Pluractionals and Frequentative Readings of Activities and Accomplishments:
van Geenhoven 2004

1.   A Background Puzzle in English

(1)   **Some of the Primary Results / Conclusions of the Paper**

   a.   Given certain parallels with overly marked pluractional verbs in Kalaallisut (West Greenlandic Eskimo), English verbs may sometimes have phonologically null pluractional morphology.

   b.   This morphology be might responsible for the 'frequentative readings' that are sometimes found for achievements and activities in certain environments.

      (i)   John clapped for four minutes.   (~ clapped over an over again)

   c.   There are perhaps two different (readings of) pluractionals (Lasersohn 1995)

      (i)   Operators that 'distribute' a plural argument over multiple subevents.
      (ii)   Operators that relate a singular argument to multiple subevents

   d.   We might be able to understand the contrast below (Kratzer 2008) in terms of this contrast between (possible readings of) pluractional affixes.

      (i)   John bounced a ball for ten minutes.   (~ same ball over and over)
      (ii)   John bounced balls for ten minutes.   (~ possibly different balls)

(2)   **A Recipe for Semantic Anomaly**

Take one accomplishment verb (2a) or achievement verb (2b); Take one singular indefinite (2a,b); Sprinkle liberally with the temporal adverbial *for NP_time*.

   a.   ? Mary ate a sandwich for an hour.
   b.   ? Mary discovered a flea on her dog for six weeks.

(3)   **How to Repair the Anomaly**

Replace the singular indefinite with an indefinite plural.

   a.   Mary ate sandwiches for an hour.
   b.   Mary discovered fleas on her dogs for six weeks.

So… what the heck is going on here??

(4) **Krifka's (1992) Analysis**

     a.   *For NP$_{time}$* presupposes that its (VP) argument *lacks* the following property:

         Quantization: A VP is 'quantized' if$_{df}$ $\forall$e. [[VP]](e) $\rightarrow$ $\neg\exists$e'. e' < e & [[VP]](e')

     b.   *Eat a sandwich* and *discover a flea* <u>are</u> quantized. No event of 'eating a sandwich' / 'discovering a flea' contain proper subevents of 'eating a sandwich / discovering a flea'.

         •   Thus *for NP$_{time}$* will not felicitously combine with the VPs in (2a,b)

     c.   *Eat sandwiches* and *discover fleas* are <u>not</u> quantized. An event of 'eating sandwiches' / 'discovering fleas' *can* sometimes contain proper subevents of 'eating sandwiches' / 'discovering fleas'.

         •   Thus *for NP$_{time}$* will felicitously combine with the VPs in (3a,b)

(5) **Problem: The Felicity of *For NP$_{time}$* with Some Achievements and Accomplishments**

• If we change the Vs in (2a,b) to ones like *read* or *find*, then the 'recipe' in (2) breaks down; those Vs *can* felicitously combine with a singular (in)definite and *for NP$_{time}$*

     a.   Mary read a letter for an hour.
     b.   Mary found her son's tricycle in the driveway for six weeks.

• Such sentences are typically understood to mean that there were *several* events of the kind described by the VP; *i.e.*, that the action described by the VP *repeated* throughout the temporal span denoted by *for NP$_{time}$*

     o   Sentence (5a) describes Mary repeatedly reading of the letter.
     o   Sentence (5b) describes Mary repeatedly finding the tricycle in the driveway.

(6) **Terminology: 'Frequentative Interpretation'**

• van Geenhoven (2004) refers to the aforementioned readings of (5a,b) as 'frequentative'.

• Jackendoff (1997)[1] refers to them as 'repetition aspectual coercion'

• Other authors have referred to them as 'repetitive' or 'iterative' readings…

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[1] Jackendoff, Ray. 1997. *The Architecture of the Language Faculty*. MIT Press.

(7)   **Generality of the Phenomenon**

Jackendoff (1997) notes that many other environments also induce these 'frequentative' readings of accomplishments and achievements.

a.   Bill clapped for an hour.   b.   Bill clapped until 3PM
c.   Bill kept / continued clapping.   d.   Bill stopped clapping.

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(8)   **A Competing Perspective Regarding (2) (Jackendoff 1997, van Geenhoven 2004)**

- The adverbial *for NP_time* can only modify 'unbounded' ('atelic') activities.

- Accomplishment verbs and achievement verbs do not denote 'unbounded' ('atelic') activities.

- However, these verbs can be understood (*a.k.a.* 'coerced') to denote unbounded repetitions of the events they typically denote.

- Under such 'coerced' frequentative readings, the verbs *do* denote 'unbounded' ('atelic') activities, and so are able to combine semantically with *for NP_time* (5)/(7).

- The anomaly of (2) is due to the fact that the events in question cannot be repeated.
   o   The same sandwich cannot be 'eaten' over and over again.
   o   The same flea cannot be 'discovered' over and over again.

