Between noun comparisons

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This work was carried out as part of the project

At the intersection of modification and scalarity:

The semantic mapping of scale structure

onto the interpretation of modifiers

PI: Elena Castroviejo Miró, Madrid, Spain;

Thanks to the **Spanish government** for funding.

Plan: Between noun comparisons

- Background & challenges (~20)
- A proposed solution (~30)
  - A. Contrast-set comparisons
  - B. A generalized definition.
  - C. An interpretation mediated by dimensions.

Adjectival Comparatives

- A *between-predicate comparison*

a. The sofa is longer than the table is wide.

- A *within-predicate comparison*

b. The sofa is longer than the table .

Incommensurability

- A *between-predicate comparison*

a. The sofa is longer than the table is wide.

- A *within-predicate comparison*

b. The sofa is longer than the table .

c. #The table is longer than the sofa is heavy.

d. #The house is taller than it is not.

- *A cross polar anomaly* (Kennedy 1999)

e. #The house is taller than the ladder is short.

Commensurability

- *Unit-based Comparisons:*

a. The table is (2cm) longer than the sofa is wide.

- *Cross polar nomalies* (Büring 2007, Heim 2008):

b. The ladder is shorter than the house is high /?tall

(≅ Er(The ladder is not tall, The house is ~~not~~high/ ~~not tall~~)).

- *Comparison of deviation* (Kennedy 1999):

c. My clock is faster than yours is slow.

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In all 3 cases, there's a common unit.

#Within noun comparisons (cf., Baker 2003)

- **#Ducker, #Duckest, #duck enough, #too duck, #very duck …**
- #Meod barvaz, Haxi barvaz, Barvaz miday, #lo maspik $barvaz_{extent}$ …
- **#Tweety is more a duck than Mr. Ed**
- #Tweety hu yoter barvaz me-Mr. Ed.

Literal readings

a. #Ha-cipor ha-yemanit hi yoter barvaz me-ha-cipor ha-smalit.

   #The rightmost bird is more a duck than the leftmost bird.

b. #Ha-cipor ha-yemanit hi haxi barvaz.

   #The rightmost bird is the most duck.

Non-literal readings: ‘duck-like’

a. Ha-cipor ha-yemanit hi yoter barvaz me-ha-cipor ha-smalit.

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b. Ha-cipor ha-yemanit hi haxi barvaz.

   ?The rightmost bird is the most duck.

Thanks to Moria Ronen for the picture!

#Within noun comparisons

a. #Ha-cipor ha-yemanit hi yoter barvaz ambatya me-ha-cipor ha-smalit.

   #The rightmost bird is more a toy duck than the leftmost bird.

b. #Ha-cipor ha-yemanit hi haxi barvaz ambatya.

   #The rightmost bird is the most toy duck.

Thanks to Moria Ronen for the picture!

#Within noun comparisons

- **#Tweety is more a duck than Mr. Ed/ very duck/ …**

- Assumption (Sassoon 2010a,b, 2013):
  - Within-adjective *more* denotes a minus operation.
  - Adjectives denote interval-scale properties (hence, the felicity of 2cm taller).
  - Nouns denote ordinal properties (hence, their infelicity with this type of *more* comparisons).

Goal: Between noun comparisons

1. Chevy is more **a car** than **a truck**.
2. John is more **a linguist** than **a psychologist**.
3. This stool is really more **a table** than **anything else**.
4. Bling Bling says "tweet“. I'm convinced he's more **a bird** than **a cat.**
5. The extensive piano part is more of **a first among equals** than **a showcase for a virtuoso soloist**.
6. This drink is more **water** than **wine**.
7. The ostrich is more **a bird** than the platypus is **a mammal.**

The challenge

- How to account for the felicity of nouns in between-predicate comparisons, while capturing their infelicity in within-predicate comparisons??
- Postulating even only ad-hoc, contextual, meta-linguistic, last resort gradability to capture (c-d), results in wrong predictions for (a-b).

a. **#Rubinstein is more a pianist than my son**.
b. #Rubinstein yoter psantran me-ha-ben sheli.
c. **Rubinstein is more a pianist than a conductor**.
d. Rubinstein yoter psantran me-menacea'x.

Commensurability in nouns is not unit-based

1. The extensive piano part is more of **a first among equals** than **a showcase for a virtuoso soloist**.
2. More **a car** than **a truck**
3. More a **mammal** than a **bird**

- It is not based on a deviation from a midpoint, as in My clock is faster than yours is slow, which entails the positive: Mine is fast, Yours is slow.
- The predicates are not antonyms, but are understood slightly that way in the context (cross polar noun comparisons??).

Additional challenging facts about between-noun comparisons

a. Tweety is more a bird than a mammal

b. Tweety is a bird, not a mammal.

c. ? Tweety is more a bird than Mister Ed is a mammal

1. A metalinguistic flavor: From (a) it follows that the speaker prefers to call Tweety a bird than to call him a mammal, if these are the only available options.

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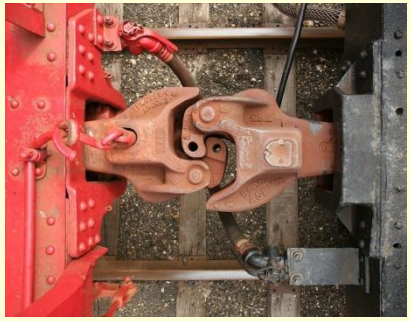
3. Number of arguments: (a) is preferred to (c).

   The metalinguistc implications seem too weak.

   It is felt to be less useful, informative, to the point.

   If (c), then __ ??

Short remarks on existing accounts



Between adj. comparison as metalinguistic

a. ?Dan is more tall than Ram is intelligent.

b. The baby is more tired than hungry.

