Noun Meanings in a World of Events and States

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Neo-Davidsonian Event Semantics

    (1)   Jack was driving slowly.   Parsons(1990)

        $\exists e$ Agent(e, Jack) & Drive(e) & Slow(e)

Statives:

    (2)   Jack owns Loon Lake.

        $\exists s$ In(s, Jack) & Own(s) & Theme(s, LoonLake)

Adjectives:

    (3)   Al is older.   Glass(2019), Wellwood(2015)

        $\exists s$ In(s, Al) & Old(s) & $\mu(s) \succ d$

Predicative nominals:

    (4)   Mary is a doctor.

        $\exists s$ In(s, Mary) & Doctor(s)

"Mary's state of being a doctor is a different state from John's state if he is also a doctor; both are different states of the same kind, that is, **both states are in the extension of the common noun 'doctor'**." Parsons(1989:219)

Nouns are stative predicates

- Simple nouns are stative predicates, and yet, most event analyses treat them as predicates of states **only some of the time.**

To Show: It is possible to have a semantics in which nouns are always predicates of states.

- We will touch on these issues:

    Reference: What do DPs refer to? How do extensions of mass and count nouns differ?

    Modification: How do noun modifiers work?

    Quantification: What do numerals count, and what do quantifiers quantify over?

    Predication: How do DPs combine as arguments of verbs and adjectives?

- Recognizing that nouns are 1-place predicates of states will lead to some new ideas about types of noun meanings, adjective meanings, and how they function in the grammar.

Reference & Predication

Tools of Analysis: Participation (IN)*, Participant sharing* (⊜)*, Pluralization* (*)

(5) s is a variable over states. S is a variable over sets of states.

IN

(6)

x-IN-s 'x is in state s'	*This house is <u>in</u> a sorry state.*
	That office was often <u>in</u> a state of chaos.
	The hotel guests were <u>in</u> a state of panic

⊜

(7)

$(s \ominus s')$ 'any participant in s is a participant in s' and vice-versa.'

$(S \ominus s)$ 'any participant in a state in S is a participant in s and vice-versa.'

$(S \ominus S')$ 'any participant in a state in S is a participant in a state in S' and vice-versa.'

• Plural *doctors* translates as *Doctor. *Doctor has pluralities of states in its extension.

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Simple singular and plural predications

(8) The book is heavy. ⇝

  $\exists s\ \text{Book}(s)\ \&\ \text{Unique}(s)\ \&\ \exists s'\ \text{Heavy}(s')\ \&\ (s \ominus s')$

(9) The books are heavy. ⇝   <mark>distributive reading</mark>

  $\exists S\ *\text{Book}(S)\ \&\ \text{Unique}(S)\ \&\ \forall s \in S \rightarrow \exists s'\ \text{Heavy}(s')\ \&\ (s \ominus s')$

(10) The books are heavy. ⇝   <mark>collective reading</mark>

  $\exists S\ *\text{Book}(S)\ \&\ \text{Unique}(S)\ \&\ \exists s'\ \text{Heavy}(s')\ \&\ (S \ominus s')$

<mark>Plurality at two levels</mark>

Plurality within a state: s' in (10) is a **multiparticipant state**

Plurality among states: S in (10) is a plurality **of** states

The labels <mark>COLLECTIVE/DISTRIBUTIVE</mark> correspond to <mark>multiparticipant / single participant</mark>

In (10), collectively read *heavy* describes a multiparticipant state

In (9), distributively read *heavy* describes **single participant** states.

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An application: Stubbornly distributive adjectives

• An adjective is **stubbornly distributive** if it is missing a collective reading we'd expect it to have, given its interpretation.

(11) This table is small.

   'This table takes up little space.'

