

Frequency adjectives as distributional modifiers

Berit Gehrke and Louise McNally
Universitat Pompeu Fabra

(First draft - comments welcome)

1 Introduction

Frequency adjectives (FAs), such as *occasional*, have been attributed three different readings (Stump, 1981; Larson, 1998; Zimmermann, 2003; Schäfer, 2007). On the so-called internal reading (termed the “deadverbial reading” by Stump), the FA typically modifies a deverbal, participant-describing noun, as in (1).

- (1) That claim was made by an occasional sailor.
= That claim was made by someone who sails occasionally.

The semantic effect of the FA is clearly limited to the DP in which it appears, and a possible paraphrase of [FA N] is “N who/that V’s/is V’d FA-ly”.

On the generic reading, illustrated in (2), typically the [FA N] nominal can be paraphrased as an event description, the FA serving to describe the event in question (examples from Stump, 1981).

- (2) An/The occasional beer is good for you.
= Drinking a beer occasionally is good for you.

Note that one of the hallmarks of nominals manifesting this reading is that they are often marked with a non-anaphoric definite determiner. We will return to this point below.

Finally, on the adverbial reading, first observed in Bolinger (1967), the FA seems to scope outside of the nominal it occurs in, in fact over the entire sentence, as in (3). Like the generic reading, this reading is also often found with nominals containing a non-anaphoric definite determiner.

- (3) An/The occasional sailor strolled by.
= Occasionally, a sailor strolled by.

This apparent wide scope is not possible for the FA on either the internal or generic reading.

The interest FAs have raised in the literature is due to the challenge of accounting for all of these putative readings, most especially the adverbial reading. The latter reading has been used by various authors to motivate recasting the FA essentially as a determiner that quantifies over event-individual pairs (see Stump, 1981; Larson, 1998; Zimmermann, 2003, though these proposals differ in matters of detail). However, the determiner analysis (as we will refer to it) faces a number of empirical and conceptual challenges that have led other authors (Schäfer, 2007; Gehrke and McNally, 2011) to argue that a unified, adjectival semantics for all uses of FAs is preferable.

We will show in this paper that none of the existing analyses of FAs accounts for all of their puzzling behavior. Specifically, though we maintain, following Schäfer and Gehrke and McNally, that the determiner analysis does not provide as satisfactory an account of the so-called adverbial reading of FAs as does an adjectival analysis, we argue, contrary to these authors, that a completely unified analysis of FAs is *not* possible. The source of the nonuniformity is twofold. First there are differences in sortal selectivity between the different FAs: some express nontemporal distribution, which can involve any sort of entity; others, temporal distribution, which must involve events; and one FA, *occasional*, can express both. Second, FAs vary in whether they can be used predicatively or not to express the appropriate kind of distribution, a correlate of differences in their semantics.

We attribute the fact that the relevant data have gone unnoticed in previous work to two factors. On the one hand, this work has arguably given too much weight to paraphrase as a diagnostic for the semantics; our analysis will make clear that there is more than one way to compose truth-conditionally equivalent representations for sentences containing FAs. On the other, it is an unfortunate accident that *occasional*, whose properties are unique due to its ambiguity, has served as the model for the entire class, obscuring the fact that FAs sort very neatly into two well-behaved subclasses: one that includes FAs such as *daily* and *frequent*, which induce temporal distribution and can be effectively treated as first-order predicates; and another that includes *odd* and *rare*, which induce nontemporal distribution and must be analyzed as second-order modifiers on the relevant use. *Occasional*, as noted, belongs to both subclasses.

Although our analysis is, as a result, not fully unified, it is, in other respects, close to that in Gehrke and McNally (2011), and in particular supports two of their key claims: 1) that kinds are realized in some cases not by single token individuals but rather by *sets* of tokens, and 2) that some sentences constitute descriptions of

event *kinds* rather than event *tokens*. Both claims open up new possibilities for the analysis of quantification-like phenomena in natural language.

The paper is structured as follows. Section 2 provides an overview of the data, including additional evidence from German for dividing FAs into two subclasses. In section 3 we present the analysis; discussion of the advantages of this analysis over both completely unified analyses and the determiner analysis, including not only a brief review of those mentioned in Gehrke and McNally (2011) but also some new arguments, follow in section 4.

2 Empirical observations

We begin by reviewing what has been said about the three putative readings for FAs, adding a few observations of our own. The discussion will lead us to a new perspective on the semantics of FAs that takes as its point of departure not the three putative readings but rather the sorts of objects particular subclasses of FAs distribute over.¹

Before we start, we need to introduce some terminology. Two basic types of FAs have been identified in the literature: those that express a fixed frequency (e.g. *daily*, *weekly*, *monthly*, *yearly*) and those that express relative, contextually-determined frequency (e.g. *occasional*, *sporadic*, *periodic*, *odd*, *rare*, *infrequent*, *frequent*). Within the category of relative frequency adjectives, some authors (e.g. Larson, 1998; Zimmermann, 2003) have distinguished between two subgroups according to whether they describe frequency or *infrequency*, on the basis of apparent differences in distribution between them.

Our analysis will likewise distinguish between subgroups of FAs, but not on this basis. Rather, we will argue that what matters is whether the FA can only be used to express temporal distribution, in which case it is restricted to characterizing the distribution of events, or whether it can (in addition or exclusively) be used to express some kind of nontemporal distribution. On the nontemporal distribution reading, illustrated in (4a) and discussed in Stump (1981), the individuals in question can be temporally co-located as long as they are properly distributed over some other sort of contextually-identified domain (typically space). This interpretation is not possible with the FAs in (4b), a fact not observed by Stump:

- (4) a. The occasional/odd/rare sailor is 6 feet tall.
b. ??The weekly/frequent/infrequent/periodic/sporadic sailor is 6 feet tall.

¹As part of our study we have extracted examples from the British National Corpus (BNC), the Corpus of Contemporary American English (COCA) and Google books corpus of American English with the tools available at <http://corpus.byu.edu>.

In addition, in our discussion we will have to distinguish between three types of nouns that FAs combine with: eventuality-denoting nouns (e.g. *visit*, *swimming*, *discussion*), participant-denoting nouns (e.g. *recipient*, *sailor*, *employee*), and other nouns (e.g. *beer*, *car*, *chair*). Throughout this paper, we will use the respective descriptive labels EVENT NOUNS, PARTICIPANT NOUNS, and SORTAL NOUNS for these.

2.1 The internal reading

The internal reading is most naturally perceivable with participant nouns (Schäfer, 2007) ((5a,b)). Event nouns ((5c)) and sortal nouns ((5d)) generally do not allow this reading, as can be seen by the unacceptable paraphrases.

- (5) a. A frequent sailor won the regatta. = one who sails frequently
- b. A frequent recipient of awards took the Rotary Club prize again.
 = one who frequently receives awards
- c. A frequent visit \neq a particular visit that happens frequently
- d. A frequent letter \neq a particular letter that Vs/is V'd frequently

Intuitively, under the internal reading the nominal describes an individual whose identity is stable across the events that support the applicability of the FA; the FA specifies the frequency with which the nominal description holds of the individual it describes. This makes the internal reading pragmatically implausible for sortal nouns, since normally there is no temporal limit or frequency under which a nominal description (e.g. *letter*) holds of an individual (e.g. a letter is not likely to be describable as a letter on some occasions but not on others). Event nouns that describe token events also will not combine with FAs to yield this reading because a token event occurs only once in time, and thus will not be manifest on multiple occasions, as the truth conditions for the FA intuitively require.

The internal reading is available in principle with all kinds of FAs, except for *odd* and *rare*:²

²The only participant noun that *rare* occurs with is *visitor*, and in the examples in the corpus the crucial nominal is typically predicative and includes explicit reference to the location where the individual denoted by the subject is rarely found.

- (i) a. Now based in Greece, he is a rare visitor to the UK.
- b. The *bombycilla garrula*, or Bohemian wax wing, is but a rare visitor in this country.

We suspect that the compositional semantics of the nominals in (i) is not exactly the same as that for the crucial nominal in (1). Intuitively, these sentences ascribe infrequent presence in a particular location of the individual denoted by the subject. Examples like those in (ii), in contrast, in which *rare* is clearly intended to predicate infrequency specifically of the activity of visiting, are unacceptable.

- (6) 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
- d. an odd visitor \neq one who visits oddly/on odd occasions
- e. a rare writer \neq one who writes rarely

Finally, when we look at the kinds of determiners that are acceptable with the internal reading, we see that there are no restrictions (see (7)).

- (7) A/Some/One/The/That/Each frequent sailor I know owns his own boat.

In these latter two respects, the internal reading sharply contrasts with both the generic and the adverbial readings, to which we now turn.

2.2 The generic reading

The core case of the generic reading is possible with all kinds of FA-noun combinations, according to both Stump (1981) and Schäfer (2007). It is most obviously observable when the NP is an argument to a generic predicate, as in (8).³

- (8) 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/rare glitch is tolerable.

Stump identifies this reading by paraphrase, observing that the FA in such sentences can be substituted by a postnominal modifier such as *now and then*, *from time to time*, and *every day*:⁴

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- (ii) a. *He is a rare visitor of museums.
 - b. *This claim was made by a rare visitor.

³The sort of interpretation paraphrasable in (9) is only available for *odd* and *rare* in combination with the definite article and not with the indefinite article (see the contrast between (8d) and (i)).

- (i) a. An odd glitch is tolerable. (\neq The occurrence of glitches on odd occasions is tolerable.)
- b. A rare glitch is tolerable. (\neq The occurrence of glitches on rare occasions is tolerable; = The sort of glitch that occurs on rare occasions is tolerable)

We will return to this crucial fact below.

