Event individuation by objects: Evidence from frequency adjectives

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1 Introduction

- **Starting point:** Gehrke and McNally (2012) show that frequency adjectives (FAs) (Bolinger 1967; Stump 1981; Larson 1998; Zimmermann 2003; Schäfer 2007; Gehrke and McNally 2011) fall into two categories, as shown in their so-called *adverbial reading*.

    - In combination with *non-event nouns*, some FAs (e.g. *occasional*, (1a)) systematically allow this reading, i.e. can be paraphrased as sentence adverbs.
    - Other FAs (e.g. *daily, frequent*), do not ((1b), see Schäfer (2007)).

    (1)   a.   The occasional sailor strolled by. = Occasionally, a sailor strolled by.
           b.   A frequent sailor strolled by. ≠ Frequently, a sailor strolled by.

    They argue that the difference is related to whether the FA expresses strictly temporal (e.g. *frequent*) vs. non-temporal (e.g. possibly spatial, e.g. *occasional*) distribution.

- **But:** There is a (fairly) systematic exception to this generalization (Gehrke and McNally 2011):

    - FAs like *frequent* can have an adverbial reading in combination with non-event nouns in certain argument positions of certain senses of certain verbs, e.g. with themes of verbs of creation and consumption ((2)).
    - However, this does not hold for incremental theme arguments more generally ((3)).
    - They note further conditions, e.g. the contrast in (2b) and (4b) vs. (4a), but offer no analysis.

    (2)   a.   She wrote me frequent letters. = Frequently, she wrote me a letter.
           b.   She baked frequent batches of cookies. = Frequently, she baked a batch of cookies.
           c.   She drank frequent cups of coffee. = Frequently, she drank a cup of coffee.

    (3)   a.   ??She read frequent books to her mother.
           b.   ??She mowed frequent lawns.

    (4)   a.   ??She baked frequent cookies.
           b.   She baked frequent cakes.

- **Our goal:** To account for these exceptions.

    - The adverbial reading requires that the events described be uniquely individuated by the FA-modified argument, have a uniform structure, and describe stereotypical activities.
    - Semantic composition proceeds via semantic incorporation (McNally 1995; van Geenhoven 1995; Chung and Ladusaw 2003; Farkas and de Swart 2003, a.o.), implemented via a rule of generalized argument identification.

- **Theoretical implications:** The analysis points to interesting parallels between event individuation by FAs and...

    - Event measurement via incremental themes as analyzed by Kennedy (2012).
    - Dowty's (2000) analysis of the *swarm* construction (e.g. *The garden swarmed with bees*.).

- **Plan:**

  – Sharpen the empirical generalization
  – Analysis
  – Conclusions and implications

2 Sharpening the empirical generalization

- Not all objects of verbs of creation/consumption allow this sort of FA:

  (5)   She baked frequent *(batches of) cookies.

- It is not only objects of creation/consumption verbs that take these FAs:[2]

  (6)   a.   Send frequent emails to your professor if something is hard to understand...
             b.   Send frequent letters, and have other family members and friends of the cult member send letters too.
             c.   ...she has begun receiving frequent messages from doubting pastors and churchgoers...
             d.   He received frequent letters asking for his prayers...

  (7)   a.   Parents of young children who receive frequent antibiotics are also frequent users of antibiotics
             b.   A large percentage of cystic fibrosis patients take frequent antibiotics to control lung infections.

A The distribution has to involve one unique discernible event for each discernible object.

  $\rightarrow$ This accounts for the contrast in (5).

  – Unit measure complements such as *instance*, *dose*, *sip*, *cup* can help otherwise resistent verbs accept these FAs.

  (8)   a.   All of us who were engaged in the struggle must have observed frequent instances of a superintending Providence in our favor.
             b.   The Small Pleasure bank helps you distribute your financial resources to purchase frequent doses of lovely things rather than infrequent doses of lovelier things.
                 (cp. ??She purchased frequent CDs.)
             c.   Drink frequent sips of water...   (cp. ??They drank frequent beers.)

B Each event has to be non-heterogeneous (uniform), with little variability within or across events.

  $\rightarrow$ This can be observed in the acceptable examples (6) and (7).

  – If it is not highly likely that the event will have no temporally discontinuous subevents, where each subevent is more or less the same as the other, the examples with FAs are generally bad, recall (3), repeated in (9).

  (9)   a. ??She read frequent books to her mother.
             b. ??She mowed frequent lawns.

