Bare Plurals as Indefinites

1. Introduction.

- Like bare plurals, *a*-DPs can have existential and generic readings. What reading we get depends on the choice of predicate.

1) A dog entered the room.
2) A dog barks.

3) Dogs entered the room.
4) Dogs bark.

- But, unlike bare plurals, *a*-DPs do not combine with kind-level predicates.

5) *A lion is widespread.
6) * A lion will become extinct soon.
[only good on the taxonomic interpretation: 'there is a kind of lion that…']

7) Lions are widespread.
8) Lions will become extinct soon.

- So a kind-analysis is not available for *a*-DPs.

- The plan:

(i) A Lewis/Heim/Kamp analysis for singular indefinites.
(ii) The Ambiguity Hypothesis (Gerstern and Krifka 1987, Krifka 1987, Wilkinson 1986, 1991): BPs are ambiguous between names of kinds and Heimian indefinites.
(iii) The problem of overgeneration: Diesing (1998, 1992), Kratzer (1989).
(iv) Taking stock.

2. A Lewis/Kamp/Heim analysis of *a*-DPs

- Quantificational Variability Effects

9) A blue-eyed bear is <u>always/usually/often/sometimes/seldom/never</u> intelligent.

10) <u>All/most/many/some/few/no</u> blue-eyed bears are intelligent.

2.1. Lewis (1975) on Adverbs of Quantification

- What do adverbs like *always, usually, often, sometimes, seldom, rarely, occasionally, never* quantify over?

Quantification over stretches of time? Events?

11) The fog usually lifts before noon here
'On most days, the fog lifts before noon here'.
'Most fog-lifting events occur before noon here'

- Quantification needs to be suitably restricted:

12) Caesar seldom awoke before dawn
'Few of all the times when Caesar awoke are times before dawn'
'Few of all the days of Caesar's life are days when he awoke before dawn'
'Few of Caesar's awakenings occur before dawn'

- But:

13) A quadratic equation never has more than two solutions.

14) A quadratic equation usually has two different solutions.

These sentences do not involve times or events. "Or do they? This imagery come to mind: someone is contemplating quadratic equations, one after the other, drawing at random from all the quadratic equations there are. Each one takes one unit of time. In no unit of time does he contemplate a quadratic equation with more than two solutions. In most units of time he contemplates quadratic equations with two different solutions". (Lewis 1975: 5)

This "offers no hope of a serious analysis. There can be no such contemplator. To be more realistic, call a quadratic equation simple iff each of its coefficients could be specified somehow in less that 10, 000 pages; then we may be quite sure that the only quadratic equations that are ever contemplate are simple ones. Yet

(13) Quadratic equations are never simple

is false, and in fact they are almost never simple" (Lewis 1975: 5)

Quantification over cases

- Adverbs of quantification take two arguments.

- Each of these arguments is an open formula: a formula with one or more free variables.

15) Q-adverb (ϕ, ψ)

- Adverbs of quantification are unselective binders: they may bind an unlimited number of free variables in their scope.

Always (ϕ, ψ) is true iff every assignment to the free variables in ϕ that makes ϕ true also makes ψ true

Sometimes (ϕ, ψ) is true iff some assignment to the free variables in ϕ that makes ϕ true also makes ψ true

Never (ϕ, ψ) is true iff no assignment to the free variables in ϕ that makes ϕ true also makes ψ true

- Adverbs of quantification quantify over cases: admissible assignments of values to the variables that occur free in ϕ.

- *If*-clauses can restrict the domain of quantification of adverbial quantifiers:

16) If a man owns a donkey, he always beat it.

17) Always [if a man owns a donkey] [he beats it]

18) Always (x is a man & y is a donkey & x owns y) (x beats y)

19) $\forall y \forall y$ ((man'(x) & donkey'(y) & own' (x,y)) → (beat' (x)(y))

[cases: pairs of a man and a donkey such that the man owns the donkey (disregarding the time coordinate -- see Lewis, p. 8)]

- Other ways of getting the restriction:

20) When John goes to school, he always walks.
Always (going-to-school' (e, John)) (walking (e, John))

21) When a man owns a donkey, he always beats it.

TFA articulation (not discussed in Lewis):

22) John always WALKS to school.
Always, if John goes to school, he walks.
Always (going-to-school' (e, John)) (walking (e, John))

23) John always walks to SCHOOL.
Always, if John walks somewhere, he walks to school.
Always (walking (e, John)) (walking-to-school (e, John))

2.2. Heim 1982

- Recall:

24) A blue-eyed bear is always/usually/often/sometimes/seldom/never intelligent.