⁴Stump does not explicitly paraphrase examples using e.g. *on a [FA] basis*, but this sort of paraphrase is in the spirit of his claims.

- (9) 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/rare occasions is tolerable.

With episodic (Carlson's 1977 stage-level) predicates, the FA is either unacceptable or is not paraphrasable as in (9); see (10).

- (10) 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.

Stump's intuition seems to be that the generic reading arises in such cases when the nominal is interpretable as generic independently of the presence of the FA. Our analysis will coincide with Stump's on this point.

However, Stump also describes as generic two other uses of FAs. The first of these he claims is restricted to definite nominals (including possessive-marked ones) and is found with episodic predicates:

- (11) John's occasional cup of coffee had left circular stains on the table.

One clear difference between the FA-modified nominals in (8) and that in (11) is that the latter clearly refers to a token (in this case one token cup of coffee), while the former do not. Note, among other things, that the nominal cannot be paraphrased as *John's cup of coffee now and then*, or even *A cup of coffee, drunk by John now and then*. Stump takes DPs such as the subject of (11) to denote an object that realizes the kind of individual that is a cup of coffee drunk by John now and then. Thus, he classifies this use of the FA as generic because the way he computes the semantics for the kind of which the DP denotes an instance involves the same treatment of the FA as the one he uses for e.g. (2). However, note that such uses of the FA are nonrestrictive; they do not form part of the at-issue content of the sentence, as the test in (12), adapted from Potts (2005), shows:

- (12) a. That's not true! He doesn't drink coffee occasionally!
 b. That's not true! That wasn't John's cup of coffee!

Since nonrestrictive modification adds an additional layer of complication to the analysis, we will set aside these sorts of examples in the remainder of this paper.

The second additional sort of use that Stump considers generic occurs in examples such as the following:

- (13) a. No daily news program can match this one.
b. John agreed to conduct one weekly inspection a year.

On the basis of such examples, Stump claims that the generic reading is compatible with a full range of determiners. Schäfer (2007), in contrast, claims that the generic reading is basically compatible only with the definite and indefinite articles and semantically bleached possessives, a claim supported by contrasts such as that between (14a) and (14b,c):

- (14) 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.

Schäfer suggests that any examples of the generic reading involving other determiners are cases of quantification over kinds (for instance, the nominal in (13a) on this view would be analyzed as equivalent to *No news program of the daily kind*). On this view, the use of the FA in examples such as *a daily newspaper* or *a weekly inspection* resembles in one important respect its use on the internal reading. Much as the latter entails that a property holds intermittently of an entity that is stable across time (e.g. an occasional sailor is a person who manifests the property of being a sailor occasionally), the examples in (13) entail that token instances are intermittently found (or not found in the case of (13a)) of a kind of event or object whose identity (as a kind) is stable across time.

We add the observation that, in fact, the determiners are even more restricted than the literature has suggested, since *occasional*, *rare* and *odd* are much more natural with the definite article or bleached possessive than are the other FAs:

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

What the disagreement between Stump and Schäfer highlights is a difference in perspective concerning the source of the generic reading. The cases that Stump unites under the generic reading share, in his view, a particular use of the FA that sharply contrasts with the adverbial use to be described in the next section. In contrast, although Schäfer's discussion is somewhat less exhaustive, his claims concerning the determiner restriction reflect the view that what makes the generic reading generic is the semantics of the nominal as a whole and not anything particular to the FA. These perspectives lead, respectively, to nonunified vs. unified analyses of FAs. We will, in a sense, reconcile these views.

2.3 The adverbial reading

The adverbial reading, the most discussed of the three putative interpretations for FAs, has also been characterized by paraphrase, in this case with the FA apparently scoping over the entire clause in which it appears. This has been claimed to be possible not only when the FA appears in the subject, as in (3), but also in nonsubject position, as in (16).⁵

- (16) We had an occasional beer together.
= Occasionally, we had a beer together.

However, if the adverbial reading is identified strictly by paraphrase, the facts concerning when it is and is not available are quite puzzling.

First, Stump (1981), Schäfer (2007), and Zimmermann (2003) have observed that the adverbial reading is only possible with the (in)definite articles and semantically bleached possessives, as illustrated in (17). If, on the other hand, the examples with other determiners in (17b,c) are acceptable at all, they cannot be paraphrased by giving something like wide scope to the FA.

- (17) a. We saw an/the/your occasional car on the road.
b. ??We saw each occasional car on the road.
c. ??We saw two/some/many occasional cars on the road.

Zimmermann in particular accounts for the restriction by positing that, since the quantificational force of the DP seems to come from the FA, only essentially pleonastic determiners are allowed on this reading. However, there are examples with other determiners, in particular *some*, which can also be paraphrased adverbially:

- (18) a. I have seen some occasional television interviews with people who are electors.
= Occasionally, I have seen some television interviews with people who are electors.
b. There was some occasional mild violence and language and comic mischief.
= Occasionally, there was some mild violence and language and comic mischief.

⁵Zimmermann (2003, 260f.) claims that in German and Finnish, only FAs modifying subjects yield the adverbial reading; he attributes this to the fact that in both these languages nonsubject quantified phrases cannot take inverse scope at LF and takes this to support his complex determiner analysis. Such an account presupposes some version of the determiner analysis for FAs, which, as noted, we will reject (see section 4.1). In section 2.4.2, we will show that the claim that German allows the adverbial reading for FAs in subject but not in non-subject position is incorrect.

These may be true counterexamples to the putative generalization illustrated in (17), or they may also point to the unreliability of paraphrase as a diagnostic for a specific reading. The analysis that we defend below points to the latter conclusion. For now, we limit ourselves to making the crucial observation that all of the exceptions we have found to the determiner restriction associated with the adverbial reading involve event nouns.

Second, if we take as our departure point the classic example of the adverbial reading, namely (19a), and start substituting in different FAs and determiners, we see that the adverbial reading is not systematically possible for all determiner-FA combinations. Specifically, it clearly appears to be available with *occasional* with either definite or indefinite article:

- (19) a. An occasional sailor strolled by.
 = Occasionally, a sailor strolled by.
 b. The occasional sailor strolled by.
 = Occasionally, a sailor strolled by.

It is possible with *odd* and with *rare* only with the definite article ((20)) (though we find (20b) a bit marginal with *rare*, we have found some corpus examples that appear to instantiate this reading with the definite article, such as those in (21)).

- (20) a. A(n) odd/rare sailor strolled by.
 ≠ Rarely/On odd occasions, a sailor strolled by.
 b. The odd/?rare sailor strolled by.
 = Rarely/On odd occasions, a sailor strolled by.
- (21) a. In Hinsonville, the 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.
 b. she runs her family's Sea-View Motel and Restaurant on a patch of
 northern Florida coastline...that sees only the rare tourist. (COCA)
 = Only rarely does the coastline see a tourist.

However, we cannot substitute in the other relative frequency FAs or any fixed frequency FAs with either definite or indefinite determiners and preserve the adverbial reading. In the case of the FA *frequent*, which has been claimed to be sensitive to plurality, even placing the noun in the plural does not help.⁶

⁶There has been some dispute in the literature as to whether the FA *frequent* allows the adverbial reading at all. Zimmermann (2003) (following Larson, 1998) claims, contra Stump (1981) (see also Moltmann, 1997; Schäfer, 2007), that the adverbial reading is only possible with FAs of relative *infrequency*. Our position on this issue will become evident below.

- (22) a. An infrequent/frequent/sporadic/periodic sailor strolled by.
 ≠ Infrequently/Frequently/Sporadically/Periodically, a sailor strolled by.
- b. The infrequent/frequent/sporadic/periodic sailor strolled by.
 ≠ Infrequently/Frequently/Sporadically/Periodically, a sailor strolled by.
- c. Frequent sailors strolled by.
 ≠ Frequently, a sailor/sailors strolled by.
- (23) a. A daily/weekly/monthly sailor strolled by.
 ≠ Daily/Weekly/Monthly, a sailor strolled by.
- b. The daily/weekly/monthly sailor strolled by.
 ≠ Daily/Weekly/Monthly, a sailor strolled by.

These facts suggest that the adverbial reading is less robust than has been taken for granted in the literature. In particular, it indicates that the reading is specific to a particular subset of FAs, namely only *occasional*, *odd*, and possibly *rare*, and that presence of the definite vs. the indefinite article, which has not previously received serious attention in the literature on FAs, in fact has a crucial role to play in the interpretation of the nominal containing the FA.

As was the case with the determiner restriction associated with the generic reading, the above generalizations about the adverbial reading are challenged when we move from sortal nouns to event nouns. For instance, Gehrke and McNally (2011) use examples such as those in (24) to defend the claim that even FAs like *frequent* allow for the adverbial reading systematically with event nouns.

- (24) a. The committee had frequent meetings.
- b. The group held a daily/weekly discussion session.
- c. The group was subject to infrequent/occasional/periodic/sporadic reviews.

Stump (1981, 224) provides the following examples for adverbial readings with FAs that express a fixed frequency, which also involve event nouns (his (30)-(33)):

- (25) a. A yearly eclipse left the city in total darkness.
 = Yearly, an eclipse left the city in total darkness.
- b. Mary paid her friend a weekly visit.
 = Weekly, Mary paid her friend a visit.

