Vagueness and Comparison

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Vagueness and Language Use

Vagueness and comparison

A building with a height of 525 meters is tall.

Vagueness and comparison

A building with a height of 525 meters is tall.

A building that is just a little bit shorter than a tall building is tall.

Vagueness and comparison

A building with a height of 525 meters is tall.

A building that is just a little bit shorter than a tall building is tall.

Therefore, a building with a height of 10 meters is tall.

Vagueness and comparison

A building with a height of 525 meters is tall.

A building that is just a little bit shorter than a tall building is tall.

Therefore, a building with a height of 10 meters is tall.

Three questions (Fara 2000)

1. The logical question
2. The epistemological question
3. The psychological question

Vagueness and comparison

A building with a height of 525 meters is tall.

A building that is just a little bit shorter than a tall building is tall.

Therefore, a building with a height of 10 meters is tall.

Similarity Constraint
When *x* and *y* (saliently) differ in *G* by a small degree, we are unable or unwilling to judge *x is G* true and *y is G* false.

Vagueness and comparison

What kind of fact is the Similarity Constraint? Where does it come from? How pervasive is it?

My plan for today is to use different ways of expressing of comparison as a probe into these questions. The facts will suggest the following conclusions:

- The Similarity Constraint is ultimately a linguistic fact, arising from a semantic property of vague predicates.
- In the case of vague gradable predicates, this property is a feature of the positive form but not the comparative form.
- The positive is not a constituent of the meaning of the comparative. (Maybe.)

Structure of the talk

1. Implicit vs. explicit comparison
2. Acceptability in contexts requiring ‘crisp judgments’
3. Implications for theories of vagueness and the semantic analysis of positive and comparative adjectives

Expressing comparison

The Eiffel Tower is tall.

Expressing comparison

The Eiffel Tower is tall.

The Sears Tower is tall.

Expressing comparison

324m

525m

Expressing comparison

The Sears Tower is taller than the Eiffel Tower.

Expressing comparison

The Eiffel Tower is smaller than the Sears Tower.

Expressing comparison

The Sears Tower surpasses the Eiffel Tower in height.

Expressing comparison

The height of the Sears Tower exceeds the height of the Eiffel Tower.

Expressing comparison

The Eiffel Tower is not tall compared to the Sears Tower.

Expressing comparison

Relative to the Sears Tower, the Eiffel Tower is small.

Expressing comparison

The Sears Tower is the tall one; the Eiffel Tower is the small one.

Expressing comparison

The Eiffel Tower in Paris, France is taller than the Eiffel Tower in Paris, Texas.

Modes of comparison

Explicit comparison
Establish an ordering between objects x and y with respect to gradable predicate G by using a (morpho-)syntactically marked form of G whose specific job is to express that information.

- *x is taller than y*

Modes of comparison

Explicit comparison
Establish an ordering between objects x and y with respect to gradable predicate G by using a (morpho-)syntactically marked form of G whose specific job is to express that information.

- *x is taller than y*

Implicit comparison
Establish an ordering between objects x and y with respect to gradable property G by using the unmarked (positive) form of G in such a way that it is true of x and false of y.

- *x is tall compared/relative to y*
- *x is the tall one*

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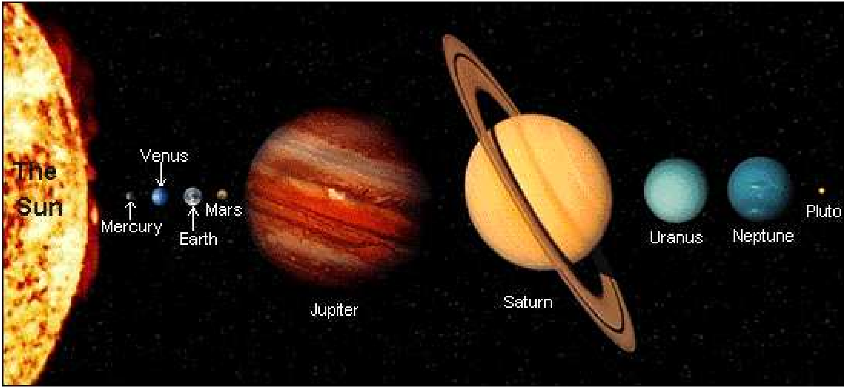
Implicit comparison
Establish an ordering between objects x and y with respect to gradable property G by using the unmarked (positive) form of G in such a way that it is true of x and false of y.