25) All/most/many/some/few/no blue-eyed bears are intelligent.

- We know now what the adverb does. But what is the contribution of the indefinite?

- Heim:

- Indefinite NPs never carry any quantificational force of their own.

- They contribute a free variable and a restrictive predicate.

- When an indefinite seems to act as a quantifier, it is really something else that contributes the quantificational force (by binding the variable introduced by the indefinite).

Overt adverb of quantification:

26) If a man owns a donkey, he always beats it.

Covert universal operator (cf. Lewis: "*always* may be simply omitted", p. 12. Heim argues that the this covert operator is a modal).

27) If a man owns a donkey, he beats it.

An existential quantifier introduced by an operation of Existential Closure

28) A man came in.

Determiner quantifiers:

29) Every man who owns a donkey beats it.

Rules of construal

- **Rule 1: NP-Indexing** [p132]
  Assign every NP a referential index

- **Rule 2: NP-Prefixing** [p132]
  Adjoin every non-pronominal NP to S leaving behind a coindexed empty NP.

30)

a.	He arrived.	a'.	$[_S$ he$_3$ arrived]
b.	A man arrived.	b'.	$[_S$ a man$_1$ $[_S$ e$_1$ arrived]]
c.	Every man arrived.	c'.	$[_S$ every man$_2$ $[_S$ e$_2$ arrived]]

Note on intended interpretations:

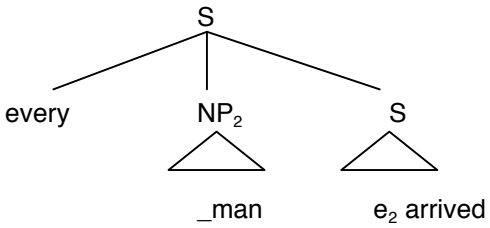
Pronouns and empty NPs will be treated as individual variables. Identity of referential indices indicates identical variables.

NPs of the form [indefinite article N']$_{ii}$ or [- N']$_{i}$ will be interpreted as sentences:

[-- man]$_1$ and [a man]$_1$ will be identified with " man (x_1)"

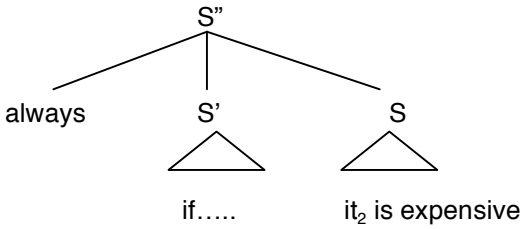
- **Rule 3: Quantifier Construal** [p133]
  Attach every quantifier as a leftmost immediate constituent of S.

31)



Roughly interpreted as: every variable assignment that satisfies "man(x_2)" also satisfies "x_2 arrived" (see the semantics in section 3).

- Quantifier construal affects also adverbial quantifiers. We also need a rule to place the *if*-clause (the restrictor) between the quantifier and the nuclear scope (a matter of well-formedness).



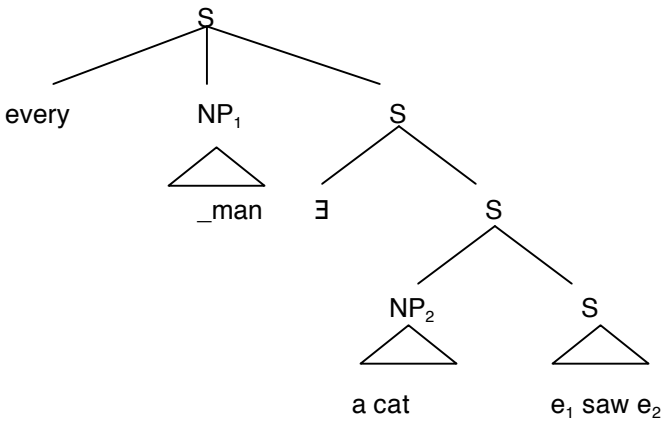
- There is a general schema that covers both quantificational determiners and adverbs of quantification: **[Quantifier, X, S].**

- Sometimes the quantificational force of indefinites is existential. This happens in simple unembedded sentences, or in the nuclear scope of a quantifier:

32) A man smiled.
33) Every man saw a cat.
34) If a man is lonely, he often buys a cat.