1. **Klein (1991), Giannakidou & Yoon (2011):** Comparisons of appropriateness or subjective speaker preference of propositions. (a) is an answer to *Is Ram intelligent?* rather than to *How tall is Dan?*

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2. **Morzycki (2011):** Comparisons of degrees of imprecision required for verification (layer ranks in Lasershonian halos).
   - "Dan is tall" is closer to the truth than "Ram is intelligent"
   - The degree of imprecision required to render Ram intelligent is not sufficient to render Dan tall.
     - Not restricted enough: Any proposition has a degree of imprecision.

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3. **Doetjes (2010), Bale (2006-11):** Comparisons of relative positions of entities on different scales. Comparisons of the degree ranks, rather than the degrees themselves.
   - Not restricted enough

Between noun comparisons – not necessarily metalinguistic

a. #Rubinstein is more a pianist than my son (is).

b. Rubinstein is more a pianist than a conductor.

- Metalinguistic grading (by speaker preferences, degrees of imprecision, or ranks) should be equally available in within- and between-predicate comparisons. But we do observe a contrast: a < b ☹.
- Greek has 2 comparison morphemes: *apo/apoti* for ordinary comparisons vs. *para* for metalinguistic ones. Both license between-noun comparisons (Giannakidou & Yoon 2011).
- (b) can answer the question *How much is Rubinstein a pianist/ conductor?*

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- (b) can answer the question *How much is Rubinstein a pianist/ conductor?*
- The orderings used seem to be those underlying categorization. Understanding them may help us understand the restrictions on the use of *more*.

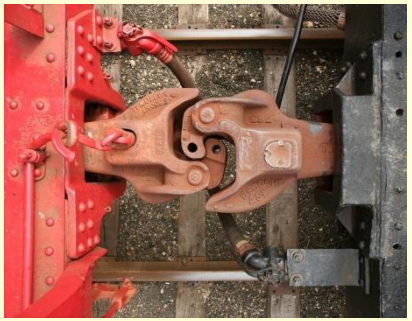
Comparisons with an elided Much

- Doherty & Schwartz (1967): Nominal comparisons are mediated by an elided adjective *much*. *More* is the comparative *much+er*.
  - How does much build gradable senses for nouns?
  - Why are between-noun comparisons better than within-noun ones?
  - How are comparisons between much-modified nouns different from ones within much-modified nouns?

    (two different much's??)

Toward a solution for the problem

- The analysis of between-noun comparisons must involve orderings based on at least two nominal predicates.
- Such a solution won't extend to within-noun comparisons, as they only have one predicative argument.



- Chevy is more **a car** than **a truck**.
- #This Chevy is more **a car** than that Chevy.

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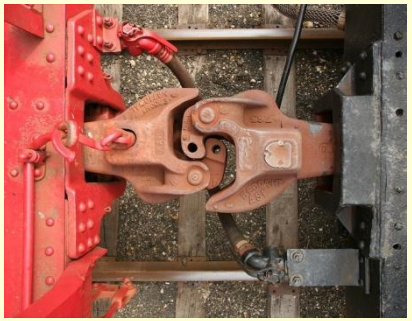


- Chevy is more **a car** than **a truck**.
- #This Chevy is more **a car** than that Chevy.

Contrast-based categorization

A. Contrast-set comparisons

a. This ball is more **red** than **blue**.

b. This Thai dish is more **sour** than **sweet**.

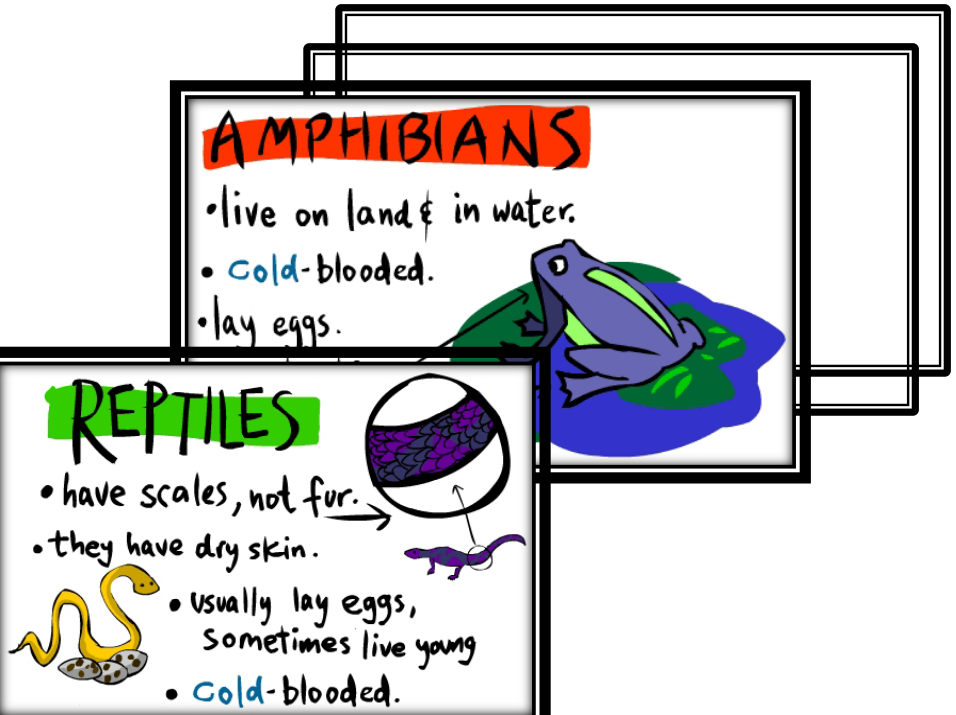
c. Tweety is more **a bird** than **a mammal**

