

Distributional modification, not quantification

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1 Introduction

- Natural language affords various well-studied strategies for composing propositions about the quantity of entities that participate in a given event or have a given property:

Quantification: Quantity relation between sets (e.g. Barwise & Cooper 1981) or propositions containing coindexed variables (e.g. Kamp 1981).

- (1) a. Most birds fly.
b. Mary always carries an umbrella if she thinks it is going to rain.

Modification: (Non-proportional) quantities can be conceived of as properties of masses or sets (e.g. Milsark 1974).

- (2) a. two birds
b. some rain

Predication over kinds, modeled as entities: Can carry implications about quantity (e.g. Carlson 1977).

- (3) The platypus lays eggs.

- We argue for a fourth strategy: **Distributional modification** (Gehrke & McNally 2011, 2015)
 - A modifier contributes a **property** not of sets of individuals but rather of **descriptions of kinds** and contributes the entailment that the kind description in question is realized not by a single token but rather by a **set** of tokens with a particular sort of distribution.
 - Exemplified by the so-called frequency adjectives (FAs): *daily, monthly, etc.; (in)frequent, sporadic, periodic; occasional, odd, and rare*:¹
(see also Bolinger 1967; Stump 1981; Larson 1998; Zimmermann 2003)

 - (4) a. The occasional sailor strolled by.
= Occasionally, a sailor strolled by. (Bolinger 1967)
b. The storm was punctuated by a sporadic crash of thunder.
= Sporadically, the storm was punctuated by a crash of thunder. (Stump 1981)
c. She wrote me frequent letters. = Frequently, she wrote me letters.

- Plan of the talk:
 - Overview of the FA data
 - Analysis (of part of) this data
 - Arguments for the modifier analysis over quantificational analyses (e.g. Stump 1981, Larson 1998, Zimmermann 2003)
 - Further considerations about cross-linguistic variation and why we might need both types analyses (cf. Gehrke to appearb)

¹Some data are taken from the British National Corpus (BNC), the Corpus of Contemporary American English (COCA), the Corpus of Global Web-Based English (GloWbE), and Google books corpus of American English, all available at <http://corpus.byu.edu>; others from Google searches. Examples from the corpus.byu.edu site will be identified simply by the name of the source corpus; examples from Google searches will be identified by their full URL.

2 Data

- FAs have been attributed **different readings** (internal, generic, adverbial; see below).

Challenges:

- How to account for the apparent wide scope of a DP-internal adjective in examples like (4), when it can be paraphrased “quantificationally”?
- How to provide a general account for the different readings?
- FAs fall into two distinct classes: Temporal(ly) vs. non-temporal(ly) distributing).
 - **Non-temporal** (5-a): *occasional*₁, *odd*, *rare*
 - **Temporal** (5-b): *daily*, *monthly*, etc.; (*in*)*frequent*, *sporadic*, *periodic*; *occasional*₂

- (5) a. a glimpse of commerce – the **occasional/odd/rare** office, barbershop, or Vietnamese strip mall...
- b. ??a glimpse of commerce – the **weekly/frequent/infrequent/periodic/sporadic** office, barbershop, or Vietnamese strip mall...

→ Gehrke & McNally (2015) (G&McN): We need a slightly different semantics for each class.

- “Quantificational” paraphrases can come about in different ways:

1. Non-temporal FA as a second order kind description modifier (4-a)
2. Temporal FA as an (intersective) event kind predicate (4-b)
3. Temporal FA with a non-event noun, “incorporation” (4-c)
(under certain conditions, cf. Gehrke & McNally 2014, and fn. 2)

We analyze only non-temporal FAs today.

- **The internal reading;** paraphrase of [FA N]: “N who/that V’s / is V’d FA-ly”

- (6) a. A frequent sailor (= one who sails frequently) won the regatta.
- b. A frequent recipient of awards (= one who frequently receives awards) took the Rotary Club prize again.

Only possible with temporal FAs:

- (7) a. a daily/weekly Internet user = one who uses the Internet daily/weekly
- b. a frequent/infrequent/sporadic/periodic visitor = one who visits frequently/etc.
- c. a(n) occasional reader of the newspaper = one who reads the newspaper occasionally
- (8) a. an odd user/visitor/reader ≠ one who uses/visits/reads on odd occasions
- b. a rare writer/winner/employee ≠ one who writes/wins/is employed rarely

We therefore set aside this reading today; see G&McN for an analysis.

- **The generic reading**

- (9) a. A(n) monthly/frequent/occasional check-up is essential.
- b. A(n) yearly/infrequent/rare visitor is not a problem.
- c. A daily/sporadic cup of coffee is harmless.
- d. The odd glitch is tolerable.
- e. ...there is little evidence to show that the rare drink will impair the healthy growth of a baby. (<http://answers.yahoo.com/question/index?qid=20110501003637AAeLyDj>)

Paraphrase (cf. Stump 1981): postnominal *now and then, from time to time, every day* etc.; (10)

- (10) a. A check-up on a monthly/frequent/occasional basis is essential.
- b. A visitor on a yearly/infrequent basis is not a problem.
- c. A cup of coffee on a sporadic basis is harmless.
- d. A glitch on odd occasions is tolerable.
- e. A drink on rare occasions will (not) impair the healthy growth of a baby.