However, there is reason to suspect that the compositional semantics of the examples in (24) and (25) is distinct from that in (3) (contra Stump, 1981; Gehrke and McNally, 2011). First, the FAs in these examples are sortally compatible with the individual described by the nominal, unlike what happens with the example in (3)

(e.g., a meeting can be frequent, but a sailor cannot be occasional). Second, the lexical semantics of the FA is clearly temporal, whereas that is not obviously the case with the FAs that appear with sortal nouns on the adverbial reading. Finally, sentences like those in (25a) allow a reading under which there was a unique event of the sort described by the main predicate, and the FA provides ancillary information about the typical frequency of the sort of event described by the nominal it modifies (e.g. (25a) refers to a specific event of the city being left in total darkness by an eclipse, and the FA simply entails that such eclipses happens on a yearly basis, an interpretation very similar to that of (11)). Such a reading is *not* available for (1). The first and third of these facts, in particular, suggest that the FA is acting as an intersective modifier in these cases, where that is clearly impossible in the classic examples of the internal reading.

Gehrke and McNally (2011) also observed that with non-event nouns, the availability of an adverbial paraphrase with fixed frequency adjectives seems to depend on the predicate to which the FA-containing nominal serves as argument, citing contrasts such as those in (26), which involve verbs of creation, and (27), which involve other verbs. However, they were not able to precisely describe the nature of the restriction or why it should exist.

- (26) a. She wrote frequent letters to her mother.
 = Frequently, she wrote letters to her mother.
 b. She baked frequent batches of cookies.
 = Frequently, she baked batches of cookies.
- (27) a. ??She sold frequent batches of cookies.
 b. ??She read frequent books to her mother.

Note furthermore the contrast between (26) and (28).

- (28) a. ??She baked frequent portions of potatoes.
 b. ??She baked frequent cookies.

(28a) shows that when *bake* is not used in its creation sense but rather in a sense similar to *cook*, a fixed frequency adjective does not license the paraphrase associated with the adverbial reading. (28b), in turn, shows that this is also not possible with a verb of creation in combination with a bare plural that is most naturally interpreted collectively, rather than distributively, with respect to the main predicate (such as *letters* in (26a)).

The relevant generalization for these cases is that the putative adverbial reading is possible when the atoms in the denotation of the (plural) entity described by the DP containing the FA are strictly homomorphic to unique events describable by the verb. In order for this to be the case, the relevant argument of the verb has to 1) satisfy the property that Krifka (1998) termed UNIQUENESS OF EVENTS and

2) strictly satisfy the property MAPPING TO EVENTS. For example, the theme of the verbs of creation in (26) can participate in such events only once (uniqueness of events); this differentiates these verbs from e.g. *sell* in (27a) or *bake* as used in (28a).⁷ Created objects also map in a strictly homomorphic way to the creation events that produced them ((strict) mapping to events); this contrasts with the theme of e.g. *read* in (27b): one can reread parts of a book, skip back and forth, and so on. Finally, the difference between *write letters* in (26a) and *bake cookies* in (28b) is that the theme in the latter case is usually a plurality, whereas in the former, it is not (that is, though one usually bakes a plurality of cookies all at once, one does not typically write a plurality of letters all at once). Just in case all of these conditions are met, distributing over the entities described by the nominal containing the FA automatically guarantees temporal distribution over the corresponding events.

The specificity of the conditions on the putative adverbial reading in (26) leads us to conclude that there is more than one way to derive the semantics of sentences that contain adverbially-paraphrasable FAs, and thus we will disconnect the explanation for the facts in (16)-(23) from that for the facts in (24)-(28). More generally, our review of the data has uncovered several observations that have been missed or underappreciated in previous literature and that lead us to take a new perspective on the semantics of FAs in the following section.

2.4 Changing the perspective: temporal vs. nontemporal distribution

In this section, we bring together the generalizations from the previous sections with some additional data first from English and then from German, which will reinforce the claim that there is a fundamental bifurcation in FAs involving temporal vs. nontemporal distribution.

2.4.1 Temporal vs. nontemporal distribution: English

Table 1 summarizes the crucial observations from the previous section about the availability of the different readings with FAs, and the restrictions on the acceptability of the different determiners. The table shows that FAs fall into two general subgroups: Those that allow the nontemporal reading and those that do not. This division correlates, respectively, with unexceptionally allowing the adverbial reading (i.e. with all sorts of nouns and independently of the lexical semantics of the

⁷See Krifka (1998) for definitions and further discussion. Note that verbs of consumption (e.g. *eat*, *drink*) behave like verbs of creation: the object goes out of existence and is consumed only once, and the relation between object and event is strictly incremental.

verb) and with allowing the internal reading. Finally, we also see that the former group systematically rejects the indefinite article in favor of the definite article, while the latter group prefers the indefinite article, whether the interpretation of the FA is generic or adverbial.⁸ The single exception is *occasional*, which shows properties of both subgroups across the board. We take this as evidence that *occasional* is ambiguous and suspect that failure to appreciate this fact has made it difficult to fully understand the behavior of FAs. In the rest of this section, all generalizations that we make will be understood to extend to *occasional* under disambiguation.

FA	internal	systematic adverbial	nontemporal	determiner gen. rdg.	determiner adv. rdg.
rare	N	Y	Y	the/*a	the/*a
odd	N	Y	Y	the/*a	the/*a
occasional	Y	Y	Y	the/a	the/a
daily, etc.	Y	N	N	??the/a	NA
periodic	Y	N	N	??the/a	NA
sporadic	Y	N	N	??the/a	NA
infrequent	Y	N	N	??the/a	NA
frequent	Y	N	N	??the/a	NA

Table 1: Empirical generalizations from sections 2.1-2.3

To explore further these patterns, we return to (4), repeated in (29), which shows the contrast between the FAs that can be used to express nontemporal distribution and those that can only express temporal distribution (over events).

- (29) a. The occasional/odd/rare sailor is 6 feet tall.
b. ??The weekly/frequent/infrequent/periodic/sporadic sailor is 6 feet tall.

The first observation is that the availability of this nontemporal reading strongly correlates with the unavailability of the internal reading. This indicates that there must be something significantly different about the computation of the internal reading vs. the nontemporal reading; specifically, there must be something temporal about the former. In contrast, the strong correlation between the systematic availability of the adverbial reading and the possibility of the nontemporal reading indicates that the former is not temporal in nature.

Second, consistent with the data in Table 1, *occasional* and *odd/rare* differ in that only the former allows the nontemporal reading with the indefinite singular.

⁸Recall that any determiner is possible with the FA on the internal reading.

- (30) a. An occasional sailor is 6 feet tall.
 b. ??A(n) odd/rare sailor is 6 feet tall.

This suggests that the semantics of DPs containing these three FAs should be computed in fundamentally the same way no matter whether the resulting sentence appears to manifest the nontemporal, generic or adverbial reading.

Third, unlike *occasional*, *odd* and *rare*, the FAs that disallow the nontemporal reading systematically resist the definite article on the generic reading:

- (31) a. *A daily sailor is 6 feet tall.
 b. A/??The daily shower is good for you.

This leads us to hypothesize that there is something different about the generic nominals in which *odd*, *rare*, and the relevant uses of *occasional* appear, versus those in which temporally interpreted FAs appear.

A fourth observation, not noted in previous literature or in the discussion up to now, is that the possibility of a predicative uses of the FA also correlates with its compatibility with the indefinite article on the generic reading. Specifically, those FAs that allow the indefinite article on the generic reading can also be used as predicates with the relevant interpretation.⁹

- (32) a. ??A(n) occasional/odd mosquito is harmless.
 b. ??The mosquito was occasional/odd.
- (33) a. A(n) weekly/infrequent/frequent/periodic/sporadic check-up is necessary.
 b. The check-up was weekly/infrequent/frequent/periodic/sporadic.

These data show that different FAs impose different sortal restrictions on the nominals they can be predicated of, and that the FA can appear in an indefinite singular

⁹Note that although *rare* can be used predicatively, as mentioned in footnote 2, we hypothesize that this is possible because predicative *rare* has an additional argument that indicates the spatial or temporal domain within which the kind of individual denoted by the subject argument is distributed:

- (i) That mosquito was rare (in these parts/10 years ago).

If the distribution of this individual is evaluated with respect to this spatial or temporal domain, as in (ii), the sentence is acceptable but lacks the so-called adverbial reading.

- (ii) A rare [with respect to some spatial or temporal domain] mosquito is harmless.

We take it that the crucial difference between this use of *rare* and the one of interest in this paper is that the latter lacks this spatial/temporal argument.

generic nominal just in case it is sortally compatible with the noun it modifies. This, in turn, suggests that in indefinite DPs such as those in (33), the FA is acting as an intersective modifier. In contrast, this cannot be the case in examples involving the definite article, as in (34).

(34) The occasional/odd/rare mosquito is harmless.

In sum, the data suggest that a fully unified semantics for FAs is not possible, contrary to what Schäfer (2007) and Gehrke and McNally (2011) maintain, but, in the spirit of what these authors argue, the different readings do not line up with the paraphrase-based readings that have been proposed in the literature. Crucially, whether one semantics or another is involved appears to depend on the specific FA involved, and the distributional data suggest that these semantics cross-cut the internal/generic/adverbial distinction previously made in the literature.

Before we turn to the analysis of these facts, we briefly consider the behavior of FAs in German, as the German data will reinforce the generalizations made above.