- Thus, the licensing readings are not possible in (2), and so anomaly results from the combination with *for NP_time*

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(9)   **Some Supporting Evidence: Productivity of Frequentative Readings**

Frequentative readings are possible (though not obligatory) in sentences where a inherent activity verb combines with *for NP_time*. Usually such readings are facilitated when *NP_time* denotes an especially long span of time.

a.   John slept in this bed for an hour.   (one continuous sleeping)
b.   John slept in this bed for six months. (frequentative reading; several sleepings)

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(10)   **The Initial Challenge**

- How, exactly, do accomplishment and achievement verbs end up denoting 'repetitions' of the events they typically denote?

- Why does the sentence improve if the NP is a bare plural (3)?

(11) **Another Challenge: 'Partitive Readings'**

- Sentence (2a) is not so bad for me, as it can describe a scenario where Mary eats *some* of the sandwich, but doesn't finish it. Such a 'partitive' reading is very salient in sentences like the following.

  a.   Mary read a book for an hour.
  b.   Mary painted a still life for an hour.
  c.   Mary cleaned her office for a few minutes.

- These kinds of partitive readings are also reported by Jackendoff (1997).
- However, they aren't at all discussed by van Geenhoven (2004) [nor Krifka (1992)].

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2.   Some Puzzling Contrasts in Kalaallisut (West Greenlandic Eskimo)

(12) **A Curious Contrast**

As we saw, English allows sentences like (12a), under a frequentative reading. However, Kalaallisut does not permit (12b), which is directly equivalent to (12a). Rather, the sentence must contain an overt 'frequentative marker', as in (12c).

  a.   John went by for an hour.   (OK, if it's multiple passings)

  b.   * Nuka   ullaap tungaa tamaat   sanioqquppoq.
         Nuka   all morning   went.by

  c.   Nuka   ullaap tungaa tamaat   sanioqqut-**tar**-poq
        Nuka   all morning   went.by-REPEATEDLY
        Nuka went by repeatedly for the whole morning.

(13) **The Analytic Puzzle**

- If (12a) and its frequentative reading are due to general processes of 'coercion', why is the corresponding Kalaallisut sentence in (12b) not possible? Does Kalaallisut lack 'coersion'?

- If so, is it simply coincidental that Kalaallisut has an overt pluractional morpheme (12c) that achieves the same result that 'coercion' does in English?

- If so, do we then expect that there are languages lacking *both* coercion and overt pluractional morphemes, and in which there is no way to 'save' sentences like (12a)?

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(14)   **A Possible Solution (van Geenhoven 2004)**

- Perhaps 'frequentative' (pluractional) morphology is also responsible for the possibility of the English sentence (12a), and its observed 'frequentative reading'.

- This frequentative morphology is simply unpronounced (abstract) in English.

- Under this picture, English and Kalaallisut would use the same means to achieve the same effect; the only difference between the languages would lie in the phonology of the lexical items.

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(15)   **Another Curious Contrast**

English allows the sentence in (15a), which describes an event where different bombs explode at different times. However, Kalaallisut does not permit (15b), which is directly equivalent to (15a). Rather, the sentence must again contain an overt frequentative marker (15c).

a.   Bombs exploded for an hour.

b.   * Qaartartut   sivisuumik   qaarput.
          bombs   for.long.time   exploded
        Bombs exploded for a long time.

c.   Qaartartut   sivisuumik   qaa-**qattaar**-put
          bombs   for.long.time   exploded-REPEATEDLY
        Bombs exploded again and again for a long time.

Note:
Don't worry about the different suffixes in (15c) and (12c). There are a variety of pluractional suffixes in Kalaallisut, but they all behave identically with respect to the phenomena discussed here.

(16)   **The Analytic Puzzle**

- According to Krifka (1992) *et multia alia*, (15a) is possible in English simply because the subject is plural, rendering the VP 'non-quantized'.

- If this were so, then what would rule out the Kalaallisut sentence in (15b), which is directly parallel to English (15a)? Are there different licensing conditions on *sivisuumik* from its English translation?

- Why does adding a pluractional marker as in (15c) improve the sentence in (15b)?

(17)   **A Possible Solution (van Geenhoven 2004)**

- Perhaps 'frequentative' (pluractional) morphology is also responsible for the possibility of the English sentence (15a).

- Again, this morphology is simply unpronounced (abstract) in English.

- This would in turn suggest that the contrast between (2) and (3) in English lies in whether the verb is / can be marked with a (null) pluractional affix.

(18)   **An Interesting Parallel**

English allows both sentences (18a,b). However, (18a) seems to entail that the same number was dialed repeatedly, while (18b) requires that more than one number is dialed.

a.   Bill dialed a phone number for an hour.
b.   Bill dialed phone numbers for an hour.