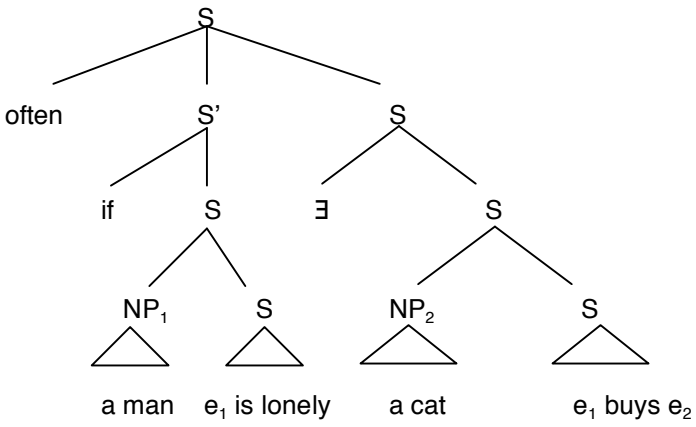
- **Rule 4: Existential closure, subrule 1** [p138]
  Adjoin a quantifier ∃ to the nuclear scope of every quantifier

35) Every man saw a cat



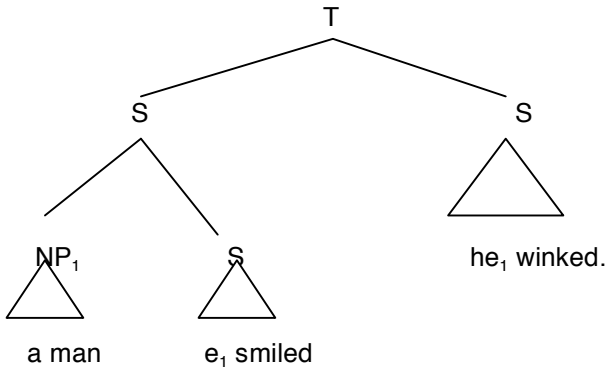
Note: ∃ shouldn't bind the variable introduced by e_1. More on this later.

36) If a man is lonely, he often buys a cat



- **Rule 5: Text-Formation** (preliminary rule to account for cross-sentential anaphora)
  Attach a sequence of sentences under a T-node

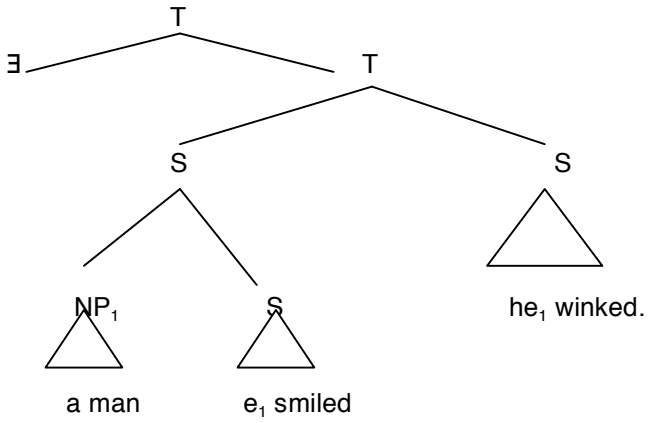
37) A man smiled. He winked.



- T-constituents are assigned a conjunctive interpretation. A T-constituent is true iff all its daughters are true.

- **Rule 6: Existential closure, subrule 2**
  Adjoin the quantifier ∃ to T.

38)



This is going to be equivalent to:

$\exists x_1$ [man (x_1) & smiled (x_1) & winked (x_1)]

→ Cross-sentential anaphora.

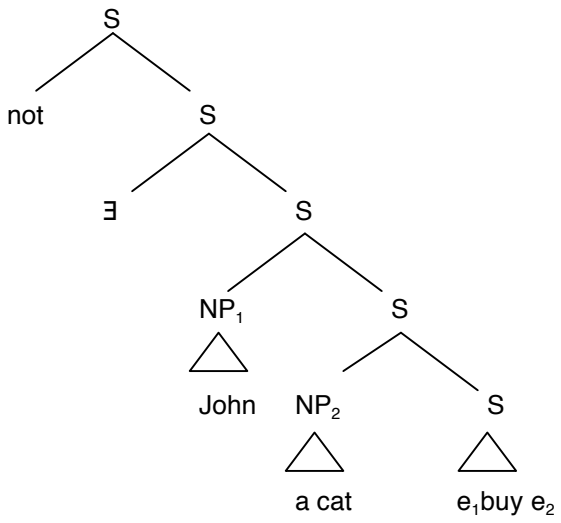
Again, we need to make sure that ∃ correctly selects the variables it is supposed to bind, but leaves others free: We don't want ∃ to bind, e.g., the variable introduced by **he** in (39).