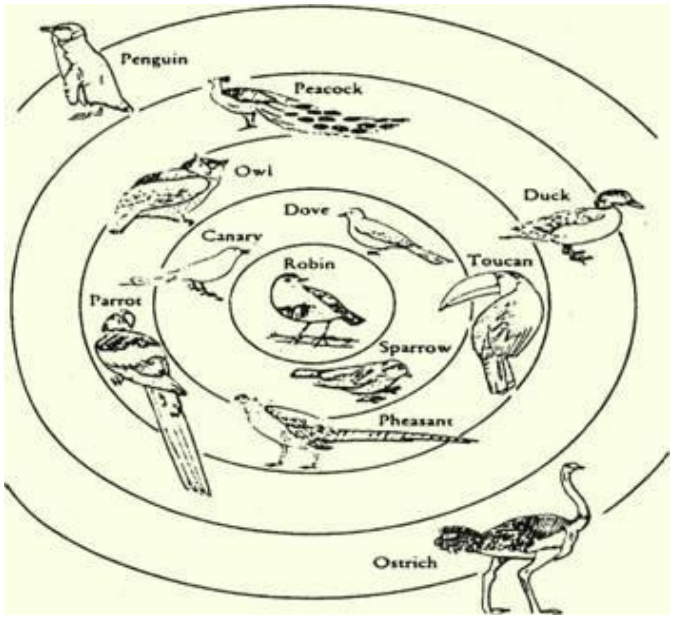
- Instead of a unique antonym, a set of contrasting categories K_P plays a role in the predicates' interpretation.
- Contrast set categories easily compare.
  - K_{red} = {pink, white, orange, yellow…}
  - K_{bird} = {mammal, bird, reptile, insect, fish …}
  - K_{sweet} = {sweet, sour, salty, …}

Dimension-based categorization

(Tversky 1977; Hampton 1995; Smith and Minda 2002)

- The study of concepts shows that in nouns entities rank by:
  - how good examples they are
  - how much they resemble the noun's prototype
  - how much their values on the dimensions match the ideal ones.





(Katamba 2005: 128)

Dimension-based categorization

(Tversky 1977; Hampton 1995; Smith and Minda 2002)

- Entities are categorized based on addition or multiplication of their degrees in multiple dimensions.

1. The distance of d from P in a dimension F:

   $\text{Distance}(d,P,F) = \text{Weight}(F_1,P) \times | \text{Deg}(d,F) - \text{Ideal-Value}(P,F) |$

2. The mean-distance of d from P w.r.t. $F_1, \ldots, F_n$:

   $\text{Distance}(d,P) = \text{Distance}(d,P,F_1)) + \ldots + \text{Distance}(d,P,F_n)$.

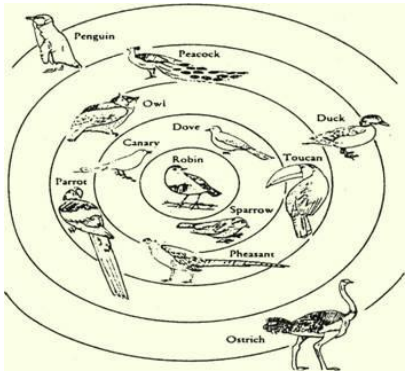
3. The similarity of d to P is the inverse of d's distance :

   $\mathbf{Deg(d,P)} = 1/(e^{\text{Distance}(d,P)})$.

   (The universal law of generalization, Shepard 1987)

4. Entities are P iff their similarity to P is big enough:

   $[\![\mathbf{P}]\!] = \{d \in D \mid \text{Deg}(d,P) \geq n \}$



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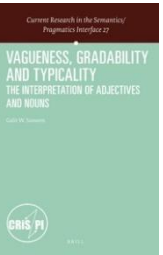

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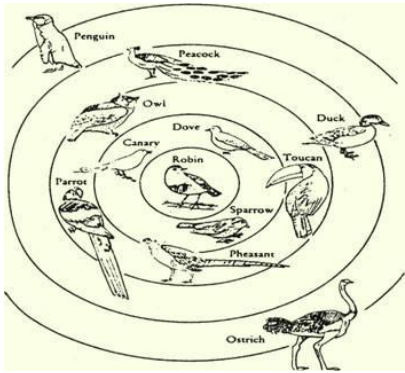
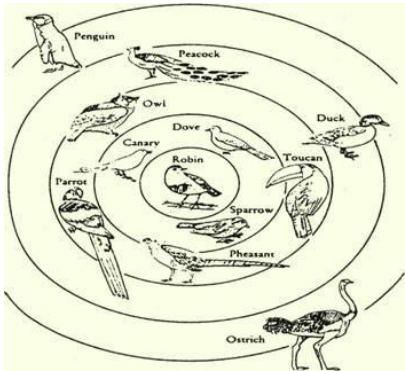


Dimension-based categorization

(Tversky 1977; Hampton 1995; Smith and Minda 2002)

- This analysis predicts many typicality effects (Murphy 2002).
- The robust correlation between likelihood of categorization of an entity and its similarity to the prototype.

  [e.g., Hampton (1998; ~500 items, 18 categories) found a very strong coupling between the mean typicality ratings of items and the probability that they were categorized positively.]
- Thus, this theory captures the fact that we can determine membership of infinitely many new instances, on the basis of a finite set of known facts (dimensions and members):
- Newly encountered entities whose mean similarity is higher than that of known members can be automatically regarded as members.



Contrast-based categorization

(Tversky 1977; Smith and Minda 2002; Ashby and Maddox 1993)

- However, in Hampton's (1998) data, there were also systematic dissociations between typicality and membership present.
- 1 of 3 main reasons for them was existence of *contrast concepts*.