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[2]Attested examples taken from Google or the GloWbE corpus (`http://corpus.byu.edu`)

Similarly:

(10) a. ??She knitted frequent sweaters.
      b. ??He drew/painted frequent pictures of his sister.
      c. ??She played frequent sonatas.
      d. ??She wrote frequent books.   (cp. write frequent letters)
      e. ??They ate frequent pizzas.   (cp. eat frequent meals)

   – The activity cannot involve too many different sub-activities (rules out e.g. *knitting, drawing, painting, eating pizza* events).
   – The single events cannot involve going back and forth / redoing something / taking breaks (rules out e.g. *mowing lawns, knitting, drawing, painting, playing sonatas, reading/writing books, eating pizza* events).
   – The objects themselves cannot be too heterogeneous and involve different kinds of subparts (e.g. *book, sonata, sweater, pizza*).

C The verb-object combination (the VP) has to name a stereotypical activity.

Another central question: What do you typically do with the objects involved?

Good input combinations: Stereotypical object-activity pairs

   – joke: tell
   – story: tell, hear
   – rumour: hear
   – letter: write, receive, send
   – cake, (batch of) cookies: bake
   – e-mail, message: receive, send
   – antibiotics: receive, take

Bad input combinations:

   – movies: direct, tape, watch etc.
     (in addition: one can re-watch, watch half-way / movies have different scenes, episodes etc.)
   – sonata: compose, listen to etc.
     (in addition: one can listen to them half-way / sonatas have different movements etc.)
   – book: write, sell, buy, read etc.
     (in addition: one can read books half-way, parts etc. / books have different chapters etc.)

   → There are many more things you can typically 'do' with the bad nominal inputs, there is no limitation to just one or two typical Vs.   **(C)**
   → And/or the nominals have a more complex internal structure that is not just like a unique (metaphorical) two-dimensional path one can go through.   **(B)**

D In all the acceptable cases, the FA-modified nominals have to be plural.

- Finally, some acceptable combinations seem to involve **object-to-event coercion**:

  (11)   a.   ...the chronic leukemias offer frequent examples of cases living for long, when left untreated...
         b.   ...all travellers were offered frequent cups of coffee...
         c.   Any areas of the walk that are steeper, or which have staircases also offer frequent benches and seating where less fit walkers can take a break...

    – (11a): The leukemias as a whole frequently offer examples, not "frequently, the leukemias as a whole/some leukemias offer examples...".

    – (11b): Each traveler is frequently offered coffee, not "frequently, all the travelers as a group were offered coffee".

    – (similarly for the areas of the walk in (11c))

    → The adverb seems to have scope under the subject (unlike what we find with all the other examples above that do not involve coercion).

- Something similar (a kind of reinterpretation of the nominal as an event) could be happening with support verb/idiom chunk/light verb constructions ((12)), as well as *have* ((13)).

  (12)   a.   He took frequent pictures of the skyline.
         b.   She undertook frequent responsibilities for the IB Organisation in the Asia Pacific region, while serving as Head...
         c.   Keep frequent tabs on offenders...

  (13)   *have*
         a.   If a person has frequent symptoms, would you suggest that they take that preventively every night...
         b.   ...when most of them have frequent bugs, they freeze...
         c.   ...you should realize that the sources you quote have frequent errors about specific US losses...
         d.   He had frequent beers with his friends...
              (cp. ??He drank frequent beers with his friends.)

- **We set aside the coercion cases and focus on accounting for the properties we have identified for the other cases:**

    – The events described have to be uniquely individuated by the FA-modified argument.

    – They have to have a uniform structure.

    – They have to describe stereotypical activities.

    – The FA-modified nouns have to be plural.

3 Analysis

3.1 Gehrke and McNally (2012)

- **Two classes of FAs:** Temporal vs. non-temporal(ly distributing).

  (We discuss only the former here.[3])

  (14) *Temporal FAs*
  - a. The house underwent monthly/frequent/periodic/sporadic cleanings.
  - b. The house underwent a/??the monthly/frequent/periodic/sporadic cleaning.
  - c. ??A/??The monthly/frequent/periodic/sporadic sailor is 6 feet tall.
  - d. The reviews were ?monthly/frequent/periodic/sporadic.

  (15) *Non-temporal FAs*
  - a. ??The house underwent odd cleanings.   (on relevant reading)
  - b. The house underwent ??an/the odd cleaning.
  - c. ??An/The odd sailor is 6 feet tall.
  - d. ??The sailor was odd.   (on relevant reading)

  (16) *occasional: ambiguous*
  - a. The house underwent occasional cleanings.
  - b. The house underwent an/the occasional cleaning.
  - c. The occasional sailor is 6 feet tall.
  - d. The cleaning/??sailor was occasional.

