Adjectives and Negation: deriving Contrariety from Contradiction

Karen De Clercq & Guido Vanden Wyngaerd
FWO/U Gent & KU Leuven

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Outline

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(1) a. Kurt is tall.
    b. Kurt is short.

- **contrary** opposition: (1a) and (1b)
  - cannot both be true
  - can both be false (when Kurt is neither tall nor short)

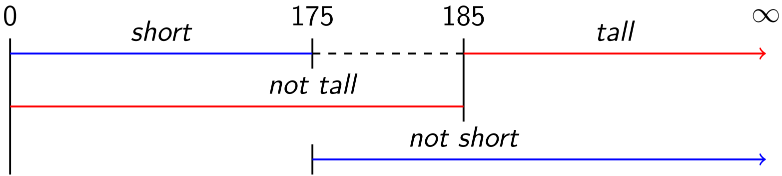
(1) a. Kurt is tall.
b. Kurt is short.

- **contrary** opposition: (1a) and (1b)
  - cannot both be true
  - can both be false (when Kurt is neither tall nor short)

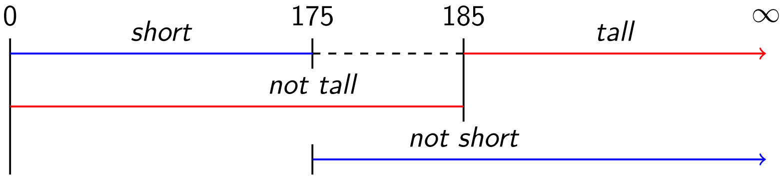
(2) a. Kurt is tall.
b. Kurt is not tall.

- **contradictory** opposition: (2a) and (2b)
  - cannot both be true
  - cannot both be false

- **contrariety** vs **contradiction**



- **contrariety** vs **contradiction**



- contradiction
  - $A \cup B = U$
  - $A \cap B = \varnothing$
- contrariety
  - $A \cup B \neq U$
  - $A \cap B = \varnothing$

(3) a. Kurt is tall.
    b. Kurt is **not** tall.

(4) a. Kurt is short.
    b. Kurt is **not** short.

(5) a. Kurt opened the door.
    b. Kurt did **not** open the door.

- *not* creates contradictory opposition

- **not** $= \neg$

(6)

p	$\neg p$
1	0
0	1

Law of the Excluded Middle (LEM)

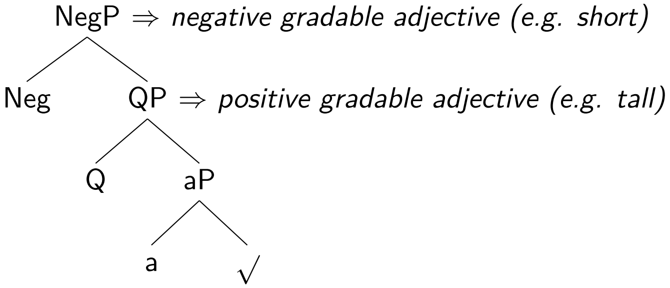
$p \vee \neg p$

Law of Contradiction

$\neg(p \wedge \neg p)$

- De Clercq and Vanden Wyngaerd (2017): negative adjectives contain a Neg feature

(7)



The Problem:

- why does negation sometimes give rise to **contrary** opposition, and sometimes to **contradictory** opposition?
- are there two flavours of negation?