- For example, both *kitchen utensil* and *furniture* were part of the stimuli. This reduced the likelihood of classification, but not the typicality of items like a *refrigerator* in the category *furniture*.

Contrast-based categorization

(Tversky 1977; Smith and Minda 2002; Ashby and Maddox 1993)

1. Nominal concepts P are often assumed to belong to a contrast set, K_P ($|K_P| > 1$) of disjoint categories that cover the local domain, D_{Kp} .

2. Degree in P normalized relative to K_P:
   $Norm(d,P,K_P) = Deg(d,P) / \Sigma_{Q \in Kp} Deg(d,Q)$.
   (How much d is P and not anything else –
   The ratio between d's similarity to P
   and d's similarity to the contrast categories)

3. An entity is classified in the contrast category it resembles most:
   $[\![P]\!]_{Kp} = \{d \in D_P \mid \forall Q \in K_P,\ Norm(d,P,K_P) > Norm(d,Q,K_P)\}$.

Contrast-based categorization

- Assume K = {P, Q, Z}, and two items d_1 and d_2:

			Total
$deg(d_1,P) = 0.33$	$deg(d_1,Q) = 0.33$	$deg(d_1,Z) = \mathbf{0.34}$	1
$deg(d_2,P) = \mathbf{0.42}$	$deg(d_2,Q) = 0.18$	$deg(d_2,Z) = \mathbf{0.40}$	1

- Because the sum of degrees of each d is 1, for each P, Norm(d,P,K) = Deg(d,P).

- d_2 is more similar to Z than d_1, but d_1 is Z, the category which d_1 resembles most, and d_2 is P, the category d_2 resembles most.
- Thus, membership likelihood *may not* be coupled with similarity: d_2 is more of a Z than d_1 but is not classified under Z.

Contrast-based categorization

- The situation is different with binary contrast sets (~antonyms):

$deg(d_1,P) = 0.49$	$deg(d_1,Z) = 0.51$	1
$deg(d_2,P) = 1$	$deg(d_2,Z) = 0.66$	1.6
$Norm(d_1,P,K_P) = 0.49$	**$Norm(d_1,Z,K_P) = 0.51$**	
$Norm(d_2,P,K_P) = 0.60$	**$Norm(d_2,Z,K_P) = 0.40$**	

- d_1 is Z, the category d_1 resembles most in K, and d_2 is P, the category d_2 resembles most in K.
- Before normalization, d_2 is more similar to Z than d_1, but w.r.t. K, d_2 is less so.
- For example, a refrigerator better exemplifies furniture than a lamp, but this changes when K = {furniture, kitchen utensil}: The refrigerator classifies as a kitchen utensil, while the lamp classifies as a furniture.

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- For any d, Norm(d,Z,{P,Z}) = 1 – Norm(d,P,{P,Z}) – If d_1's normalized P degree is higher than d_2's, than d_1's normalized Z degree is smaller than d_2's.
- Thus, if $Z(d_1)$ & $\neg Z(d_2)$, d_2 cannot be more Z than d_1 w.r.t. {P,Z}.
- **Membership *is* coupled with normalized similarity in binary contrast-sets.**
- New entities which are more P relative to K_P than known P's can be automatically regarded as P w.r.t. K.

Contrast-set comparisons

- Noun comparisons involve concepts of the same contrast set:

  $[\![X \text{ is more } \mathbf{A} \text{ than } Y \text{ is } \mathbf{B}]\!]_{w,g} = 1$ iff for $\mathbf{K} = \{\mathbf{A},\mathbf{B}\}$:

  $$\text{Norm}([\![X]\!]_{w,g},\mathbf{A},K,w,g) > \text{Norm}([\![Y]\!]_{w,g},\mathbf{B},K,w,g).$$

- The contrast set K consists of the predicative arguments of *more*, which are analyzed as contextually disjoint and the only alternatives around, covering the local domain ($[\![A]\!]_{w,g} \cap [\![B]\!]_{w,g} = \varnothing$ and $[\![A]\!]_{w,g} \cup [\![B]\!]_{w,g} = D_{K,w,g}$.)
- The normalized degrees of the entity-arguments compare – The ratio between the similarity of each entity to the category applied to it and its similarity to the category applied to the other entity:

$$\text{Norm}([\![X]\!]_{w,g},A,K,w,g) = \frac{\deg([\![X]\!]_{w,g},\mathbf{A},w,g)}{\deg([\![X]\!]_{w,g},\mathbf{A},w,g) + \deg([\![X]\!]_{w,g},\mathbf{B},w,g)}$$

- We turn the degrees complementary—they sum up to 1.

  This helps us to decide which one is higher.

Contrast-set comparisons

a) $[\![\text{Tweety is more a bird than Mister Ed is a mammal}]\!]_{w,g} = 1$ iff $\text{Norm}([\![\text{Tweety}]\!]_{w,g}, \text{bird}, K, w, g) > \text{Norm}([\![\text{Mr. Ed}]\!]_{w,g}, \text{mammal}, K, w, g)$

b) The contrast set consists of the arguments: K = {bird, mammal}. These are the only alternatives.

c) The similarity of an entity to a contrast concept is normalized relative to the sum of its degrees in the concepts in K.

- Thus, (a) is true in w iff in w, Tweety is closer to the prototype of *bird* than Mister Ed is close to the prototype of *mammal*, when taking only these two prototypes into account.

Facts

a. Tweety is more a bird than a mammal

b. Tweety is a bird, not a mammal.

c. ? Tweety is more a bird than Mister Ed is a mammal

1. A metalinguistic flavor: From (a) it follows that the speaker prefers to call Tweety a bird than to call him a mammal, if these are the only available options.
2. A negative flavor It is implied that these are not optimal options, for otherwise the speaker would have said (b):
3. Number of arguments: (a) is preferred to (c).