Natural when FA-DP is an argument to a **generic predicate** (e.g. (9)) (Stump 1981; Schäfer 2007), and when DP is interpretable as generic independently of the presence of the FA:

- (11) a. A check-up is / Check-ups are essential.
- b. A visitor is / Visitors are not a problem.
- c. A cup of coffee is / Cups of coffee are harmless.

With episodic predicates, the FA is unacceptable or not paraphrasable as in (11):

- (12) a. ??An occasional cup of coffee has left circular stains on the table. (Stump 1981)
- b. The Premier Division-based Scotland side were only beaten, in fact, by a goal of almost tragic proportions, conceded when an infrequent error was characteristically punished by Riedle. (BNC)
- ≠ An error on an infrequent basis was characteristically punished by Riedle.

Schäfer (2007): **Restricted** to (in)definites, semantically bleached possessives:

- (13) a. An/The/Your occasional beer is good for you.
- b. ??Each occasional beer is good for you.
- c. ??Two/??Many occasional beers are good for you.

G&McN: The restrictions are more refined

- Temporal FAs prohibit definite marking (14)
- Non-temporal FAs require it (15)
- Only *occasional* allows both (13-a)

- (14) a. ??The/??Your daily shower is good for you.
- b. ??The/??Your infrequent/frequent beer is good for you.
- c. ??The/??Your sporadic/periodic inspection is necessary.

- (15) a. An odd glitch is/Odd glitches are tolerable.
- ≠ The occurrence of glitches on odd occasions is tolerable.
- b. A rare drink/Rare drinks will not impair the healthy growth of a baby.
- ≠ A drink on rare occasions will not impair the healthy growth of a baby.

With temporal FAs (e.g. (14)), the generic reading is systematically available only with **event nouns**. With other nouns: they have to be coercible into event descriptions (cf. Schäfer 2007):

- (16) a. A frequent cup of coffee helps keep John awake.
- = Drinking a cup of coffee frequently helps keep John awake.
- b. Occasional newspaper articles are part of John's job.
- = (e.g.) Writing/Editing newspaper articles occasionally is part of John's job.

• **The adverbial reading**

- (17) a. The occasional sailor strolled by.
= Occasionally, a sailor strolled by. (Bolinger 1967)
b. The storm was punctuated by a sporadic crash of thunder.
= Sporadically, the storm was punctuated by a crash of thunder. (Stump 1981)
c. She wrote me frequent letters. = Frequently, she wrote me letters.

Stump (1981); Zimmermann (2003); Schäfer (2007): Like generic reading, **restricted** to (in)definites, semantically bleached possessives:

- (18) a. We saw an/the/your occasional car on the road.
= Occasionally, we saw a car on the road.
b. ??We saw each occasional car on the road.
≠ Occasionally, we saw each car on the road.
c. ??We saw two/some/many occasional cars on the road.
≠ Occasionally, we saw two/some/many cars on the road.

Again, the restrictions are more refined: Temporal ((19)) and non-temporal FAs ((20)-(22)) show the same restrictions as with the generic reading.

- (19) a. Mary paid her friend **a/??the** daily/weekly/monthly/(in)frequent visit.
b. Mary paid her friend daily/weekly/monthly/(in)frequent visits.
- (20) a. **The/??An** odd sailor strolled by.
= On odd occasions, **a** sailor strolled by.
b. He might point out **the[/??an]** odd bird or tell us the name of a plant, but these park excursions were not botanical treks. (COCA)
= On odd occasions, he might point out a bird...
c. ...Brown himself did imbibe **the[/??an]** odd drink (he appears not to have been a temperance advocate)... (COCA)
= On odd occasions, Brown himself did imbibe a drink...
- (21) a. The pier is still used by **the[/??a]** rare passenger. (Google books)
= Rarely, the pier is still used by a passenger.
b. she runs her family's Sea-View Motel and Restaurant on a patch of northern Florida coastline...that sees only **the[/??a]** rare tourist. (COCA)
= ...that rarely sees a tourist
c. In Hinsonville, **the[/??a]** rare family had just one parent, and that condition was usually quickly altered by the second marriage of the widow or widower. (Google books)
= Rarely, a family had just one parent.
- (22) a. **The** occasional sailor strolled by.
= Occasionally, **a** sailor strolled by.
b. **An** occasional sailor strolled by.
= Occasionally, **a** sailor strolled by.

Temporal FAs show same restriction to **event nouns** as found on generic reading (23).²

²This second class of FAs allows an adverbial paraphrase with non-event nouns only under particular conditions (23) (for details and an account, see Gehrke & McNally 2014): 1. Unique discernible events, uniformity across subevents, temporal continuity within events (Atomic Event-Entity Mapping); 2. Stereotypicality; 3. The noun phrase must be a bare plural.

- (24) a. An (in)frequent/sporadic/periodic sailor strolled by.
 ≠ (In)frequently/Sporadically/Periodically, a sailor strolled by.
 b. A daily/weekly/monthly sailor strolled by.
 ≠ Daily/Weekly/Monthly, a sailor strolled by.
 c. Frequent sailors strolled by.
 ≠ Frequently, a sailor/sailors strolled by.

