Event-Related Readings of Adnominal Quantifiers: Krifka (1990) and Barker (1999)

As originally brought to popular attention by Krifka (1990), sentences like those in (1) are ambiguous in a very interesting way…

(1) **The Ambiguity of Interest**

a. Four thousand ships passed through the lock last year.
b. The library lent out 23,000 books in 1987.
c. Sixty tons of radioactive waste we transported through the lock last year.
d. 12,000 persons walk through the turnstile yesterday.
e. This airline transported 13,000 passengers last year.

f. Object-Related Reading: The numeral counts objects (duh)
- Under this reading, (1b) entails that the library has 23,000 books

g. Event-Related Reading: The numeral counts something else… *events?*
- Under this reading, (1b) is consistent with the library having < 23,000 books
- *However, under this reading there still must be 23,000 lending events.*

Three key works on this phenomenon are Krifka (1990) – the *locus classicus* – Barker (1999) and Doetjes & Honcoop (1997).

- The analysis of Doetjes & Honcoop (1997) is quite similar to that of Barker (1999), but seems to retain many of the shortcomings of Krifka (1990).

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1. "Four Thousand Ships Passed Through the Lock": Krifka (1990)

1.1 Some Possible but Rejected Lines of Analysis

Krifka (1990) begins by considering and then rejecting two intuitive analyses of the puzzle in (1)

(2) **First Analysis: Criterion of Identity for the NP (Gupta 1980)**

a. The Analysis (For Sentence (1e))

- Some nouns, like "passenger", are 'spatio-temporally bound'.
  (e.g., I'm no longer a passenger once I've gotten off the plane.)

- Consequently, it's reasonable to think that the same individual can perhaps be counted as different 'passengers' on different occasions of travel.

b. The Problem (Krifka 1990):
This seems to work for sentence (1e), but it's hard to generalize to the other cases.
  - So, for the noun "ship", the same *what* can count as two different ships?

(3) **Second Analysis: Counting Stages (Carlson 1982, Barker 1999)**

a. Background Ontology:

(i) Individual entities are made up of different (spatio-temporal) *stages*.

(ii) Eventive/episodic predicates like "pass" apply to *stages* directly, not individuals.

1. [[This ship passed through the lock]] = T *iff*

$\exists$s . s $\leq$ this.ship & pass.through.the.lock(s)

b. The Proposal:
Perhaps, under the 'event-related reading' of (1a), we aren't counting individual ships, but *ship stages*.

(i) Note that a ship stage *s* passes through the lock *iff* there is an event of a ship passing through the lock…

(ii) Thus, if there are 4000 events of a ship passing through the lock, it follows that there will be 4000 ship *stages* passing through the lock.

(iii) But, since two ship stages can belong to the same ship, in neither case does it follow that there are 4000 distinct ships!

c. The Problem (Krifka 1990):
Actually, contrary to the claim in (3bii), if there are 4000 events of a ship passing through the lock, there are *a lot more than* 4000 ship *stages* that passed through the lock.

- Note that if (i) s_1 is a ship-stage that passed through the lock, and (ii) s_2 is a ship-stage that passed through the lock, then (ii) $s_1+ s_2$ is a ship-stage that passed through the lock.

- Therefore, if the event-related reading of (1) is obtained by counting ship-stages, we would seem to *wrongly* predict that the sentence below can be given a true 'event-related reading' in a scenario where there are 4000 lock-passings.

(i) 6000 ships passed through the lock last year.

Note: Barker (1999) has an answer to this objection in (3c), which we will see in a moment…

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

Krifka (1990) puts forth two different analyses of the event-related readings in (1). While he seems to prefer (4b), he doesn't really provide any arguments for one over the other.

a. First Analysis: Ambiguity in the Numerals

Numerals can optionally receive an interpretation whereby they end up creating special 'measure functions' out of the denotation of the NP and the VP.