2.4.2 Some remarks about German

The empirical generalizations we arrived at for English, and especially the division between temporal and nontemporal interpretations for FAs, are reinforced by German. In particular, German FAs appear to allow only temporal distribution. The FA uses of *odd* and *rare* translate with temporal expressions only, namely *gelegentlich* ‘occasional’ and *selten*, which is cognate with *seldom*. Nontemporal interpretations of the kind we observed for English are impossible with *gelegentlich*:

(35) *Ein gelegentlicher Matrose ist 2 Meter groß.
 an occasional sailor is 2 meters tall
 Intended: ‘An occasional sailor is 6 feet tall.’

The adverbial interpretation of the classical example is unacceptable ((36a))¹⁰, whereas an internal reading is possible with participant nouns ((36b)).

(36) a. *Ein gelegentlicher Matrose schlenderte vorbei.
 an occasional sailor strolled by
 Intended: ‘An occasional sailor strolled by.’
 b. Ein gelegentlicher Radfahrer kam vorbei.
 an occasional bike-rider came by

¹⁰Note that German *Matrose* ‘sailor’, unlike its English counterpart, is not morphologically derived from a verb like ‘sail’, and thus does not allow the internal reading.

‘Someone who occasionally bikes came by.’

Instead of the classical example in (36a) Zimmermann (2003) uses the example in (37a) (his (27a)) to exemplify the adverbial reading in German. He furthermore notes that only FA-noun-combinations in subject but not in object position allow for the adverbial reading (his (27b-d)):

- (37) 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

Indeed, when we presented 11 German native speakers with these data in a questionnaire, they unanimously rejected examples like (37b-d). However, only 7 of 11 accepted (37a), and only one of those clearly allowed for the adverbial reading. The other six that found it grammatical allowed this sentence under the internal reading only, as supported by spontaneous responses such as ‘ok under the reading where this is someone who is a customer occasionally’, or ‘ok in marketing contexts, where customers are divided into regular, occasional, and one-time customers’. Interestingly, these speakers all accepted the discourse in (38), while the speaker who got the adverbial reading for (37a) did not.

- (38) Ein gelegentlicher Kunde betrat den Laden. Er 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.’

We thus conclude, contra Zimmermann, that the adverbial reading is not reliably available for (38a). We will return to the issue of subject vs. object position after we have sketched Zimmermann’s proposal in section 4.

Interestingly, German resembles English in that examples like (24) and (25) are acceptable, as in (39).

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

- b. Das Seminar war seltenen / gelegentlichen / periodischen /
 the department was infrequent / occasional / periodic /
 sporadischen Prüfungen unterworfen.
 sporadic reviews submitted-to.
 ‘The department underwent infrequent/occasional/periodic/sporadic
 reviews.’

Recall that we suggested in section 2.3 that although such examples have been claimed in previous literature to involve the adverbial reading, we suspect that the similarity to the classic example of the adverbial reading is only superficial.

Though we will have to leave the analysis of the German data for a future occasion, the comparison with English clearly indicates that the temporal/nontemporal distinction within FAs is fundamental. We expect that the analysis we propose for temporally interpreted FAs in English should extend to German, whereas German simply does not allow nontemporal interpretations for FAs. This sort of variation is unsurprising if the different readings are fundamentally a function of the individual FAs in the lexicon, as lexical inventories vary from language to language.

We now return to the English data and their analysis.

3 The proposal

3.1 Key ideas

Our analysis, like that in Gehrke and McNally (2011), builds on the premise that natural language allows for reference both to token (ordinary) entities and events, as well as kinds of entities and events. This premise is by now widely accepted in the case of ordinary entities (Carlson, 1977, being the classic reference), and though less commonly made in the case of events, it has roots e.g. in situation semantics (see Barwise and Perry, 1983) and has gained currency in recent years (e.g. Landman and Morzycki, 2003; Ginzburg, 2005; Sailer, 2010; Gehrke, 2012).

In the case of nominal expressions, we modulate reference to kinds vs. tokens addition via a “layered” DP (Zamparelli, 1995). Specifically, we take nouns to denote properties of kinds, as exemplified in (40a). These are converted via inflectional morphology (which we introduce in (40b) via a syntactic Num(ber) projection) into properties of token entities (see e.g. McNally and Boleda, 2004; Farkas and Swart, 2003; Déprez, 2005; Müller-Reichau, 2011; Espinal and McNally, 2011, and references cited there for related proposals); **R** is Carlson’s (1977) realization relation, and we assume here that existential closure binds off the kind variable in the representation of the noun in (40), though an indexical

approach could also be taken to valuing this variable.¹¹

- (40) a. $\llbracket \llbracket_{NP}[_N \mathbf{car}] \rrbracket \rrbracket: \lambda x_k [\mathbf{car}(x_k)]$
 b. $\llbracket \llbracket_{NumP}[_{NP} \mathbf{car}] \rrbracket \rrbracket: \lambda y \exists x_k [\mathbf{car}(x_k) \wedge \mathbf{R}(y, x_k)]$

We treat verbs analogously to nouns, in the sense that they can apply both to kind- and token-level individuals or eventualities (see (41)), although we will not make any specific assumptions here about what kind of inflectional morphology might fulfill the function that we attribute to Number in (40).

- (41) $\llbracket \llbracket \text{strolled by} \rrbracket \rrbracket: \lambda x_\alpha \lambda e_\alpha [\mathbf{strolled_by}(e_\alpha, x_\alpha)]$, where α ranges over both kinds and tokens.

As mentioned in the introduction, we also adopt two important claims from Gehrke and McNally (2011). The first of these is that kinds may be realized not only by single tokens but also sometimes crucially by sets of tokens. The function of FAs is to impose conditions on the distribution of these sets of tokens at a given index. We differ from Gehrke and McNally, however, in recognizing that temporally interpreted FAs can do this either as modifiers or as predicates applied to either kind- or token plurality-descriptions (illustrated in (42a,b) and (42c), respectively).

- (42) a. The meeting was daily/weekly/monthly/periodic/occasional.
 b. Meetings were periodic/sporadic/frequent/infrequent.
 c. Her job changes were frequent.

Nontemporally interpreted FAs, in contrast, do this only as kind-level modifiers describing token entity (including event) distributions; as mentioned in 2.4.1, we have not found examples of these FAs as predicates on the relevant interpretation (recall (32) and footnote 9).

The second claim we adopt from Gehrke and McNally (2011), namely that the semantics of declarative sentences can involve existential quantification not only over event tokens, but also sometimes over event kinds, will be crucial in the

¹¹The fact that it is possible to pluralize nouns such as *kind*, *variety* or *sort*, which form DPs that refer much more easily to kinds than to tokens (as shown by the difficulty with which (ia) licenses discourse anaphora to token dogs ((ib)) vs. kinds of dogs ((ic))), raises the question of whether what we are capturing in this appeal to NP and NumP layers needs a slightly different or more general treatment, or whether we simply need to posit that kinds can also be realized by other kinds.

- (i) a. I like those kinds of dogs.
 b. ??I saw them (=dogs of those kinds) yesterday.
 c. They (=those kinds of dogs) are cute.

However, exploration of this issue is beyond the scope of this paper.

analysis of the so-called adverbial reading of FAs.

We now turn to the analyses of temporal and nontemporal distribution with FAs.

3.2 Temporal distribution

We propose the semantic representations for the predicative and predicate modifier versions of temporal FAs in (43a) and (43b), respectively (where α ranges over both kinds and tokens); note that the latter guarantees that the modifier use of the FA is effectively intersective and that its semantics does not differ in any deep way from the semantics of the predicative use.

- (43) a. $\llbracket \mathbf{FA}_{temp-pred} \rrbracket: \lambda e_\alpha [\mathbf{FA}_{temp}(e_\alpha)]$
 b. $\llbracket \mathbf{FA}_{temp-mod} \rrbracket: \lambda P \lambda e_\alpha [P(e_\alpha) \wedge \mathbf{FA}_{temp}(e_\alpha)]$

The satisfaction conditions for \mathbf{FA}_{temp} – the content that is common to both the predicative and modifier uses – when it applies to kinds and token (plural) individuals appear in (44a) and (44b), respectively, where **distribution** is a function that yields the distribution *dist* of a set of entities at a given index i (with values like *high*, *low*, *daily*, etc.).¹² These conditions simply state that a temporal FA is true of its argument at an index just in case the distribution of the set of realizations or atomic parts of that argument at the index is whatever distribution the FA requires. For the remainder of this paper we will be concerned only with application of the FA to kinds as in (44a).

- (44) a. $\forall e_k, i [\mathbf{FA}_{temp}(e_k) \text{ at } i \leftrightarrow \mathbf{distribution}(\{e : \mathbf{R}(e, e_k) \text{ at } i\}) = \mathit{dist}]$
 b. $\forall e, i [\mathbf{FA}_{temp}(e) \text{ at } i \leftrightarrow \mathbf{distribution}(\{e' : \mathbf{atomic-part-of}(e' < e) \text{ at } i\}) = \mathit{dist}]$

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. However, as the means by which this is guaranteed is not crucial to our proposal, we will not discuss the options further here.

The semantics in (43b) and (44a), and its effect in combination with a noun, is illustrated for (temporal) *occasional* in (45):

- (45) a. $\llbracket \mathbf{occasional}_{temp} \rrbracket: \lambda e_k [\mathbf{occasional}_{temp}(e_k)]$

¹²An index is understood here to be spatiotemporally more constrained than a possible world; otherwise, the satisfaction conditions imposed below will be too strong, for instance entailing that there are few sailors (in a given world) if it is true that an occasional sailor strolled by.