- **Basic semantics for temporal FAs:**

  - Temporal FAs are sortally restricted to **events**. They can apply either to **event kinds** *or* to **pluralities of event tokens** (understood as sums of events in an algebraic model).

  - Non-event nouns modified by FAs generally must be plural.
    $\rightarrow$ We assume that only the plurality-of-event-tokens case is relevant here.

  (17) - a. ??She wrote a frequent/periodic/sporadic letter to her mother.
        - b. She wrote frequent/periodic/sporadic letters to her mother.

  - Representation for the semantics of the predicate modifier use:

  (18) $[\![\text{FA}_{temp-mod}]\!]$: $\lambda P \lambda e[P(e) \wedge \textbf{FA}_{temp}(e)]$

  - Temporal FAs provide information about the distribution of a set of events at a given spatiotemporal index:

    An FA$_{temp}$ holds of a plurality argument at an index i just in case the distribution of the set of atomic parts of that argument at i is what the FA requires (**distribution** is a function that yields the distribution *dist* of a set of entities at i, with values like *high*, *low*, *daily*, etc.):[4]

  (19) $\forall e, i[\textbf{FA}_{temp}(e)$ at $i \leftrightarrow \textbf{distribution}(\{e' : \textbf{atomic-part-of}(e', e) \text{ at } i\}) = dist]$

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[3]Fixed frequency temporal FAs such as *monthly* behave slightly more like relational adjectives than do variable frequency temporal FAs such as *sporadic* (see McNally and Boleda 2004, on relational adjectives). The generalizations stated throughout apply most clearly to the latter.

[4]The distribution function must guarantee that the members of the set be properly individuable and that the distribution be sufficiently regular (see Stump 1981; Zimmermann 2003; Schäfer 2007, for discussion). As the means by which this is guaranteed is not crucial to our proposal, we will not discuss the options further here.

- Thus, e.g. *frequent cleanings* denotes a property of pluralities of cleanings whose atomic parts have a high distribution (see Krifka 1989, for a definition of atomic part):

(20) $[\![$frequent cleanings$]\!]$: $\lambda e[\textbf{cleaning*}(e) \wedge \textbf{frequent}(e)]$
$= \lambda e[\textbf{cleaning*}(e) \wedge \textbf{distribution}(\{e' : \textbf{atomic-part-of}(e', e) \text{ at } i\}) = high]$

- **The adverbial reading with temporal FAs:**

  - Sentences containing adverbially-interpreted FAs are not, as a rule, generic. For example:

(21) Send frequent emails to your professor if something is hard to understand (=(6a))

  - Gehrke and McNally (2011) argue that the FA cannot be analyzed as a covert quantificational determiner, e.g. it does not take scope over a bare plural subject, as would be expected if the DP *frequent cleanings* scoped over the sentence in (22).

(22) Houses had frequent cleanings.
= Houses are such that they had cleanings frequently.
$\neq$ There were frequent house-cleaning events.

  - Adverbially-used temporal FAs occur only in indefinite singulars or bare plurals (see (14) and (23)):

(23) The house underwent two/several/many/those frequent cleanings.
$\neq$ Frequently, the house underwent two/several/many/those cleanings.
= The house underwent two/several/many/those different kinds of frequent cleanings.

$\rightarrow$ The nominal containing the FA denotes a kind when indefinite singular (Gehrke and McNally 2012) and a property (of pluralities) when plural.
(We discuss only the latter here; recall (17)).

$\rightarrow$ To combine the verb with the property-type nominal we use Semantic Incorporation, implemented with Chung and Ladusaw's (2003) **Restrict** and Existential Closure (**EC**) composition rules ((24)):[5]

(24) a. **Restrict**$(\lambda y \lambda x.P(x, y), \lambda z.Q(z)) = \lambda y \lambda x[P(x, y) \wedge Q(y)]$
b. **EC**$(\lambda y \lambda x.P(x, y)) = \lambda x \exists y.P(x, y)$

(25) $[\![$underwent frequent cleanings$]\!]$:
Restrict$(\lambda y \lambda e[\textbf{undergo}(y, e)], \lambda z_{ev}[\textbf{cleaning*}(z_{ev}) \wedge \textbf{frequent}(z_{ev})])$
$= \lambda y_{ev} \lambda e[\textbf{undergo}(y_{ev}, e) \wedge [\textbf{cleaning*}(y_{ev}) \wedge \textbf{frequent}(y_{ev})]]$
After **EC**: $\lambda e \exists y_{ev}[\textbf{undergo}(y_{ev}, e) \wedge [\textbf{cleaning*}(y_{ev}) \wedge \textbf{frequent}(y_{ev})]]$

  - The satisfaction conditions for (25b): We posit that for a plurality like that described in (20) to participate in an event, each atom that supports the distribution should participate in a distinct atom of the event described by the verb.

