Tiède in the middle: A formalization of a centrally-oriented gradable adjective

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Kennedy & McNally (2005) propose a typology of scale structures that suitably accounts for different classes of gradable adjectives within a degree-based framework. Burnett (2014) presents a similar typology of gradable adjectives, but within a delineation framework. We report empirical data on the adjective *tiède* (French cognate of *tepid*) which are inconsistent with standard typologies. We propose a formalization of *tiède* in a delineation framework to account for the data, therefore extending the typology to *centrally-oriented adjectives*.

A typology of scale structures along the lines of (1) (adapted from Kennedy (2007), conflating lower and upper closed scales) is now widely used in degree-based semantics.

(1)   a. OPEN: ∘———∘   b.   CLOSED: •———•   c.   PARTIAL: ∘———•

Kennedy (2001, 2007) shows that this typology helps us model pairs of gradable antonyms as sharing a same scale but differing in their orientation on the scale (2); and relates the list of specific degree modifiers of an adjective (3) to its vague or precise status. While adjectives with an open scale are fundamentally vague, the end points of totally and partially closed scales can serve as non-arbitrary *precise* thresholds that can be targeted by e.g. *absolutely*.

(2)   a. Wet ∘———• Dry   b. Cold ∘———∘ Hot

(3)   a. **Slightly** wet / **Absolutely** dry   b. # **Slightly** cold / ?? **Absolutely** hot

Importantly, this typology leaves no room for two adjectives sharing the same scale but one being oriented towards the *center* of the scale. In addition, linking the topology of an adjective's scale to both its list of acceptable modifiers and its vagueness predicts that gradable adjectives that can appear with closed-scale modifiers like *absolutely* should have precise, non-arbitrary uses based on the end-points of their scales.

Tiède (French for *tepid*) stands as a counterexample to both previous points. Despite some inter-speaker variability, (French equivalents of) examples like (4) attest felicitous comparative constructions where (4-a) conveys that 'her' beer was *warmer* than 'his' whereas (4-b) conveys that 'her' coffee was *colder* than 'his'. This suggests that *tiède* shares its scale with (the French equivalents of) *cold* and *hot/warm* while being oriented towards a *central* region on this scale, contradicting the first prediction of the above typology.

(4)   *I report a bad experience that two friends of mine had at a local café:*

   a. Her beer was even more *tiède* than his. b. Her coffee was even more *tiède* than his.

In order to maintain the above typology, one might derive the scalar relation of *tiède* and *cold/hot* by what could be described as *folding* the scale of the latter along a central point, as illustrated in (5). Being *more tiède* would then mean being closer to the (squared shape) folding point standing at the end of *tiède*'s scale and in the middle of the *cold/hot* scale.

(5)   Cold ∘———■———∘ Hot   ⟶   (cold/hot)⊙———■ Tiède

The resulting scale has a closed end and *tiède* would therefore be predicted to pattern with *dry* (2c): it should be possible to modify it with (the French equivalent of) *absolutely*. This is indeed what we observe (6).

(6)   Le châssis reste **absolument tiède** (*the frame remains absolutely tiède*, online review)

However, despite co-occurring with (the French equivalent of) the closed-scale modifier *absolutely*, *tiède* also patterns with *open-scale* adjectives in that it is a *vague* adjective: it seems impossible to determine a precise temperature which would correspond to the end-point of the scale, and at which something would start or stop being *tiède*, contradicting the second prediction of the above typology.

A formalization of *tiède* must account for 1. its gradable uses, 2. its compatibility with (the French equivalent of) *absolutely*, and 3. its vagueness. We propose a formal meaning for *tiède* in a delineation framework that also captures its scalar relation with *hot* and *cold*.

Delineation semantics (Klein, 1980) take the meaning of the positive form of a gradable adjective as a basis to derive its scalar properties. We propose that the meaning of *tiède* is defined by three core features that derive the properties discussed above (we use a simplified version of the formalism in Burnett 2014, itself based on van Benthem 1982, 1990).

(7) a. **Pivot:** There is a set $\mathscr{T}$ s.t., for any class of comparison C: $\forall x \in \mathscr{T}\ x \in tiède_C$

  b. **Relativity:** $\exists C, C'\ [\forall x \notin \mathscr{T}\ x \in tiède_C \wedge x \notin tiède_{C'}]$

  c. **Lexical relation:** $\forall x, y, z[\exists C, C'\ x \in cold_C \wedge y, z \notin cold_C \wedge x, y \notin hot_{C'} \wedge z \in hot_{C'}] \rightarrow$
  $[\neg \exists C''\ x, z \in tiède_{C''} \wedge y \notin tiède_{C''}]$

As standard in delineation semantics, we assume that no classification of two objects discriminated by an adjective can be inversed. *Pivot* specifies that some objects are tiède no matter what class of comparison is considered. *Relativity* specifies that whether *other* objects are classified as *tiède* depends on the class of comparison. Finally, *Lexical relation* encodes *tiède*'s relation to *cold* and *hot* and thereby specifies that out of three objects at different temperatures, the one at the central temperature cannot be the only non-*tiède* one. It follows that *tiède* defines a non-trivial order towards a central region on the *cold-hot* dimension.