Type of FA	Temporal	Nontemporal	Both
	<i>(in)frequent, periodic, sporadic, daily, etc.</i>	<i>odd, rare</i>	<i>occasional</i>
Internal reading	✓	*	✓
Adverbial reading with non-event nouns	*	✓	✓
Determiner used with the generic and/or adverbial reading	✓ <i>a</i> ?? <i>the</i>	?? <i>a</i> ✓ <i>the</i>	✓ <i>a</i> ✓ <i>the</i>
Nontemporal distribution	*	✓	✓
Predicative use on relevant reading	✓	*	✓

Table 1: Summary of the empirical generalizations

3 Analysis

3.1 Background assumptions

- We make reference to token (ordinary) entities and events, as well as to kinds of entities and events (Carlson 1977).

Tokens realize kinds (Carlson 1977), e.g. $\mathbf{R}(x_o, \mathbf{dog}) \approx x_o$ **realizes** a token of the kind **dog**.

- **Nouns denote descriptions of kinds.**

- These can be converted into properties of token entities via functional morphology, resulting in a Predicative Noun Phrase (PNP) (25), adapting a proposal in Zamparelli (1995) (see e.g. McNally & Boleda 2004; Déprez 2005; Espinal 2010; Mueller-Reichau 2011, for related proposals)
- Converting a PNP to a DP creates a referential/quantificational expression.

- (25) a. $\llbracket \llbracket \llbracket \text{NP} [\text{N car}] \rrbracket \rrbracket : \lambda x_k [\mathbf{car}(x_k)]$
 b. $\llbracket \llbracket \llbracket \text{PNP} [\text{NP car}] \rrbracket \rrbracket : \lambda y_o \exists x_k [\mathbf{car}(x_k) \wedge \mathbf{R}(y_o, x_k)]$

- **Verbs** work analogously, aspect supplying the realization relation (26).

(on event kinds see, e.g., Carlson 2003; Landman & Morzycki 2003; Ginzburg 2005; Gehrke 2013, 2015, to appear; Arsenijević, Boleda, Gehrke & McNally 2014; Gehrke & McNally 2019)

- (26) a. $\llbracket \llbracket \llbracket \text{VP} [\text{V strolled by}] \rrbracket \rrbracket : \lambda x_\alpha \lambda e_k [\mathbf{strolled_by}(e_k, x_\alpha)]$, where α ranges over both kinds and tokens.
 b. $\llbracket \llbracket \llbracket \text{AspP} [\text{VP strolled by}] \rrbracket \rrbracket : \lambda x_\alpha \lambda e_o \exists e_k [\mathbf{strolled_by}(e_k, x_\alpha) \wedge \mathbf{R}(e_o, e_k)]$, where α ranges over both kinds and tokens.

- (23) a. She baked frequent batches of cookies/ ??a frequent batch of cookies/ ??frequent cookies.
 b. She sent me frequent letters / ??a frequent letter / ??frequent posters.

Kind realization for FAs: The realization relation **R** must be able to hold sometimes between a kind and a *set* of tokens (Gehrke & McNally 2011).

FAs impose conditions on the distribution of these sets of tokens at a given index *i*.

- Represented with a **distribution** function that yields the distribution *dist* of a set of entities at the given index, with values like *high*, *low*, *daily*, etc.):
distribution($\{y : \mathbf{R}(y, x_k) \text{ at } i\} = dist$)]
- Must also guarantee that the members of the set be properly individuable and that the distribution be sufficiently regular; we set aside this issue here.
 (see Stump 1981, Zimmermann 2003, and Schäfer 2007 for various alternatives)

3.2 A semantics for non-temporal FAs

- Nontemporal FAs are kind description modifiers:

$$(27) \quad \llbracket \mathbf{FA}_{nontemp} \rrbracket: \lambda P \lambda x_k [(\mathbf{FA}(P))(x_k)]$$

- **Why a second-order modifier?** [unlike temporal FAs]

- Nontemporal FAs lack a predicative use (28)
- Nontemporal FAs do not coordinate with intersective modifiers (29)
- Changing the order of nontemporal FAs with respect to other modifiers clearly produces a corresponding change in interpretation, something typical of predicate modifiers (30)

(28) ??The sailor was occasional/odd (on relevant reading)/rare.

(29) a. ??The museum had the odd/rare and brief visit from school groups.
 b. ??The occasional and fast car drove by.

(30) Only the odd/rare/occasional 2-door car will have enough leg room in the back seat.
 ≠ Only the 2-door odd/rare/occasional car will have enough leg room in the back seat.

- **Satisfaction conditions:**

$$(31) \quad \forall P, x_k, i [(\mathbf{FA}_{nontemp}(P))(x_k) \text{ at } i \leftrightarrow [P(x_k) \wedge \mathbf{distribution}(\{y : \mathbf{R}(y, x_k) \text{ at } i\} = dist)]]$$

- **An example:**

$$(32) \quad \begin{array}{l} \text{a. } \llbracket \text{odd} \rrbracket: \lambda P \lambda x_k [(\mathbf{odd}(P))(x_k)] \\ \text{b. } \llbracket \text{odd car} \rrbracket: \lambda x_k [(\mathbf{odd}(\mathbf{car}))(x_k)] \\ \text{c. } \forall x_k, i [(\mathbf{odd}(\mathbf{car}))(x_k) \text{ at } i \leftrightarrow [\mathbf{car}(x_k) \wedge \mathbf{distribution}(\{y : \mathbf{R}(y, x_k) \text{ at } i\} = low)]] \end{array}$$

- **Why necessarily definite and singular?**

(33) the/??an odd car/odd cars

- The nominal that the FA combines with denotes the set of kinds described by that nominal.
- This set includes the general kind and any recognizable subkinds.
 E.g. *car* denotes the set that includes the kind described by *car*, but also the subkinds described by *station wagon*, *sportscar*, *Mercedes*, etc.
- Whenever we convert the kind description to a description of tokens, there is always only one unique kind that the tokens are entailed to be realizing: the maximally general kind.