39) He went to a restaurant. It was expensive.

∃ interpretation in the scope of negation.

40) John didn't buy a cat.

Replace 'Quantifier' by 'Operator' in rules above.



The problem of indices

- Sometimes quantifiers appear to be selective (see Lewis' qualification of the statement that adverbial quantifiers are unselective):

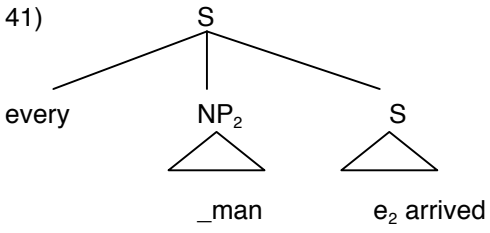
  We have seen this with ∃ (examples (35), (39)). For other quantifiers, see Heim's example (10) (p. 144)

- Quantifiers bear selection indices. A quantifier binds all and only the variables whose indices match one of the quantifier's selection indices.

- Quantifiers get their selection indices in two ways:

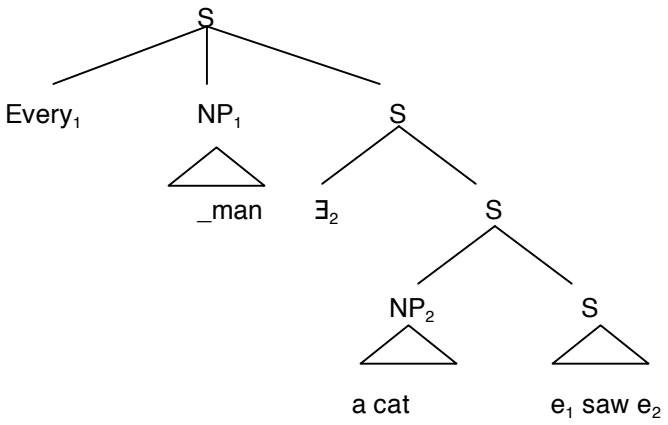
When a quantifier is moved out of an NP, it takes the referential index of that NP with it.

41)

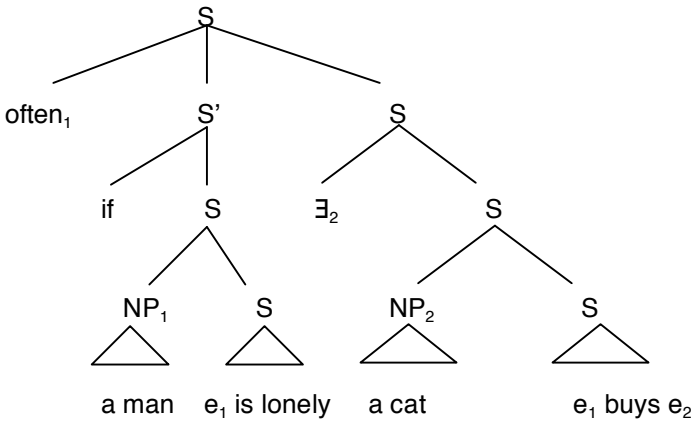


Rule 7: Quantifier Indexing (=Operator Indexing) [p146]
Copy the referential index of every indefinite NP as a selection index onto the lowest c-commanding quantifier.

42) Every man saw a cat



43) If a man is lonely, he often buys a cat



- Given the rules of construal above and the semantics spelled out in section 3, we will get the same interpretation for:

44) If a man owns a donkey, he always beats it.

45) Every man who owns a donkey beats it.

Indefinites can be bound by modal operators

[This is a very rough summary - we'll talk about modality next time!]:

- Kratzer 1986, building on Lewis: the job of if-clauses is to restrict the domain of operators, wherever they occur.

46) If John obstructed the driveway, he must pay a fine.

- Heim: modals can act as quantifiers and bind variables.

47) If a cat has been exposed to 2, 4-D, it must be taken to the vet immediately.

48) $Must_1$ (cat (x_1) & exposed-to-2, 4, D (x_1)) ∃ (taken-to-the-vet (x_1))

Simplifying a lot:

49) In all worlds w' that are accessible from the world of evaluation w: for every x that has been exposed to 2, 4, D in w', x is taken to the vet in w'.

Lots of work needs to be done to determine which worlds we quantify over: we'll discuss this next time, when we present Kratzer's theory of modality.

