
- manner modification as the way it functions in the frame at hand.

	Lexical domain	Function in Frame	
in, on, under	function from entities to places		
with	function from events to instruments	instr. attribute; mostly +manner	
quick	measure function on a rate speed attribute; ±m of change cf. R		<mark>2013</mark>
careful	correlation between intended quality of result and suitable method	manner (inherently correlational)	//

Manner and lexical classes of modifiers

- However, manner modification is not merely an inference: remember that adjectives may be unacceptable as modifiers although unification with some frame attribute would be possible.
- Hence, modification may implement a "manner rule": create a subtype.
- Main point: the specific manner semantics is not something that entirely resides in the lexical representation of the modifier; it rather resides in the conceptual network that the modifier contributes to.
- This also speaks to the discussion of intersective vs. subsective modification: a modifier in the spirit of intersectivity would have an "autonomous" meaning. They do have one, but this is not "the manner".

So what is manner

We can distinguish "m-theories" and "k-theories" of manner:

- Are manners primitive entities / particulars that live in a frame, or
- Are manners subtypes derived from a given event type? [the

"subsective" / kind-analysis].

We see better prospects for a theory of manner in the "subtype" approach:

- a manageable ontology
- explains the dependency of manners on events
- manner as the sum effect of changes in attributes/values; makes a connection to other issues of kind formation

Frame theory provides an understanding of manner that goes beyond the introduction of new variables...

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Appendix Manner and event-internal modifiers: *quickly*

We would expect variability in ±manner for other e-internal modifiers, too:

quickly alternates between a pure measurement and a manner reading (Rawlins 2013) (in the same, lower, syntactic position!).
(i) He ran to the park 2 min. more quickly than last time (measurement)
(ii) The Chinese economy expands quickly, and the Vietnamese

economy also expands like that

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- It is currently not clear what really distinguishes manner quickly. Rawlins suggests it is reference to subevents.
- Does the anaphor in (ii) actually refer to the kinds and patterns of subevents that are being measured (instead of referring to the value of the measurement itself)?