- When the FA combines with a kind description, it returns the description of the unique kind upon whose realizations distributional conditions are being imposed.

→ Nominals containing these FAs reject any determiner that does not entail uniqueness.

- **The generic reading:** Predication of a kind, à la Carlson (1977), (34)

(34) The odd glitch is tolerable.

- a. **tolerable**($\iota x_k [(\text{odd}(\text{glitch}))(x_k)]$)
- b. In prose: The kind of thing that is a glitch, the members of whose set-realization have a low distribution, is tolerable.

An example involving coercion of the nominal to an event description:

(35) The occasional beer is healthy. = V-ing a beer on an occasional basis is healthy.

- a. **healthy**($\iota e_k [\mathbf{E}(\text{occasional}(\text{beer}))(e_k)]$)
- b. In prose: The kind of event that is a beer V-ing, realized by a set of events with a low distribution, is healthy.

- **The adverbial reading**

Preliminary: Token event descriptions using kind terms typically require a token of the kind to participate in the event in question (e.g. in (36), a token bird of the deictically indicated kind).

(36) That kind of bird made a nest on my roof.

How could this work for *the occasional sailor*?

- The distribution condition on the set of tokens that realize this kind make it impossible for such a set to participate in one token event of the sort described by the verb.
- But nothing would prohibit it from participating in the *kind* of event described by the verb, if the latter could be instantiated by multiple event tokens.

→ Sentences with the adverbial reading correspond to propositions about event kinds.

- Satisfaction conditions for sentences that are used to make assertions about event kinds:

(37) $\forall e_k, x_\alpha, P, i [P(e_k, x) \text{ at } i \leftrightarrow \exists e, x_\alpha [\mathbf{R}(e, e_k) \wedge P(e, x_\alpha) \text{ at } i]]$

In prose: In order for an event kind predication to hold at some index *i*, at least one realization of the event kind should exist at *i*.

- Each element of the set that realizes the participant should participate in a token event of the relevant event kind.
- In such cases, it will follow automatically that the corresponding token events will satisfy the same distribution as the token participants.

- For (38-a) to be true, there will have to be a set of token strolling events with a distribution that *occasional/odd/rare* require. (This is precisely what the adverbial paraphrase expresses.)

(38) a. The occasional(odd/rare sailor strolled by.
 b. $\exists e_k [\mathbf{strolled_by}(e_k, \iota x_k [(\text{occasional}(\text{sailor}))(x_k)])]$

⇒ With one semantics for the FA we account for both the generic and adverbial “readings”.

The different paraphrases are simply a byproduct of other elements in the sentences in which they occur.

4 Modification (MOD) vs. quantification (Q)

- **The quantifier analysis of the adverbial reading** (e.g. Stump 1981; Larson 1998; Zimmermann 2003; Morzycki 2016; Sæbø 2016):

- FAs under the adverbial reading are complex determiners, and thus different from FAs under the internal or generic readings.
- No account of the internal or generic readings

E.g. Zimmermann (2003): FAs under the adverbial reading syntactically incorporate into the determiner, as in (39) (Zimmermann 2003, 271, minor details modified).

The result is a complex pluractional quantifier INFREQ over event-individual pairs that are found within a larger, contextually identified event (40-a); satisfaction conditions in prose in (40-b) (adapted from Zimmermann 2003, 272, minor details modified)

(39) [IP[QP[Q the/an+occasional₁][NP *t*₁ sailor]]₂[VP *t*₂ strolled by]]

(40) a. [an/the occasional N VP]:

(INFREQ $\langle e, x \rangle$: **part-of**(e, e^*) $\wedge N(x)$)[VP(e, x)]

- b. There are some pairs $\langle e, x \rangle$, with e part of a contextually given event e^* , and x having property **N**, such that e is an event of x **VP**-ing, and any two events of x **VP**-ing occur at separate points in time.

- **Two main sorts of arguments in favor of the quantifier analysis:**

Q1 The FA appears to scope over the entire sentence, as the paraphrases show.

Q2 The FA does not behave like a “typical adjective” in some respects (coordination with and relative order with respect to other adjectives, etc.; recall (29)-(30)).

- **Arguments against the quantifier analysis:**

Q2 is not convincing (and these facts are also captured by our modifier analysis): other non-intersective adjectives show similar behavior (see Gehrke & McNally 2011, for details).

MOD1 Unexpected scope facts

- Normally, nothing prevents a quantifier in object position from taking scope over a sentence in which there is no other quantificational operator.
- There is no reason in principle why an INFREQ operator contributed by the FA (in conjunction with the determiner) should not be able to effectively scope over the entire sentence, but in (41), it cannot.

(41) Idling beside the propped-open kitchen window he registers the occasional car swishing past, three stories below. (COCA)
≠ Occasionally, he registers a car swishing past.

- The quantifier analysis predicts that (41) should be paraphrased as in (42-a) or (42-b), depending on the syntactic analysis one adopts:

(42) a. There are some pairs $\langle e, x \rangle$, with e part of a contextually given event e^* , and x a car swishing past, such that e is an event of him registering x , and any two events of him registering x occur at separate points in time.