- b. $\llbracket \text{occasional}_{temp} \text{ downdraft} \rrbracket: \lambda e_k [\text{downdraft}(e_k) \wedge \text{occasional}_{temp}(e_k)]$
 $= \lambda e_k [\text{downdraft}(e_k) \wedge \text{distribution}(\{e : \mathbf{R}(e, e_k) \text{ at } i\}) = low]$

In adding an intersective condition on the kind, the FA effectively creates a subkind, one characterized by the distribution of the instances of the superkind and which can be contrasted with other subkinds characterized by other distributions. At a conceptual level, it would appear to be meaningful to characterize types of eventualities according to their distribution in time.

The intersectivity of the semantics for the temporal reading distinguishes our analysis from those in previous work and accounts for a couple of facts about which other analyses have had nothing to say, a point that we will further elaborate on in section 4.2. First, the intersective semantics sheds light on the fact that temporal FAs occupy postnominal position in Romance languages (e.g. Spanish), which is reserved for intersectively interpreted modifiers, as shown in (46).

- (46) un problema frecuente (Spanish)
 a problem frequent
 ‘a frequent problem’

Second, this semantics predicts that temporally interpreted FAs will combine with other intersective modifiers of the same general sort (in this case, additional descriptors of the kind of event in question), in the way that intersective modifiers generally do. On the one hand, they should be able to coordinate with such modifiers, a prediction borne out by examples such as the attested (47a); and, on the other, there should be a certain freedom in the ordering of these modifiers, as in (47b).¹³

- (47) a. ...an occasional and brief downdraft will occur within the chimney...
 b. a brief, occasional downdraft = an occasional, brief downdraft

¹³This combinatorial freedom is somewhat restricted. The greater the semantic difference between the information provided by the two modifiers, the more difficult it is to combine them absolutely freely.

- (i) a. ?a yearly and external review
 b. a yearly external review = an external yearly review
 c. ?a frequent and international problem
 d. a frequent international problem vs. ??an international frequent problem

However, we suspect that pragmatic factors intervene in accounting for these restrictions, as similar effects are found on adjective coordination and ordering more generally (see e.g. Bouchard, 2005; Svenonius, 2008, and references cited there for discussion of adjective ordering):

- (ii) a. ?a tall and fascinating child
 b. a tall, fascinating child vs. ?a fascinating, tall child

- c. a frequent and widely-recognized problem
- d. a frequent, widely-recognized problem = a widely-recognized, frequent problem

The fact that the output of modification by the FA can serve as the input to additional modification demonstrates that the denotation of the set of kinds denoted by the FA+N need not be unique. That is, e.g. *occasional downdraft* denotes a set of kinds of downdrafts whose extension might include brief downdrafts, cold downdrafts, etc. This predicts the existence of examples such as the following (from the BNC), where the bare plural containing the FA denotes a set of kinds of abnormalities with a low distribution:

- (48) A number of occasional abnormalities have been described, including cardiac defects, cleft lip/palate, scoliosis, genitourinary anomalies, and central nervous system anomalies.

It also predicts that temporal FAs should in principle be able to co-occur with a variety of determiners, as was observed in (13), repeated in (49):

- (49) a. No daily news program can match this one.
 b. John agreed to conduct one weekly inspection a year.

Since the set described by the nominal is a set of kinds, we capture Schäfer’s intuition that when a determiner other than a generic determiner appears with an FA, it is doing something like quantifying over kinds.

Before moving on to show how this semantics yields the internal, generic, and – when warranted – adverbial readings for temporal FAs, let us consider one final question, namely what happens when a kind description containing a temporally interpreted FA combines with Number. The result will be a description of token individuals of a kind whose distribution is determined by the FA, as in (50):

- (50) $\llbracket \llbracket \text{NumP occasional}_{temp} \text{ downdrafts} \rrbracket \rrbracket$:
 $\lambda e \exists e_k [\text{downdraft}(e_k) \wedge \text{occasional}_{temp}(e_k) \wedge \mathbf{R}(e, e_k)]$

We will have more to say about this description in the account of the different readings, to which we now turn.

3.2.1 Accounting for the internal reading

The internal reading crucially requires a deverbal participant noun or a “stage noun” (e.g. *passenger*, see Barker, 1999). We hypothesize that what distinguishes these nouns from other nouns is the presence of an additional event argument (or, as we will assume, an event kind argument) in their semantic representation

(see e.g. Winter and Zwarts, 2011, for independent arguments to this effect for participant nouns). Thus, given our assumptions about the layered DP, the representation of a noun like *sailor* will be as in (51a), which will be converted into a property of token individuals via the introduction of number morphology, as in (51b) (note that the existential closure introduced when Num is added will bind off the event kind variable in the noun’s representation, in addition to the ordinary kind variable).

- (51) a. $\llbracket_{NP}[_N \text{sailor}]\rrbracket: \lambda x_k \lambda e_k [\mathbf{sailor}(x_k, e_k)]$
 b. $\llbracket_{NumP}[_{NP} \text{sailor}]\rrbracket: \lambda y \exists x_k, e_k [\mathbf{sailor}(x_k, e_k) \wedge \mathbf{R}(y, x_k)]$

The FA will thus combine with the noun before the latter combines with Number, as in (52b), much in the way that relational adjectives combine with kind descriptions before these are turned into token-level descriptions on the analysis in McNally and Boleda (2004). Since the FA is sortally restricted to apply to events, the only option is for it to apply to the event argument in the noun’s representation. The exact mechanism via which the adjective accesses this argument is not crucial; see e.g. Pustejovsky (1995); Larson (1998); McNally and Boleda (2004) for different implementations.

- (52) a. $\llbracket[_N \text{sailor}]\rrbracket: \lambda x_k \lambda e_k [\mathbf{sailor}(x_k, e_k)]$
 b. $\llbracket[_{NP} \text{frequent sailor}]\rrbracket: \lambda x_k \lambda e_k [\mathbf{sailor}(x_k, e_k) \wedge \mathbf{frequent}(e_k)]$

When Number is added, the result is a description of those token individuals of the sailor kind who participate in that kind of event that can be described as frequent sailing.

- (53) $\llbracket[_{NumP} \text{frequent sailor}]\rrbracket: \lambda y \exists x_k, e_k [\mathbf{sailor}(x_k, e_k) \wedge \mathbf{frequent}(e_k) \wedge \mathbf{R}(y, x_k)]$

Note that expressions with representations like that in (53) should be able to combine with any determiner, and indeed we saw in section 2.1 that this was possible.

An additional prediction of this analysis is that any token-level modification should have to appear further away from the head noun than does the FA, since it will only be able to be added once a variable corresponding to the token individual is introduced by Number (see McNally and Boleda, 2004, for related examples). This prediction is also borne out: (54b) entails that skilled sailors are a recognizable subkind of sailor, rather than simply entailing that Martin is skilled.

- (54) a. Martin is a skilled frequent sailor.
 b. ??Martin is a frequent skilled sailor.

3.2.2 The generic reading with temporal FAs

Now consider the generic reading. There are two kinds of cases: those in which the modified noun describes an event, and those in which it does not. Recall that in both cases there is a very strong preference for the indefinite article or bare plural vs. the definite article.

- (55) a. A periodic inspection is important.
b. Periodic inspections are important.
c. ??The periodic inspection is important.
- (56) a. A frequent glass of wine is healthy.
b. Frequent glasses of wine are healthy.
c. ??The frequent glass of wine is healthy.

The oddness of the definite article is exactly as when the FA is not present: The DPs in (57) lack a generic reading.

- (57) a. The inspection is important.
b. The glass of wine is healthy.

We therefore attribute the oddness of (56c) and (57c) to factors that are independent of the FA and will not be further concerned with explaining this restriction on the definite article here.

The question of how best to analyze indefinite and generic bare plural sentences has been the source of a long debate in the literature (see e.g. Carlson and Pelletier, 1995; Mari et al., 2013, for overviews). To keep things simple, we will sketch a relatively primitive analysis that will serve to make our basic point.

The examples in (55) are straightforwardly analyzable in the same way as other generic sentences involving indefinite singular and bare plural DPs. We illustrate using the indefinite singular. We assume that the source of genericity in indefinite generic sentences is external to the subject DP and treat the indefinite as nonquantificational (see Farkas and Sugioka, 1983; Cohen, 2001; Greenberg, 2002; Krifka, 2013, inter alia, for different proposals). Given these assumptions, the representation of (55a) will be as in (58), where **Gen** represents a generic quantifier:

- (58) $(\mathbf{Gen}e_k : \mathbf{inspection}(e_k) \wedge \mathbf{periodic}(e_k))[\mathbf{important}(e_k)]$

In prose, (58) says that if e_k is an inspection kind of event whose instances are sets with periodic distributions, e_k is important. This is the interpretation we want.

For completeness, now consider the representation of a sentence in which the generic operator combines with a NumP containing an FA, as in (50):

(59) **(Gene : $\exists e_k[\text{inspection}(e_k) \wedge \text{periodic}(e_k) \wedge \mathbf{R}(e, e_k)][\text{important}(e)]$)**

(59) does not have exactly the same satisfaction conditions as (58): it is true if, in general, a token inspection that qualifies as being of the periodic inspection sort is healthy.

When the head noun does not describe an event, as in (56), coercion of the denotation to an eventuality description is needed. Recall that examples in which temporal FAs modify sortal nouns are systematically equivalent to event descriptions in which an individual of the sort described by the noun is a participant (e.g. (60a) is paraphrasable as in (60b)).¹⁴

- (60) a. A daily beer is healthy.
b. V-ing a beer on a daily basis is healthy.