$\rightarrow$ For (25) to be true, there has to be a set of token cleaning events with a distribution that can be described as "frequent".

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[5]Unlike Chung and Ladusaw, we follow Kratzer (1996) in severing the external argument from the verb.

- Brief comments on the choice between "regular" incorporation vs. pseudo-incorporation (Dayal 2003, 2011; Espinal and McNally 2011):

  - The construction involves bare plurals, not (number-neutral) bare nouns.

  - The nominal containing the FA licenses the accommodation of a persistent discourse referent:

(26)   The house underwent frequent cleanings. They were very thorough.

  - The bare nominal can be modified by a token-level modifier:

(27)   The house underwent frequent cleanings by the whole family.

Complexities of this issue go beyond the scope of this talk (see Farkas and de Swart 2003; McNally 2009, for related discussion).

3.2   The adverbial reading with temporal FAs and non-event nouns

- Basic semantics like that for temporal FAs with event nouns, **but**:

  - Two conditions must be met in order for the adverbial reading with FAs modifying non-event nouns to be possible:
    1. **Atomic event-entity mapping:** There must be an easily retrievable 1-to-1 mapping between the atomic parts of the entities in the denotation of the nominal containing the FA and those of the events in the denotation of the verb (as identified by distinct, continuous temporal traces).[6]
       $\rightarrow$ Guarantees that the FA will eventually properly distribute over events.
    2. **Stereotypicality:** The verb+nominal must describe a stereotypical activity.
       $\rightarrow$ Facilitates the pragmatic function we attribute to sentences containing these FAs: to characterize the subject or discourse topic (generically or at some particular interval) in terms of some relevant action with a particular temporal distribution.
  - Must solve sort mismatch between the FA and the non-event noun denotations.

- **Atomic event-entity mapping (AEEM):**

(28) $\forall P[\textbf{AEEM}(P) \leftrightarrow \forall x, e[P(x, e) \leftrightarrow$
        $[\forall x', \textbf{atomic-part-of}(x', x)\exists! e', \textbf{atomic-part-of}(e', e)[P(x', e')]\wedge$
        $\forall e', \textbf{atomic-part-of}(e', e)\exists! x', \textbf{atomic-part-of}(x', x)[P(x', e')]]]$

  - Accounts for oddness of sentences for which the argument participates in atomic events in pluralities ((4a) vs. (2b), and also the contrast in (29) and the unacceptability of (30)):

(29)   a.   They ate frequent handfuls of peanuts.
        b. ??The ate frequent peanuts.

(30)   a. ??She saw frequent sailors.
              (no guarantee that each sailor corresponds to a distinct seeing).
        b. ??She listened to frequent songs.
        c. ??She baked frequent potatoes.

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[6]The notion of atom has to be understood loosely enough to include cases like *take frequent antibiotics*. As used in the contexts where it includes a temporal FA, *to take antibiotics* corresponds to a sequence of events over a single period of treatment. The FA distributes over these periods, not over events of taking individual doses during the treatment; the same is true, *mutatis mutandis*, for the antibiotics themselves.

- – Accounts for the oddness of sentences where the same atomic object participates in multiple atomic events, as in (31).
- – More generally, this will keep the structure of the events and the objects involved relatively simple and uniform.

(31)   a. ??She knitted frequent sweaters.
        (sweaters are typically knitted over multiple sessions)
      b. ??She read frequent books.   (books are typically read over multiple sessions)
      c. ??She watched frequent movies.

- **Stereotypicality** (see e.g. Aguilar Guevara 2013, for recent discussion):

  - – Stereotypes are: 1) Conventional beliefs about concepts that are part of the world a community has access to. 2) Motivated by the regularity/frequency/habituality/homogeneity with which instances of the concepts occur. 3) Often associated with artefacts, which tend to be produced by a particular activity (e.g. baking) or used for a particular purpose (e.g. letters).
  - – Stereotypicality is often associated with incorporation.
  - – It accounts for the oddness of examples such as the following:

  (32)   a. ??He married periodic heiresses.   (cp. He married heiresses periodically.)
        b. ??She received frequent posters.