   The metalinguistc implication seems too weak in (b).

   It is felt to be less useful, informative, to the point.

   If (c), then __ ??

1 The metalinguistic flavor

In binary contrast sets, categorization is always monotonic to similarity. Thus, *Tweety is more a bird than a mammal* implies that *Tweety is a bird*, given the contrast set.

- $[\![\text{Tweety is more a bird tan a mammal}]\!]_{w,g} = 1$ iff
  for K = {bird, mammal}:
  $\text{Norm}([\![\text{Tweety}]\!]_{w,g}, \text{bird}, K, w, g) > \text{Norm}([\![\text{Tweety}]\!]_{w,g}, \text{mammal}, K, w, g)$
  iff $[\![\text{Tweety is a bird}]\!]_{w,g,\ K = \{\text{bird, mammal}\}} = 1$.

- This gives rise to the metalinguistic flavor, namely the implication that the speaker prefers to call Tweety a *bird* than to call him a *mammal*.

2 The negative flavor

- The implication that the speaker prefers to call Tweety a *bird* than to call him a *mammal* is informative when **the default setting of parameters for categorization** – the dimensions, their weights, and the set of contrast categories – **do not render Tweety a bird.**
- **Only the setting of parameters with K = {bird, mammal} does**.

- $[\![\text{Tweety is a bird}]\!]_{w,g,} = 0$ &
  $[\![\text{Tweety is a bird}]\!]_{w,g,\ K\ =\ \{\text{bird, mammal}\}} = 1.$

3 The single-entity preference

Low potential for inference:

Tweety is more a bird than Mr. Ed is a mammal implies very little about their categorization. They may both be birds or both be mammals w.r.t. {bird, mammal}. Only single-entity comparisons have categorization entailments (Tweety is a bird w.r.t. K).

- 2-entity comparisons only entail trivially:
  - Mr. Ed is less a mammal than Tweety is a bird.
  - Tweety is less a mammal than Mr. Ed is a bird.
- Moreover, for Mr. Ed not to be much of a mammal, it holds that:
  - Mr. Ed is more a bird than Tweety is a mammal.

	Bird	**Mammal**
Ed	**Norm(d_1,P,K_P) = 0.49**	**Norm(d_1,Z,K_P) = 0.51**
Tweety	**Norm(d_2,P,K_P) = 0.666**	**Norm(d_2,Z,K_P) = 0.333**

3 The single-entity preference

- The metalinguistic flavor is lost: (a) does not imply that the Dolphin is a fish w.r.t. K = {fish,bird}. Thus, this construction is more marked for lack of inferential power.

a. *The Dolphin is more a fish than the platypus is a bird* Maybe yes

(dolphins resembles fish not birds, the platypus resembles both)

Anemone

3 The single-entity preference

Cyclamen

- We only easily accept trivial cases, such as (b-c).

b. *This flower is more red than this one is purple* Yes

(This one is very red, but that one is not purple, it's pink).

c. *The Dolphin is more a mammal than the platypus is a bird* Yes

(dolphins *are* mammals; the platypus is a mammal too).

3 The single-entity preference

Different entities may make salient different contrast categories:

- We have **world** knowledge telling us that the platypus and dolphin are mammals, or borderline between mammal and bird and between mammal and fish, respectively.
- Thus, we may want to add the contrast concept mammal, or even accommodate different contrast sets for the two entities. But this creates a clash with the semantics, and only decreases the inferential power. --For a binary, but no bigger set, a => b:
  a. Tweety is more a bird than Mister Ed is a mammal
  b. Tweety is less a mammal than Mister Ed is a bird

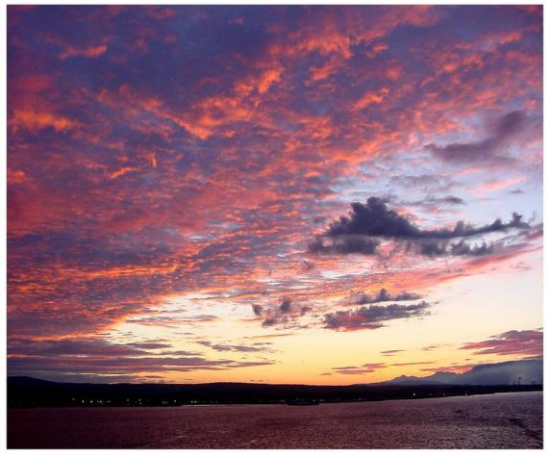
	Fish:	Bird:	Mammal:
Mr. Ed:	1	0	0
Tweety:	1/3	1/3	1/3

3 The single-entity preference

- Entity-arguments make salient different comparison classes, and possibly incommensurable contrast dimensions.

a. This {sky, ball} is more red than blue
   - Can mean “the red area is bigger than the blue area”

b. ?This {sky, ball} is more red than that ball is blue
   - Cannot mean: “the red area on this ball is bigger than the blue area on that ball”, because the balls may differ in size, drawing, number of colors, shades of colors… All these may affect the way we measure.



3 The single-entity preference

- Entity-arguments make salient different comparison classes that may trigger the use of different ranges of a scale.

a. This glass is more full than empty

  - Doubly closed scales compare: They can be easily converted to a single interval. Noun scales are readily closed and converted, for averaging.

b. ?This glass is more full than this bottle is empty

  - But different containers do not easily compare. Conversion between their different scales is non trivial.

c. A completely full Espresso cup is fuller than a half full tea cup??

  - A preference for a single (type of) entity even in within-adj comparison
  - Compared things are ideally all alike except with respect to full/empty.

    In nouns, no two things are all alike except w.r.t. bird/mammal. Thus, only single entities easily compare.