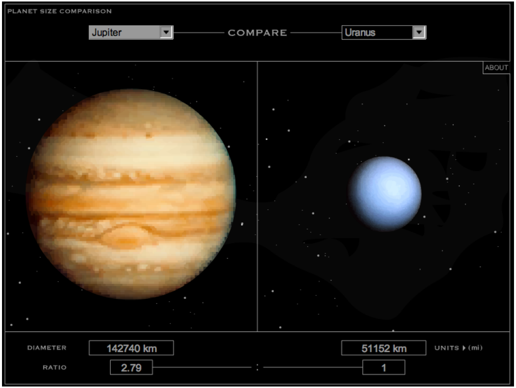
- *x is tall compared/relative to y*
- *x is the tall one*

These two modes of comparison differ in contexts involving crisp judgments: small differences in degree.

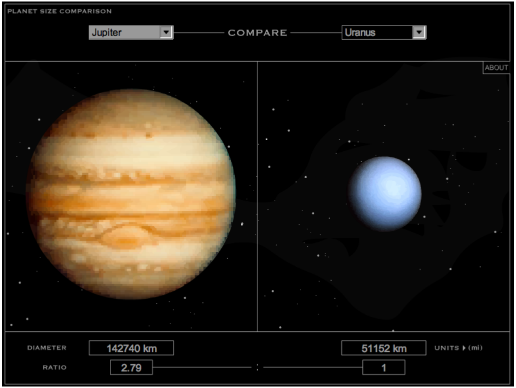
The Solar System



Uranus and Jupiter

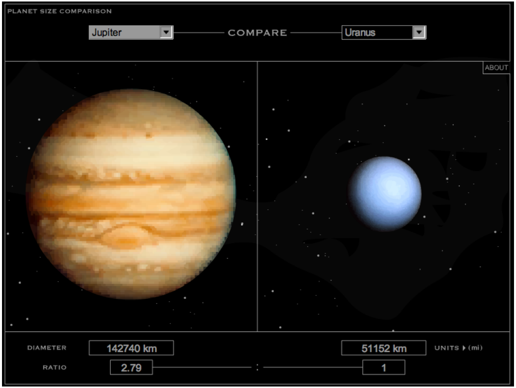


Uranus and Jupiter

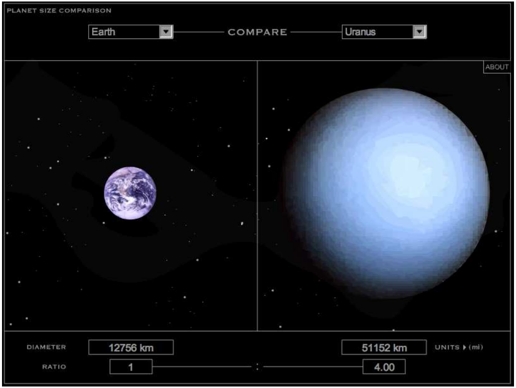


Compared to Jupiter, Uranus is not big.

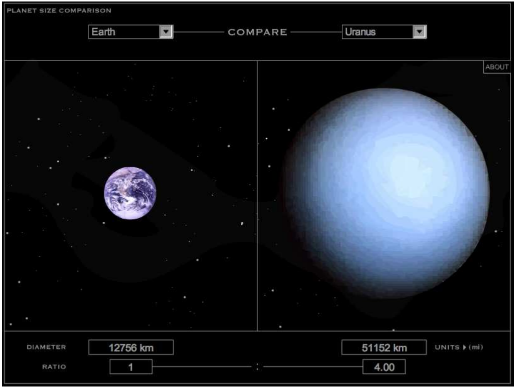
Uranus and Jupiter



Uranus and Earth

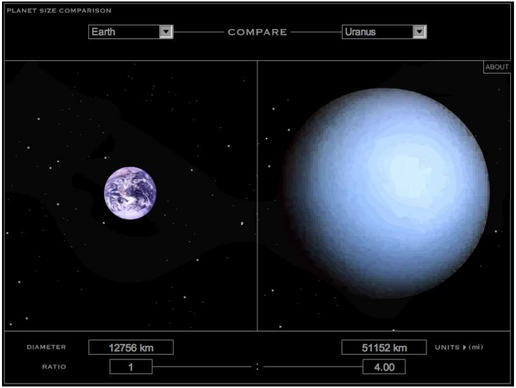


Uranus and Earth

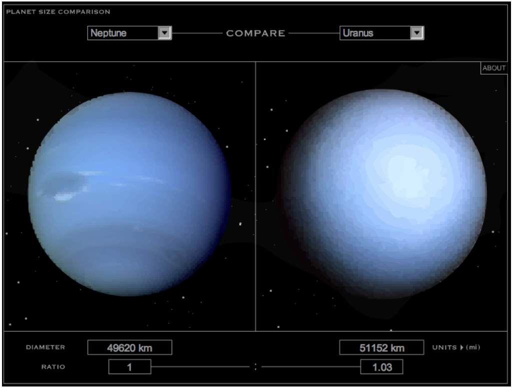


Compared to Earth, Uranus is big.