Indefinites can be bound by covert modal operators

50) If a man owns a donkey, he beats it.

(Lewis: in some cases **always** may be omitted).

- Bare conditionals contain a covert necessity operator (see, especially, work by Kratzer)
- This covert modal can also bind variables:

51) $Must_{1,2}$ (x_1 is a man & y_2 is a donkey & x_1 owns y_2) (x_1 beats y_2)

- Simplifying a lot:

52) In all worlds w' that are accessible from the world of evaluation w: every x, for every y such that x is a man in w' and y is a donkey in w', x beats y in w'.

Generic indefinites

- Sometimes indefinites by itself can do the job of an *if*-clause:

53) If a cat has been exposed to 2, 4, D, it (a) can go blind/(b) often goes blind/(c) always goes blind/(d) goes blind.

54) A cat that has been exposed to 2, 4, D, (a) can go blind/(b) often goes blind/(c) always goes blind/(d) goes blind.

- The sentences in (53) and (54) all have logical forms like:

55) $Quantifier_1$ ([a cat]$_1$ [that e_1 has been exposed to 2, 4, D]) (∃ (e_1 goes blind))

It is left open how the indefinite gets mapped into the restrictive clause

- The so-called 'generic' uses of indefinites (54d) are a special case of this.

56) Gen_1 ([a cat]$_1$ [that e_1 has been exposed to 2, 4, D]) (∃ (e_1 goes blind))

- More on the semantics of Gen once we introduce the relevant background on modality.

3. Back to Bare Plurals: The Ambiguity Hypothesis

- The Ambiguity Hypothesis (Wilkinson, a. o.): BPs are ambiguous between

  (a) Heimian indefinites

  (b) Kind-denoting

  Heimian indefinites:

  Existential uses: ∃-closure.

57) Dogs were barking

58) $\exists_1$ (dog' (x_1) & barking' (x_1))

  'Inductive' generalization uses: covert adverb of quantification.

59) Dogs bark.

60) Gen_1 (dog' (x_1)) (bark' (x_1))

  Kind-denoting:

61) Lions are widespread
62) Dinosaurs are extinct.

- Note:

- QVEs with BPs are accounted for:

63) Blued eyed-bears are always/usually/often/sometimes/seldom/never intelligent.

  [see Wilkinson 1991 for a critique of Carlson's account of sentences like (68)]

- Behavior of BPs in there-sentences are accounted for:

64) There are boys/a boy on the fence.

  [see Wilkinson 1991 for a critique of Carlson's account of sentences like (68)]

Accounting for the typhoon sentences: Kratzer 1989.

65) Typhoons arise in this part of the South Pacific.

  (a) Typhoons in general arise in this part of the South Pacific.
  (b) There arise typhoons in this part of the South Pacific.

- Kratzer (1989): stage-level predicates have an argument position for spatio temporal locations (a Davidsonian argument). Individual-level predicates don't.

  Argument 1: spatial and temporal modifiers.

  Stage-level

66) … weil uns heute fast alle Kandidaten beeindruckt haben.
Since us today almost all candidates impressed have.

  a) since almost all of today's candidates impressed us.
  b) since almost all of the candidates impressed us today.

  'today' can modify the main predicate (reading (b)): it is predicated of the spatio-temporal variable. Cf.

  Individual-level

67) … weil fast alle Schwane in Australien Schwarz sind.
Since almost all swans in Australia black are.

  Since almost all swans in Australia are black.

  'in Australia' cannot modify the main predicate: no spatiotemporal variable.

  Argument 2: *when*-clauses.

68) (a) When a Moroccan knows French, she knows it well.
(b) When Mary knows a foreign language, she knows it well.
(c) * When Mary knows French, she knows it well.

  (c) ruled out due to a ban on vacuous quantification:

  For every quantifier Q, there must be a variable x, such that Q binds an occurrence of x in both its restrictive and its nuclear scope.

69) When Mary speaks French, she speaks it well

  (69) is good because the adverb can bind the variable over spatio-temporal locations.

- Typhoon sentences:

70) Typhoons arise in this part of the South Pacific.

(a) Typhoons in general arise in this part of the South Pacific.

  Gen_x (typhoon' (x)) $\exists_1$ (this-part-of-the-Pacific' (1) & arise-in(x, 1))

(b) There arise typhoons in this part of the South Pacific.

  Gen_1 (this-part-of-the-Pacific' (1)) $\exists_x$(typhoon' (x) & arise-in(x, 1))

Too Many Readings? Diesing 1988/Kratzer 1989.