(12) These dots take up little space.   ✓ collective   ✓ distributive

(13) These dots are small.   × collective   ✓ distributive

• Other stubbornly distributive adjectives:

(14)   *big, large, enormous, long* (temporal & nontemporal senses)*, short, spherical, cubical, square, broken, multilingual, interracial, grow*intransitive

• <u>Group nouns</u> can be used to convey the missing collective reading:

(15) The collection of dots is small.

(16) A stubbornly distributive predicate has only **single-participant states** in its extension.

(17) $\exists S$ *Dot(S) & $\exists s'$ Small(s') & $(S \ominus s')$ × collective

(18) $\exists S$ *Dot(S) & $\forall s \in S \rightarrow \exists s'$ Small(s') & $(s \ominus s')$ ✓ distributive

Stubborn distributivity and count nouns

Stubborn Distributivity and COUNT*: Distribution*

• Quine observed that certain adjectives tend **not** to occur next to mass terms (#*spherical wine*, #*square water*).

• Moravcsik extended the count-mass distinction to adjectives.
  He called Quine's examples <mark>count adjectives</mark>.

• Moravcsik's count adjectives are stubbornly distributive adjectives.

∴ Given (16), this suggests:
  COUNT means 'predicate of single participant states'.

Stubborn Distributivity and COUNT: Morphology

• A **singulative** is an affix used to form a count noun. In some languages, diminutives are used as singulatives

(19)   Diminutives as singulatives (Jurafsky 1996)

Dutch	*tarwe*	'wheat'	*een tarwe**tje***	'wheat loaf'
Ojibwa	*goon*	'snow'	*goon**ens***	'snowflake'
Ewe	*sukli*	'sugar'	*sukli-**ví***	'piece of sugar'
Cantonese	*tong²¹*	'sugar'	*tong³⁵*	'piece of candy'

(20)   Diminutives as singulatives are bleached.
'smallness' is gone, only stubborn distributivity is left.
The diminutive affix creates a predicate of single-participant states: a count noun.

Mass and Count

(21)   A COUNT noun is a predicate true only of **single-participant states**.

• The hypothesis in (21) was implicit in our rendering of book sentences in (8)-(10).

Corollary: mass nouns describe multiparticipant states

(22)   A state in the extension of a mass noun may include a plurality of participants.

• The plurality~mass connection is present in the literature, even if it is not correctly located inside states .

Terminology:

• *mass* "A dense aggregation of objects having the appearance of a single, continuous body".

Theories:

"the proposal is to construe any mass term 'm' as a plural sortal of the form 'm-elements.'" Laycock 1972
"mass nouns come out of the lexicon with plurality already built in" Chierchia 1998.

Dictionary definitions:

rubble   Waste fragments of stone, esp. as constituting the rubbish of decayed or demolished buildings (OED)

Morphology of mass and count

• A <u>singulative</u> is a COUNT affix. There are MASS affixes as well.

• Asturian is a language that shows agreement for mass nouns. In the example below from García González (1985), -**u** is masculine singular, -**a** feminine singular and –**o** is mass:

(23) El paisanu viey**u** de la casa blanc**a** lleva'l <mark>pelo cort**o**</mark> y la ropa llimpi**o**.
the peasant old of the house white had-the <mark>hair short</mark> clothes clean

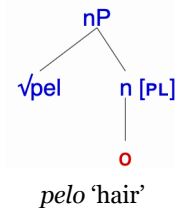'the old peasant in the white house had short hair and clean clothes'

(24) "we have provided evidence from a set of typological diverse languages for mass/count distinctions performed at **the N class level**, rather than by Number projections." Franco, Manzini and Savoia (2015)

(25)

Franco et al structure
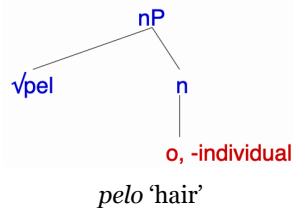
Proposed modification

pelo 'hair'

pelo 'hair'

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An illustration: directions

- √*direction* is ambiguous with a count interpretation and a mass interpretation:

    (26) The Roman god Janus looks in <u>two directions</u>. count

    (27) You must carefully follow <u>all directions</u> to avoid eye injury. mass
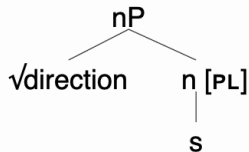
    (28) *I followed <u>many directions</u>.