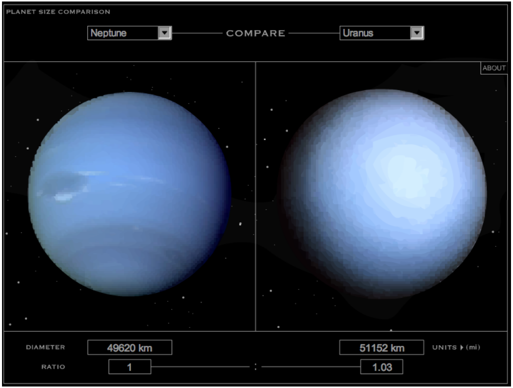
Uranus and Earth



Uranus and Neptune

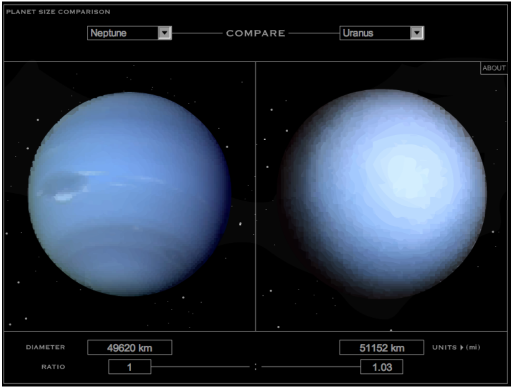


Uranus and Neptune



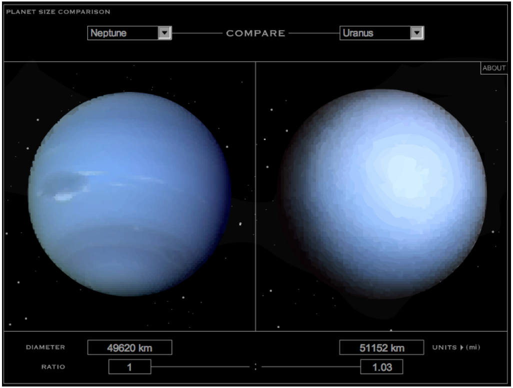
#Compared to Neptune, Uranus is big.

Uranus and Neptune



Compared to Neptune, Uranus is bigger.

Uranus and Neptune



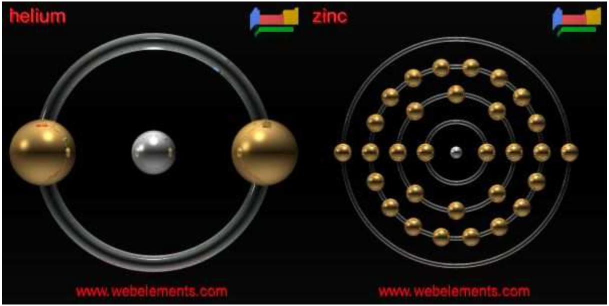
Uranus is bigger than Neptune.