Kalaallisut allows both (18c,d). As before, the pluractional affix in these sentences is obligatory. Moreover, (18c) entails that the same button was pushed over and over, while (18d) entails that more than one button was pushed.

c.   Minutsit arlallit   attasaasaq   tuur-**tar**-paa
     for.severalminutes   button   push-REPEATEDLY
     He pushed a button for several minutes.

d.   Minutsit arlallit   attasaasat   tuur-**tar**-paa
     for.severalminutes   buttons   push-REPEATEDLY
     He pushed buttons for several minutes.

(19)   **The Analytic Puzzle**

- Why does the English sentence in (18a) entail that the *same* phone number was dialed for an hour?

- Whatever answer is proposed, it must be something principled, since we see the *same* kind of phenomenon at work in the Kalaallisut data in (18c,d).

(20)   **One Last Puzzle in English**

While (20a,c) are anomalous, (20b,d) aren't.

a.   ? Mary ate a sandwich for an hour.
b.   Mary ate a sandwich *every five minutes* for an hour.

c.   ? John discovered a flea on his dog for six months.
d.   John discovered a flea on his dog *every day* for six months.

The felicity of (20b,d) is due to the fact that – unlike (20a,c) – they needn't entail that the *same* entity underwent the action multiple times.

(21)   **The Analytic Puzzle**
Why does an overt frequency adverb like those in (20b,d) improve (20a,c)?

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3.   The Analysis of Frequentative Morphology in Kalaallisut

To begin, van Geenhoven (2004) proposes the following semantics for the frequentative suffix *tar* in Kalalllisut.

- The semantics in (22) differs slightly from van Geenhoven's exact formulation, but it is a fair notational variant.
    - Note that (22) assumes Vs to be relations between entities and *times* (not events)

- van Geenhoven does not assume a *v*P. Thus, (22) is meant to apply only to intransitives.

- van Geenhoven (2004, 2005) provides similar analyses for other frequentative affixes in Kalaallisut. For our purposes, however, the differences between them can be ignored.

- The semantics in (22) bears clear similarities to Lasersohn's (1995) analysis of pluractionals exhibiting the 'distributed in time' reading.

(22)   **The Semantics of Frequentative (Pluractional) Morphology in Kalaallisut, Part 1**

[[tar]]   =

$[\lambda P_{<eit>} : [\lambda x : [\lambda t : \exists t' . t' \subseteq t \& P(x,t') \&$
$\forall t' . t' \subseteq t \& P(x,t') \rightarrow \exists t'' . t'' \subseteq t \& t'' > t' \lor t'' < t' \& P(x,t'') \&$
$\exists t''' . t''' \subseteq t \& t'' > t''' > t' \lor t'' < t''' < t' \& \neg P(x,t''')]]]$

There is at least one sub-time t' of t such that P(x,t') holds, and
for any such sub-time t', there is another sub-time t''
that either precedes or follows t' and where P(x,t'') holds, and
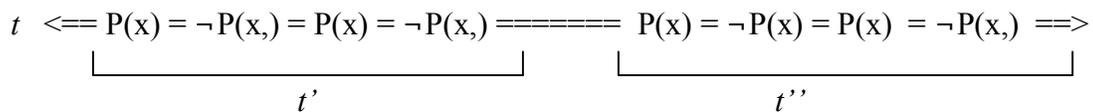*t' and t'' are separated by a sub-time t''' where P(x,t''') doesn't hold*

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(23)   **Key Observation: Frequentatively Marked Vs are Non-Quantized**

Given the semantics in (22), any verb marked with *tar* will *not* be 'quantized', where quantization is defined as in (23a).

a.   Quantization:
A V is 'quantized' if$_{df}$ $\forall$t. $\forall$x. [[VP]](x)(t) $\rightarrow$ $\neg\exists$t'. t' $\subset$ t & [[VP]](x)(t')

- Consider, for example, the time interval *t* below. This time interval *t* satisfies the requirements of frequentative *tar* in (22).

- However, *t* also has sub-times *t'* and *t''*, which also satisfy the requirements of *tar* in (22). Thus, *t* witnesses the falsity of (23a) for frequentatively marked verbs.

$$t \quad \Longleftarrow P(x) = \neg P(x,) = P(x) = \neg P(x,) ======== P(x) = \neg P(x) = P(x) = \neg P(x,) \Longrightarrow$$

$$\underbrace{\qquad\qquad\qquad}_{t'} \qquad\qquad \underbrace{\qquad\qquad\qquad}_{t''}$$

With the observation in (23) at hand, let us adopt the semantic hypothesis in (24)…

(24)   **The Semantics of *Ullaap Tungaa Tamaat* 'All Morning'**

[[ullaap tungaa tamaat]]   =

[λP$_{<eit>}$: P is not quantized . [λx : [λt : P(x,t) & the.whole.morning(t)]]]

- *Ullaap tungaa tamaat* 'all morning' contributes the information that action held throughout the entire morning.