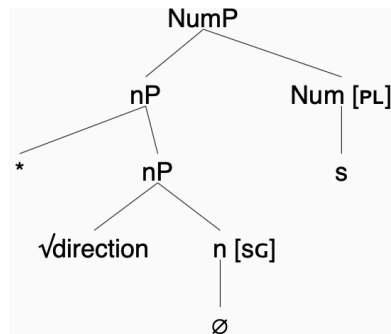   (29) *There are <u>two directions</u> on this package.

(30)   ***Inner Plural***   ***Outer Plural***

directions 'instructions' (mass)   *directions* (count)

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• The internal syntax of noun phrases is iconic:

(30)   ***Inner Plural***   ***Outer Plural***
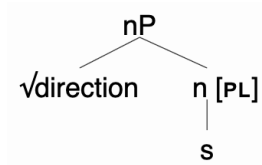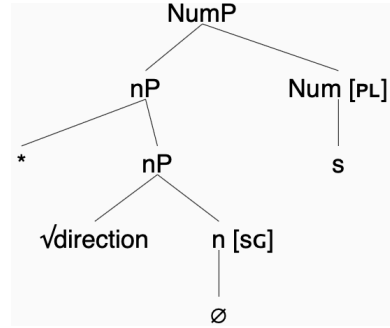
directions 'instructions' (mass)   *directions* (count)

Inner	**Outer**
syntax: inside nP	syntax: outside of nP
semantics: inside the state.	semantics: external to the state.
a multiparticipant state	many states

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Application: *Reciprocals and other plurality seekers*

• Expressions that require outer plurals: *each other,* floated and adnominal *each, both, together*, internal *same*
and *different, one by one*.

• These expressions show that the distinction between inner and outer plurals is felt external to the DP.

(31) #This definition contradicts each other.

(32) $\exists s$ Definition(s) & ⟦*contradict each other*⟧(s)

   $\Rightarrow$ ⟦*contradict each other*⟧ only applies to a plurality of states.

(33) #The directions on the shampoo bottle contradicted each other.

(34) $\exists s$ Directions(s) & ⟦*contradict each other*⟧(s) s is a **single**, multiparticipant state

(35) The directions you gave me and the directions he gave me contradicted each other.

(36) ⟦*The directions you gave me*⟧ = s_1 ⟦*The directions he gave me*⟧ = s_2 s_1 , s_2 are multiparticipant states

(37) ⟦*and*⟧ = $\lambda x\,\lambda y.\ \{x, y\}$

(38) a. The directions you gave me and the directions he gave me contradicted each other.

   b. $\exists S\ \ S = \{s_1, s_2\}$ & ⟦*contradict each other*⟧(S)

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Modification

- Textbook analysis:

(39)
$$\left[\!\!\left[\begin{array}{c} \text{NP} \\ \overline{\text{gray} \quad \text{cat}} \end{array} \right]\!\!\right] = [\![gray]\!] \cap [\![cat]\!]$$

"intersective modification"

- Syntactic investigation doesn't bear out the structure above. "Intersective modifiers" like *gray* appear higher in the structure. For recent discussion and references see Kim(2019).

- As for the semantics, I make the following negative claim:

(40)

Modification does **not** result from combining meanings via intersection.

(a) Adjective and noun meanings cannot combine intersectively.

(b) Adverb meanings aren't combined with verb meanings intersectively (Higginbotham 2005).

Adjective and noun meanings cannot combine intersectively.