- *E.g.*, The measure function obtained for (1a) ends up mapping an event *e* to the numeral *n* if *n* ships passed through the lock in *e*.

b. Second Analysis: A Special Null Determiner

Numerically modified NPs like "4000 ships" can be complement to a special null D(eterminer). This D takes as argument the NP and the VP, and constructs from the VP a special measure function whereby the NP is a possible value.

- *E.g.*, The measure function obtained for (1a) ends up mapping an event *e* to the value '4000 ships', if *e* is made up of 4000 events of a ship passing a lock.

1.2 Some Background on Measure Functions

(5) **Definition of a 'Measure Function'**

A function from concrete entities (things) to abstract entities (numbers) such that certain concrete relations between the concrete entities correspond to mathematical relations between the abstract entities

Example: Celsius — Celsius (C) is a mapping from entities to numbers such that:
x 'is cooler than' y *iff* C(x) < C(y)

(6) **Definition of an 'Extensive Measure Function'**

A measure function *m* is 'extensive' if it satisfies the following condition:

a. $m(x+y) = m(x) + m(y)$

Example: Weight — Pounds(Dave+Bill) = Pounds(Dave) + Pounds(Bill)

(7) **Measure Functions in Semantics**

We can use these measure functions to give a semantics for words like *ton*

a. [[ton]] = [$\lambda n_n : \lambda P_{<et>} : \lambda x_e$: P(x) & ton(x) = n]

b. Illustration:

[[[[60 tons] (of) radioactive waste]]] = [λx_e : radioactive.waste(x) & ton(x) = 60]
x is radioactive waste, and the value of x in tons is 60

(8) **Noun Phrases as Measure Functions (?!)**

Krifka (1990) proposes that we also model the semantics of NPs using measure functions.

a. [[ship]] = [$\lambda n_n : \lambda x_e$: ship(x) = n]

b. Illustration: [[4000 ships]] = [λx_e : ship(x) = 4000]
the value of x in 'ships' is 4000

c. Important Note:
Under this semantics, NPs like *ship* are extensive measure functions

- ship(Minnow) = 1
- ship(Titanic+Enterprise) = 2
- ship(Minnow+Titanic+Enterprise) = 3

1.3 Deriving the Object-Related Reading

(9) **A Crucial Ingredient: A Null Existential Determiner**

[[D]] = [$\lambda Q_{<et>} : \lambda R_{<e,\varepsilon t>} : \lambda e : \exists x$. R(e)(x) & Q(x)]

(10) **Deriving the Object Related Reading**

a. The LF: [[D [4000 ships]] [passed through the lock]]

b. The Truth-Conditions:

$\exists$e . $\exists$x . *pass-through-the-lock(e) & *Ag(e) = x & ship(x) = 4000

There is a plural event e of passing through the lock, the cumulative agent of e is x, and x's value in ships is 4000 (i.e., x is a group of 4000 ships)

1.4 Deriving the Event-Related Reading, First Version

(11) **The Key Idea to Krifka's First Approach to the Event-Related Reading**

Numerals can be interpreted as higher type operators, which combine the meaning of the NP and the VP to obtain a special 'measure function' on events.

(12) **First Ingredient: The Definition of an Iterative Event**

An event *e* is 'iterative' with respect to a relation *R* between entities and events *iff* a single entity x bears the relation *R* to two different subevents *e'* and *e''* of *e*

(13) **Second Ingredient: 'Object Induced Event Measure Function' (OEM)**

If *f* is a measure function on entities (*e.g.*, [λn_n : λx_e : ship(x) = n]), and *R* is a relation between entities and events (*e.g.*, [λx_e : λe : *pass-through-lock(e) & *Ag(e) = x]), then