- *Ullaap tungaa tamaat* 'all morning' carries a presupposition that its argument P is *not* quantized (Krifka 1992).

With the semantics in (24), we can now explain the contrast between (12b,c), repeated below.

(25)   **The Interaction Between Frequentative Morphology and *Ullaap Tungaa Tamaat***

a.   * Nuka   ullaap tungaa tamaat   sanioqquppoq.
         Nuka   all morning   went.by

b.   Nuka   ullaap tungaa tamaat   sanioqqut-**tar**-poq
         Nuka   all morning   went.by-REPEATEDLY
         Nuka went by repeatedly for the whole morning.

- The unmarked predicate *sanioqquppoq* 'go by' is an achievement, and thus is quantized.

- Due to the presence of *tar*, *sanioqqut-**tar**-poq* is *not* quantized (23).

- Thus, given its presuppositions (24), *ullaap tungaa tamaat* 'all morning' will only be able to semantically compose with the latter, and so only (25b) is well-formed.

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4.   Extending the Analysis to English

With the analysis in (25) at hand, van Geenhoven (2004) proposes that we extend it to English, in just the way that you'd expect…

(26)   **Frequentative Readings and *For NP$_{time}$* in English**

a.   <u>Hypothesis 1: Phonologically Null Frequentative (Pluractional) Operators</u>
         The English lexicon contains the following, phonologically null verbal affix.

         $[[\varnothing_{\text{FREQ}}]]$ =

         $[\lambda P_{<eit>} : [\lambda x : [\lambda t : \exists t' . t' \subseteq t \ \& \ P(x,t') \ \&$
              $\forall t' . t' \subseteq t \ \& \ V(x,t') \rightarrow \exists t'' . t'' \subseteq t \ \& \ t'' > t' \lor t'' < t' \ \& \ P(x,t'') \ \&$
                   $\exists t''' . t''' \subseteq t \ \& \ t'' > t''' > t' \lor t'' < t''' < t' \ \& \ \neg P(x,t''')]]]$

b.   <u>Hypothesis 2: Presupposition of *For NP$_{time}$*</u>
         The adverbial *for NP$_{time}$* presupposes that its argument is non-quantized

         $[[\textit{for NP}_{time}]]$ = $[\lambda P_{<eit>}: \text{P is not quantized} . [\lambda x : [\lambda t : P(x,t) \ \& \ [[\textit{NP}_{time}]](t)]]]$

(27)   **Obvious Prediction**

If an achievement or accomplishment V combines with *for NP$_{time}$*, a frequentative reading of the V will result!

a.   John clapped for an hour   (entails multiple clappings)

(28)   **Obvious Explanation**

- Sentence (27a) is structurally ambiguous, and could be assigned either LF below.

  a.   [John [[clapped] for an hour]]
  b.   [John [[clapped-$\varnothing_{FREQ}$] for an hour]]

- Since *clap* on its own is an achievement, it is quantized. Thus, it will not be in the domain of [[for an hour]], and so (28a) is uninterpretable.

- Since *clap-$\varnothing_{FREQ}$* is non-quantized (23), it *will* be in the domain of [[for an hour]], and so (28b) is interpretable. Due to the meaning of "$\varnothing_{FREQ}$", the resulting sentence gets a frequentative reading.

(29)   **Another Obvious Prediction**

- Frequentative readings are possible (though not obligatory) in sentences where an inherent activity verb combines with *for NP$_{time}$*.

- Both the sentences below in principle allow both a 'continuous' reading and a 'frequentative' one, though (28a) prefers a 'continuous' reading, while (28b) prefers the 'frequentative' one.

  a.   John slept in this bed for an hour.   (one continuous sleeping)
  b.   John slept in this bed for six months. (frequentative reading; several sleepings)

(30)   **Obvious Explanation**

- Sentences (29a,b) are structurally ambiguous and allow for either of the LFs below.

  a.   (i)   [John [[slept in this bed] for an hour]]
          (ii)   [John [[slept-$\varnothing_{FREQ}$ in this bed] for an hour]]

  b.   (i)   [John [[slept in this bed] for six months]]
          (ii)   [John [[slept-$\varnothing_{FREQ}$ in this bed] for six months]]

- Due to the meaning of *for an hour*, (30ai) will be true if there is *one* event of John sleeping in the bed, lasting one hour. (30bi) will be true if there is *one* event of John sleeping in the bed, lasting six months. Only the former is a 'typical' circumstance.

- Due to the meaning of -$\varnothing_{FREQ}$, (30aii) will be true if there are many separate events of John sleeping in that bed, distributed across an hour. (30bii) will be true if there are many separate vents of John sleeping in that bed, distributed across six months. Only the latter is a 'typical' circumstance.