The Periodic Table

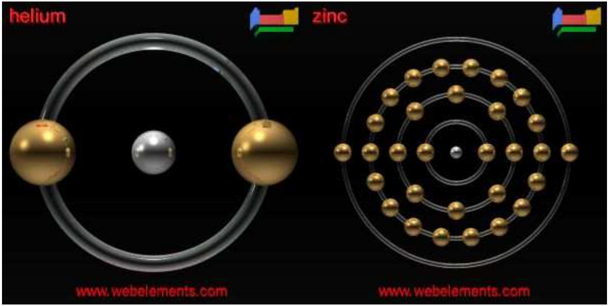
hydrogen 1 **H** 1.0079																		helium 2 **He** 4.0026
lithium 3 **Li** 6.941	beryllium 4 **Be** 9.0122												boron 5 **B** 10.811	carbon 6 **C** 12.011	nitrogen 7 **N** 14.007	oxygen 8 **O** 15.999	fluorine 9 **F** 18.998	neon 10 **Ne** 20.180
sodium 11 **Na** 22.990	magnesium 12 **Mg** 24.305												aluminium 13 **Al** 26.982	silicon 14 **Si** 28.086	phosphorus 15 **P** 30.974	sulfur 16 **S** 32.065	chlorine 17 **Cl** 35.453	argon 18 **Ar** 39.948
potassium 19 **K** 39.098	calcium 20 **Ca** 40.078		scandium 21 **Sc** 44.956	titanium 22 **Ti** 47.867	vanadium 23 **V** 50.942	chromium 24 **Cr** 51.996	manganese 25 **Mn** 54.938	iron 26 **Fe** 55.845	cobalt 27 **Co** 58.933	nickel 28 **Ni** 58.693	copper 29 **Cu** 63.546	zinc 30 **Zn** 65.39	gallium 31 **Ga** 69.723	germanium 32 **Ge** 72.61	arsenic 33 **As** 74.922	selenium 34 **Se** 78.96	bromine 35 **Br** 79.904	krypton 36 **Kr** 83.80
rubidium 37 **Rb** 85.468	strontium 38 **Sr** 87.62		yttrium 39 **Y** 88.906	zirconium 40 **Zr** 91.224	niobium 41 **Nb** 92.906	molybdenum 42 **Mo** 95.94	technetium 43 **Tc** [98]	ruthenium 44 **Ru** 101.07	rhodium 45 **Rh** 102.91	palladium 46 **Pd** 106.42	silver 47 **Ag** 107.87	cadmium 48 **Cd** 112.41	indium 49 **In** 114.82	tin 50 **Sn** 118.71	antimony 51 **Sb** 121.76	tellurium 52 **Te** 127.60	iodine 53 **I** 126.90	xenon 54 **Xe** 131.29
caesium 55 **Cs** 132.91	barium 56 **Ba** 137.33	57-70 *	lutetium 71 **Lu** 174.97	hafnium 72 **Hf** 178.49	tantalum 73 **Ta** 180.95	tungsten 74 **W** 183.84	rhenium 75 **Re** 186.21	osmium 76 **Os** 190.23	iridium 77 **Ir** 192.22	platinum 78 **Pt** 195.08	gold 79 **Au** 196.97	mercury 80 **Hg** 200.59	thallium 81 **Tl** 204.38	lead 82 **Pb** 207.2	bismuth 83 **Bi** 208.98	polonium 84 **Po** [209]	astatine 85 **At** [210]	radon 86 **Rn** [222]
francium 87 **Fr** [223]	radium 88 **Ra** [226]	89-102 * *	lawrencium 103 **Lr** [262]	rutherfordium 104 **Rf** [261]	dubnium 105 **Db** [262]	seaborgium 106 **Sg** [266]	bohrium 107 **Bh** [264]	hassium 108 **Hs** [269]	meitnerium 109 **Mt** [268]	ununnilium 110 **Uun** [271]	unununium 111 **Uuu** [272]	ununbium 112 **Uub** [277]		ununquadium 114 **Uuq** [289]				

* Lanthanide series	lanthanum 57 **La** 138.91	cerium 58 **Ce** 140.12	praseodymium 59 **Pr** 140.91	neodymium 60 **Nd** 144.24	promethium 61 **Pm** [145]	samarium 62 **Sm** 150.36	europium 63 **Eu** 151.96	gadolinium 64 **Gd** 157.25	terbium 65 **Tb** 158.93	dysprosium 66 **Dy** 162.50	holmium 67 **Ho** 164.93	erbium 68 **Er** 167.26	thulium 69 **Tm** 168.93	ytterbium 70 **Yb** 173.04
* * Actinide series	actinium 89 **Ac** [227]	thorium 90 **Th** 232.04	protactinium 91 **Pa** 231.04	uranium 92 **U** 238.03	neptunium 93 **Np** [237]	plutonium 94 **Pu** [244]	americium 95 **Am** [243]	curium 96 **Cm** [247]	berkelium 97 **Bk** [247]	californium 98 **Cf** [251]	einsteinium 99 **Es** [252]	fermium 100 **Fm** [257]	mendelevium 101 **Md** [258]	nobelium 102 **No** [259]

Zinc and Helium

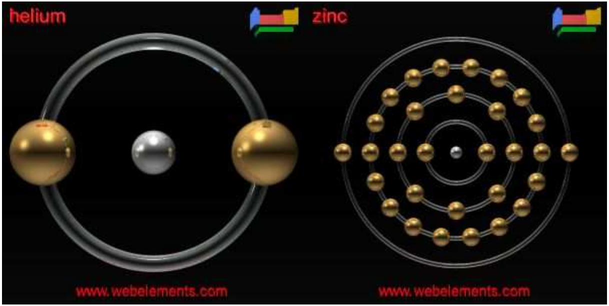


Zinc and Helium

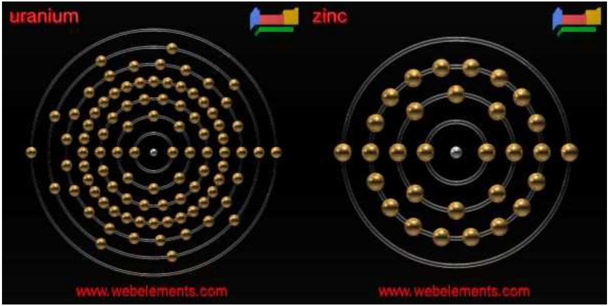


Relative to Helium, Zinc is heavy.