This sort of coercion is well known (consider cases such as the interpretation of *the book* in *enjoy the book*), and our analysis is compatible with any independently-motivated account of coercion (see e.g. Asher, 2011, for a recent proposal). Here we will simply use a function **E** to induce the appropriate coercion, yielding the denotation for (60a) in (61):

(61) **(Gene_k : **E(beer)**(e_k) \wedge **daily**(e_k))**[healthy**(e_k)]**

(61) is fully analogous to (58).

¹⁴Stump (1981) cites one sort of example that might appear to counterexemplify this claim: (ia) is not paraphrasable as in (ib):

- (i) a. An occasional cup of coffee tastes good when it's cold out.
b. V-ing an occasional cup of coffee tastes good when it's cold out.

However, *taste* does admit eventuality-describing arguments when they are presented in infinitive form, particularly if they are extraposed:

- (ii) It tastes good to drink an occasional cup of coffee when it's cold out.

We also observe that the equivalent sentence is acceptable in German ((iii)), despite the fact that we have shown in section 2.4.2 that *gelegentlich* sortally selects for an eventuality (in contrast to English *occasional*).

- (iii) Ein gelegentliches Bier schmeckt gut.
an occasional beer tastes good
'If one occasionally drinks a beer, it tastes good.'

We therefore conclude that, despite initial appearances, sentences like (ia) do not call into question the generalization that generic uses of temporal FAs with sortal nouns systematically involve coercion.

3.2.3 The adverbial reading with temporal FAs

Finally, we turn to the issue of the adverbial reading (i.e., the paraphrasability of the FA in terms of a sentence-level adverb) with temporally interpreted FAs. Recall that with these FAs, this reading is only systematically possible with event nominals as illustrated in (62).¹⁵

- (62) The department has undergone a periodic review (over the last 10 years).
= Periodically, the department has undergone a review.

As such sentences are not, as a rule, generic, there is no motivation for using a generic adverbial quantifier to bind the variable in the DP's denotation. We conclude that the DP is an instance of an indefinite kind nominal of the sort found in sentences like (63) (see e.g. Dayal, 2004; Müller-Reichau, 2011, for additional discussion and examples of indefinite kind nominals):

- (63) a. A giant tortoise has recently become extinct.
b. Fred invented a pumpkin crusher.

The denotation of the nominal in (62) will be composed in exactly the same way as the denotation of the nominal containing the FAs was composed for the generic reading (see (64a)). When the indefinite article is added, the result is (64b), where for the sake of illustration we treat the resulting DP as denoting the entity returned by a choice function f_i on the set denoted by *periodic review* (Reinhart, 1997; Kratzer, 1998):¹⁶

- (64) a. $\llbracket \text{periodic review} \rrbracket: \lambda e_k [\mathbf{review}(e_k) \wedge \mathbf{periodic}(e_k)]$
b. $\llbracket \text{a periodic review} \rrbracket: f_i(\lambda e_k [\mathbf{review}(e_k) \wedge \mathbf{periodic}(e_k)])$

Gehrke and McNally (2011) observe that, because of the distribution condition on the set of tokens that realize this kind, it is difficult to imagine how any such set could participate in one token event of the sort described by the verb. However, nothing would prohibit it from participating in the *kind* of event described by the verb, if the latter could be instantiated by multiple tokens. This observation

¹⁵Because of the complexity of the details that would have to be addressed, we will not consider in this paper the extension of the analysis we develop here to sortal nominals that satisfy the properties of Uniqueness of Events and Mapping to Events, illustrated in (26)-(28), leaving these for future research.

¹⁶Whether the choice function variable is treated as existentially quantified or as a contextually-valued free variable is not crucial here; we treat it as a free variable. Other analyses of the indefinite article would be compatible with our treatment of the FA.

Note that the DP containing the FA can also be understood as denoting a token review of the periodic kind. If the DP were to be interpreted this way in (62) the sentence would entail only that the department had undergone one token review, rather than a set of reviews.

leads them to propose that sentences with the adverbial reading correspond to propositions about event kinds. Thus, the denotation of (62) is represented as in (65), where **d** stands for *the department*.

$$(65) \quad \llbracket \text{The department has undergone a periodic review} \rrbracket: \\ \exists e_k [\mathbf{undergo}(e_k, \mathbf{d}, f_i(\lambda e'_k [\mathbf{review}(e'_k) \wedge \mathbf{periodic}(e_k)])))]$$

Gehrke and McNally propose the following satisfaction conditions for sentences that are used to make assertions about event kinds. First, in order for an event kind to exist at some index i , at least one realization of the event kind should exist at i . This is the intuition behind the semantics of existential sentences in McNally (1992), who in turn built on observations in Strawson (1959). This intuition is formalized in (66).

$$(66) \quad \forall e_k, x, P, i [P(e_k, x) \text{ at } i \leftrightarrow \exists e, x [\mathbf{R}(e, e_k) \wedge P(e, x) \text{ at } i]]$$

Second, in the vast majority of cases, the realization of an event involving kind-level participants will entail the existence of at least one realization of those kind-level participants; that is, in general, (67) holds for a given choice of event description P .

$$(67) \quad \forall e, x_k, i [P(e, x_k) \text{ at } i \leftrightarrow \exists x [\mathbf{R}(x, x_k) \wedge P(e, x) \text{ at } i]]$$

Finally, Gehrke and McNally posit that for a kind with a set-of-tokens realization (e.g. (64b)) to participate in a kind of event that is subject to (67), each element of the set that realizes the kind should participate in a token event of the relevant event kind. As the set of token entities needs to satisfy a particular distribution, the corresponding token events will also satisfy that distribution. This is represented in (68), where x_k is understood to range over just those kinds realized by sets of tokens and X is the set of tokens that realize x_k at i .

$$(68) \quad \forall e_k, x_k, i, X [P(e_k, x_k) \text{ at } i \leftrightarrow \\ \forall x \in X \exists e [\mathbf{R}(e, e_k) \wedge P(e, x) \text{ at } i]]]$$

Thus, for (65) to be true, there will have to be a set of token review-undergoing events with a distribution that can be described as “periodic”. This is precisely what the adverbial paraphrase expresses.

Note, finally, that temporally interpreted FAs will not, as a rule, yield the adverbial reading in combination with sortal nouns for a very simple reason: the noun does not describe the sort of entity that the FA can modify, and there is nothing in the interpretation of the sentences we have used to illustrate this reading that would force coercion of the sortal noun’s denotation to that of an event description. If such coercion is independently called for, we expect that temporally

interpreted FAs should be possible with sortal nouns, and indeed that does appear to be the case:

- (69) We enjoyed a daily/frequent beer with our friends.
 = Daily/frequently, we enjoyed (having) a beer with our friends.

Summarizing, with a single denotation for the temporally interpreted FAs, we have accounted for the three classic readings associated with these adjectives. We will now do the same for FAs expressing nontemporal distribution.

3.3 Nontemporal distribution

The semantics for nontemporally interpreted FAs is identical except for two details. First, these FA are not sortally restricted to describing event distributions; and second, their semantics is exclusively that of a predicate modifier – recall that these FAs lack a predicative use. The general semantics for nontemporally interpreted FAs is schematized as in (70a). Note, however, that the satisfaction conditions for nontemporal FAs are the same as those for temporal FAs (compare (70b) with (44a)):

- (70) a. $[[\mathbf{FA}_{nontemp}]]: \lambda P \lambda x_k [(\mathbf{FA}(P))(x_k)]$
 b. $\forall P, x_k, i [(\mathbf{FA}_{nontemp}(P))(x_k) \text{ at } i \leftrightarrow [P(x_k) \wedge \mathbf{distribution}(\{y : \mathbf{R}(y, x_k) \text{ at } i\}) = \mathit{dist}]]$

We exemplify this semantics, again using *occasional*, in (71):

- (71) a. $[[\mathbf{occasional}_{nontemp}]]: \lambda P \lambda x_k [(\mathbf{occasional}_{nontemp}(P))(x_k)]$
 b. $[[\mathbf{occasional}_{nontemp} \text{ car}]]: \lambda x_k [(\mathbf{occasional}_{nontemp}(\mathbf{car}))(x_k)]$
 c. $\forall x_k, i [(\mathbf{occasional}_{nontemp}(\mathbf{car}))(x_k) \text{ at } i \leftrightarrow [\mathbf{car}(x_k) \wedge \mathbf{distribution}(\{y : \mathbf{R}(y, x_k) \text{ at } i\}) = \mathit{low}]]$

The proposal that nontemporally interpreted FAs do not denote simple (first order) properties of (kinds of) individuals is crucial to explaining various contrasts between them and temporally interpreted FAs. Unlike the latter, nontemporally interpreted FAs do not coordinate with modifiers that can be given an intersective analysis:

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

In addition, changing the order of these FAs with respect to other modifiers clearly produces a corresponding change in interpretation, something typical of predicate modifiers but not, as shown above, of modifiers that can be given an intersective

semantics:

- (73) a. Only the odd/rare/occasional 2-door car will have enough leg room in the back seat. \neq
b. Only the 2-door odd/rare/occasional car will have enough leg room in the back seat.