5.   The Contrast Between Indefinites and Bare Plurals

(31)   **Burning Question**

- What accounts for the contrast between the English sentences in (31a) or the Kalaallisut sentences in (31b)?

- Why do (31ai) and (31bi) entail that the same phone number/button was dialed/pressed multiple times? Why does this not hold for (31aii) and (31bii)?

    a.   (i)   Bill dialed a phone number for an hour.
            (ii)   Bill dialed phone numbers for an hour.

    b.   (i)   Minutsit arlallit   attasaasaq   tuur-**tar**-paa
                   for.severalminutes   button   push-REPEATEDLY
                   He pushed a button for several minutes.

            (ii)   Minutsit arlallit   attasaasat   tuur-**tar**-paa
                   for.severalminutes   buttons   push-REPEATEDLY
                   He pushed buttons for several minutes.

(32)   **van Geenhoven's Analysis, Part 1**

Following van Geenhoven (1998), narrow scope indefinites and bare plurals can undergo 'semantic incorporation'.

- Such DPs can be interpreted as pure <et> predicates.

    a.   (i)   [[a phone number]]   =   [λx : phone.number(x)]
           (ii)   [[phone number]]   =   [λx : * phone.number(x)]

- Verbs can be interpreted as taking such predicates as arguments. That is, there is (say) a type-shifting operator INCORP with the following semantics.[2]

    b.   [[INCORP]]   =   [$\lambda Q_{<eeit>}$ [$\lambda P_{<et>}$: [λx : [λt : $\exists y$. Q(x,y,t) & P(y)]]]

- Via this type-shifting operator, a VP like *dial a phone number* can come to have the following interpretation.

    c.   [[[dial INCORP] a phone number]]   =

         [λx : [λt : $\exists y$. dial(x,y,t) & phone.number(y)]]

[2] Again, this isn't *exactly* van Geenhoven's (2004) proposal, but a fair notational variant of it.

(33)   **van Geenhoven's Analysis, Part 2**

Recall that *-tar* and $-\varnothing_{FREQ}$ only apply to intransitive Vs. For transitive verbs, there are two homophonous frequentative markers, *-tar$_P$* and $-\varnothing_{FREQP}$, with the following meaning.

[[*tar$_P$* / $-\varnothing_{FREQP}$]]   =

[$\lambda P_{<eeit>}$ [λy : [λx : [λt : $\exists t'$. $\exists y'$. $t' \subseteq t$ & $y' < y$ & $P(x,y',t')$ &
      $\forall t'$. $\forall y'$. $t' \subseteq t$ & $y' < y$ & $P(x,y', t')$ $\rightarrow$
            $\exists t''$. $\exists y''$. $t'' \subseteq t$ & $t'' > t'$ v $t'' < t'$ & $y'' < y$ & $P(x,y'', t'')$ &
                  $\exists t'''$. $t''' \subseteq t$ & $t'' > t''' > t'$ v $t'' < t''' < t'$ &
                        $\neg \exists y'''$. $y''' < y$ & $P(x,y''',t''')$]]]

There is at least one sub-time t' of t and one subpart y' of y such that P(x,y,t') holds, and
  for any such sub-time t' and subpart y', there is another sub-time t'' and subpart y''
    such that t'' either precedes or follows t' and P(x,y'',t'') holds, and
      t' and t'' are separated by a sub-time t''' where there is <u>no</u> subpart y''' of y
        such that P(x,y''',t''') holds.

t <===== P(x,y') ===== ¬∃y' . y' < y & P(x,y') ======= P(x,y'') =========>
                     _____/
                                      y
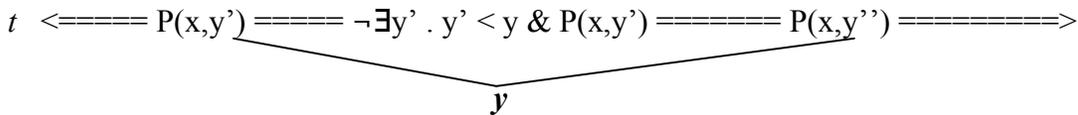
(34)   **Important Note:**   Again, a V marked with *tar$_P$* / $-\varnothing_{FREQP}$ will be non-quantized.

(35)   **The Analysis in Action, Part 1**

With the ingredients above, we can now provide an analysis of sentence (35a). It will be assumed to have the LF in (35b), and thus the truth conditions in (35c).

a.   Bill dialed phone numbers for an hour.
b.   [Bill [[[dialed-$\varnothing_{FREQP}$ INCORP] phone numbers] for an hour]].

c. $\exists y$. *phone.number(y) & $\exists t'$. $\exists y'$. $t' \subseteq t$ & $y' < y$ & dial(Bill,y',t') &
          $\forall t'$. $\forall y'$. $t' \subseteq t$ & $y' < y$ & dial(Bill,y', t') $\rightarrow$
              $\exists t''$. $\exists y''$. $t'' \subseteq t$ & $t'' > t'$ v $t'' < t'$ & $y'' < y$ & dial(Bill,y'', t'') &
                  $\exists t'''$. $t''' \subseteq t$ & $t'' > t''' > t'$ v $t'' < t''' < t'$ &
                        $\neg \exists y'''$. $y''' < y$ & Bill(x,y''',t'')]]]

   There is a group of phone numbers y such that
     there is a sub-time t' of t and a subgroup of phone numbers y' < y such that
       Bill dialed y' at t', and there is also another sub-time t'' of t and subgroup y''
         such that Bill dialed y'' at t'', and t' and t'' are separated by a time t''' where
           Bill <u>didn't</u> dial <u>any</u> phone numbers.