OEM(*f* , *R*) is the 'smallest' measure function on entities such that:

a. If *e* is not iterative with respect to *R*, then OEM(*f* , *R*)(*e*) = *n* *iff*
$\exists x . f(n)(x) \ \& \ R(x)(e)$

b. Otherwise, if *e* and *e*' do not overlap, then
$\text{OEM}(f, R)(e+e') = \text{OEM}(f, R)(e) + \text{OEM}(f, R)(e')$

Say WHAT?!?...
Don't worry, this will make a bit more sense when you see how it's used…

(14) **Third Ingredient: A Special Semantics for Numerals**

If *num* is a numeral with the denotation *n*, then another possible interpretation of *num* is as follows:

$[[\ num\ ]] = [\ \lambda Q_{<n,\, et>} : \lambda R_{<e,\varepsilon t>} : \lambda e : \text{OEM}(\ Q, R\ )(e) = n\ ]$

<u>Illustration:</u> $[[\ 4000\ ]] = [\ \lambda Q_{<n,\, et>} : \lambda R_{<e,\varepsilon t>} : \lambda e : \text{OEM}(\ Q, R\ )(e) = 4000\ ]$

Now let's see how these ingredients get baked into a delicious 'Event-Related Reading pie'…

(15) **A Toy Scenario, Because I Can't Draw 4000 Events on a Handout**

Passings Through the Lock	Agents	
e_1	$ship_1$	
e_2	$ship_2$	
e_3	$ship_3$	
e_4	$ship_1$	} repeated ships
e_5	$ship_2$	

(16) **A Key Observation**

a. The Proposition:

OEM ([[ship]] , [[pass through the lock]])(e_1+ e_2+ e_3+ e_4+ e_5) = 5

b. The Proof:

(i) Note that none of e_1, … , e_5 are 'iterative' with respect to [[pass through the lock]]. Note, also that none of e_1, … , e_5 overlap.

(ii) Note that for all of $e \in \{ e_1, \dots , e_5 \}$, it is the case that:
∃x . [[ship]](1)(x) & [[pass … lock]](x)(e)

(iii) Therefore, given (13a), it follows that for all $e \in \{ e_1, \dots , e_5 \}$:

OEM ([[ship]] , [[pass through the lock]])(e) = 1

(iv) Therefore, given (13b), it follows that

OEM ([[ship]] , [[pass through the lock]])(e_1+ e_2+ e_3+ e_4+ e_5) = 5

(17) **Deriving the Event-Related Reading**

a. LF: [[5 ships] [passed through the lock]]

b. T-Conditions (Given (14)) : ∃e : OEM([[ship]] , [[pass … lock]])(e) = 5

c. Crucial Observation:
- We just proved in (16) that the T-conditions in (17b) hold in scenario (15)
- Thus, our semantics predicts that "Five ships passed through the lock" is *true* in scenario (15).
- Thus, our semantics predicts the 'event related reading' of (17a), whereby it seems to count the *events*, rather than the ships themselves..

In addition, it's worth noting that we are able to predict the event-related reading of sentences like (1c), containing mass nouns…

(18) **The Scenario with Radioactive Waste**

Passings Through the Lock	Agents		Weight of Waste
e_1	$waste_1$		12 tons
e_2	$waste_2$		12 tons
e_3	$waste_3$		12 tons
e_4	$waste_1$	repeated waste	12 tons
e_5	$waste_2$		12 tons

(19) **A Key Observation**

a. The Proposition:

OEM ([[tons of r.w]] , [[pass through the lock]])(e_1+ e_2+ e_3+ e_4+ e_5) = 60

b. The Proof:

(i) Note that none of e_1, … , e_5 are 'iterative' with respect to [[pass through the lock]]. Note, also that none of e_1, … , e_5 overlap.

