Artifact Nouns: Reference and Countability

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Artifacts and Their Associated Events

Proposal: A key component of the semantic representation of artifact nouns is an 'associated event' (Nichols 2008, Grimm & Levin 2012; see also Pustejovsky 1995).

Goal: Show countability properties of artifact nouns can be traced back to their associated event.

- The associated event often represents the function associated with the artifact, e.g. drinking for a cup.
- The semantics of a given artifact noun relates entities in the world to the associated event.
- To rule out arbitrarily complex events in the representation, the associated event must be minimal (Berman 1987, Heim 1990, von Fintel 1995).

(1) *Minimal event with respect to a predicate*:
$\min(e, P) = P(e) \land \neg \exists e'[e' < e \land P(e')]$

(2) $[\![cup]\!]$ (preliminary version) :=
$\lambda y[x \text{ drinks out of } y \text{ in } e \land \min(e, \text{drinks-out-of})]$

Typical or 'Functional' Artifacts

'Functional artifact' nouns (e.g. *cup*, *hammer*) are in a *potential* relation to the associated event: they incorporate an ability modal, here the operator **ABLE**, where the physical and design properties of the entity are relevant to the accessibility relation.

We employ Brennan's (1993) extension of Kratzer: the conversational background consists of relevant properties relative to an individual rather than propositions.

- The accessibility relation, h, is 'keyed to' an individual x (h_x)
- The conversational background includes a 'stereotypical' ordering on worlds, indexed by j.

(3) $[\![cup]\!] := \lambda y[\text{ABLE}[x \text{ drinks out of } y \text{ in } e_{min}]]^{w,g,h_y,j}$

Opportunistic Reference: An entity may be considered an instance of an artifact when used opportunistically to serve the related function.

- a crate can serve as 'furniture' in a student apartment
- not possible for natural kind nouns (e.g. *dog*; Keil 1993)

Such uses follow directly: If a crate is currently furnishing a location, then trivially there is an accessible world in which that entity can furnish a location, viz. the actual world.

Stage-Level Artifacts

Stage-level artifact nouns describe entities that only temporarily qualify as instances of that noun:

- a sock qualifies as *laundry* only while it is in the process of being laundered, but not when bought or worn.
- compare a natural kind noun (e.g. *dog*), which stably identifies its referent through its lifetime.

Stage-level artifact nouns relate entities directly to an associated event, but also include a temporal parameter.

(4) $[\![laundry]\!] := \lambda y[x \text{ launders } y \text{ in } e_{min} \text{ at } t]$

Object-Level Countability

An artifact noun's basic countability arises from an interaction of its associated event and the minimality condition on the event.

Canonical artifact nouns: are countable as the minimality condition restricts the domain of entities satisfying the associated event to singular entities. For *cup*, a minimal drinking event involves a single cup; any event with more than one cup requires drinking out of these cups in separate events, violating minimality.

Furniture-**nouns**: are not countable as the minimality condition does not restrict their domain to singular entities: the event of furnishing a study may involve a bookcase, a desk, and a chair and yet is minimal since these items jointly furnish the study.

Kind-Level Countability

Issue: *Furniture*-nouns, unlike other artifact nouns, disallow 'taxonomic plurals' ('multiple kinds readings').

(5) a. *The store sells many furnitures from France.
    b. *Chairs and tables are two furnitures that I like.
(6) *This museum show features Roman and Greek jewelries.
(7) This dealer sells various cars: Audis, Toyotas, and Volvos.

Licensing: A noun may have a taxonomic plural when it designates an entity standing in a taxonomic relation to a kind, and that entity is measured as at least two 'kind units'.

(8) $[\![wines]\!] := \lambda w \lambda x[\text{T}_w(\text{wine}, x) \land \text{KU}_w(\text{wine}, x) \geq 2]$

- A taxonomic relation T relates kinds and subkinds: $T(x, y)$ means y is a subkind of x (Krifka et al. 1995)
- 'Kind unit operator' counts subkinds: $KU(x, y) = n$ indicates y contains n number of subkinds of the kind x (Krifka 1995)

Associated Events and Taxonomic Relations

Key properties of well-defined taxonomies:

i a sub-element is a **kind of** super-element

ii a sub-element **inherits** the properties of the super-element

iii if A is a sub-element of B, and B is a sub-element of C, then A is a sub-element of C (**transitivity**)

Natural kind nouns: $[\![dog]\!] \subseteq [\![mammal]\!]$ — naturally stand in kind–subkind relations.

**Proposal**: Artifact nouns must have a common associated event to stand in a taxonomic 'super-kind/sub-kind' relation.

Canonical artifact: $[\![car]\!] \subseteq [\![vehicle]\!]$ as the nouns *share* an associated event (provide transport), though *car*'s is more specific