Clearly, the T-conditions in (35c) hold in scenarios where Bill dials a series of different phone numbers over the course of an hour.

(36)   **The Analysis in Action, Part 2**

Given the semantics in (33), a verb marked with tar_P / $-\varnothing_{FREQP}$ will <u>not</u> be able to take as argument a singular NP, which denotes only atoms.

- The LF in (36a) will be assigned the T-conditions in (36b).

   a.   [Bill [[[dialed-$\varnothing_{FREQP}$ INCORP] a phone number] for an hour]].

   b. $\exists y.$ phone.number(y) & $\exists t'$. $\exists y'$. $t' \subseteq t$ & $y' < y$ & dial(Bill,y',t') &
             $\forall t'$. $\forall y'$. $t' \subseteq t$ & $y' < y$ & dial(Bill,y', t') $\rightarrow$
                 $\exists t''$. $\exists y''$. $t'' \subseteq t$ & $t'' > t'$ v $t'' < t'$ & $y'' < y$ & dial(Bill,y'', t'') &
                     $\exists t'''$. $t''' \subseteq t$ & $t'' > t''' > t'$ v $t'' < t''' < t'$ &
                         $\neg \exists y'''$. $y''' < y$ & Bill(x,y''',t'')]]]

- The Problem:
  Since y is an atom, it does not have any (proper) subparts y', y'', or y'''. Thus, the T-conditions in (b) could never hold.

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(37)   **Question:**   What, then, about the sentence *Bill dialed a phone number for an hour.*
                          How is this sentence interpretable, and why does it entail that the *same* phone number was dialed for an hour?

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(38)   **van Geenhoven's Analysis, Part 3**

In addition to $-tar_P$ and $-\varnothing_{FREQP}$, there are two more homophonous frequentative markers, $-tar_{P2}$ and $-\varnothing_{FREQP2}$, which have the following interpretation.

$[[\ tar_{P2} / -\varnothing_{FREQP2}]]$ =

$[\ \lambda P_{<eeit>} [\ \lambda y : [\ \lambda x : [\ \lambda t : \exists t' . t' \subseteq t$ & $P(x,y,t')$ &
    $\forall t'$. $t' \subseteq t$ & $P(x,y, t') \rightarrow \exists t''$. $t'' \subseteq t$ & $t'' > t'$ v $t'' < t'$ & $P(x,y, t'')$ &
        $\exists t'''$. $t''' \subseteq t$ & $t'' > t''' > t'$ v $t'' < t''' < t'$ & $\neg P(x,y, ,t''')$]]]

There is at least one sub-time t' of t such that
   P(x,y, t') holds, and for any such sub-time t', there is another sub-time t''
       that either precedes or follows t' and where P(x,y,t'') holds, and
           t' and t'' are separated by a sub-time t''' where P(x,y,t''') <u>doesn't</u> hold

(39)   **The Analysis in Action, Part 3**

With the ingredients above, we can now provide an analysis of sentence (39a). It will be assumed to have the LF in (39b), and thus the truth conditions in (39c).

a.   Bill dialed a phone number for an hour.
b.   [Bill [[[dialed-$\varnothing_{FREQP2}$ INCORP] a phone number] for an hour]].

c. $\exists y.$ phone.number(y) & $\exists t'$. $t' \subseteq t$ & dial(Bill,y,t') &
          $\forall t'$. $t' \subseteq t$ & dial(Bill,y, t') $\rightarrow \exists t''$. $t'' \subseteq t$ & $t'' > t'$ v $t'' < t'$
             & dial(Bill,y, t'') &
                $\exists t'''$. $t''' \subseteq t$ & $t'' > t''' > t'$ v $t'' < t''' < t'$ & $\neg$dial(Bill,y, ,t''')

There is a phone number y such that there is at least one sub-time t' of t such that Bill dialed y at t', and for any such sub-time t', there is another sub-time t'' that either precedes or follows t' and where Bill dialed y at t'', and t' and t'' are separated by a sub-time t'' where Bill didn't dial y.

(40)   **Key Observation:**
According to the T-conditions in (39c), sentence (39a) will entail that Bill dialed the *same* phone number y at multiple times.