- **Extending the semantics:**

  - – We assume that, as often happens, the FA modifies not the non-event noun but a variable indirectly associated with that noun, as in Pustejovsky's (1995) Selective Binding.
  - – Instead of using qualia structures to mediate the relation between the noun variable and event variable, we use a contextually-valued relation R.
  - – We take inspiration in Kennedy's (2012) semantics for combining incremental theme verbs with measure phrases (e.g. (34)): He uses Kratzer's (1996) Event Identification to combine the verb and nominal denotations.[7]

(33)   **Event Identification** (Kratzer 1996, p. 122): If α is a constituent with daughters β, γ such that $[\![\beta]\!]$ is type $\langle \epsilon, t \rangle$, and $[\![\gamma]\!]$ is type $\langle e, \langle \epsilon, t \rangle \rangle$, then $[\![\alpha]\!] = \lambda x \lambda e\ [\![\beta]\!](e) \wedge [\![\gamma]\!](x)(e)$.

(34)   a. $[\![\text{eat}]\!]$: $\lambda e[\textbf{eat}(e)]$
      b. $[\![\text{ten dumplings}]\!]$: $\lambda x \lambda e[\textbf{dumpling}(x) \wedge \text{NU}_\Delta(\textbf{dumpling})(x)(e) = 10]$
      c. $[\![\text{eat ten dumplings}]\!]$: $\lambda x \lambda e[\textbf{eat}(e) \wedge \textbf{dumpling}(x) \wedge \text{NU}_\Delta(\textbf{dumpling})(x)(e) = 10]$

  - – Event Identification is deeply similar to **Restrict**, which identifies the object arguments.
    $\rightarrow$ We simply generalize identification to all arguments.

(35)   a. $[\![\text{bake}]\!]$: $\lambda y \lambda e.\textbf{bake}(y, e)$
      b. $[\![\text{frequent cakes}]\!]$: $\lambda z \lambda e[\textbf{cake*}(z) \wedge \textbf{frequent}(e) \wedge R(z, e)]$
      c. $[\![\text{bake frequent cakes}]\!]$: $\lambda y \lambda e[\textbf{bake}(y, e) \wedge [\textbf{cake*}(y) \wedge \textbf{frequent}(e) \wedge R(y, e)]]$

  - – When R is valued as the thematic role borne by y in e and the verb satisfies AEEM, the adverbial reading will arise: The event described in (35c) is a plurality with atomic subevents of baking one cake individuated by the atomic subobjects of the plurality described by *cakes*. The distribution of this plurality of events is described by the FA.
  - – If R is given some other value or the event arguments are not identified, some other interpretation (perhaps as in *Sue read a daily newspaper*) or anomaly will result.

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[7]Kratzer assumes that external arguments do not form part of the semantics of verbs; Kennedy implicitly generalizes this to the internal argument.

4   Conclusion and implications

- The facts are easily accommodated, requiring no change in the analysis of FAs we have independently argued for.

The bigger picture:

- Generalization of (and more explicit connection between) semantic incorporation and Event Identification.

- Interesting parallels between Kennedy's analysis of the way measure phrases in nominals measure out events and the way FAs in nominals effect distribution over events.

    → Orthogonal to incrementality.

    → Underscores the generality of participant-mediated individuation of events.

  (36)   ??The athlete ran frequent kilometers/swam frequent laps.

- Striking similarities to the conditions on the *swarm* construction ('perceptually simple', *with*-phrase object must be unquantified).

    Dowty (2000:122): "The [*swarm* construction] ascribes an abstract property (expressed by the predicate) to a Location (denoted by the subject NP): the property a place or space has when it is 'characterized' by an activity taking place within it – that is, when the extent, intensity, frequency and/or perceptual salience of this activity...is sufficient to categorize the Location in a way that is relevant for some purpose in the current discourse."

  (37)   a.   The garden swarmed with (*many) bees.
         b. ??The field grazed with cattle.
         c.   The trees twittered/??sang with birds.

  Cp. "typicality" conditions on incorporation (see Carlson 2006, for a review), the "potentially characterizing" condition on pseudo-incorporation in Espinal and McNally (2011).

    Carlson (2006:46): "There are, logically speaking, a number of different types of restrictions that we might be dealing with, and possibly more than one might be at work at the same time in any given language."