$[\![gray]\!] = \{s \mid x$ is IN s *iff* every kind of light is half-absorbed and half-reflected by $x\}$

$[\![cat]\!] = \{s \mid x$ is IN s *iff* x is feline$\}$

$[\![gray]\!] \cap [\![cat]\!] = \varnothing$

Adverb meanings aren't combined with verb meanings intersectively (*Higginbotham 2005*).

(1)   Jack was driving slowly.   Parsons(1990)

∃*e* Agent(*e*, Jack) & Drive(*e*) & Slow(*e*)

(41)   Jack was driving slowly.   Higginbotham(2005) Geuder(2000)

∃*e* Agent(*e*, Jack) & Drive(*e*) & ∃*s*′ Slow(*s*′) & *e*-IN-*s*′

Argument 1: The state *s*′ introduced in (41) can be referred to with a DP:

(42) *The slowness of Jack's driving* irritated other motorists.

Argument 2:   Parsons (1) identifies an event of driving with an event of slowness,
                   but the event of Jack's driving is <mark>causally distinct</mark> from the state of slowness:

(43) The slowness of Jack's driving caused him to be late.   TRUE
(44) Jack's driving to work caused him to be late.   FALSE

(45) Jack's desire to get to work caused his driving.   TRUE
(46) Jack's desire to get to work caused the slowness of his driving.   FALSE

☑ No intersective combination of noun meanings with adjective meaning or verb meanings with adverb meanings.

Application: Larson's old friends -- Higginbotham modification in the DP

• To Explain: Why ⟨Jack is an old friend⟩ doesn't entail ⟨Jack is old⟩.

old   **1:** of long standing an *old* friend.   **2:** advanced in years

(47) Old(s) *iff* the participant of s has existed for a long time.   *unambiguous*

(48) [$_{NP}$ old friend] $\leadsto$ Modification

   Friend(s) & $\exists s'$ Old(s') & s-IN-s'

   $\Rightarrow$ the Friend state has existed for a long time.

(49) The friend is old. $\leadsto$ Predication

   $\exists s$ Friend(s) & $\exists s'$ Old(s') & ($s \ominus s'$)

   $\Rightarrow$ the participant in the Friend state has existed for a long time.

(50)

The ambiguity in *old* is not lexical (Larson 1998)

The 'long standing' meaning results from NP modification.
The 'advanced in years' meaning results from predication.

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Counting and quantifying

"If a state verb applies to a state that holds over a certain interval, that same verb also applies to substates of the larger state. If Mary knows Fred for three years, then many shorter Mary-knowing-Fred states hold within that interval of time." Parsons(1990:255)

- By similar reasoning, if there is a book on the table, then there are <mark>many books states</mark> that share participants with a being-on-the-table state. That means:

  🔧 *There are two books on the table ⊨ There are 10,000 books on the table.* 💣

(51) **Default Domain Constraint**

  If the domain of any ordinary use of a quantifier contains s and s' then the participants of s and s' do not overlap:

  $$\forall x \,\forall y \ (x\text{-IN-}s \ \& \ y\text{-IN-}s') \to (x \oslash y)$$

- The non-overlap condition subsumes conditions already recognized for object counting:

  Ruys (2017:21) [*two* [*liters of wine*]]

  Ionin & Matushansky (2006:318) [*two* [*hundred books*]]

  Feldman (1973) – examples like the Pope's crown which includes crowns as parts.

(8) The book is heavy ~
$\exists s$ Book(s) & **Unique**(s) & $\exists s'$ Heavy(s') & ($s \ominus s'$)

• Contextual uniqueness is possible if

    (a) there is one contextually relevant book

    (b) the Default Domain Constraint is met.

Lifting the Default Domain Constraint (Viebahn 2013)

(52) a. Four thousand ships passed through the lock last year.   Krifka (1990)

    b. s is in the domain of the quantifier *four thousand*   iff $\exists e$ LockCrossing(e) & TIME(s) = TIME(e) & ($e \ominus s$)

(53) a. During her career, she has taught over 100 courses serving over 2,058 students.

    b. For each course taught and for each student in that course, the domain of the quantifier *2,058* includes a student-state cotemporal with the course

Verbs

(54) A boy taught a dog (some tricks).