(ii) Note that for all of $e \in \{ e_1, \dots, e_5 \}$, it is the case that:
∃x . [[tons of r.w]](**12**)(x) & [[pass … lock]](x)(e)

(iii) Therefore, given (13a), it follows that for all $e \in \{ e_1, \dots, e_5 \}$:

OEM ([[tons of r.w.]] , [[pass through the lock]])(e) = 12

(iv) Therefore, given (13b), it follows that

OEM ([[tons of r.w.]] , [[pass through the lock]])(e_1+ e_2+ e_3+ e_4+ e_5) = 60

(20) **Deriving the Event-Related Reading**

a. LF: [[60 tons of radioactive waste] [passed through the lock]]

b. T-Conditions (Given (14)) :

∃e . OEM([[tons of r.w.]] , [[pass … lock]])(e) = 60

c. Crucial Observation:
We just proved in (19) that the T-conditions in (20b) hold in scenario (18)

1.5 Deriving the Event-Related Reading, Second Version

(21) **The Key Idea to Krifka's Second Approach to the Event-Related Reading**

There is a special null determiner *D* that constructs from the VP a measure function that maps events to NP denotations. The NP argument of the *D* is set as the value of that function.

(22) **First Ingredient: NP Denotations as Degrees**
We can define a sum operation on NP denotations, which will ultimately allow us to treat them as 'degrees', as values of measure functions.

a. Sum Operation on NP Denotations

$[[\text{NP}_1]] + [[\text{NP}_2]] \quad =$

$[\ \lambda x : \exists y, z \,.\, [[\text{NP}_1]](y) = T \ \&\ [[\text{NP}_2]](z) = T \text{ and } y \neq z \ \&\ x = y{+}z\ ]$

b. Illustration:
(i) [[boy]] = { Dave, Bill, Tom }
(ii) [[girl]] = { Mary, Sue, Jenn }

(iii) [[boy]] + [[girl]] = { Dave+Mary, Dave+Sue, Dave +Jenn, Bill+Mary, Bill+Sue, Bill+Jenn, Tom+Mary, Tom+Sue, Tom+Jenn }

c. Key Result: The Sum of Numerically Modified NPs
If *f* is an extensive measure function from entities to numerals, then:

$[\ \lambda x : f(x) = n\ ] + [\ \lambda x : f(x) = m\ ] \quad = \quad [\ \lambda x : f(x) = n + m\ ]$

Illustration: $[\ \lambda x : \text{ship}(x) = 2\ ] + [\ \lambda x : \text{ship}(x) = 3\ ] \ = \ [\ \lambda x : \text{ship}(x) = 5\ ]$

(23) **Second Ingredient: 'Object Induced Event Measure Relation' (OEMR)**

If *R* is a relation between entities and events (*i.e.,* a VP denotation) then

OEMR(*R*) is the 'smallest' relation between events and <et> predicates such that:

a. If *e* is not iterative with respect to *R*, then OEMR(*R*)(*e*)(*P*) *iff* $\exists x \,.\, P(x) \ \&\ R(x)(e)$

b. Otherwise, if *e* and *e'* do not overlap, then if (i) OEMR(*R*)(*e*)(*P*) , and (ii) OEMR(*R*)(*e'*)(*Q*), then (iii) OEMR(*R*)(*e*+*e'*)(*P*+*Q*)

(24) **Third Ingredient: A Special Null Determiner**

There is a null determiner *D* with the following semantics:

[[*D*]] = [$\lambda P_{<et>}$: $\lambda R_{<e,\varepsilon t>}$: λe : OEMR(R)(e)(P)]

Alright, let's see how these ingredients come together to get our desired result…

(25) **A Toy Scenario, Because I Can't Draw 4000 Events on a Handout**

Passings Through the Lock	Agents	
e_1	$ship_1$	
e_2	$ship_2$	
e_3	$ship_3$	
e_4	$ship_1$	} repeated ships
e_5	$ship_2$	

(26) **A Key Observation**

a. The Proposition:

OEMR ([[pass through the lock]])($e_1 + e_2 + e_3 + e_4 + e_5$) ([[five ships]])

b. The Proof:

(i) Note that none of e_1, … , e_5 are 'iterative' with respect to [[pass through the lock]]. Note, also that none of e_1, … , e_5 overlap.