Imagine a, b, c and d, distributed along the scale of temperatures as illustrated on the right. The only divisions consistent with the features in (7) separate them about

(e) a b c d
$\longleftarrow \overline{\qquad \mathscr{T} \qquad} \longrightarrow$

a vertical axis. Importantly, any such division making c *tiède* must also make b *tiède*: if c, but not b, were *tiède* it would mean that there is a class of comparison where both a and c are *tiède* (as a is *tiède* in any class of comparison by *Pivot*) whereas b is not. Given their ordering along the scale of temperatures, there are classes of comparison where only a (or c) is cold and some where only c (or a) is hot: this configuration (where a and c would be *tiède* and one would be warmer while the other would be cooler than b, which would be not *tiède*) would be inconsistent with *Lexical relation* and thus actually cannot follow from the proposed meaning for *tiède*. The features above therefore force b to be *tiède* whenever c is *tiède*, and by the same logic also force c to be *tiède* whenever d is *tiède*: this amounts to saying that b is *more tiède* than c and that c is *more tiède* than d. Note that this points holds regardless of which ends *cold* and *hot* stand at: whether a is warmer or colder than d, b is still more *tiède* than c. More generally, being *more tiède* therefore means being closer to the elements in $\mathscr{T}$, i.e. having a more central temperature.

The possible co-occurence of *tiède* with *absolutely* comes from its feature *Pivot*. *Pivot* corresponds to a wide-scope existential version of Burnett's *Absolute Adjective Axiom* (8): as such it associates *tiède* with a specific set $\mathscr{T}$, constant across classes of comparison, which is a required feature for a felicitous modification by *absolutely*. Being *absolutely tiède*

therefore means belonging to $\mathscr{T}$). Contrary to Burnett's *Absolute Adjective Axiom*, *Pivot* is consistent with *Relativity* and extensions dependent on the class of comparison, which we showed straightforwardly accounts for the comparative uses of *tiède*. *Relativity* also accounts for the impossibility to identify a unique, perfectly precise threshold temperature for *tiède*: the characteristic set of *tiède* varies across classes of comparison while the constant set $\mathscr{T}$ is only a subset of it. Burnett (2014) showed how the type of context-dependency formalized in *Relativity* is responsible for vagueness.

(8) **AAA:** For any classes of comparison $X \subset Y$, $\forall x\ AbsAdj_X(x) \leftrightarrow AbsAdj_Y(x)$

The delineation approach leaves some questions open or problematic despite its advantage over the competing accounts. Both the delineation and the 'folding' formalizations predict that *tiède* could be used to compare entities whose temperatures fall on each side of the central region (as illustrated above with e vs. $b/c/d$). However, preliminary evidence seem to contradict this prediction: it seems that *more tiède* cannot be used to convey a *warmer* and a *colder* orientations at the same time (9). This suggests that *tiède* might be lexically ambiguous between these two orientations, with (9) accessing only one at a time.

(9) #Her beer and her coffee were respectively more *tiède* than his beer and his coffee.

Note however that in order to account both for *tiède* co-occurring with (the French equivalent of) *absolutely* and for its vagueness, an ambiguity-based approach would need to posit that the topology of *tiède*'s scale is ambiguous too. Besides, two-sided comparisons seem to improve when keeping the category of evaluated entities constant (10).

(10) *In a (bad) bakery where some cookies have recently been unfrozen and others baked*
    a. Give me the *most tiède* cookie for the customer.   b. No cookie is *tiède*.

Another point bearing on the standard typology comes from the inferences drawn from comparative constructions. The comparisons in (4) seem to be felicitous only if both beers and both coffees are taken to be *tiède* to start with (hence the presence of *even*). This is typical of adjectives oriented *away* from a closed-end-point like *wet*, as opposed to *dry* with which *tiède* otherwise shares the possibility to be modified by (the French equivalent of) *absolutely* as we showed above.

The present study questions the standard typology of gradable adjectives in ways that extend beyond the case of *tiède*. Some of the points discussed above directly apply to English *mild*, and more generally to gradable adjectives that do not define clear two-end spectrums and do not show categorical distributions with modifiers. Even though *tiède* is certainly not the only instance of centrally-oriented adjectives, their scarce distribution makes the investigation harder and is intriguing at the same time. In this regard, a comparison with color adjectives would be of particular interest, as Kennedy & McNally (2009) have proposed at least a three-way ambiguity to account for their superficially inconsistent properties, including a *quality* reading that they say involves "a measurement of how closely an object's color approximates or diverges from a 'center' or prototype".

Selected References. Burnett, H. (2014). A Delineation solution to the puzzles of absolute adjectives. *Linguistics & Philosophy 37:1.* **Kennedy, C.** (2007). Vagueness and grammar: the semantics of relative and absolute gradable adjectives. *Linguistics & Philosophy 30:1.*