(55) $\exists s$ Boy(s) & $\exists e$ Taught(e) & ($s \ominus e$) & $\exists s'$ Dog(s') $\wedge$ ($s' \ominus e$) <mark>No good!</mark>

Solution: Event Structure Identification (Grimshaw 1990)

(56) $\exists s$ Boy(s) & $\exists e$ Teach-PROCESS(e) & ($s \ominus e$) &
$\qquad\qquad \exists s$ Teach-STATE(s) & $\exists s'$ Dog(s') & ($s' \ominus s$)

Solution: Θ roles as aspects – like the perfect Θ roles relate events to states

(57) $\exists e$ Taught(e) & $\exists s$ Boy(s) & $\exists s'$ AG(e, s') & ($s \ominus s'$) &
$\qquad\qquad \exists s$ Dog(s) & $\exists s'$ THEME(e, s') & ($s \ominus s'$)

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Appendix

So-called 'object mass nouns'

(58) *artillery, baggage, beachwear, bedding, change, company, crockery, cutlery, cutlery, equipment, footwear, fruit, furniture, glassware, hardware, inventory, jewelry, luggage, mail, silverware, underwear, waterfowl and wildlife*

- These nouns **do** combine with stubbornly distributive predicates:

(59) When I was just shy of 18 I started stretching my ears w/o parental permission and they didn't notice bc the jewelry was small.

(60) The mail in this box is square and small.

(61) The fruit was perfectly round.

- When these nouns combine with stubbornly distributive adjectives they are interpreted collectively, because, of course, the adjective can't be:

(62) The earrings are heavy.

$\exists S$ *Earring(S) & $\exists s'$ Heavy(s') & $(S \ominus s')$ collective reading of ***heavy***

(63) The jewelry is small.

$\exists s'$ Jewelry(s') & $\exists S$ *Small(S) & $(S \ominus s')$ collective reading of ***jewelry***

• Since 'small' states are single participant, (63) says that each participant in the jewelry state s' is small.

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• So why the difference between 'object mass nouns' and the ones Quine mentioned? Why can't we get a collective
    reading of *water*, in *The water is spherical*?

(55) "There are some anomalous mass terms in English….Terms such as 'furniture', 'jewelry', and so on have as
    minimal units items which are already individuated by means of count nouns such as 'chair' and
    'necklace'… I doubt such nouns are of any theoretical interest." Grandy(1979:fn 4)

• the participants in the states in the extension of 'furniture' and 'jewelry' are identifiable entities. For *wine* and
    water, the participants are not identifiable or not the kinds of thing that could be small or spherical.

•Another property of 'object mass nouns' is that they lead to comparatives that measure in terms of cardinality.

• If we can identify the participants in a state, we can assign the state a cardinality:

> "*Esme has more footwear than Seymour* can be paraphrased as 'Esme has more shoes and boots than
> Seymour'" Bale & Barner 2009

Collective nouns

(64) Collective nouns: *collection, constellation, pile, bunch, group, portion, herd*

collection of dots is a count noun phrase. It picks out a single-participant state. A participant in such a state is complex object composed of the participants of *dot* states. (65)-(66) say slightly different things:

(65) The stars are bright.
(66) The constellation is bright.

portion of coffee is a count noun phrase. It picks out a single-participant state. A participant in such a state is complex object composed of the participants of *coffee* states.

As count noun phrases, collectives combine with stubbornly distributive adjectives in the singular and do not give rise to a distributive reading:

(67) This collection of dots is small.

(68) That portion of wine is too small.

(69) That pile of snow is square!