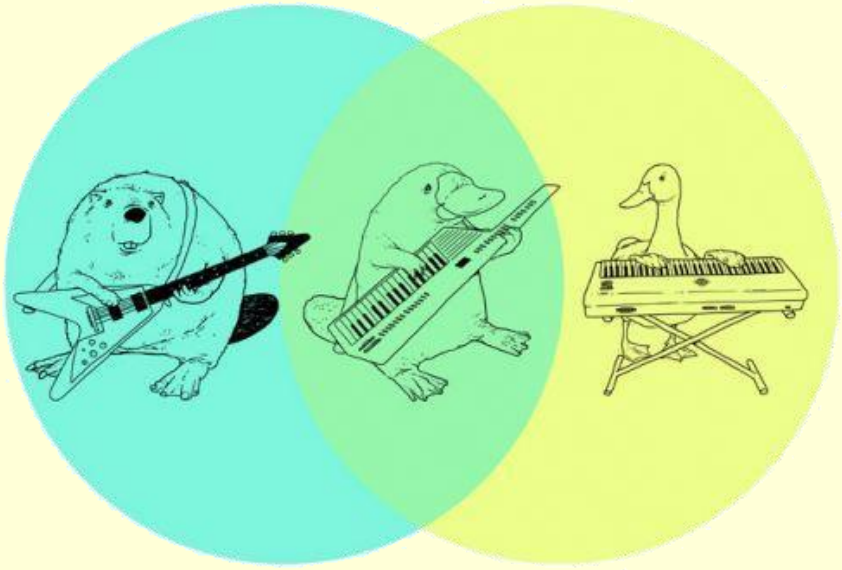
4. Solution to the main challenge

- Contrast-based *more* in "x is more P than y is Q" can't be licensed when P = Q.
- The notion of a contrast set K presupposes that there are at least two different contrast concepts, $|K| > 1$, namely, $P \neq Q$.
- All entities are always equally A w.r.t. {A}. A degree normalized w.r.t. to one and the same predicate is always 1:

$$\text{Norm}([\![X]\!]_{w,g},A,K,w,g) = \frac{\deg([\![X]\!]_{w,g},\mathbf{A},w,g)}{\deg([\![X]\!]_{w,g},\mathbf{A},w,g)} = 1$$

- "X is more a bird than Y" is false because all birds are equally so.

B. A generalized definition

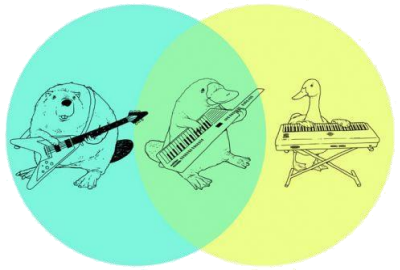


Comparisons with overlapping categories

a. Frank is more a pianist than a conductor

b. Van Benthem is more a philosopher than Bill is a linguist

c. Van Benthem is more a linguist than Bill is a philosopher



- Human traits often denote overlapping sets
- We may resist treating them as contrasting, seeing both (b) and (c) as true.
- The contrast set may comprise of the disjoint contrast categories philosopher who is not a linguist, linguist who is not a philosopher and one who's both. We normalize the degree of each entity in each type:

$$\text{Norm}(X,A,K) = \frac{A(X)}{A\&\neg B(X) \; + \; A\&B(X) + B\&\neg A(X)}$$

%	P&¬L	L& ¬P	L&P	Norm(P)	Norm(L)	Total
vB:	0	0	100	0+100/100 = **1**	**1**	**2**
B:	10	80	10	10+10/100 = **.2**	**.9**	**1.1**

Nominal ordering in complex concepts

1. … pretty much typical of a non-fan, non-entertainment, smart, up-market British paper (http://m.whedonesque.com/comments/5280)
2. You counter with an anecdotal tale about a non-typical non-developer. How does your counter-argument apply to a typical non-developer? (http://fox.wikis.com/wc.dll?Wiki~RemovingWindowsScriptingHost)
3. What were some exercises you would do on a typical non-running day? I read that they are mainly variations of pushups and situps... (http://forums.military.com/eve/forums/a/tpc/f/2681962206/m/1241902096)
4. There is one week where the format will be more typical of a non-seminar class. (http://acad.depauw.edu/~kertzman/mars/syllabus.htm)
5. [H]er irritating non-performance is typical of a primarily young (read 'cheap') cast… (http://www.amazon.com/review/RCTH05TFS0VQD)
6. The music is typical of a non-CD game - that is to say, worthless. It's tinny and very electronic sounding. (http://www.amazon.com/Mortal-Kombat-Trilogy-Nintendo-64/dp/product-description/B00002STFP)

C. Dimensions mediate interpretation

Final version

Dimensions mediate interpretation

- *Their suggestions are more similar than different*
- The number of similarity dimension with respect to which the suggestions classify as *similar* exceeds the number of dimension with respect to which they classify as *dissimilar*
- $|\{F \in Dim(similar)$: The suggestions are similar w.r.t. $F\}| > |\{F \in Dim(similar)$: The suggestions are not similar w.r.t. $F\}|$.