- Carlson 1977: BPs with stage-level predicates only have an existential reading.

- Diesing 1988, 1992: A Lewis/Heim/Kamp account of BPs predicts the three readings below. [note: Diesing 1992 assumes a time argument]

71) Firemen are available.

(a) $\exists_{x,t}$ (firemen'(x) & available' (x, t))
there are firemen available at some time.

(b) $Gen_{x, t}$ (firemen (x) & time (t)) (available' (x)(t))
It is a characteristic property of firemen that they are available.

(c) $Gen_{x, 1}$ (time(t)) $\exists_{x.}$ (firemen' (x) & available' (x,t))
'Generally, there are firemen available'. [e.g., there are always some firemen on call]

Diesing: this is the right prediction. Intuitions? See also:

72) Hospital patients are sick.
73) Raising a baby bird is very difficult. Baby birds are hungry, and have to be fed constantly.
74) People in bars are drunk. (Diesing 1988: 19)

Wilkinson: switch to individual-level predicates?

- BUT: as it stands, the analysis cannot rule out the unattested (b) reading for (81).

75) Firemen are intelligent.

(a) $Gen_{x, 1}$ (firemen' (x)) (intelligent' (x))
(b) $\exists_{x.1}$ (firemen' (x) & intelligent' (x,1))

- Diesing: Syntactic explanation.

Subjects of stage-level predicates are generated in Spec, VP. At LF, they can be at Spec, VP or at Spec, IP.

Subjects of individual-level predicates are generated in Spec, IP. Thus, they cannot be lowered to Spec, VP.

- Mapping Hypothesis: "material from VP is mapped into the nuclear scope, material from IP is mapped into a restrictive clause" (Diesing 1992: 15)

- Existential Closure is limited to nuclear scopes (contra Heim 1982)

- Hence:

  Subjects of individual-level predicates cannot get an existential reading.

  Subects of stage-level predicates can get both generic and existential readings.

[Note: independent problems with existential closure over texts (see Kadmon 1987)

76) Johns own sheep. Harry vaccinates them.
(Kadmon 1987, inspired by Evans 1977, 1980)]

• Kratzer 1989/1995: syntactic differences between s-level and i-level predicates are rooted in argument structure.

- Recall: s-level predicates have a Davidsonian argument; i-level predicates don't.

- Argument-Linking Principle: "In deep-structure, all arguments except the external argument are realized within the maximal projection of the predicate" (Williams 1981).

- The Davidsonian argument always occupies the highest position in the argument hierarchy (when there is a Davidsonian argument, it is the external argument.)

So:

- Subjects of stage-level predicates will be generated inside VP (or AP). [first part of Diesing's proposal.]

- Subjects of individual-level predicates that are unaccusative are generated inside VP. Subjects of individual-level predicates that are not unaccusatives are generated in Spec, IP. [slightly different version of the second part of Diesing's conjecture. For data that support this version see Kratzer 1995: 137-138]

- Subjects of individual-level predicates that are not unaccusative are mapped to the restrictive clause → no ∃ readings.

77) Firemen are altruistic.

- All other subjects can be mapped either to the restrictive clause or to the nuclear scope: they can get both existential and generic readings.

78) PONDS belong to this lot
She thinks that COUNTEREXAMPLES are known to us.

(i-level, unaccusative, ∃ reading possible)

4. Differences between BPs and singular indefinites

- The system we have in place now treats both the non-kind referring use of BPs on a par with singular indefinites.

- But: there are differences between the two types of DPs.

1. Interpretation.

79) a. Madrigals are polyphonic
b. Madrigals are popular

80) a. A madrigal is polyphonic
b. # A madrigal is popular (Lawler 1973)

- Original intuition: Generically interpreted singular indefinitesubjects can felicitously combine only with 'inherent' or 'essential' properties. IS sentences express 'analytic' statements. BP sentences express 'weaker' kinds of generalizations with a descriptive or 'inductive' flavor

- Greenberg 2002 refines the original intuition and proposes an account of the interpretational differences between singular generic indefinites and generic BPs. We'll come back to this.

2. Carlson's scope facts.

81) Dogs are here, and dogs are not here.
82) A dog is here, and a dog is not here.

83) Dogs are everywhere.
84) A dog is everywhere.

- We need a theory that accounts for the similarities between BPs and singular indefinites while giving us the contrasts in (87) and (90). We'll come back to this when we talk about Chierchia (1998) and Krifka (2004).