Furthermore, if nontemporally interpreted FAs have a slightly different semantics, and in particular a different semantic type, from temporally interpreted ones, this may explain why the two types of FAs have different distributions in different languages. For example, as shown in section 2.4.2, German lacks nontemporally interpreted FAs (or if it has them, we have not identified them yet), and this also appears to be the case for the Romance languages, as illustrated with the following examples from Spanish:

- (74) a. *Pasaba el ocasional coche.
passed the occasional car
Intended: ‘The occasional car passed by.’
b. *Pasaba el coche ocasional.
passed the car occasional

Finally, the predicate modifier semantics helps explain the determiner restriction on nominals containing nontemporally interpreted FAs. To see why, consider the following. In principle, the nominal that the FA combines with denotes a set: the set of kinds described by that nominal. This set will include the general kind associated with the nominal plus, as seen in the previous section, any recognizable subkinds; for example, *car* will denote the set that includes the kind described by *car*, but also the subkinds described by *sedan*, *station wagon*, *sportscar*, etc. We may narrow this kind description (and thus reduce the set of subkinds it denotes) by adding subkind-creating modification (e.g. *2-door*). However, whenever we convert the kind description to a description of tokens (on our approach by adding number and possibly token-level modifiers as well), there is always only one unique kind that the tokens are entailed to be realizing, namely the maximally general kind described by the nominal.

For example, the nominal *cars that we saw* denotes the set of token individuals that we saw that are of the car kind. It may be that all of these cars belonged to one particular subkind of car, but no entailments to that effect are part of the semantics of the modified nominal. Though we cannot provide a deep answer as to why this uniqueness effect arises, it is an obvious consequence of having to choose some kind for the tokens to stand in the realization relation to, and natural language does not seem to be able to express at once, with a single, noncoordinated nominal,

multiple realization relations.¹⁷

Now, although the effect of adding a (nontemporally interpreted) FA is not to convert a kind-level description to a token-level description, its effect is similar insofar as it takes a kind description and imposes conditions on the realizations of the corresponding kind. But in order for those conditions to be met, the identity of the kind that will participate in the realization relation must be established, and it will be the unique, most general kind described by the nominal the FA combines with, for the same reasons sketched immediately above. As a result, when the FA combines with a kind description, it returns the description of the unique kind upon whose realizations conditions are being imposed. Thus, nominals containing these FAs should reject any determiner that does not entail uniqueness, hence the restriction to *the* and the bleached possessive.¹⁸

The representation for a DP containing a nontemporal FA appears in (75), where we represent the denotation of the definite article with the iota operator.

(75) [[the occasional car]]: $\iota x_k [(\mathbf{occasional}_{nontemp}(\mathbf{car}))(x_k)]$

It follows directly from this semantics that we will not get the internal reading with nontemporally interpreted FAs. The internal reading arises, as shown above, when the FA intersectively modifies an internal event argument within the representation of a nominal. There is obviously no way for nontemporal FAs to achieve this kind of modification, as they crucially apply to descriptions of (kinds of) individuals, rather than to (kinds of) individuals themselves.

In contrast, the generic and adverbial readings can be straightforwardly accounted for in fundamentally the same way as they were accounted for with temporal FAs. The only difference is that the kind term contributed by the nominal containing a nontemporal FA has a unique denotation, but this does not affect the semantic type of the nominal. Thus, once the nominal's semantics has been composed, the rest of the semantics of the sentence can be composed in the same way as it was in the case of temporal FAs, modulo the fact that the kind variable in the denotation of the nominal is not available for binding e.g. by a generic adverbial operator.

For example, (76b) shows the representation for the generically-used FA in (76a).

¹⁷Of course, if some token realizes a given kind, it will realize all superkinds of that kind by entailment, but this is not relevant to our point.

¹⁸Insofar as the singular demonstratives *this* and *that* also entail uniqueness, we might also find examples where they occur with nontemporally interpreted FAs. This prediction is in fact borne out:

- (i) This product is great for pickups, vans and that odd car that comes in the shop.

- (76) a. Max hates the occasional headache.
 (= Max hates headaches that occur on an occasional basis)
 b. $\exists e[\mathbf{hates}(e, \mathbf{m}, \iota x_k[(\mathbf{occasional}_{nontemp}(\mathbf{headache}))(x_k))]]$

In prose, (76b) states that Max hates that kind of thing that is a headache, realized by a set of tokens with a low distribution.

A representation for the generic reading involving coercion of the nominal appears in (77), analogous to that in (61).

- (77) a. The occasional beer is healthy. = V-ing a beer on an occasional basis is healthy.
 b. $\mathbf{healthy}(\iota e_k \mathbf{E}(\mathbf{occasional}_{nontemp}(\mathbf{beer})(e_k)))$

(77b) states that the kind of event that is a beer V-ing, realized by a set of events with a low distribution, is healthy.

Finally, sentences in which the FA manifests the adverbial reading, like (3) (repeated in (78a)), will be represented as in (78b).

- (78) a. The occasional sailor strolled by.
 b. $\exists e_k[\mathbf{strolled_by}(e_k, \iota x_k[(\mathbf{occasional}_{nontemp}(\mathbf{sailor}))(x_k))]]$

The account of the specific entailments of (78b) is identical to that for sentences like (65). The only difference is that the kind description in (78a), unlike the indefinite kind description in (65), picks out a unique kind.

Again, as was the case with temporally interpreted FAs, with one semantics we account for all of the uses of the adjective. The different readings attributed to the FA are a byproduct of other elements in the sentences in which they occur.

Before concluding this section, we should address the question of what happens when a nontemporally interpreted FA combines with NumP. The representation for such NumPs is schematized in (79):

- (79) $[[[NumP \mathbf{FA}_{nontemp} \mathbf{N}]]]: \lambda x \exists x_k[\mathbf{FA}_{nontemp}(\mathbf{N})(x_k) \wedge \mathbf{R}(x, x_k)]$

(79) denotes the set of token individuals that are realizations of the kind **N**, with the added condition that this kind is realized by a set of tokens with a particular nontemporal distribution. This looks close to the use of FAs that we find in expressions such as the following:¹⁹

- (80) a. He found some odd change in his pocket.
 b. She had nothing left except a few odd pieces of furniture.
 c. They held several odd jobs over the course of the summer.

¹⁹Note that although (80c) might be considered an idiomatic expression, it presumably originated compositionally.

Thus, all of the uses of nontemporally interpreted FAs discussed in the literature can be accounted for with one basic semantics, just as was the case with the temporally interpreted FAs. Perhaps the most significant difference between the two uses is that the latter has an intersective semantics, while the former does not. We have shown that this difference accounts for several differences between the two classes of FAs.

4 Advantages over previous analyses

We are now in a position to point out the advantages of the current proposal over previous analyses, which are of two basic kinds. The first is the determiner analysis of the adverbial reading, which treats the FA essentially as a determiner, and thus as different from FAs on the internal and generic readings (which are not directly accounted for under this sort of approach). The second is the unified account for all readings, pursued by Schäfer (2007) and Gehrke and McNally (2011). The latter paper presents some arguments against the determiner analysis, as well as against the specific version of the analysis presented in Schäfer (2007); we will not review these here. Rather, we will focus on additional arguments against the determiner analysis and on showing how the recognition of the distinction between temporal and nontemporal distribution, missing in all previous proposals, solves a number of puzzles that these proposals left unaccounted for. We will turn to these in the second part of this section.

4.1 The determiner analysis of the adverbial reading

Let us first consider the determiner analysis. Under this analysis (Stump, 1981; Larson, 1998; Zimmermann, 2003), the adverbial reading is given a separate syntactic and semantic treatment from the internal and generic readings. For example, Zimmermann argues that FAs under the adverbial reading syntactically incorporate into the determiner, as in (81) (Zimmermann, 2003, 271, minor details modified).

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

The result of incorporation is interpreted as a complex pluractional quantifier INFREQ over event-individual pairs that are found within a larger, contextually identified event (see (82a)); the semantics for a sentence containing an INFREQ is presented informally in (82b) (adapted from Zimmermann, 2003, 272, non-crucial details simplified).

- (82) a. $\llbracket \text{an/the occasional N VP} \rrbracket$:
 $(\text{INFREQ}\langle e, x \rangle : \text{part-of}(e, e^*) \wedge N(x))[\text{VP}(e, x)]$
 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.

Zimmermann further argues that INFREQ is a weak quantifier in the sense of Milsark (1977), citing e.g. the fact that DPs containing the relevant FAs can occur in the pivot of existential sentences:

- (83) There was the/an occasional sailor strolling by. (Zimmermann, 2003, (32a))

The determiner analysis of the adverbial reading has been supported by two main sorts of arguments: the observation that the FA apparently scopes over the entire sentence, and the observation that the FA does not behave like a typical adjective in some respects.²⁰ Gehrke and McNally (2011) show that the latter argument is not convincing; the reader is referred to their paper for details. Here, we will show that there are scope facts that are in fact problematic for the determiner analysis.

4.1.1 Unexpected scope facts

A first, and quite significant, problem for the determiner analysis is posed by sentences which do not appear to be generic, and yet which do not permit a paraphrase in which the FA takes sentence-level scope. Normally, nothing prevents a quantifier in object position from taking scope over a sentence in which there is no other quantificational operator. However, consider (84), from the BNC:

- (84) Idling beside the propped-open kitchen window he registers the occasional car swishing past, three stories below.

The syntactic analysis of this sentence is not trivial: it is not immediately obvious whether *the occasional car swishing past* should be analyzed as a DP or as a small clause. However, this is not important because whichever analysis is chosen, there is no reason in principle why INFREQ contributed by the FA (in conjunction with the determiner) should not be able to effectively scope over the entire sentence. Compare, for example (85a), where the weakly interpreted determiner *many* is substituted for *the occasional*. The crucial part of the sentence can be paraphrased as in either (85b) or (85c):

²⁰For example, FAs under the adverbial reading cannot follow or conjoin with other adjectives; in section 3, we have already shown that such facts follow from our analysis since treats nontemporally interpreted FAs as a special sort of predicate modifier instead of as intersective adjectives.