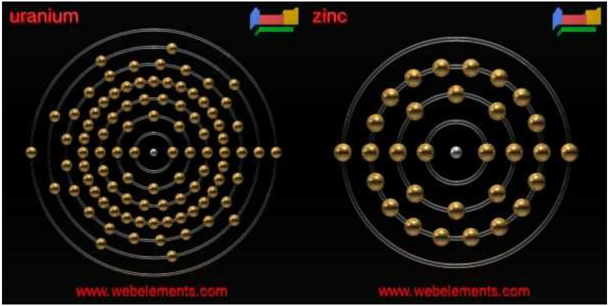
Zinc and Helium



Zinc and Uranium

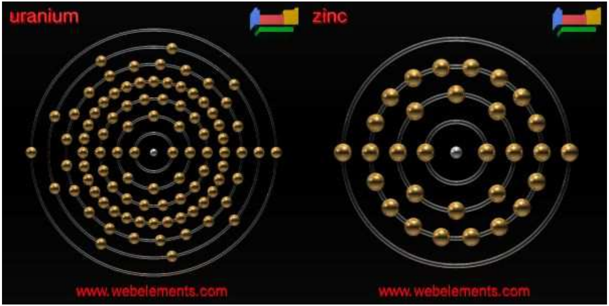


Zinc and Uranium

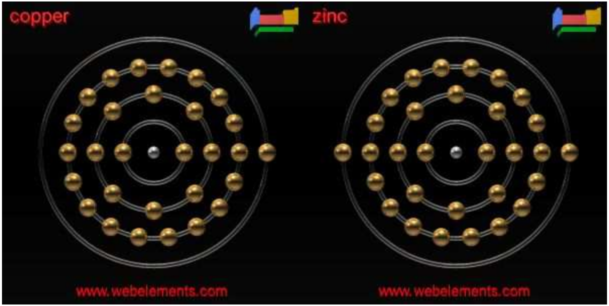


Relative to Uranium, Zinc is not heavy.

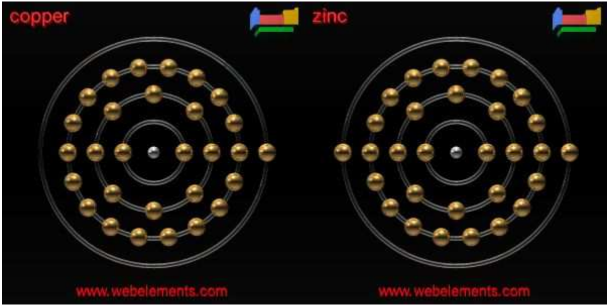
Zinc and Uranium



Zinc and Copper

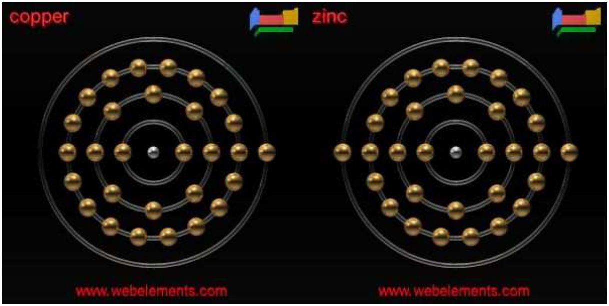


Zinc and Copper



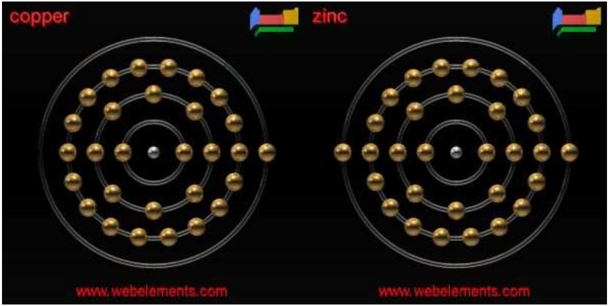
#Relative to Copper, Zinc is heavy.

Zinc and Copper



Relative to Copper, Zinc is heavier.

Zinc and Copper



Zinc is heavier than Copper.

Definite descriptions

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For the purposes of today's discussion, assume that the uniqueness and existence inferences associated with definite descriptions are presuppositions.

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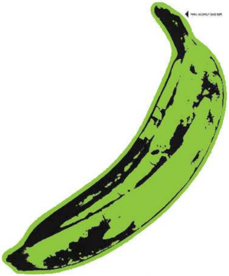
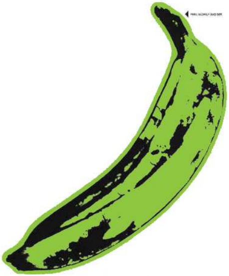
In a context containing two objects that both satisfy a particular nominal property (e.g., *banana*), we can use a definite description based on that property to distinguish one object from the other by adding a modifier which makes the description true of just one of the two objects.