(ii) Note that for all of $e \in \{ e_1, \ldots, e_5 \}$, it is the case that:
∃x . [λy : ship(y) = 1](x) & [[pass … lock]](x)(e)

(iii) Therefore, given (23a), it follows that for all $e \in \{ e_1, \ldots, e_5 \}$:

OEMR ([[pass through the lock]]) (*e*) ([λy : ship(y) = 1])

(iv) Therefore, given (23b) and (22c), it follows that

OEMR ([[pass through the lock]])($e_1 + e_2 + e_3 + e_4 + e_5$) ([λy : ship(y) = 5])

(v) Therefore, given our semantics for NPs, it follows that

OEMR ([[pass through the lock]])($e_1 + e_2 + e_3 + e_4 + e_5$) ([[five ships]])

(27) **Deriving the Event-Related Reading**

a. LF: [[D [5 ships]] [passed through the lock]]

b. T-Conditions (Given (24)) :
∃e . OEMR([[passed through the lock]])(e)([[five ships]])

c. Crucial Observation:

- We just proved in (26) that the T-conditions in (27b) hold in scenario (25)
- Thus, our semantics predicts that "Five ships passed through the lock" is *true* in scenario (25).
- Thus, our semantics predicts the 'event related reading' of (27a), whereby it seems to count the *events*, rather than the ships themselves.

(28) **Exercise for the Reader**

Krifka's system in (22)-(27) again correctly extends to cases with mass nouns, like (28a), whereby it can be true in scenarios like (28b).

a. Sixty tons of radioactive waste we transported through the lock last year.

b. Scenario Verifying 'Event Related' Reading

Passings Through the Lock	Agents	Weight of Waste
e_1	$waste_1$	12 tons
e_2	$waste_2$	12 tons
e_3	$waste_3$	12 tons
e_4	$waste_1$ } repeated waste	12 tons
e_5	$waste_2$ } repeated waste	12 tons

1.6 Some Discussion of Krifka's (1990) Analysis

(29) **A Potential Problem (Barker 1999)**

- Krifka's analysis does not tie the possibility of event-related readings to any external pragmatic or discourse-related factors.
- Thus, as shown above, we seem to incorrectly predict that a sentence like (29a) should have an event-related reading that is true in scenario (29b).

a. Two people sat down.

b. Dave sat down. Then he got up. Then he sat down again.

2. "Individuation and Quantification": Barker (1999)

(30) **The Core of Barker's (1999) Proposal**

- Under the so-called 'event related reading' of the sentences in (1), the numeral does not actually count *events*.
- However, neither does the numeral quantify over entire objects.
- Rather, the numeral indeed quantifies over *stages* of various ships.
  - o While Krifka (1990) notes a potential problem for such an approach (3c), Barker (1999) has a solution to that problem.

Note that Barker (1999) does not provide a full, compositional account…
Instead, he offers some general suggestions as to what iss going on with the data in (1)…

(31) **Barker's Empirical Argument Against Krifka (1990)**

- Under Krifka's semantics, the denotation of (31a) will hold of a plurality of 4000 different ships.
- Therefore, under Krifka's semantics, the denotation of (31a) should be the same as the denotation of (31b).
- Therefore, Krifka's semantics would predict that the sentences in (31c) should be equivalent.
  - o Thus, (31cii) is wrongly predicted to have an event-related reading like (31ci)

a. [four thousand ships]

b. [four thousand different ships]

c. (i) Four thousand ships passed through the lock.
(ii) Four thousand different ships passed through the lock.

(32) **A Problem with This Argument**
I'm skeptical of the conclusion in the second bullet in (31).

