What Does It Mean To Be A Shelf?
Semantic Bleaching and WORDNET

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Denominal Verbs: Box and Butter

Remarks on Denominals (Kiparsky, 1997):

John boxed the present
John PUT present IN \(<box>\)

John boxed the present in a gift box
#John boxed the present in a paper bag
Remarks on Denominials (Kiparsky, 1997):

John boxed the present
John PUT present IN <box> Location

  John boxed the present in a gift box
#John boxed the present in a paper bag

John buttered the bread
John PUT <butter> ON bread Locatum

  John buttered the bread with margarine
#John buttered the bread with marmalade/onions
Partial Bleaching

Peter shelved the books on the windowsill/mantelpiece/stand/table

#Peter shelved the books on the ball/spike/ceiling/floor/balcony

shelf → shelve
N → V
Partial Bleaching

Peter shelved the books on the windowsill/mantelpiece/stand/table

#Peter shelved the books on the ball/spike/ceiling/floor/balcony

Sue breaded the fish with breadcrumbs/shredded coconut/crushed almonds

#Sue breaded the fish with marmalade/butter/treacle/ice
Full Bleaching

Location verbs:

to land a hydroplane on water
to dump garbage by the roadside
to ditch a car in a vacant lot
to warehouse the empty crates in the silo
Full Bleaching

Location verbs:

to land a hydroplane on water
to dump garbage by the roadside
to ditch a car in a vacant lot
to warehouse the empty crates in the silo

Locatum verbs:

highways blanketed with fog
burgers blanketed with onions
streets blanketed with cars
a steep embankment blanketed with dense foliage
Full Bleaching

Locatum verb (blanket):

- highways blanketed with fog
- burgers blanketed with onions
- streets blanketed with cars
- a steep embankment blanketed with dense foliage

Locatum verb (blindfold):

- blindfolded with his own shirt/duct tape/a filthy rag/a teacosy

• Note: blindfold, dump are de-verbals (diachronically)...

Question

Can WordNet be used to predict and account for semantic bleaching?
**Question**

Can WordNet be used to predict and account for semantic bleaching?

**Spectrum of bleaching:**

<table>
<thead>
<tr>
<th></th>
<th>box</th>
<th>butter</th>
<th></th>
<th>shelf</th>
<th>bread</th>
<th></th>
<th>blanket</th>
<th>blindfold</th>
</tr>
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<tbody>
<tr>
<td>none</td>
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WORDNET

- Synonym set (synset) network for nouns, verbs, adjectives and adverbs
- Synsets connected by semantic relations (isa, antonymy, etc.)
- Size: 10K verbs (polysemy 2), 20K adjectives (polysemy 1.5)

change, alter

connect, link, tie

better, improve, amend,...

join, conjoin

mend, repair, fix, doctor,...

patch, piece

hypernym

hypernym

hypernym
## WORDNET Relations

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<tr>
<th>Relation</th>
<th>Description</th>
<th>Example</th>
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<td>x HYP y</td>
<td>y is a hypernym of x</td>
<td>x: repair, y: improve</td>
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<td>x entails y</td>
<td>x: breathe, y: inhale</td>
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<td>y is a cause of x</td>
<td>x: anesthetize, y: sleep</td>
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<td>y is similar to x (V)</td>
<td>x: behave, y: pretend</td>
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<td>x ANT y</td>
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<td>x: present, y: absent</td>
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Using **WORDNET**

- Concept of *shelf* as a horizontal support:
Using **WORDNET**

- Concept of *shelf* as a horizontal support:

![Diagram of hypernym relationships between shelf, bookshelf, hob, chimneypiece, mantle, mantelpiece, mantel, and overmantel.]