(8)

a.	*not tall*	*not*	$\neg$	contradictory opposition
b.	*short*	Neg	?	contrary opposition

Outline

Claim

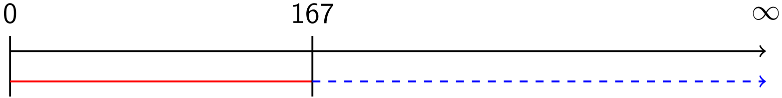
- There are no two flavours of negation
- Neg in negative adjectives is the same Neg as the one in **not**.
- Neg derives **contradictory** opposition.
- **Contrary** opposition (as in *tall-short*) is the result of an interplay of several factors:
  - interval or extent semantics, in particular the notion of a **negative extent** (Seuren 1978; 1984; von Stechow 1984; Kennedy 2001)
  - context-dependence

Outline

- a **scale** $\langle S, <_{DIM}\rangle$ is a linearly ordered set of points along a dimension *DIM* (e.g. *HEIGHT* is the dimension of the *tall-short* scale).
- for any object x which can be ordered along some dimension *DIM*, there is a **degree function** d_{DIM} from x to a unique point on the scale $\langle S, <_{DIM}\rangle$. (e.g. $d_{HEIGHT}(Kurt) = 167$).
- an **extent** E on $\langle S, <_{DIM}\rangle$ is a nonempty subset of S with the following property:

(9) $$\forall p_1, p_2 \in E, \forall p_3 \in S, [p_1 < p_3 < p_2 \rightarrow p_3 \in E]$$

- any degree on the scale defines a positive extent and a negative extent.



(10) a. $POS_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid p \leq d(x)\}$
b. $NEG_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid \neg[p \leq d(x)]\}$

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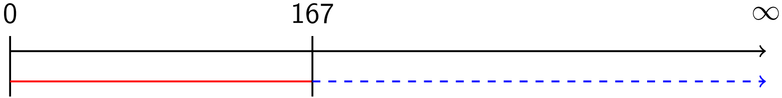


(10) a. $POS_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid p \leq d(x)\}$

b. $NEG_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid \neg[p \leq d(x)]\}$

(11) $d(\text{Kurt}) = 167$

(12) a. $POS_{HEIGHT}(\text{Kurt}) = [0, 167]$

b. $NEG_{HEIGHT}(\text{Kurt}) =]167, \infty[$

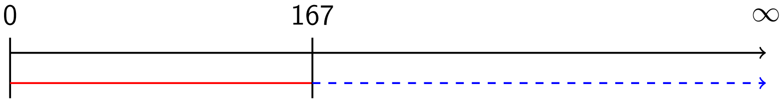
- Negative and positive extents are related by **contradictory** opposition:

(13) $NEG_{DIM}(x) = \neg POS_{DIM}(x)$

(14) $POS_{DIM}(x) \cup NEG_{DIM}(x) = \langle S, <_{DIM} \rangle$
$POS_{DIM}(x) \cap NEG_{DIM}(x) = \varnothing$

- a positive gradable adjective denotes a positive extent
- a negative gradable adjective denotes a negative extent

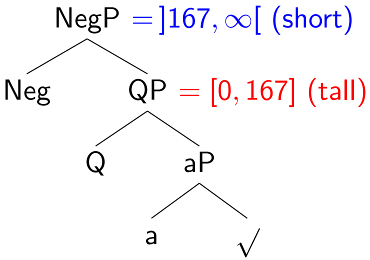
(15) a. $[\![\text{tall(x)}]\!] = POS_{HEIGHT}(x)$
b. $[\![\text{short(x)}]\!] = NEG_{HEIGHT}(x)$



(16) a. $[\![\text{tall(Kurt)}]\!] = POS_{HEIGHT}(\text{Kurt})$ = the extent to which Kurt is tall
b. $[\![\text{short(Kurt)}]\!] = NEG_{HEIGHT}(\text{Kurt})$ = the extent to which Kurt is not tall/short

- the Neg feature in negative adjectives is logical negation $\neg$
- **Neg** derives **contradictory** opposition

(17)



- So where does the contrary nature of the opposition in *tall-short* come from?

Outline

(18) Kurt is tall.

- does not mean: 'Kurt has a degree on the scale of *HEIGHT*'.
- but: 'Kurt's degree on the scale of *HEIGHT* exceeds a contextually given standard'.

(19) a. Kurt is tall for a Bolivian.
b. Kurt is not tall for a Swede.

(19) a. Kurt is tall for a Bolivian.
b. Kurt is not tall for a Swede.

