

Artifact Nouns: Reference and Countability

Scott Grimm (University of Rochester) & Beth Levin (Stanford University)

Artifact nouns (*cup, furniture, chair*) comprise a significant subclass of common nouns, yet analyses of nominal semantics are primarily designed to accommodate natural kind nouns (*dog, water, flower*): they are kind-based (Carlson 1980; Krifka et al. 1995). We present semantic representations intended to capture the semantic properties unique to artifact nouns. Following Nichols (2008), we argue that the meaning of an artifact noun includes an ‘associated event’, often representing the artifact’s intended function; yet, as witnessed by the flexibility with which such nouns may be used to refer to entities, their meaning may also involve (sub-lexical) modality or temporal components. Our analysis is able to resolve several outstanding puzzles in the countability literature involving artifactual nouns such as *furniture* or *mail*, namely why such nouns are non-countable both at the object- and kind-level, (*dog, water, flower*), yet seem to have individual entities in their denotation (Barner & Snedeker 2005).

The Associated Event We argue that a key component of the semantic representation of artifact nouns is an ‘associated event’, as proposed by Nichols (2008); see also Grimm & Levin (2012) and Pustejovsky’s (1995) telic role. This event often represents the function associated with the artifact, e.g. drinking for a cup or hammering for a hammer. The semantics of a given artifact noun relates entities in the world to the associated event: *cup* relates entities in the world to the associated event ‘drinks out of’: $\lambda y[\exists e[x \text{ drinks-out-of } y \text{ in } e]]$. Thus, *cup* designates the set of things that people drink out of. To rule out arbitrarily complex events in the representation, the associated event is required to be minimal (Berman 1987, Heim 1990, von Stechow 1995), as spelled out in (1) and applied to a first approximation of the representation of *cup* in (2). (The agent variable is left free; it is either bound during the composition, e.g. by a Saxon genitive, or undergoes existential closure.)

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

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

Modal and Temporal Components of Artifact Nouns Artifacts and natural kinds differ in two crucial respects that have been neglected in the nominal semantics literature. For a natural kind term such as *dog*, it is plausible to a priori consider the set of dogs in the world; however, for many artifacts, an entity may be used opportunistically to serve a certain function, whereby it then becomes an instance of the relevant artifact. For instance, a crate can serve as ‘furniture’ in a student apartment or a lobster trap may be ‘recycled’ as an outdoor planter (Dennett 1990); this option is not available for natural kind terms (Keil 1993). A second class of artifact terms describes entities that only temporarily qualify as instances of that term, e.g. entities only temporarily qualify as laundry: a sock qualifies as *laundry* only while it is in the process of being laundered, but not, say, when it is bought at the store. In contrast, natural kind terms like *dog* stably identify their referents through their lifetimes.

Thus, the two classes of artifact terms require us to recognize two types of relations between entities and their associated event, FUNCTIONAL and STAGE-LEVEL. Functional artifact nouns such as *cup* or *hammer* — the vast majority of artifact nouns — possess a *potential* relation to the associated event. Stage-level artifact nouns possess a direct relation to the associated event; they are simply true of entities participating in the associated event. Whether a letter counts as *mail* depends solely on whether the letter is participating in the associated event at that time.

To model the potential relation to the associated event for functional artifacts, we employ Brennan’s (1993) extension of the Kratzerian framework to modalize properties. Here the conversational background consists of relevant properties relative to an individual rather than relevant propositions. The accessibility relation, h , then depends on, or is ‘keyed to’, an individual x , represented as h_x . We treat functional artifact nouns as incorporating an ability modal, represented by the operator ABLE, where the properties relevant to the accessibility relation are physical and design properties of the entity. Further, the conversational background includes a ‘stereotypical’ ordering on worlds, indexed by j . Putting this together, the revised representation of *cup* in (3) states that *cup* is true of an entity (at the world w and assignment function g), for which, given the actual properties of the entity, there exists an accessible (and maximally close) world in which one can drink out of this entity. This analysis captures the ‘opportunistic reference’ characteristic of these artifact nouns: 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.

$$(3) \quad \llbracket \text{cup} \rrbracket := \lambda y [\text{ABLE} [\exists e [x \text{ drinks out of } y \text{ in } e \wedge \min(e, \text{drinks-out-of})]]]^{w,g,h_y,j}$$