Two bananas

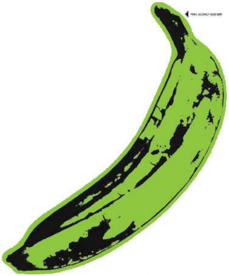


Two bananas



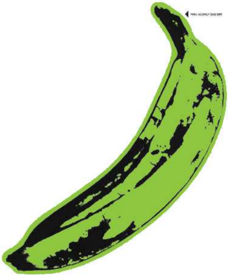
#The banana is big.

Two bananas



#The banana is big.
The green banana is big.

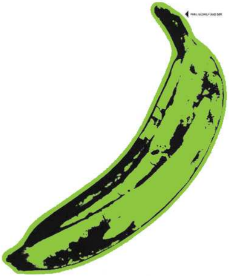
Two bananas



#The banana is big.
The green banana is big.
#The big banana is green.

Two bananas

Two bananas

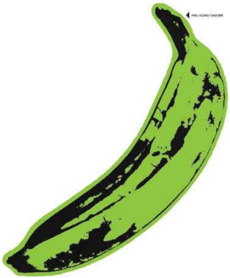


Two bananas

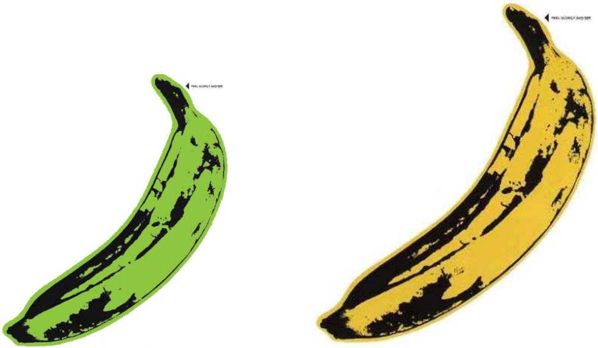
The big banana is green.

Two bananas

Two bananas



Two bananas



The big banana is yellow.

Standards of differentiation

Vague predicates have context dependent extensions: the standard of comparison for what counts as *big* can vary from context to context.

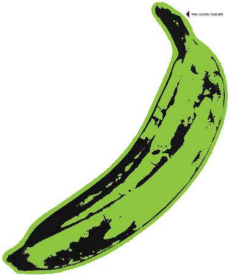
In the differentiation context, the presuppositions of the definite description are satisfied by shifting the standard of comparison so that it is true of the green banana in the first case and false in the second.

Standards of differentiation

The big banana is green.

SIZE:

Standards of differentiation

The big banana is yellow.

SIZE: ———————○———————→

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Both adults and children as young as 3 do this quite rapidly and successfully (Syrett, Kennedy and Lidz 2007).

Two bananas

Two bananas

Two bananas

 

#The big banana is green.

Two bananas

 

The bigg**er** banana is green.

A conflict

Even the presuppositions of the definite article are not sufficient to override the crisp judgment effect.

This is the case even though there is an observable difference between the two objects relative to the relevant scalar continuum:

- There is no question about where the distinction between *big* and *not big* needs to be made: at some point between the two bananas' sizes.
- Evidently, we cannot fix the (otherwise contextually variable) standard of comparison in such a way as to make this distinction.

Relative vs. absolute gradable adjectives

This is a fact about vague predicates in particular.

Relative vs. absolute gradable adjectives

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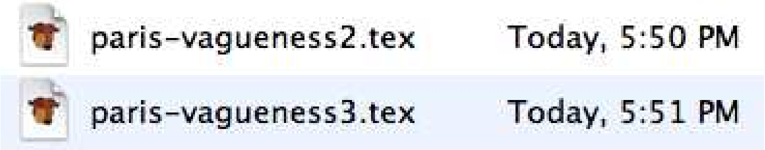
Some gradable adjectives have both relative (vague) and absolute (not vague) forms (Kennedy and McNally 2005):

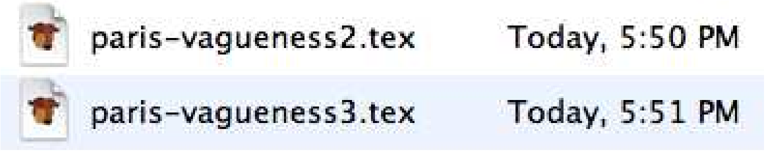
- *old/new* as a measure of date of creation/modification
- *old/young* as a measure of age

Only the latter are sensitive to crisp judgments.

Date of modification

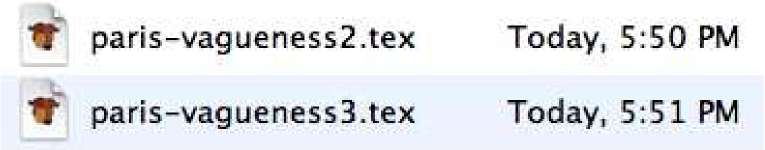


Date of modification



The old file is paris-vagueness2.tex.