(41)   **A Summary of the Analysis**

a.   Bill dialed a phone number for an hour.   (same number multiple times)
b.   Bill dialed phone numbers for an hour.   (different phone numbers)

• The contrast between (41a,b) is not a matter of the 'scope' of the DP. In both cases, the DPs are interpreted with 'low scope', as type <et> arguments of a verb marked with a frequentative (pluractional) operator.

• Rather, the contrast concerns *which* frequentative operator can combine with the verbs in the two sentences.

   o The operator *tar_P* / -$\varnothing_{FREQP}$ serves to 'distribute' the parts of the verb's argument over multiple subevents. Thus, it can only mark verbs that take plural arguments, like (41b). The resulting T-conditions entail that different phone numbers were dialed at different times.

   o The operator *tar_P2* / -$\varnothing_{FREQP2}$ relates a single (atomic) argument to multiple subevents. Thus, it can mark verbs that take singular arguments, like (41a). The resulting T-conditions entail that the same number was dialed at different times.

(42)   **A Criticism of the Analysis: Accidental Homophony**

- The analysis requires us to hypothesize that there is a three-way ambiguity in Kalaallisut between *tar, tar$_P$, and tar$_{P2}$.*

- It also requires us to hypothesize a *coincidental* three-way ambiguity in English between -$\varnothing_{FREQ}$, -$\varnothing_{FREQP}$, and -$\varnothing_{FREQP2}$

- It would be preferable to relate these three meanings via some general rule, or type-shifting operator.

  - On occasion, van Geenhoven (2004) gives hints of such a view, but it is not explicitly spelled out in this paper…

- Note, though, that Lasersohn (1995) must posit a similar ambiguity between pluractional affixes, though this is somewhat occluded via his use of the term 'parameter'.

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(43)   **A General Puzzle Coming into View**
What, exactly, is going on with the 'polysemy' of pluractional markers? Are they lexically ambiguous? Are they context dependent? Are they 'underspecified'?

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(44)   **van Geenhoven's Critique of Lasersohn (1995)**

- van Geenhoven (2004: 174) claims that in order to properly capture the meaning of frequentative affixes in Kalaallisut, we need for the multiple 'events' to be distributed both in terms of the *time* and in terms of their *participants*.

  - Distribution only in time will (allegedly) not allow us to capture the truth conditions of sentences like (31bii), since the butting-pushings *must* be understood to involve different buttons.

  - Distribution only in participants will (allegedly) not allow us to capture the truth-conditions of (31bii) either, since the button-pushings *must* be understood to occur at different times.

- However, in Lasersohn's (1995) framework for pluractionals, one cannot simultaneously have distribution in times *and* participants, since such distributions represent 'different settings' of the same 'parameter' (*i.e.* 'distributivity').

(45)   **A Counter-Response**

o   It isn't obvious that Lasersohn (1995) *would need* to explicitly represent participant distributivity in the T-conditions of sentences like (31bii).

o   Given her background assumptions, van Geenhoven (2004) *does* need to explicitly represent the participant distributivity.
  o   Ultimately, this is because she views transitive verbs as being of type <eeit>, and thus frequentative affixes as taking functions of this type as argument.

o   In Lasersohn's (1995) system, however, a sentence like (31bii) can have the LF in (45a), and thus the T-conditions in (45b).

a.   [He   [v [pushed-PA$_{\text{time-distributive}}$ [THM buttons]]]]

b. $\exists$e : |e| > n . $\exists$y . *buttons(y) & *Agent(e, he) & *Theme(e, y) &
          $\forall$e' . e' $\leq$ e & atom(e') $\rightarrow$ push(e')
            & $\forall$e', e''. e', e'' $\leq$ e & atom(e') & atom(e'') $\rightarrow$ ¬ T(e') ° T(e'')]]

          There is a plural event e, whose cumulative agent is 'he', and whose cumulative
              theme is a group of buttons, and every atomic subevent e' of e is
                an event of pushing, and any two such atomic subevents have
                      different times.

o   These T-conditions above also hold in scenarios where different individual buttons are pushed at different times.

o   Finally, note that sentence (31bi) would have the LF in (45c) below, and thus the T-conditions in (45d).

c.   [He   [v [pushed-PA$_{\text{time-distributive}}$ [THM a button]]]]

d. $\exists$e : |e| > n . $\exists$y . button(y) & *Agent(e, he) & *Theme(e, y) &
          $\forall$e' . e' $\leq$ e & atom(e') $\rightarrow$ push(e')
            & $\forall$e', e''. e', e'' $\leq$ e & atom(e') & atom(e'') $\rightarrow$ ¬ T(e') ° T(e'')]]

          There is a plural event e, whose cumulative agent is 'he', and whose cumulative
              theme is a single (atomic) button, and every atomic subevent e' of e is
                an event of pushing, and any two such atomic subevents have
                      different times.

o   These T-conditions only hold in scenarios where the *same* button was pushed at different times.

o   Thus, far from being unable to explain the contrast in (31b) [and (31a)], Lasersohn (1995) would seem to offer an analysis that circumvents the problem in (42).