- b. There are some pairs $\langle e, x \rangle$, with e part of a contextually given event e^* , and x a car, such that e is an event of him registering x swishing past, and any two events of him registering x swishing past occur at separate points in time.

- (41) entails that there are few cars swishing past, but neither of the informal representations in (42) carries this entailment.

- Rather, these representations only entail that there are few events of the subject referent registering the car (swishing past), and this could be the case if there are many cars (swishing past) and he simply fails to notice most of them.
- The effect of the FA appears to be only over events of swishing past, rather than over events of registering.
- Contrast e.g. (43), with *many* substituted for *the occasional*, where both scopes, corresponding to (43-a)-(43-b) are allowed (We illustrate with the syntax in (42-a)).

- (43) Idling beside the propped-open kitchen window he registers many cars swishing past, three stories below.
- a. Many cars are such that he registers them swishing past.
 - b. There are many cars swishing past, and he registers that.

- We see no independently-motivated mechanism that could produce this effect, assuming the quantifier analysis.

These sorts of examples are not problematic for the analysis proposed here:

- They receive the same analysis as examples like (38) (y_i represents the pronoun *he*; we assume a small clause analysis for illustration):

- (44) $\exists e, e_k [\mathbf{register}(e, y_i, \mathbf{swishing_past}(e_k, \iota x_k [(\mathbf{occasional}(\mathbf{car}))(x_k)]))]$

- The satisfaction conditions for this sentence will guarantee that the distribution of token cars is low; this will guarantee that there are few token events of such cars swishing past.
- The sentence describes a token event of y_i registering that kind of event that is one of the occasional car swishing past.

MOD2 Unexpected determiner facts

- Assumption in the literature: the adverbial reading is only available with the (in)definite articles and semantically bleached possessives.
- Zimmermann: These determiners are semantically empty.

Problem: Why must the FA be accompanied by an overt article in the first place (cf. (45))?

- (45) *Occasional sailor strolled by.

- No account of the fact that there are distinct patterns of determiner distribution for temporal vs. non-temporal FAs.
- Semantic emptiness cannot account for the determiner restriction, and the difficulty of explaining how the FA would contribute quantificational or referential force when there must also be a determiner doing so reemerges.
- Since the quantifier analysis does not relate the generic and adverbial paraphrases, it has nothing to say about why any given FA shows a similar pattern of determiner restrictions on *both* the adverbial and generic readings.

NEW Some parts of MOD2 are not a problem for the Q analysis in Morzycki (2016), others remain; see below.

MOD1 is sometimes also less clear for MOD analysis, as pointed out by Sæbø (2016); see below.

5 Interim conclusion (2015)

- FAs are true adjectives, not quantifiers
- Analysis raises some new and interesting possibilities:
 - Kinds can be realized by sets of tokens, rather than individual tokens.
 - Some clauses are descriptions of event kinds, rather than descriptions of event tokens.
- There is generally more than one way in natural language to convey truth-conditionally equivalent information.

6 Let's move to 2019: We might need both types of analysis (cf. Gehrke to appearb)

• Problems for the adjectival analysis of adverbial *occasional*

- Lexical ambiguity of *occasional*: Why? (not an advantage over the determiner account)
- The adverbial reading of *occasional* in combination with a sortal noun is equally possible with the indefinite article (46), which is not expected for non-temporal FAs.

(46) An **occasional** sailor strolled by.

- DeVries (2010) (as discussed in Sæbø 2016): Our account merely derives that, e.g., sailors are occasionally realised, but not that they are occasionally realised in passing-by events.

Sæbø (2016): Contrast in (47)

- (47-a) can only have 'wide scope' of the FA (the distribution specified by the FA is only for the kinds of events specified by the VP, but not other events, where there are many window but only a few in which there was light)
- (47-b) can only have 'narrow scope'

(47) a. Most of the houses were still dark, though a light shone in the **occasional** window.
b. From the **occasional** window you have a magnificent view towards the coast.

- Q analysis makes correct predictions for (47-a), but incorrect predictions for (47-b).
- MOD analysis makes incorrect predictions for (47-a), but correct predictions for (47-b).

Similarly, two readings (narrow vs. wide scope) available with (49) (Sæbø 2016)

(48) There are geraniums in the **occasional** window box.

- Sæbø (2016): Norwegian complex determiner *ei(-) og anna(-)* '(lit.) one and other' (49)
 - ~ English *occasional* (under the adverbial reading)
 - Only allows wide scope readings, along the lines of (48-a) → calls for a determiner analysis
 - However, one that also allows for distribution in space, as evidenced by (49-b,c)

(49) a. **En og annen** abbor belt på.
one and other perch bit on
b. **Ei of anna** stjerne lyste enno.
one and other star shone yet
c. Mange overbefolkede vann inneholder **en og annen** storfisk.
many overpopulated lakes contain one and other bigfish

Sæbø's proposal generalises the notion of distribution to cases like these (along the lines of Gawron 2006, and his notion of a generalised path).