- "Different" most likely has a complex semantics whereby (31b) is not equivalent to (31a), even it's the case that (31a) necessarily denotes 4,000 separate ships…

2.1 Barker's Analysis of the So-Called 'Event Related Reading'

(33) **Barker's First Inspiration: Nunberg's (1984) Discussion of Identity**

"When we say that *a* and *b* are 'the same', we simply mean that… the differences between them are not material to the point we are after…"

(34) **Barker's Second Inspiration: Gupta's (1980) Theory of NP Semantics**

Natural language predicates are paired in the lexicon with two different 'criteria'

a. Criterion of Application:
The conditions determining when an entity *x* falls in the extension of the NP

b. Criterion on Identity:
The conditions determining when *x, y* falling in the extension of the NP are 'the same' or not.

c. Illustration: 'River'

(i) Criterion of Application: A large body of flowing water

(ii) Criterion of Identity:
- *x* and *y* are the same river if they occupy the same topography.
- *The identity of the water in x and y is not relevant for their identity*

(35) **Barker's Key Proposal**
Nouns of natural language have a lexically fixed Criterion of Application, but their Criterion of Identity is contextually determined.

a. Illustration: 'Ship'

(i) Criterion of Application: A large water-going vessel.

(ii) Criterion of Identity: (unspecified)

b. Possible Criteria of Identity:

(i) *Object-Identity:* Long-term self-identity in the real world

(ii) *Stage-Identity:* Stage-identity in the real world

c. Key Observation:
If the word 'ship' has 'Stage Identity' as its Identity Criterion, then two different 'ships' might just be two different *stages* of the *same* larger entity.

(36) **The Analysis of the (So-Called) 'Event Related Reading'**

- Given (35), the sentence in (36a) should permit a reading akin to (36b).
- The T-conditions in (36b) will hold in a scenario like (36c).
- Thus, we predict that (36a) needn't always entail the existence of 4000 distinct ships (only 4000 distinct ship *stages*)

a. 4000 ships passed through the lock.
b. 4000 ship *stages* passed through the lock.

c. Verifying Scenario:

(i) *The Make-Up of the Ships*

$ship_1$ = … $stage_{1a}$, $stage_{1b}$, $stage_{1c}$, …
$ship_2$ = … $stage_{2a}$, $stage_{2b}$, $stage_{2c}$, …
…
$ship_{3997}$ = … $stage_{3997a}$, $stage_{3997b}$, $stage_{3997c}$, …

(ii)

Events of Passing through the Lock	Agent
e_1	$stage_{1a}$
e_2	$stage_{2a}$
…	
e_{3997}	$stage_{3997a}$
e_{3998}	$stage_{3997b}$
e_{3999}	$stage_{3997c}$
e_{4000}	$stage_{1b}$

(37) **Krifka's (1990) Challenge Against This Proposal (3c)**

Given that '$stage_{1a}$+$stage_{2b}$' is *also* a stage of a ship which passed through the lock, how do we rule out the truth of (37a) in the scenario in (36c)?

a. 4001 ships passed through the lock.

(38) **Barker's (1999) Solution**

It's a general principle of counting that we *never* separately count an object *x* and its subparts.

- If asked to count the objects in a room, we won't count the table, and then the table-top and then its legs.

- Thus, if we were ever to count '$stage_{1a}$+$stage_{2b}$' as a ship-stage that passed through the lock, we wouldn't *also* count '$stage_{1a}$' and '$stage_{2b}$'

2.2 Solutions to the Problems Facing Krifka (1990)

(39) **The Conditions on 'Stage Identity'**

a. Question: When is it possible for the Criterion of Identity for an NP to be 'Stage Identity' (35bii)?

b. Barker's Answer:

- The Criterion of Identity for NP should fail to identify *x* and *y* only if the context is one where *x* and *y* would be difficult for a human being to identify as 'the same thing'.

- Thus, 'Stage Identity' – which fails to identify two stages of the same object – will only be possible in contexts where *it's hard to identify stages of the same ship!*
  - There are too many distinct individuals to keep track of
  - The individuals are so similar that they are difficult to distinguish
  - The events are very widespread in time

Barker (1999) claims that the assumption in (39) correctly explains the facts in (40), which are a challenge for Krifka's (1990) account.