(9) a. $[\![vehicle]\!] := \lambda y[\text{ABLE}[x \text{ uses } y \text{ for transport in } e_{min}]]^{w,g,h_y,j}$
    b. $[\![car]\!] := \lambda y[\text{ABLE}[x \text{ uses } y \text{ for transport in } e_{min} \land \text{has-four-wheels}(x)]]^{w,g,h_y,j}$
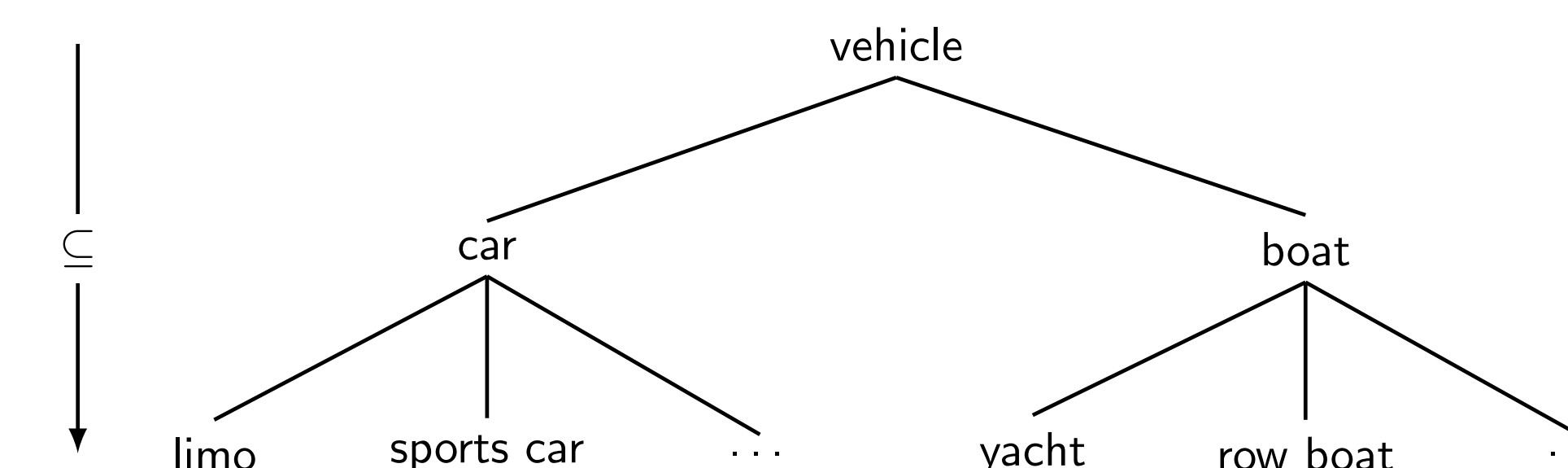
Furniture-**nouns**: $[\![chair]\!] \not\subseteq [\![furniture]\!]$ as they have *distinct* associated events, though chairs (in stereotypical worlds) always satisfy the associated event of *furniture*

(10) a. $[\![furniture]\!] := \lambda z[\text{ABLE}[x \text{ furnishes } y \text{ with } z \text{ in } e_{min}]]^{w,g,h_z,j}$
     b. $[\![chair]\!] := \lambda y[\text{ABLE}[x \text{ sits on } y \text{ in } e_{min}]]^{w,g,h_y,j}$
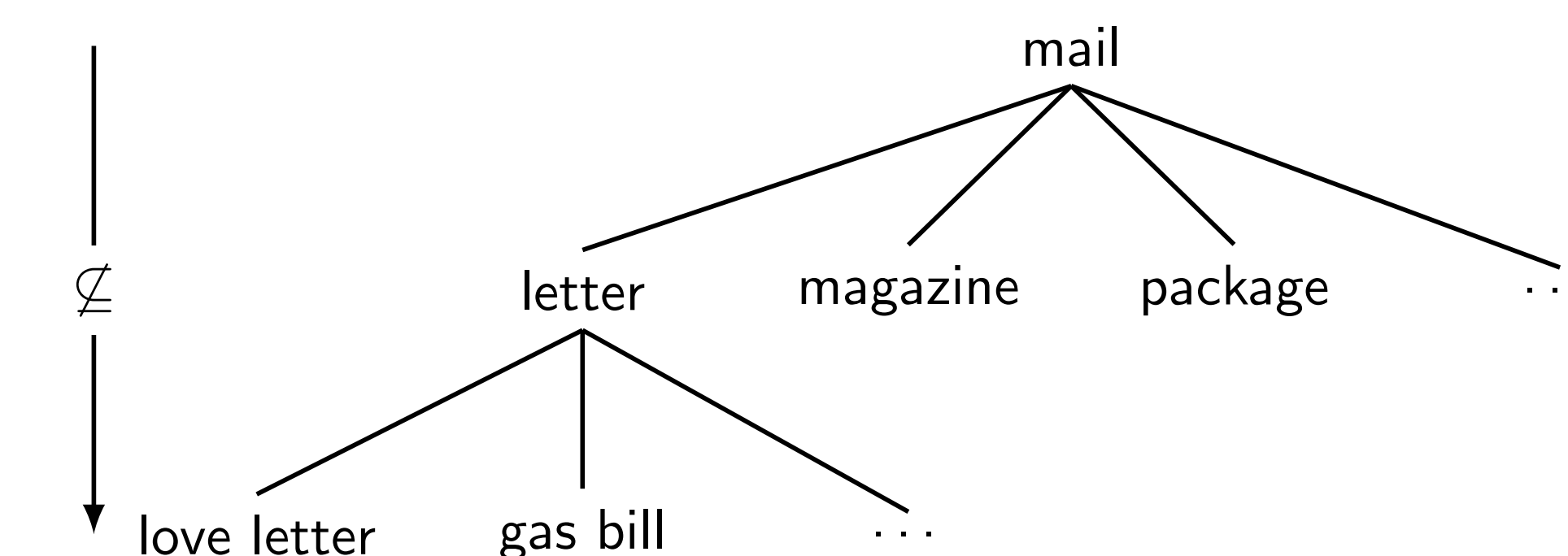
Key properties of taxonomies are lacking:

- No sub-/super-kind relation: A letter is *not* a kind of mail.
- The properties of the purported super-kind don't trickle down:
  - Mail is delivered, but the purported sub-kind nouns do *not* inherit this property, viz. not all magazines are delivered.
- Transitivity does not hold:
  - Though some kinds of mirrors are kinds of furniture, not all are (e.g. *hall mirror* vs. *rear view mirror*)