Dimensions mediate interpretation

a. Let us call the dimension set of A in w and g, Dim(A,w,g)

b. Let D associate predicates with dimension counts:

$$D(d,A,w,g) = |\{F \in Dim(A,w,g): A(x)\}| \,/\, |Dim(A,w,g)|.$$

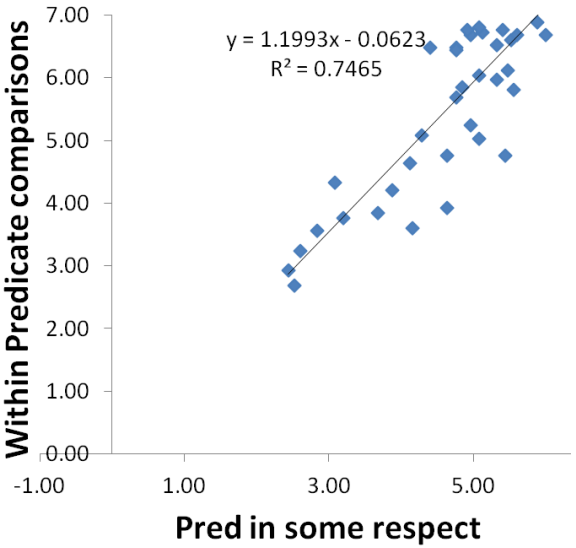
c. Let between-predicate morphemes systematically involve dimension counts, instead of degree functions, deg(d,A,w,g):

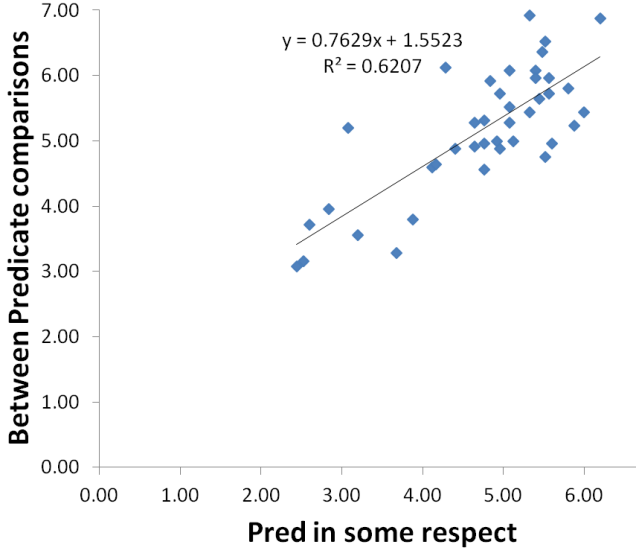
$$Norm(d,A,\{A,B\},w,g) = D(d,A,w,g) / (D(d,A,w,g) + D(d,B,w,g))$$

- E.g., for an entity to be *more a bird than a mammal* is to have a higher proportion of dimensions of birds than of mammal.

Dimensions mediate interpretation

Supported by high correlations between felicity of comparisons and felicity of explicit dimension counters, namely, quantifiers over dimensions ("X is P in n respects", where n = {every, most, some}).





(n=40, df=38)	Every respect	Most respects	Some respect
Between-Pred comparisons	(r=.64, t=5.08, P<.00001)	(r=.61, t=4.79, P<.000026)	(r=.69, t=5.8, P<.000001)
Within-Pred comparisons	(r=.75, t=7.04, P<.000001)	(r=.81, t=8.51, P<.000001)	(r=.82, t=8.73, P<.000001)

Dimensions mediate interpretation

- Recall: Entities are categorized in nouns based on **addition or multiplication of their degrees in multiple dimensions** (plus normalization w.r.t. a contrast set).

- Entities classify under a noun based on the number of dimensions they satisfy (Deg(d,P,w,g) = D(d,P,w,g)) iff

  The noun's dimensions are represented as binary, with equal weights, and **categorization is based on addition** (as opposed to multiplication), so **each dimension has an independent and constant effect** on the degree/categorization status of an entity.

- With 1 in all dimensions, except for one 0:
  - Multiplication gives **0 × 1 ×…× 1 = 0**.
  - Addition gives **0 + 1 +…+1 >> 0**.

Syntax (Adj/N) vs. *Domain* (concept type)

- Dimension independence (addition) characterizes social concepts (human traits & tools), but not natural kinds (Hampton et al., 2009).
- Prediction: The former are better in comparison constructions. ☺
- Between-social-noun comparisons are no worse than between-adjective ones. *Concept type affects felicity, over and above syntax.*

Figure 1: Adjectives (n = 10)

