Context dependence and shiftability in two classes of gradable adjectives

Christina Kim, Ming Xiang & Chris Kennedy
University of Chicago

Background

We investigate context dependence in two subclasses of gradable adjectives: **relative gradable adjectives (RGAs)** such as 'tall,' and **absolute gradable adjectives (AGAs)** such as 'empty.' Both classes display **context dependence:** the interpretation of the adjective is partially determined by the contexts in which they are used:

(1) Alex is **tall**.
  a. [among 6 year olds]
  b. [among adults]

(2) The theatre is **empty**.
  a. [prior to start of performance]
  b. [prior to fumigation with termite poison]

Different basic meanings? However, the two classes differ in important ways related to the (un)availability of precise interpretations.

	RGAs are inherently vague	AGAs have precise meanings
Sorites paradox	✓	x
borderline cases	✓	x

In RGAs, context sensitivity and vagueness are linked: they express properties that require an object to exceed a ***standard of comparison*** determined relative to a salient comparison class.

Puzzle: How do we reconcile the apparent similarity in context dependence, and the differences in the (un)availability of precise meanings [1-2]?

>**Hypothesis1:** Both RGAs and AGAs express the same kinds of properties.
>**Part to be explained:** existence of precise interpretations for AGAs.

>**Hypothesis2:** AGAs differ from RGAs in having precise meanings.
>**Part to be explained:** source of context-dependence in AGAs.

We present four Mechanical Turk experiments that provide support for Hypothesis2.

>**Exp1-2:** RGAs sensitive to salience in the local context in a way that AGAs are not.

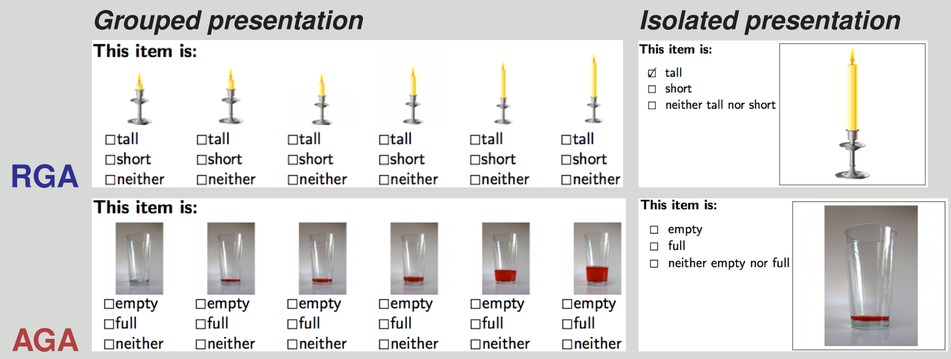
>**Exp3-4:** RGAs and AGAs have different dynamic patterns. AGAs, consistent with [4], show an asymmetry in the direction of shiftability, while RGAs do not.

>**Explanation:** Context dependence in RGAs and AGAs have different sources:
  RGAs exhibit ***semantic context dependence*** — function of semantic content
  AGAs exhibit ***pragmatic context dependence*** — toleration of uses that deviate from semantic content

Exp1-2: Sensitivity to local discourse — semantic context dependence

Questions:
>Given semantic analysis of RGAs, we expect sensititivity of standard to local context.
>Do AGAs pattern like RGAs? Hypothesis1 predicts "yes"; Hypothesis2 does not.

Items: Sets of images representing 6 points on a continuum characterized by an adjective pair (*tall-short* candle).

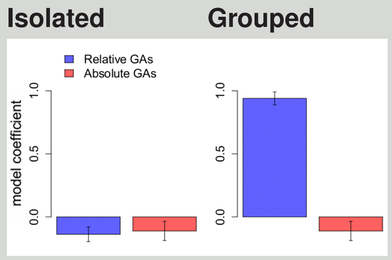


Local context manipulation: Participants indicated for each image-adjective pair whether they considered the pictured object to be e.g. *tall, short*, or *neither*. They saw items in **one of two presentation types**:

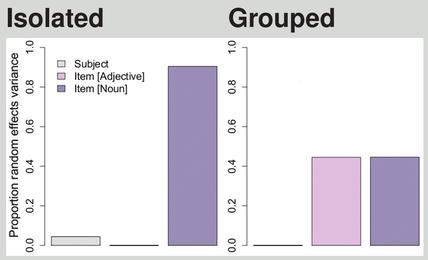
>**Isolated (Exp1,n_1=28):** each trial represented its own local discourse context; interspersed with trials with other adjective-noun pairings
>**Grouped (Exp2,n_2=20):** adjective-noun pairs from the same continuum presented together, thereby providing an implicit comparison class on each trial

Responses were fitted with mixed-effects regression models with ***Subject***, ***Adjective***, ***Noun*** as random effects, and ***Scale position*** (position on continuum) as fixed effect [3].

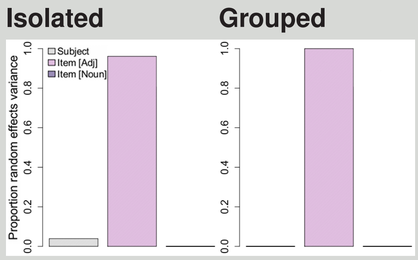
Scale position



RE variance: RGAs



RE variance: AGAs



Results — scale position:
>**RGAs:** Scale position was a reliable predictor of response for grouped but not for isolated presentation
>**AGAs:** No difference by presentation type.
>Model with Adj class, Presentation type, Scale position as FEs showed a 3-way interaction: scale position influenced responses for grouped presentation, RGAs only.