6.   **The Core Contrast Re-Examined**

(45)   **The Solution to Our Initial Puzzle**

    a.   <u>The Puzzle:</u> Why is sentence (i) anomalous? Why is sentence (ii) just fine?

        (i)   ? Mary ate a sandwich for an hour.
        (ii)   Mary ate sandwiches for an hour.

    b.   <u>The Explanation:</u>

        o   Since *eat* is an accomplishment, it can only combine with *for an hour* if it is marked with a frequentative affix.

        o   Since the verb in (45ai) takes a singular NP argument, the verb could only be marked with -$\varnothing_{FREQP2}$.
            • Such a sentence, however, would entail that the same sandwich was eaten repeatedly, which is inconsistent with our world knowledge.

        o   Since the verb in (45aii) takes a plural NP argument, the verb could be marked with -$\varnothing_{FREQP}$.
            • Such a sentence would entail that multiple sandwiches were eaten at different times, which is consistent with our world knowledge.

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(46)   **Another, Quick Point of Criticism**

If *for NP_{time}* merely requires that its VP argument be non-quantized (26b), why do we even need a pluractional morpheme in (45aii)? After all, the bare VP *eat sandwiches* is not quantized?...

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(46)   **One Final Puzzle**

    a.   <u>The Puzzle</u>   Why is the sentence below perfectly OK, and able to describe events of eating *multiple* sandwiches?

        (i)   Mary ate a sandwich *every five minutes* for an hour.

    b.   <u>The Explanation</u>
        Unlike (phonologically null) frequentative affixes, frequency adverbs like *every five minutes* can take scope over the entire VP, and thus over the singular indefinite. Thus, sentence (i) above can have the LF below.

        (ii)   [for an hour [every five minutes [a sandwich [Mary ate *t*] …]

7.   Conclusion: A Brief Comparison with Kratzer (2008)

Just about all the facts from Section 1 follow from the system put forth by Kratzer (2008).

- The possibility of 'frequentative' readings follows simply from the fact that *all* verbs are inherently cumulative. We needn't actually posit any phonologically null 'pluractional' morphology, nor stipulate that such morphemes cannot scope above indefinites.

- The contrast between (18a,b), repeated below, follows from the assumption that:

    - All verbs are inherently cumulative.
    - All thematic relations are inherently cumulative
    - Cumulative '*' operators cannot just be freely inserted in the syntax.

(47)   **Frequentative Readings and Plurality**

    a.   Bill dialed a phone number for an hour.   (same phone number over and over)
    b.   Bill dialed phone numbers for an hour.   (different phone numbers)

(48)   **Some Puzzles for the Kratzer (2008) System**

    a.   The Need for Overt Pluractional Affixes in Kalaallisut

        - If verbs are inherently cumulative, why are sentences like (12b) and (15b) not possible in Kalaallisut?

        - Kratzer (2008) proposes that nouns in English are dominated by a kind of phonologically null classifier, which limits their extensions to atoms…
            - Is a verbal equivalent of this present in Kalaallisut?

    b.   Pluractionality and Cumulative Readings

        - In the Kratzer (2008) system, frequentative readings and cumulative readings are accomplished via the same devices:
            - The inherent cumulativity of *v* and V
            - Cumulative '*' operators inserted in the syntax.

        - Since Kalallisut verbs cannot receive frequentative readings without overt pluractionals, do we then also predict that such verbs should not allow for cumulative readings without such morphology?

(49)   **One Last Observation: Pluractionals and Events**

- van Geenhoven (2004: 165) states that she is intentionally pursuing an analysis of frequentative (pluractional) morphology that does not make use of events.

- Her stated reasons for doing so, however, seem to be little more than 'because I can'

- Note, however, the costs associated with this avoidance of event semantics:

    o The complexity of the semantic formulae in Sections 4 and 5

    o The need to relate verbs to their arguments directly, without the mediation of (Neo-Davidsonian) thematic-role assigning heads…

        - Which ultimately requires us to build into the semantics of pluractional markers the ways in which the argument of the verb relates to the various 'sub-times' over which the verb holds ((33) and (38))

- By comparison, with the tools of Neo-Davidsonian event semantics, Lasersohn (1995) is able to craft a comparatively simple semantics for pluractional affixes.

    o As we noted (and as Lasersohn (1995) seems not to fully recognize), such an event-based semantics needn't appeal to *lexical ambiguity* to capture the different kinds of 'distributivity' that pluractional verbs can be construed with

(50)   **The Moral of This Story**

- Pluractionals are *hard* without events!
- Thus, pluractionals really do give independent evidence for event semantics…