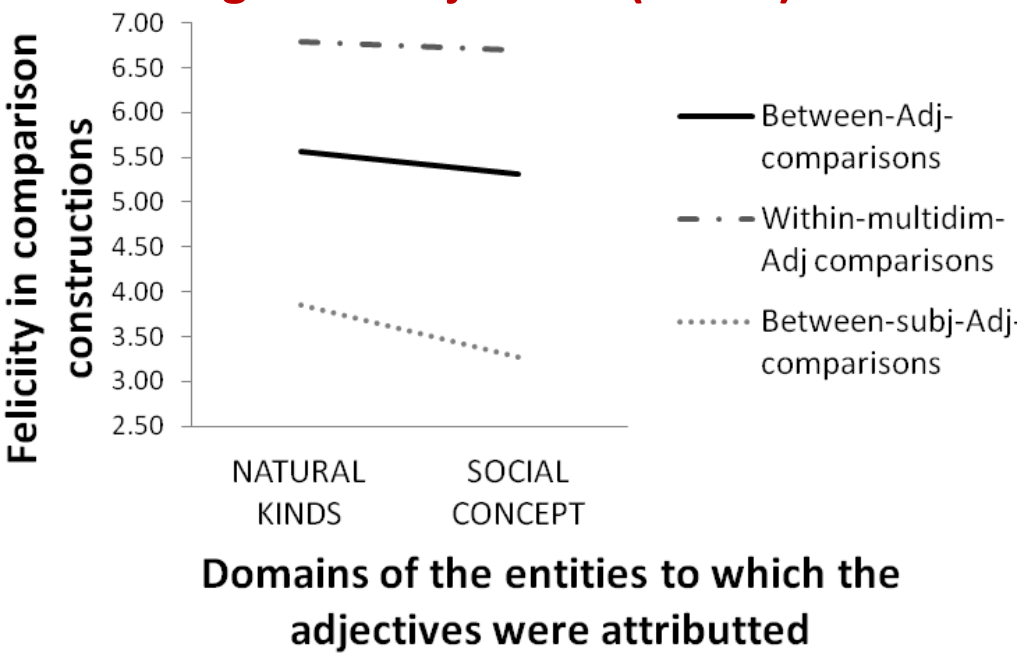
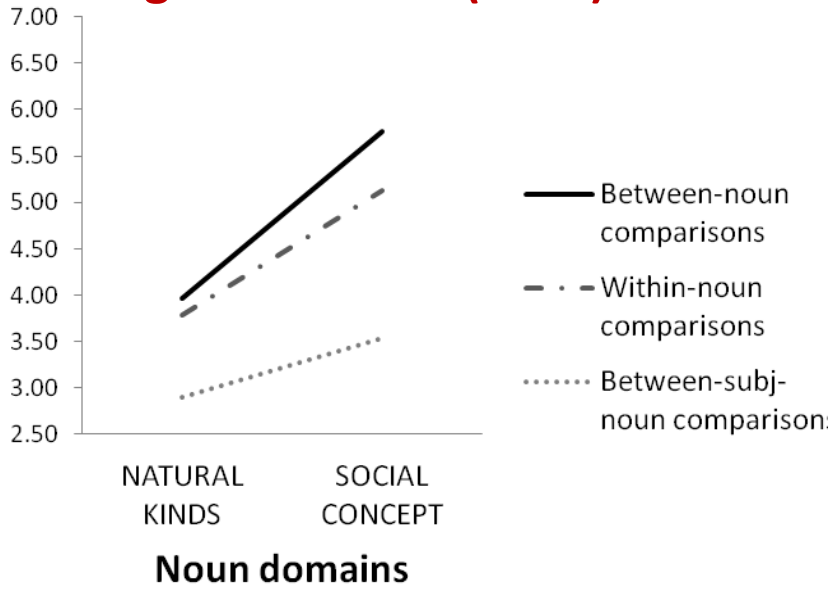


Figure 2: Nouns (n=20)



Summary and conclusions

1. For entities to compare relative to a nominal concept P:

- **Either** a mediating morpheme selects gradable dimensions from P's dimension set, e.g., *typical,* or the bare particle *of* (possibly via an elided adjective).
- **Or** another concept Q that forms a contrast set with P is used to license a contrast-based comparison.

2. Interpretations w.r.t. **a single entity** and **a binary contrast set** are preferred due to an increased inferential power.
3. Comparison with non-disjoint categories might be captured by means of a **generalized definition of normalized degrees**.
4. The analysis captures intuitive truth value judgments and inference patterns in disjoint vs. overlapping categories.

4. Interpretations w.r.t. **dimension counts** capture the correlations with explicit quantifiers on dimensions & concept type effects.

Future work

1. The theory of contrast based categorization was developed based on experimental research. Its linguistic significance has yet to be pinned down.
   - Connections between contrast-based categorization and Q-implicatures?
   - To what extent are comparisons by relative position contrast based? (more tired than hungry ⇔ tiredness/(t+h) > hunger/(t+h)).
   - Is *much* capable of triggering normalized contrast-based measurements, as in *pretty much a chair* or *not much of a bird*?

2. Cross linguistic experimental research of the data:
   - Inference patterns with different categories
   - Test the predictions of the suggested definitions with invented nouns.
   - Acceptability; Word order
   - As *(much) {a chair as a table, crazy as dumb}.

Thank you!

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☺

Mr. Ed

Differences
(Morzycki 2009, McCawley 1998, Embick 2007)

- -Er is a degree head that takes an AP and a than-PP as complements. Within-adjective *more* is the same.

- The metalinguistic (between-noun) *more A than B* is an adjunct
  - it can't be replaced wit –er
  - it is flexible w.r.t. position relative to the AP/ NP (as in (b)).
  - It is robustly cross-categorial
  - In some languages, it is expressed with distinct morphemes
  - It occurs with non-gradable (our non-interval scale) predicates.
  - It gives rise to a meta linguistic implication

a. *Murder is illegal more than speeding.
b. Your problems are legal more than financial (McCawley 1998).

Imprecision order (Morzycki 2009) can't explain:

a. George is {much, ?slightly, ??somewhat, ??a lot, ?no} more dumb than crazy.
b. George is dumb {much, *?slightly, *?somewhat, *?a lot, *?no} more than crazy.

- Interval–based degree modifiers are out (except for *much*)
- To the extent that degree modification (except by *much*) of metalinguistic *more* is good, it induces (says a reviewer) a **comparison of deviation** reading. That's a typical adjectival comparison based on degree intervals.

a. Tweety is {much, ?slightly, ??somewhat, ??a lot, ?no} more a bird than a mammal.
b. Tweety is a bird {much, *?slightly, *?somewhat, *?a lot, *?no} more than a mammal.

Imprecision order (Morzycki 2009) can't explain:

a. George is {much, ?slightly, ??somewhat, ??a lot, ?no} more dumb than crazy.
b. George is dumb {much, *?slightly, *?somewhat, *?a lot, *?no} more than crazy.

- To the extent that degree modification (except by *much*) of metalinguistic *more* is good, it induces (says a reviewer) a **comparison of deviation** reading. That's a typical adjectival comparison based on degree intervals.

a. *I am machine now more than man.
b. I am more machine now than man.
c. *I am more machine now.

- Metaphoric readings for the nouns in (c-d) create an adjectival difference reading (machine-like compares to human).
- (e)–intended as a within noun comparison,