    → One of these is related to categorization: the predicates formed must denote "not just any classes of things or actions, but classes which are relevant for purposes of human activities, e.g. ascribing causation relations and making other generalizations." (Dowty 2000:122)

    → Structural resources such as argument alternations, the possibility for representing participants with non-referring expressions, and embedding temporal expressions within the VP all facilitate this pragmatic function.

References

Aguilar Guevara, Ana. 2013. Weak nouns, weak verbs, and stereotypicality. Paper presented at the DGfS workshop Syntax and Semantics of Pseudo-Incoporation, Potsdam, March 2013.

Bolinger, Dwight. 1967. Adjectives in English: Attribution and predication. *Lingua* 18:1–34.

Carlson, Gregory N. 2006. The meaningful bounds of incorporation. In *Non-definiteness and plurality*, ed. Svetlana Vogeleer and Liliane Tasmowski, 35–50. Amsterdam: John Benjamins.

Chung, Sandra, and William Ladusaw. 2003. *Restriction and Saturation*. Cambridge, MA: MIT Press.

Dayal, Veneeta. 2003. A semantics for pseudo-incorporation. Ms, Rutgers University.

Dayal, Veneeta. 2011. Hindi pseudo-incorporation. *Natural Language and Linguistic Theory* 29.1:123–167.

Dowty, David. 2000. 'the garden swarms with bees' and the fallacy of 'argument alternation'. In *Polysemy: Theoretical and computational approaches*, ed. Y. Ravin and C. Leacock, 111–128. Oxford: Oxford University Press.

Espinal, M. Teresa, and Louise McNally. 2011. Bare nominals and incorporating verbs in Spanish and Catalan. *Journal of Linguistics* 47:87–128.

Farkas, Donka, and Henriëtte de Swart. 2003. *The Semantics of Incorporation: From Argument Structure to Discourse Transparency*. Stanford, CA: CSLI Publications.

van Geenhoven, Veerle. 1995. Semantic incorporation: A uniform semantics for West Greenlandic noun incorporation and West Germanic bare plural configurations. In *Proceedings of CLS 31*, 171–186.

Gehrke, Berit, and Louise McNally. 2011. Frequency adjectives and assertions about event types. In *Proceedings of SALT 19*, ed. Ed Cormany, Satoshi Ito, and David Lutz, 180–197. eLanguage.

Gehrke, Berit, and Louise McNally. 2012. Frequency adjectives as distributional modifiers. Submitted to *Language*.

Kennedy, Chris. 2012. The composition of incremental change. In *Telicity, Change, State: A Cross-Categorial View of Event Structure*, ed. Violeta Demonte and Louise McNally, 103–121. Oxford: Oxford University Press.

Kratzer, Angelika. 1996. Severing the external argument from the verb. In *Phrase Structure and the Lexicon*, ed. Johann Rooryck and Laurie Zaring, 109–137. Dordrecht: Kluwer.

Krifka, Manfred. 1989. Nominal reference, temporal constitution, and quantification in event semantics. In *Semantics and contextual expression*, ed. Renate Bartsch, Johan van Benthem, and Peter van Emde Boas, 75–115. Dordrecht: Foris.

Larson, Richard. 1998. Events and modification in nominals. In *Proceedings of SALT 8*, ed. Devon Strolovitch and Aaron Lawson, 145–168. Ithaca, NY: CLC Publication.

McNally, Louise. 1995. Bare plurals in Spanish are interpreted as properties. In *Formal Grammar*, ed. Glyn Morrill and Richard Oerhle, 197–212. Barcelona.

McNally, Louise. 2009. Properties, entity correlates of properties, and existentials. In *Quantification, definiteness, and nominalization*, ed. Anastasia Giannakidou and Monica Rathert, 163–187. Oxford: Oxford University Press.

McNally, Louise, and Gemma Boleda. 2004. Relational adjectives as properties of kinds. In *Empirical Issues in Syntax and Semantics*, ed. Olivier Bonami and Patricia Cabredo Hofherr, volume 5, 179–196. http://www.cssp.cnrs.fr/eiss5.

Pustejovsky, James. 1995. *The Generative Lexicon*. Cambridge: MIT Press.

Schäfer, Roland. 2007. On frequency adjectives. In *Proceedings of Sinn und Bedeutung 11*, ed. Estela Puig Waldmüller, 555–567. Barcelona: Universitat Pompeu Fabra.

Stump, Gregory T. 1981. The interpretation of frequency adjectives. *Linguistics and Philosophy* 4:221–257.

Zimmermann, Malte. 2003. Pluractionality and complex quantifier formation. *Natural Language Semantics* 11:249–287.