Date of modification



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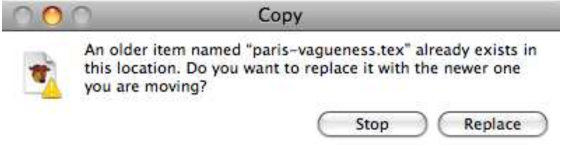
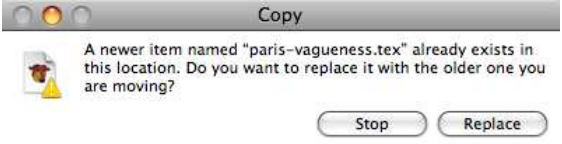
The new file is paris-vagueness3.tex.

Date of modification





Date of birth

Julian

Pieter

Date of birth

Julian
4 July, 2002
Pieter

Date of birth

Julian
4 July, 2002
Pieter
29 June, 2002

Date of birth

Julian
4 July, 2002
Pieter
29 June, 2002

#The one holding a shovel is the old one.
#The one holding a bucket is the young one.

Date of birth

Julian
4 July, 2002
Pieter
29 June, 2002

The one holding a shovel is the older one.
The one holding a bucket is the younger one.

Date of birth

Julian
4 July, 2002
Sterling
2 July, 2004

The one in the green coat is the young one.
The one in the blue coat is the old one.

Taking stock

The facts support the following empirical generalizations:

- Implicit comparisons (based on the positive form) do not allow for crisp judgments.
- Explicit comparisons (based on the comparative form) allow for crisp judgments.

Taking stock

What are the implications for theories of vagueness and the semantics of positive and comparative gradable predicates?

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- What are the implications of the facts for the semantic analysis of positive and comparative gradable predicates?

UNDERLYING POSITIVE	POS vs. COMP(POS)
UNDERLYING COMPARATIVE	free vs. bound standards
‘DECOMPOSITIONAL’	POS(A) vs. COMP(A)

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- What are the implications of the facts for the semantic analysis of positive and comparative gradable predicates?

UNDERLYING POSITIVE	POS vs. COMP(POS)
UNDERLYING COMPARATIVE	free vs. bound standards
'DECOMPOSITIONAL'	POS(A) vs. COMP(A)

These issues are independent, but usually not distinguished.

The Similarity Constraint

Of course, any theory of vagueness or semantic analysis of positive/comparative adjectives can account for the facts if we stipulate that the Similarity Constraint holds:

- When *x* and *y* (saliently) differ in *G* by a small degree, we are unable or unwilling to judge *x is G* true and *y is G* false.

But our goal is to explain where this constraint comes from, not to stipulate it. If the only way to account for the facts is to stipulate the constraint that's a problem for the theory.

Supervaluations

Kamp 1973

$[\![big]\!]^M = \{x \mid x \textit{ is definitely big in } M\}$

$[\![bigger]\!]^M = \lambda y \lambda x.\{M' \mid [\![big]\!]^{M'}(x) \wedge M' \textit{ completes } M\} \supset \{M' \mid [\![big]\!]^{M'}(y) \wedge M' \textit{ completes } M\}$

Supervaluations

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As Kamp himself observes, this semantics allows for arbitrarily fine-grained precisifications. But if the positive form can be arbitrarily precise, it should be insensitive to crisp judgments.

Supervaluations

Kamp 1973

$[\![big]\!]^M = \{x \mid x \textit{ is definitely big in } M\}$
$[\![bigger]\!]^M = \lambda y \lambda x.\{M' \mid [\![big]\!]^{M'}(x) \wedge M' \textit{ completes } M\} \supset \{M' \mid [\![big]\!]^{M'}(y) \wedge M' \textit{ completes } M\}$

As Kamp himself observes, this semantics allows for arbitrarily fine-grained precisifications. But if the positive form can be arbitrarily precise, it should be insensitive to crisp judgments.

We could stipulate that some models (the very precise ones) are inadmissible, but then explicit comparison should fail in crisp judgment contexts.

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Alternatively, we could hypothesize that the positive form has some semantic feature that restricts it to ‘coarse’ models, but then the theory would lose its status as a solution to the ‘markedness problem’.

Comparison classes

Wheeler 1972

$[\![big]\!] = \lambda X \lambda y.\mathbf{big}(X)(y)$

$[\![bigger]\!] = \lambda x \lambda y.[\![big]\!](\{z \mid z = x\})(y)$

No way to distinguish between *the big banana* and *the bigger banana* in the differentiation context.

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Klein 1980

$[\![big]\!]^c = \lambda y.\mathbf{big}(c)(y)$

$[\![bigger]\!]^c = \lambda z \lambda y.\exists X[\mathbf{big}(c[X])(y) \wedge \neg\mathbf{big}(c[X])(z)]$

Perhaps we could say that the set of contextually relevant comparison classes is a superset of the ones that can be accessed by the comparative, and in particular doesn't include e.g. pairs of bananas with slight differences in size.