7 Cross-linguistic perspective

- **German:** Different opinions in the literature

- Zimmermann (2003); Bücking (2012): Adverbial readings of FAs exist, but are more restricted than in English.
- Schäfer (2007): No adverbial reading with non-event nouns
- Gehrke & McNally (2015): German lacks non-temporal FAs

E.g. Zimmermann: Restrictions on adverbial readings of FAs in German

Claim: German adverbial FAs only in subject position (50) (from Zimmermann 2003, 261)

- (50)
- a. Ein **gelegentlicher** Kunde betrat den Laden.
an occasional customer entered the shop
'Occasionally, a customer entered the shop.'
 - b. #PAGAD zerstörte das **gelegentliche** Gebäude.
PAGAD destroyed the occasional building
 - c. #Peter schickte einer **gelegentlichen** Frau Blumen.
Peter sent an occasional woman flowers
 - d. #Wir stoppten bei dem **gelegentlichen** Rasthaus.
we stopped at the occasional roadhouse

- His explanation: German non-subject quantified phrases cannot take inverse scope at LF
→ further support for his analysis (Q3)
- Preposed topicalised objects are fine on the adverbial reading (51) (from Zimmermann 2003, 263; also his non-literal translation)

- (51) Ein **gelegentliches** Bierchen haben wir auch getrunken.
an-occasional-beer.DIM.ACC have we also drunk
'Of course, we have occasionally drunk a beer, too.'

(Finnish is argued to behave on a par with German in this respect.)

- Gehrke & McNally (2015) checked Zimmermann's data with 11 German native speakers

- Unanimous rejection of (50-b)-(50-d) (agree with Zimmermann)

BUT: Four speakers also rejected (50-a).

- Only one of the seven who accepted it, clearly allowed for the adverbial reading.³
- The other six: internal reading of the FA
'ok under the reading where this is someone who is a customer occasionally'
'ok in marketing contexts, where customers are divided into regular, occasional, and one-time customers'

e.g. acceptable discourse in (52) (from G&McN, 851)

- (52) [Ein **gelegentlicher** Kunde]_i betrat den Laden. Er_i hatte rote Schuhe an.
an occasional customer entered the shop he had red shoes on
'An occasional customer entered the shop. He was wearing red shoes.'

³There might be some speaker variation (incidentally, this was the only Austrian German speaker, the others were Federal German ones), or this speaker might have been influenced by English (at the time living in the Netherlands and working in an English-speaking environment).

– Under this interpretation it can also appear in canonical object position:

- (53) Wir trafen einen **gelegentlichen** Kunden.
we met a occasional customer
(if at all:) ‘We met someone who is a customer on occasion.’
(≠ ‘Occasionally, we met a customer.’)

→ The adverbial reading is not reliably available for (50-a) either.

- (not discussed in G&McN) judgment of the 11 speakers wrt Zimmermann’s (51)
 - 8 found it acceptable
 - 9 equally liked or even preferred (54) (on the relevant reading), where the DP containing the FA remains in object position, out of which QR is supposed to be impossible.

- (54) Wir tranken ein **gelegentliches** Bier.
we drank an-occasional-beer.ACC
‘We drank an occasional beer.’ (~ ‘Occasionally, we drank a beer.’)

→ Either absence of complex determiners in German (under the Q analysis), or absence of non-temporal FAs (under MOD analysis; this is G&McN’s conclusion)

- Ungrammaticality of the German translation of the original example or of cases involving non-temporal distribution (55) (from G&McN, 850)
- All instances of acceptable adverbial readings of FAs in German involve event nominals, as in (56) (from G&McN, 851), or sortal nouns coerced into event readings, which is arguably the case in (51) and (54).

- (55) *{Ein **gelegentlicher** / der **gelegentliche**} Matrose {schlenderte vorbei / ist 2 Meter
an occasional the occasional sailor strolled by is 2 meters
groß}.
tall

- (56) Die Gruppe hielt eine **tägliche** / **wöchentliche** Diskussionsrunde ab.
the group held a daily weekly discussion session off
‘The group held a daily/weekly discussion session.’

- **Spanish:** also lacks non-temporal FAs (57) (from G&McN, 861)

- (57) ??Pasaba el { **ocasional** coche / coche **ocasional** }.
passed the occasional car car occasional
Intended: ‘The occasional car passed by.’

- **Irish** (James McCloskey, p.c.): Mirror image of German (see footnote 22 in G&McN)

- Lacks temporal FAs (for meanings like *frequent*, *occasional* etc.)
- has one adjective that could count as a non-temporal FA, namely *corr*, meaning ‘peculiar, unusual’ in postnominal position (58)

- (58) fear **corr**
man peculiar
‘a strange/weird man’

– In prenominal position it is interpreted like a non-temporal FA (59)

- (59) a. Tá **corr**-chorrán fós féin sa gceantar seo
is odd-sickle still even in-the area this
‘There’s still the odd sickle in this area.’
b. Ní bhíodh idir í agus uncail a hathar ach an **corr**-fhocal.
NEG used-to-be between her and uncle her father.GEN but the odd-word
‘There was only the odd word (exchanged) between herself and her father’s uncle.’

McCloskey’s further observations:

- Irish prenominal adjectives form compounds with the nouns they modify → complex determiner analysis is out of the question
- Unlike English non-temporal FAs, Irish *corr* does not require the definite article (59-a), though it is compatible with it (59-b) (no semantic difference)

→ Zimmermann’s (2003) Q analysis will not work, but maybe Morzycki’s (2016) ...