• These facts are not compatible with theories that allow a definite mass noun phrase like *the wine* to have the meaning of a collective counterpart like *the portion of wine*. Gillon 1992:629, Chierchia 1998:89 and Landman 2020:Ch6 make such a move to explain, eg:

(70) #The wine goes well together.

(71) The wine and the cheese go well together.

Pluralizing mass nouns

- Internal *same* requires an outer plural antecedent. (like reciprocals)

  (72) Jack's discovery supports the same the conclusion.   external reading only
  (73) Jack's discovery and Jill's discovery support the same conclusion.   ✓ internal reading
  (74) All these discoveries support the same conclusion.   ✓ internal reading

  (75) Jack's evidence supports the same conclusion.   external reading only
  (76) Jack's evidence and Jill's evidence support the same conclusion.   ✓ internal reading
  (77) #All these evidences support the same conclusion.

- Why is it possible to create a plurality of multiparticipant states with conjunction (76) but not with an outer plural (77)?

Cumulativity

(78) A predicate P of type $s\varepsilon t$ is PARTICIPANT-CUMULATIVE *iff*

$\forall w \ \exists s \ s \in P(w) \rightarrow \exists s' \ s' \in P(w) \ \wedge (s' \ominus P(w))$

• Mass nouns are participant cumulative. Count nouns are not.

• Plural count nouns could be said to be state-cumulative.

• Multiplicity implicatures:

(79) [PL] is number neutral. It allows pluralities but doesn't require them.

(80) the overall multiplicity requirement for outer plurals is the result of strengthening the basic number-neutral meaning of the plural through the denial of the singular alternative. (cf. recently Ivlieva 2020)

• if N is participant cumulative, and $[\![the\ N]\!]$ denotes the maximal element in $[\![N]\!]$, (s' in (78)), then:

$[\![the\ *Ns]\!] \ominus [\![the\ N]\!]$.

• In that case, any predication of the form *the *Ns VP* will be equivalent to *the N VP*. So denying the singular alternative would lead to contradiction.

"intersective modifiers"

"…relative clauses, postnominal PPs and APs, and intersective prenominal A's all originate as inner complements of D in a DP "shell structure," where D subsequently raises away from the complement:

[$_{DP}$ [$_{D'}$ a [$_{DP}$ [$_{NP}$ vase] [$_{D'}$ t   [$_{CP}$ that was broken]]]]]
                                                                        [$_{PP}$ in pieces]
                                                                        [$_{AP}$ broken into pieces]
                                                                        [$_{AP}$ broken]

In the case of intersective APs that will end up prenominal, there is subsequent raising for agreement, with AP becoming a second Spec of DP;

[$_{DP}$ [$_{D'}$ a [$_{AP}$ broken] [$_{DP}$[$_{NP}$ vase] [$_{D'}$ t t]]]]

By contrast, nonintersective modifiers are constituents within a D-complement, such as an NP" **Larson & Cho 2003**

- Larson(2014) proposes a rule to combine "intersective modifiers" with determiners. I've analyzed them as "predicative modifiers", that is, modifiers that combine via predication, where predication is understood in terms of participant-sharing. Here's a stately version of Larson's rule:

(81) a. If $[\![D]\!] = \lambda P \lambda Q.\ \mathcal{R}(P,Q)$, then $[\![D\ Mod]\!] = \lambda P \lambda Q.\ \mathcal{R}(P+Mod, Q)$

      b. $P+Mod = \lambda s\ P(s)\ \&\ \exists s'\ Mod(s')\ \&\ (s \ominus s')$

Slogan: Don't say "predicate modification" say "predicative modification"

Compositional semantics for <u>A book is heavy</u>

∃s BOOK(s) & ∃s'.(s' ⊖ s) & HEAVY(s')

DP

A book λs

∃s' (s' ⊖ s) & HEAVY(s')

be

$\exists_{(\varepsilon t)t}$

AP$_{\varepsilon t}$

λs' (s' ⊖ s), ⊖P

heavy$_{\varepsilon t}$

⊖   s