Results — distribution of random effects:
>**RGAs:** *Isolated presentation* increased dependence on item-specific prototypes: identity of the head noun accounted more of random effects variance for isolated relative to grouped presentation.
>**AGAs:** Most of RE variance due to adjective identity; crucially, no difference as a function of presentation type.

Together, Experiments 1-2 demonstrate that
>**RGAs** rely on the local context to supply comparison classes.
>**AGAs** exhibit relative stability despite changes to the local context.

Exp3-4: Ordering effects — pragmatic context dependence

Questions:
>Standards of comparison for RGA should shift to accommodate discourse context. Do AGAs show the same pattern as RGAs?
>Does setting a standard for a RGA on a previous trial influence how the standard is set on subsequent interpretations of the same adjective? (**Exp3,n_3=36**)
>Does prior interpretation of an AGA have a similar effect on subsequent interpretations of the same adjective? (**Exp4,n_4=36**)

RGA

This item is {tall,short, neither}

AGA

This item is {full,empty, neither}

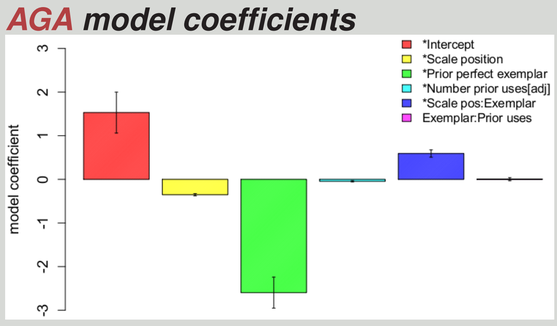
Participants judged images as in Exp1 (isolated).

Responses fit to mixed-effects regression models with the following fixed effects:

>***Scale position***
(1=*tallest*/*emptiest*, 6=least *tall*/*empty*)
>***Number prior instances*** of the same adjective
>***Prior precise/extreme exemplar***
(RGA: tallest ladder; AGA: completely empty cup)

RGA model coefficients

AGA model coefficients



Results — RGAs:

>***Prior exposure to extreme exemplar*** increased likelihood of accepting a subsequent use of the same adjective

>No interaction with current item's ***scale position***

>Effect of prior extreme exemplar decreased as ***number of intervening uses*** of the same adjective increased

>Substituting *prior exemplar* for *prior extreme exemplar* as a predictor of response yields a comparable model; i.e. symmetric/asymmetric versions of the predictor are comparable.

Results — AGAs:

>***Prior exposure to a max precision exemplar*** decreased likelihood of accepting a subsequent use of the same adjective

>Interaction with current item's ***scale position***: objects distant from maximally precise were more strongly affected by a prior maximally-precise exemplar

>Effect of prior max precision exemplar did not interact with ***number of intervening uses*** of the same adjective

>Model substituting *prior exemplar* for *prior max precision exemplar* reduces likelihood of the data; i.e. the asymmetric version of the predictor is better than the symmetric one.

Experiments 3-4 show that RGAs and AGAs differ in terms of shiftability of extension across multiple uses:

>**RGAs:** Prior extreme exemplars has a *facilitative* effect on subsequent acceptance of the same adjective.

>**AGAs:** Prior maximally precise exemplars make comprehenders *more resistant* to accept subsequent uses of the same adjective.

Discussion

These results provide additional evidence for a distinction between RGAs and AGAs (Hypothesis2). We interpret the different patterns of behavior as reflecting different types of context dependence:

(i) **RGAs are sensitive to semantic context**

>Standards of comparison for RGAs are closely tied to the local discourse representation

>By contrast, uses of AGAs that deviate from semantic content are sensitive to broader features of the context at large

(ii) **AGAs are sensitive to pragmatic context**

>Standards of comparison for RGAs shift in response to changes in the local context of interpretation, irrespective of shift direction

>Interpretations of AGAs also vary with aspects of the context; however, AGAs show an asymmetry in direction of shiftability: they allow shifts to higher levels of precision, and resist loosening a standard that was previously set at maximum precision.

>This is consistent with a picture where AGAs, unlike RGAs, have precise basic meanings, and pragmatic aspects of the context modulate comprehenders' willingness to tolerate uses that deviate from maximally precise interpretations.

In work currently in progress, we investigate differences in sensitivity between RGAs and AGAs to aspects of the global communicative (i.e. not necessarily linguistic) context, such as goal structure and communicative intent.

References [1] Lasersohn 1999. Pragmatic Halos. *Language* 75(3). [2] Kennedy & McNally 2005. Scale Structure, Degree Modification, and the Semantics of Gradable Predicates. *Language* 81. [3] Agresti 2012. Categorical Data Analysis, 3rd ed., Wiley. [4] Lewis 1979. Scorekeeping in a language game. *J Phil Logic* 8(1). [5] Syrett, Kennedy & Lidz 2010. Meaning and context in children's understanding of gradable adjectives. *J Semantics* 27(1).

cskim@uchicago.edu, mxiang@uchicago.edu, ck@uchicago.edu