8 Outlook: Seemingly ‘non-local’ readings of adjectives

(but remember: there can be different paths to the same paraphrase)

- Morzycki (2016): ‘non-local’ readings of adjectives

- (60) a. The **average** American has 2.3 children. (Kennedy & Stanley 2009)
~ On average, an American has 2.3 children.
b. A **whole** ship was submerged. (Moltmann 1997)
~ A ship was wholly submerged.
c. Solange is staying at an **unknown** hotel. (Abusch & Rooth 1997)
~ Solange is staying at a hotel and it is not known which hotel she is staying at.

Shared properties:

- Allow an adverbial paraphrase
- Come with particular determiner restrictions
- Display “un-adjectival” behavior (as in (29), (30))

Morzycki: two different groups

- As that only allow (in)definite articles and bleached possessives, e.g. *occasional*, *average*
- As that additionally allow weak determiners, e.g. *whole*

Morzycki’s analysis of the first class (*occasional*, *average*):

- Quantificational adjectives (type $\langle et, \langle et, t \rangle \rangle$), but no incorporation (unlike Zimmermann)
- The determiners are not semantically empty, their semantic import remains untouched.
- The trace of the moved adjective is shifted (by the BE type shift in Partee 1987) to *et*, to combine with a determiner
- Strong determiners cannot combine with this trace because they presuppose that their domain has more than one member, but the trace denotes a singleton set.
- Weak determiners are not acceptable because the trace is treated as a kind (following Gehrke & McNally 2011), and kinds do not have cardinalities.

Still problematic:

- No general account of differences between (non)temporal FAs
- No connection to generic reading

• Further ‘non-local’ readings:

- *same, different* (61) (e.g. Beck 2000; Barker 2007; Dotlačil 2010; Brasoveanu 2011)
- Ordinals (62) (e.g. Bhatt 1999; Bylinina, Ivlieva, Podobryaev & Sudo 2015)
- External modification in idioms (63) (Ernst 1981)

(61) Elena and Louise read a **different** / the **same** book.

(62) a. They sent the **first** man to the Moon today.
~ Today is the first time they sent a man to the Moon.

b. John gave MARY the **first** telescope.
~ John gave a telescope to Mary before he gave a telescope to anyone else.

(63) He came apart at the **political** seams. *(come apart at the seams ≈ ‘fail’)*
~ Politically, he came apart at the seams.

• Gehrke & McNally (2019) on external modification in idioms

Generalisation on Ernst’s (1981) data: External modifiers are either

- Relational adjectives (RAs) (64), or
- Noun modifiers (65)

(64) a. Carter doesn’t have an **economic** leg to stand on.
b. We need to blow off a little **theoretical** steam here.

(65) a. Our team is not as good as last year’s, but we aren’t going to drop out of the **soccer** picture.
b. He broke new **inkwell** ground with his invention.

→ Semantics of RAs in McNally & Boleda (2004); Arsenijević et al. (2014): Both types of modifiers involve a contextually specified relation R between modifier and modifiee.

→ Our actual analysis builds on FA analyses in Gehrke & McNally (2014, 2015)
Check it out!

References

- Abusch, Dorit & Mats Rooth. 1997. Epistemic NP modifiers. In Aaron Lawson (ed.), *Proceedings of Semantics and Linguistic Theory (SALT) 7*, Ithaca, NY: CLC Publications.
- Arsenijević, Boban, Gemma Boleda, Berit Gehrke & Louise McNally. 2014. Ethnic adjectives are proper adjectives. In Rebekah Baglini, Timothy Grinsell, Jonathan Keane, Adam Roth Singerman & Julia Thomas (eds.), *CLS 46-1 The Main Session: Proceedings of the 46th Annual Meeting of the Chicago Linguistic Society*, 17–30. Chicago: Chicago Linguistic Society.
- Barker, Chris. 2007. Parasitic scope. *Linguistics and Philosophy* 30.4. 407–444.
- Barwise, Jon & Robin Cooper. 1981. Generalized Quantifiers and natural language. *Linguistics and Philosophy* 4. 159–219.
- Beck, Sigrid. 2000. The semantics of *different*: Comparison operator and relational adjective. *Linguistics and Philosophy* 23.2. 101–139.
- Bhatt, Rajesh. 1999. *Covert Modality in Non-Finite Contexts*: UPenn dissertation.
- Bolinger, Dwight. 1967. Adjectives in English: Attribution and predication. *Lingua* 18. 1–34.
- Brasoveanu, Adrian. 2011. Sentence-internal *different* as quantifier-internal anaphora. *Linguistics and Philosophy* 34. 93–168.
- Bücking, Sebastian. 2012. The semantics of frequency adjectives. In *Proceedings from the Annual Meeting of the Chicago Linguistic Society* 48, 93–107.
- Bylinina, Lisa, Natalia Ivlieva, Alexander Podobryaev & Yasutada Sudo. 2015. An *in situ* semantics for ordinals. In *NELS 45: Proceedings of the Forty-Fifth Annual Meeting of the North East Linguistic Society: Volume 1*, 135–145.
- Carlson, Greg. 2003. Weak indefinites. In Martine Coene & Yves D’hulst (eds.), *From NP to DP*, 195–210. Amsterdam: John Benjamins.
- Carlson, Gregory N. 1977. *Reference to Kinds in English*: University of Massachusetts at Amherst dissertation. Published in 1980 by Garland Press, New York.
- Déprez, Viviane. 2005. Morphological number, semantic number and bare nouns. *Lingua* 115. 957–883.
- DeVries, Karl. 2010. Frequency adjectives. BA thesis, Michigan University.
- Dotlačil, Jakub. 2010. *Anaphora and Distributivity: A study of same, different, reciprocals and others* LOT Dissertation Series 231. Utrecht: LOT.
- Ernst, Thomas. 1981. Grist for the linguistic mill: Idioms and ‘extra’ adjectives. *Journal of Linguistic Research* 1.3. 51–68.
- Espinal, M. Teresa. 2010. Bare nominals in Catalan and Spanish: Their structure and meaning. *Lingua* 120. 984–1009.
- Gawron, Jean Mark. 2006. Generalized paths. In Effi Georgala & Jonathan Howell (eds.), *Proceedings of SALT 15*, Ithaca: Cornell University.
- Gehrke, Berit. 2013. Still puzzled by adjectival passives? In Raffaella Folli, Christina Sevdali & Robert Truswell (eds.), *Syntax and Its Limits*, 175–191. Oxford University Press: Oxford.
- Gehrke, Berit. 2015. Adjectival participles, event kind modification and pseudo-incorporation. *Natural Language and Linguistic Theory* 33.3. 897–938.
- Gehrke, Berit. to appeara. Event kinds. In Robert Truswell (ed.), *The Oxford Handbook of Event Structure*, Oxford: Oxford University Press.
- Gehrke, Berit. to appearb. Multiple event readings and occasional-type adjectives. In Patricia Cabredo Hofherr & Jenny Doetjes (eds.), *The Oxford Handbook of Grammatical Number*, Oxford: Oxford University Press.
- Gehrke, Berit & Louise McNally. 2011. Frequency adjectives and assertions about event types. In Ed Cormany, Satoshi Ito & David Lutz (eds.), *Proceedings of SALT 19*, 180–197. Ithaca: CLC Publications.
- Gehrke, Berit & Louise McNally. 2014. Event individuation by objects: Evidence from frequency adjectives. In Urtzi Etxeberria, Anamaria Falaus, Aritz Irurtzun & Bryan Leferman (eds.), *Proceedings of Sinn und Bedeutung* 18, 146–163. semanticsarchive.