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

The determiner analysis predicts that (84) should be paraphrased as in (86a) or (86b), depending on the syntactic analysis one adopts:

- (86) 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.

Neither of these paraphrases is exactly right. The problem is that (84) entails that there are few cars swishing past, but neither of the informal representations in (86) carries this entailment. Rather, the sentence only entails that there are few events of him registering the car, and this could be the case if there are many cars swishing past and he simply fails to notice most of them. In other words, the effect of the FA appears to be restricted to events of swishing past, rather than to events of registering, but we see no independently-motivated mechanism that could produce this effect, assuming the determiner analysis.

In contrast, these sorts of examples are not problematic for the analysis proposed here: they receive the same analysis as examples such as (78), where y_i represents the pronoun *he* (we assume a small clause analysis for illustration):

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

The satisfaction conditions for this sentence will guarantee that the distribution of token cars is low; this, in turn, 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. This is exactly what we want.

4.1.2 Unexpected determiner facts

In addition to failing to explain these scope facts, the determiner analysis fails to provide an insightful account of the distribution of FAs with different determiners. In section 2.3 we noted that it has generally been assumed in the literature

that the adverbial reading is only available with the (in)definite articles and semantically bleached possessives. Zimmermann proposes that this restriction can be accounted for in the case of the articles on the hypothesis that they are semantically empty. However, Gehrke and McNally (2011) observe that treating these items as semantically empty and the FA essentially as a quantifier leaves unexplained why the FA must be accompanied by an overt article in the first place, i.e., why (88) is unacceptable:

(88) *Occasional sailor strolled by.

The data we have presented here in fact weaken this account of the determiner restriction even further. We have shown here that previous work has failed to recognize the fact that there are really two patterns to the distribution of determiners with FAs, and that nontemporally interpreted FAs (unless subsequently combined with Number) are in fact restricted to determiners that entail uniqueness, thus permitting even demonstratives in cases such as the example in footnote 18. The claim that semantic emptiness accounts for the determiner restriction is thus incorrect, and as a result the difficulty of explaining why the FA would contribute quantificational or referential force when there is already a determiner to do so reemerges.

4.1.3 Unexpected facts from German

Finally, recall that in German it appears that only FAs in subject but not in object position allow for the adverbial reading (recall (37)). Zimmermann observes that German allows quantifier raising out of subject but not out of object position, which he takes as support for the determiner analysis of FAs. In further support for this claim, he notes that preposed topicalized objects, like the one in (89) ((31) in Zimmermann, 2003), are fine on the adverbial reading.

(89) Ein gelegentliches Bierchen haben wir auch getrunken.
 an-occasional-beer.ACC have we also drunk
 ‘Of course, we have occasionally drunk a beer, too.’

Eight out of eleven of the native speakers we consulted agreed that this example is, in fact, acceptable. However, nine out of the eleven equally liked or even preferred (90) on the relevant reading, where the DP containing the FA remains in object position. The acceptability of this sentence on this reading is not predicted under Zimmermann’s analysis.

(90) Wir tranken ein gelegentliches Bier.
 we drank an occasional beer
 ‘We drank an occasional beer.’ (= ‘Occasionally, we drank a beer.’)

In section 2.4.2, we observed that native speakers of German generally disprefer what has been called the adverbial reading, as in the examples in (37) (which we argued to involve nontemporal distribution), except with event nouns and nominals bearing a certain type of thematic role. The fact that the determiner in (89) and (90) is indefinite further calls into question that these examples really involve nontemporal distribution. Rather, we conclude that these are similar to the English examples with strictly incremental theme verbs, illustrated in (26)-(27). Thus, while nothing would prevent one from maintaining the determiner analysis for nontemporally interpreted FAs in German, these facts cannot be considered an argument for the determiner analysis.

Summarizing, there are significant empirical challenges for the determiner analysis. In addition it requires positing not otherwise motivated syntactic movement and a nonstandard semantic type for the adjective on the adverbial reading. We thus see no reason to maintain such an analysis.

We now turn to the advantages that result from teasing apart temporal from nontemporal distribution.

4.2 Puzzles solved by distinguishing temporal and nontemporal distribution

As noted throughout the paper, a problem we see for all previous analyses of FAs is that they failed to observe the crucial distinction between temporally vs. nontemporally interpreted FAs that lies at the heart of the analysis proposed in this paper. This oversight led to many open questions mentioned in Gehrke and McNally (2011), which remain unresolved under any account, but to which we now have an answer.

For example, Gehrke and McNally present data that raised the general question of whether there are important semantic differences in the subclasses of FAs, in particular in relation to the determiner restrictions on the generic and adverbial readings. We have argued that this is, indeed, the case.

In addition, none of the previous analyses had anything to say about the lexical restrictions on the combinatorial possibilities of different kinds of FAs with different kinds of nouns and the respective restrictions on the availability of particular readings. In this paper, we took a closer look at each FA in isolation, observing that some are compatible only with determiners entailing uniqueness, while others are more flexible; that only some are able to appear in predicate position; and finally that there is a clear split within the class of FAs with respect to which readings they allow. This led us to abandon the idea that each of the three putative readings (internal, generic, adverbial) should be given a unified semantics, and to concentrating on the distinction between temporally- and nontemporally-

interpreted FAs. From this distinction, in turn, the combinatorial possibilities and restrictions on the putative readings follow: the internal reading only involves temporal FAs because only these FAs have the right sort of semantic type to effect the modification associated with the internal reading, and the adverbial reading (i.e., the paraphrasability of the sentence containing the FA in terms of a sentence-level adverb) is accounted for in different ways depending on whether the FA induces temporal and nontemporal distribution.

A third unsolved puzzle mentioned by Gehrke and McNally is that FAs resist combining with mass sortal nouns, in contrast to mass event nouns, as shown in (91).

- (91) a. ??There was occasional beer.
b. There was occasional trouble.

Once temporal and nontemporal distribution are distinguished, a more precise generalization appears to emerge. Assume, following McNally (1992) that the postverbal nominal in an existential sentence contributes a description of token entities. (91) then would appear to show that nominals containing nontemporally interpreted FAs cannot be converted to descriptions of mass entities, a generalization consistent with the anomaly of the sentences in (92).

- (92) a. ??There was odd trouble.
b. ??There was odd beer.

However, we have already seen an example that shows that this generalization is not exactly correct, namely (80a), repeated in (93a) below, to which we add a few other attested examples:

- (93) a. He found some odd change in his pocket.
b. Most people who advertise on Craigslist are moving or found some odd furniture in their basement that they had forgotten about.
c. The Goodwill nearby has bins full of odd silverware, only sorted by forks, knives, and spoons, and you can buy as little or as much as you like.

What distinguishes the acceptable examples in (93) from those in (92) is that the mass nouns in the former describe masses with naturally identifiable minimal parts, whereas those in the former do not (see e.g. Gillon, 1992). Though we cannot offer a full account for why this should be a relevant distinguishing factor, we suspect that it is related to the observation made in section 2.3 in relation to the contrast between (26b) and (28b), repeated in (94):

- (94) a. ??She baked frequent cookies (vs. \checkmark frequent cakes).

- b. She baked frequent batches of cookies.

Specifically, with nontemporally interpreted FAs it appears to be necessary to guarantee that there is a strictly homomorphic mapping between the entities whose distribution is being characterized and the eventualities in which they participate. Mass nouns that describe entities lacking natural minimal parts may simply not provide the right sort of individuation conditions to allow for a proper characterization of the distribution imposed by the FA and its effect on individuating eventualities. With temporally interpreted FAs, as in (91b), perhaps because they characterize the distribution of eventualities directly, rather than via the individuation of individuals who participate in those events.

5 Conclusion

We have shown that FAs fall into two classes depending on whether they effect temporal vs. nontemporal distribution. This new observation has led to an analysis that solves a number of puzzles that previous analyses failed to explain. We have argued that the interesting differences between the nontemporal and temporal FAs are attributable to the fact that the latter are intersective modifiers sortally restricted to events, while the former are not.

Though the analysis defended here does not present a fully unified treatment of FAs, it does provide a unified analysis each individual FA, with the exception of *occasional*, which we have argued is ambiguous. In this respect, the analysis preserves the spirit of unified analyses such as those in Schäfer (2007) and Gehrke and McNally (2011) insofar as it avoids an *ad hoc* semantics for the adverbial reading vs. the other readings associated with FAs. It also reinforces the two most interesting theoretical proposals in the latter work, namely that some kinds have sets of tokens as their realizations, and that some clauses should be analyzed in terms of descriptions of event kinds, rather than descriptions of event tokens.

Despite the fact that we have limited the range of adjectives we have considered in this paper to those considered in previous works on the subject, there is no reason to exclude the possibility that the sort of analysis we have proposed could apply to other adjectives that have not previously been associated with FAs. Some candidates of this sort include *typical* and *usual*.²¹ Indeed, these might be the counterparts to *odd* and *rare* that would convey nontemporal *frequency*, rather than *infrequency*, in distribution, and thus render the class of nontemporally interpreted adjectives semantically more complete. More generally, the analysis opens up for exploration the possibility of previously unrecognized strategies for conveying the sort of information typically attributed to (quantificational) deter-

²¹We thank Itamar Francez, p.c., for this suggestion.

miners. Similarly, the analysis suggests the possibility of reanalyzing so-called quantificational adverbs such as *frequently* or *occasionally* along similar lines, as predicates of event kinds described by clauses. However, we will have to leave this task for future research.

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