(40) **The Limits of 'Event-Related Readings'**

The sentence in (40a) cannot be easily given an 'event-related reading' whereby it is true in the scenario in (40b).

a. Two people sat down.
b. Dave sat down. Then he got up. Then he sat down again.

(41) **The Semantic Effect of 'Different'**

Barker also claims that his account can explain the inability for sentence (41a) to receive an 'event related reading'.

- First, let's suppose the modifier 'different' requires that the Criterion of Identity be 'Object Identity' (35bi).

- Consequently, in (41a) will not allow a reading where *ships* has 'Stage Identity' (35bii), and so will not be equivalent to (41b).

a. 4000 different ships passed through the lock last year.

b. 4000 ship *stages* passed through the lock last year.

2.3 Some Potential Problems for Barker's (1999) Approach

While Barker's (1999) approach has many empirical advantages – and might also be conceptually more natural – it faces a few empirical challenges of its own…

(42) **Event-Related Readings with Mass Nouns**

Recall that sentences like (42a) also allow for 'event related' readings, where they are true in scenarios like (42b)

a. 60 tons of radioactive wasted passed through the lock last year.

b. Scenario Verifying 'Event Related' Reading

Passings Through the Lock		Agents	Weight of Waste
e_1		waste_1	12 tons
e_2		waste_2	12 tons
e_3		waste_3	12 tons
e_4	repeated waste	waste_1	12 tons
e_5		waste_2	12 tons

c. The Challenge for Barker (1999)

- In examples like (42a), the numeral is combining with a measure phrase, rather than directly with an NP.
- How, then, do we obtain the truth of (42a) in (42b), exactly? By relaxing the identity criterion on *waste*? On *tons*?
- Note that we wouldn't want to assign (42a) truth-conditions like those in (42d), since those *wouldn't* hold in scenario (42b)

d. Sixty stages/events of *a ton of toxic waste* passed through the lock.

(43) **An Empirical Question, Part 1**

Consider the scenario in (43a) below. Can sentence (43b) be understood as true in this scenario?

a. The Scenario:
We're interested in visitation to Disneyworld last year. We learn that 30,000 tickets to Disneyworld were redeemed.

b. The Sentence: 30,000 people went to Disneyworld last year.

(44) **An Empirical Question, Part 2**

Now consider the extension of the scenario in (44a). Can (44b) be understood as true in *that* scenario?

a. The Scenario:
Interestingly, with each redeemed ticket, there's a little survey asking whether the person has traveled to Disneyworld earlier in the year. 16,000 of those surveys indicate that, yes, the person redeeming the ticket had also visited earlier in the year.

b. The Sentence:
Most of the 30,000 people who visited Disneyworld last year visited multiple times.

(45) **The Potential Problem**

If sentence (44b) *can* be understood as true in scenario (44a), this poses a challenge to Barker's (1999) account. (Also, it's independently a difficult puzzle.)

a. The Prediction:
Barker (1999) predicts that (44b) can only be read as *false* in scenario (44a)

b. Explanation of the Prediction:

- If *30,000* is truthfully quantifying over *people* in (44b), then *people* must be construed with 'Stage Identity' as its Criterion of Identity.

- If this is the case, however, then it must also be the case that the larger DP *most of the 30,000 people who visited Disneyworld* quantifies over *stages* of people *s* such that *s* went to Disneyworld.

- Now, given the nature of stages, it should be impossible for one-and-the-same stage *s* of an individual x to go to Disneyworld *twice*.
    - If we were allowing such stages, then we wouldn't have 30,000.

- Therefore, if *most of the 30,000 people who visited Disneyworld* in (44b) quantifies over *stages*, it should not be able to truthfully combine with the VP *visited multiple times.*