Comparison classes

Here is what Klein says:

> Let me return now to the problem of comparatives. I pointed out, when discussing Kamp's proposal, that it was difficult to see how the operation of making a vague predicate more precise could lead naturally to a context in which 'an' was considered to be an orthographically long word. I want to claim that nevertheless there is such a context: namely, that in which the comparison class for **long** is a set of word forms consisting of either one or two letters. The word 'an' is long, relative to a set such as $X = \{$'an', 'I', 'we', 'on', 'a'$\}$. Suppose Y is the set of all English word forms. Then my proposal, put formally, is that while $F_{\textbf{long}}(c[Y])$('an') $= 0$, this semantical decision becomes irrelevant if we focus on X. That is, $F_{\textbf{long}}(c[X])$('an') $= 1$, while $F_{\textbf{long}}(c[X])$('a') $= 0$.
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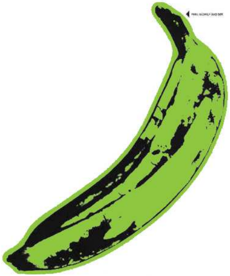
But stay tuned: tomorrow, Robert van Rooij will try to get this kind of approach to work for the data we're interested in.

Epistemic uncertainty

Perhaps Williamson's answer to the epistemological question will help us out:

- **The Margin for Error Principle**
  For a given way of measuring differences in measurements relevant to the application of property P, there will be a small but non-zero constant c such that if x and y differ in those measurements by less than c and x is known to be P, then y is known to be P.

Epistemic uncertainty

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But surely for this account to have any explanatory force, c should be relative to the scale and the domain. In the case of our bananas, c should be so small as to be irrelevant.

Interim assessment

- If the impossibility of crisp judgments in implicit comparison stems from the same factors that determine our judgments about the second premise of the Sorites Paradox, then the fact that the accounts we have looked at so far cannot handle the former is a problem.
- The comparative is not derived from the positive in the ways we have considered so far (which represent the main options on the market).
- The meaning of the positive is not a comparative with a ‘contextual standard’.

Internal contextualism

Following Raffmann, we might say that implicit comparison involves *categorization* and explicit comparison *discrimination*.

The former but not the latter is subject to BACKWARDS SPREAD:

- A category shift consists in a shift of perspective in which the new category instantaneously 'spreads backward' along a string of the preceding objects in the sequence.

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Question 1: Does backward spread apply to judgments about two objects alone, as well as two objects in a sequence?

Question 2: What underlies the difference between positive and comparative?

Interest relativity

Fara 2000

$[\![big]\!] = \lambda x.$*the size of x is significant*

$[\![bigger]\!] = \lambda y \lambda x.$*the size of x* $\succ$ *the size of y*

The positive form is interest-relative; the comparative form is not. This derives the Similarity Constraint, and makes the former unusable for making crisp judgments:

- *Among whatever other interests I may have, I also have a standing interest in efficiency that causes me to avoid making discriminations that are too costly.* (Fara 2007)

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Given x, y, *big* can be true of x and false of y only if this is consistent with my interest in avoiding costly discriminations, i.e. only if their sizes are sufficiently far apart.

In contrast, whether *bigger* is true or false of x, y is independent of my interests, so the difference in size doesn't matter.

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Interest relativity

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Because there's nothing incompatible with the *semantics* of the comparative form and fine distinctions.

This is the sense in which the Similarity Constraint is rooted in a linguistic fact: it reflects an incompatibility between my interests (in crisp judgment contexts) and the semantics of the positive form.

A semantics of positive and comparative degree

A decompositional semantics

$[\![[_A long]]\!] = \mathbf{long}_{\langle e,d\rangle}$

$[\![[_{Deg} pos]]\!] = \lambda g \lambda C \lambda x . g(x) \succeq \mathbf{s}(g)(C)$

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(Bartsch and Venneman 1972; Kennedy 1999, 2007)

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What about the markedness problem?

- Neither the comparative nor positive is derived from the other; both are based on a more basic underlying term (a measure function).
- The comparative is semantically more complex in that it introduces an extra argument (the standard term).

Conclusions

Two crucial parts to the account of Similarity/crisp judgments:

- Interest relative semantics of the positive form
- Decomposition of gradable predicate into:
  - lexical core (adjective/measure function)
  - positive degree morphology ($\succ$ **s**)
  - comparative degree morphology ($\succ y$)

The first part could possibly be exchanged, e.g. for a contextualist account, for a 'distributional' account (Kennedy 2007), or for a 'cognitive' account (Scott Fults' talk today).

It's not clear that we can do without the second part, however.

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Stay tuned.

Vagueness and Comparison

Chris Kennedy
University of Chicago

7 April, 2008

Vagueness and Language Use