Stage-level artifact nouns relate entities directly to an associated event, but also include a temporal parameter, shown for *laundry* in (4). In the talk, we will contrast these nouns with nouns designating temporary roles, e.g. *president*, *passenger* or *batter* (Gupta 1980, Carlson 1982, Barker 2010).

$$(4) \quad \llbracket \text{laundry} \rrbracket := \lambda y \exists e [x \text{ launders } y \text{ in } e \text{ at } t \wedge \min(e, \text{launders})]$$

Object-level Countability Canonical artifact nouns such as *cup* and *chair* are count nouns; however, as often noted, *furniture*-type artifact nouns, like substance mass nouns, are not countable. We attribute the basic countability of an artifact noun to an interaction between its associated event and the minimality condition on this event. Artifact nouns whose minimal associated event involves a single entity are countable nouns, while those whose minimal associated event involves multiple entities are typically not countable nouns.

For canonical artifact nouns, the minimality condition restricts the domain of entities which can satisfy the associated event to singular entities. Consider *cup*: a minimal drinking event typically only involves a single cup. Any event in which more than one cup is used would require drinking out of multiple entities in separate drinking events; thus, this event is decomposable into smaller subevents, a violation of the minimality condition. In contrast, the minimality condition does not restrict *furniture*-nouns to singular entities. These nouns have associated events that permit, and typically imply, multiple, often diverse participants. For example, the event of furnishing a study may involve a bookcase, a desk, and a chair. This furnishing event is minimal since these items jointly furnish the study. Any attempt to decompose this event into subevents would require dividing the spatial region involved in unintuitive ways, e.g. the bookcase ‘furnishes’ the left half of the study, while the desk ‘furnishes’ the right half.

Kind-level Countability Our analysis handles the less discussed observation that, *unlike* substance mass nouns or canonical artifact nouns, *furniture*-type artifact nouns disallow ‘taxonomic plurals’.

(5) This restaurant features many wines from Europe. (substance mass natural kind)

(6) This dealer sells several cars: BMWs, Teslas, and Porsches. (canonical artifact)

(7) *This museum exhibits my favorite furnitures: Shaker and Arts & Crafts. (*furniture*-noun)

Following Krifka (1995), such a plural is licensed when a noun designates an entity standing in a taxonomic relation (T) to a kind (Krifka et al. 1995), and that entity counts as at least two ‘kind units’ (KU).

$$(8) \quad \llbracket \text{wines} \rrbracket := \lambda w \lambda x [T_w(\text{wine}, x) \wedge KU_w(\text{wine}, x) \geq 2]$$

Natural kind terms naturally stand in kind–subkind relations, and thus have taxonomic plurals. We propose that taxonomic relations for artifacts are defined via the associated event: the subtype’s associated event must be a more specific instantiation of the supertype’s. Thus, *vehicle* and *car* stand in such a relation as they share the associated event ‘provide transportation’, though *car* further specifies it. Thus, *vehicle* has a taxonomic plural. As evidence, we show that artifact taxonomies defined via shared associated events have the key properties of well-defined taxonomies (Murphy 2002): a sub-element bears a kind-of relation to the super-element, a sub-element inherits properties from the super-element, and the super-/sub-element relation is transitive.

Furniture-nouns and their constituent entities have different associated events, e.g. furniture furnishes, but a chair is for sitting. Therefore, they cannot stand in a taxonomic super-/sub-element relation, explaining why *furniture*-nouns lack a taxonomic plural. This proposal may seem surprising as some researchers treat *furniture*-nouns as Roschian superordinate terms (Markman 1985, Rosch 1975): just as a typical count superordinate term (e.g. *vehicle*) gathers together heterogeneous subordinate terms with common properties, so does a *furniture*-noun. Yet, other researchers show the relation of such nouns to their purported subordinate terms lacks the properties of a well-formed taxonomy (Wierzbicka 1985, Wisniewski et al. 1996, Mihatsch 2007). Consider *mail* and *magazine*: it seems off to call a magazine a kind of mail; further, magazines don’t inherit a key property of mail as only some come by post.

Conclusion We have provided a uniform semantics for various types of artifact nouns which naturally accounts for the unique properties of *furniture*-nouns. Key to our analysis is the recognition that artifact nouns encode a relation between entities and a predicate designating an associated event.