- Concept of *shelf* as a projecting ridge
Using WORDNET

• Concept of shelf as a horizontal support:

• Web search (shelved + on <location>):
Support and Shelf

<noun.artifact> shelf
-- (a support that consists of a horizontal surface for holding objects)
=> <noun.artifact> support
-- (any device that bears the weight of another thing)
Cannot account for *table*:

- Notion of “functional” hypernymy
Hyponyms of Support

andiron, firedog, dog, dogiron, arch support, back, backrest, backboard, baluster, base, pedestal, stand, bearing, bearing wall, bedpost, bookend, brace, bracket, bridge, foot, foothold, footing, handrest, hanger, harness, harp, headstock, leg, perch, pier, pillow block, rack, stand, rest, rib, rocker, seat, shelf, skeg, sling, spoke, radius, step, stair, stirrup, stirrup iron, stock, gunstock, structural member, tailstock, tee, football tee, undercarriage, yoke
WordNet and Non-Bleaching Verbs

Asphalt and tarmac:

the crew asphalted/tarmaced the road with fresh asphalt/new tarmac

#the crew asphalted/tarmaced the road with concrete

#the crew asphalted/tarmaced the road with cobblestones
Hypothesis: Denominal leaf nodes are non-bleaching
Bleaching and Leaf Concepts

- **Counterexamples:** *blanket* and *blindfold*

  highways *blanketed with fog*
  burgers *blanketed with onions*
  streets *blanketed with cars*
  a steep embankment *blanketed with dense foliage*
Blanket

Functional superordinate: covering
Coverings: Natural and Artificial

Natural coverings:

scale, shell, test, body, covering sheath, case, integument, blanket, mantle, crust, incrustation, encrustation, envelope, shell, eggshell, slough, peridium, pericarp, seed vessel, perianth, floral envelope, theca, sac, indusium, bark

Artificial coverings:

artificial skin, bootleg, canopy, casing, cloak, cloth, covering, clothing, clothes, apparel, vesture, wearing apparel, wear, coating, coat, cover plate, fig leaf, flap, floorcover, floor covering, folder, footwear, footgear, imbrication, overlapping, lapping, instep, mask, mercy seat, paddlebox, protective covering, protection screen, cover, covert, concealment, swathing top, upholstery, wrapping, wrap, wrapper
Bleaching of Blanket

Web Data:

snow, fog, parachutes, sauce, smog, debris, ash, flowers, glaze, wildflowers, bacon, forest, garland, mixed grill, turkey, ham, smoke, compost, clippings, mulch, cheese, onions, plants, fallout, panels, bodies, pines, mixture, foliage, tephra, blast material, craters, salsa, yogurt, shards, paper, scrub, cars, till, wilderness, loess, crabmeat, fondue, logos, landmines, deposits, Teflon, bags, turf, notices, bracken, heather, moss, mud, fronds, trees, groves, posters, handbills, doorknobs, powder, haze, sand, absorbent, leaves, stars, crickets, peanuts, plaques, foul air, particles, ice, rainforest, spruce, cedar, coating
Bleaching of Blanket

Exclude metaphorical uses:

The countryside is blanketed in *snow*, but it is also blanketed with *concern* [BBC NEWS]

Event semantics:

x PUT <*blanket*> ON/OVER y
x PUT <*covering*> ON/OVER y

Same goes for *blindfold*...
Spindle and Spear

the dragon has been spindled on a spear
x PUT y on <spindle>

WordNet hierarchy:

```
spindle₁ isa rotating shaft isa rod
  isa

artifact isa instrumentality isa implement

spindle₂ isa stick
```
Components of a Spear

WordNet hierarchy:

- Two senses for *spear*:
  1. an implement with a *shaft* and a barbed point used for catching fish
  2. a long pointed *rod* used as weapon
- Notion of Indirect Functionality: *sharpened shaft* or *rod*
Summary

Linguistic Phenomenon of *Semantic Bleaching*:
- Location/Locatum denominals
- ...or morphologically and semantically related noun/verb pairs

Application of WordNet’s hyponym-hypernym network
- Functional hypernymy...

Evaluation of the hyponym-hypernym network
- Possible changes... (table/shelf)
- Language specificity?