- Gehrke, Berit & Louise McNally. 2015. Distributional modification: The case of frequency adjectives. *Language* 91.4. 837–870.
- Gehrke, Berit & Louise McNally. 2019. Idioms and the syntax/semantics interface of descriptive content vs. reference. *Linguistics* 57.4.
- Ginzburg, Jonathan. 2005. Situation Semantics: The ontological balance sheet. *Research on Language and Computation* 3.4. 363–389.
- Kamp, Hans. 1981. A theory of truth and discourse representation. In Jeroen Groenendijk, Theo M.V. Janssen & Martin Stokhof (eds.), *Formal Methods in the Study of Language, Part I*, 277–322. Amsterdam: Mathematisch Centrum.
- Kennedy, Christopher & Jason Stanley. 2009. On average. *Mind* 118(471). 583–646.
- Landman, Meredith & Marcin Morzycki. 2003. Event-kinds and manner modification. In Nancy Mae Antrim, Grant Goodall, Martha Schulte-Nafeh & Vida Samiian (eds.), *Proceedings of the Western Conference in Linguistics (WECOL) 2002*, 136–147. California State University, Fresno.
- Larson, Richard. 1998. Events and modification in nominals. In Devon Strolovitch & Aaron Lawson (eds.), *Proceedings of SALT 8*, 145–168. Ithaca, NY: CLC Publications.
- McNally, Louise & Gemma Boleda. 2004. Relational adjectives as properties of kinds. In Olivier Bonami & Patricia Cabredo Hofherr (eds.), *Empirical Issues in Formal Syntax and Semantics* 5, 179–196. <http://www.cssp.cnrs.fr/eiss5>.
- Milsark, Gary. 1974. *Existential Sentences in English*: MIT dissertation.
- Moltmann, Friederike. 1997. *Parts and Wholes in Semantics*. Oxford: Oxford University Press.
- Morzycki, Marcin. 2016. Toward a general theory of nonlocal readings of adjectives. In Nadine Bade, Polina Berezovskaya & Anthea Schöller (eds.), *Proceedings of Sinn und Bedeutung 20*, 515–532. semanticsarchive.
- Mueller-Reichau, Olav. 2011. *Sorting the World: On the Relevance of the Kind-Level/Object-Level Distinction to Referential Semantics*. Frankfurt/M.: Ontos Verlag.
- Partee, Barbara. 1987. Noun phrase interpretation and type-shifting principles. In Jeroen Groenendijk, Dick de Jongh & Martin Stokhof (eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*, 115–143. Dordrecht: Foris.
- Sæbø, Kjell Johan. 2016. Adjectives and determiners of distribution. Ms. Oslo University.
- Schäfer, Roland. 2007. On frequency adjectives. In Estela Puig Waldmüller (ed.), *Proceedings of Sinn und Bedeutung 11*, 555–567. Barcelona: Universitat Pompeu Fabra.
- Stump, Gregory T. 1981. The interpretation of frequency adjectives. *Linguistics and Philosophy* 5. 221–256.
- Zamparelli, Roberto. 1995. *Layers in the Determiner Phrase*: University of Rochester dissertation.
- Zimmermann, Malte. 2003. Pluractionality and complex quantifier formation. *Natural Language Semantics* 11. 249–287.