(20) a. Kurt is tall.
b. Kurt is not tall.

(19) a. Kurt is tall for a Bolivian.
b. Kurt is not tall for a Swede.

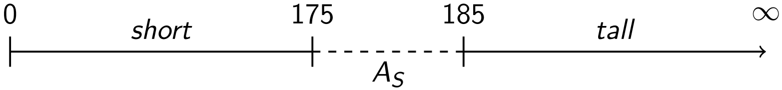
(20) a. Kurt is tall.
b. Kurt is not tall.

- (20a) and (20b) cannot both be true, *but only if the standard of comparison is kept constant*!

- the contextual standard

= the interval of average height A

= those degrees of HEIGHT that qualify as neither short, nor tall:



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$=$ the interval of average height A

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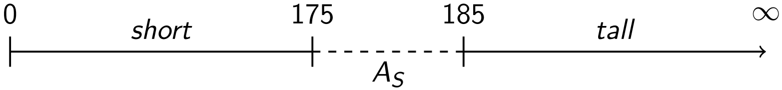


(21) a. $A_S = [175, 185]$ (Swedish men)

b. $A_B = [145, 155]$ (Bolivian men)

Outline

(22) Linus is tall.

$=$ the extent to which Linus is tall includes A_S

$=$ $POS_{HEIGHT}(Linus) \supset A_S$

(23) For two extents X and Y, $X \subset Y \iff X \cup Y = Y$.

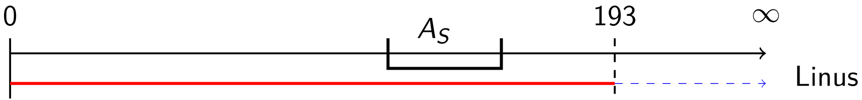
(22) Linus is tall.

$= \quad$ the extent to which Linus is tall includes A_S

$= \quad POS_{HEIGHT}(Linus) \supset A_S$

(23) For two extents X and Y, $X \subset Y \iff X \cup Y = Y$.

(24) d(Linus) $= 193$

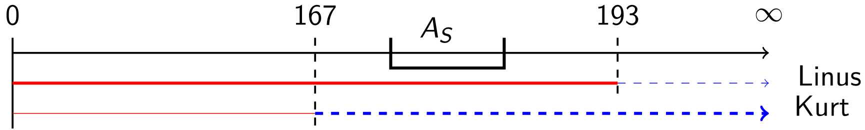


(25) Kurt is short.

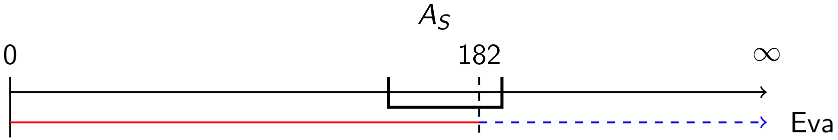
$=$ the (negative) extent of Kurt's tallness includes A_S

$=$ $NEG_{HEIGHT}(Kurt) \supset A_S$

(26) d(Kurt) $= 167$



(27) $d(\text{Eva}) = 182$



(28) a. $POS_{HEIGHT}(Eva) \not\supset A_S$
b. $NEG_{HEIGHT}(Eva) \not\supset A_S$

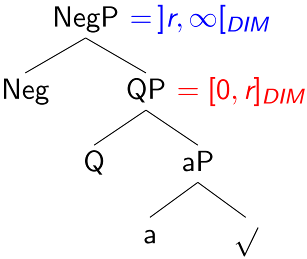
(29) a. $[\![\text{Eva is tall}]\!] = 0$
b. $[\![\text{Eva is short}]\!] = 0$

- **contrariety** follows from the truth conditions of *tall* and *short*, which are formulated in terms of
  - a positive extent for *tall*, and a negative extent for *short*
  - the dependence on a context-dependent average A_C, which is itself an extent

Outline

- **Neg** contributes **contradictory** opposition (recall (17) above)

(17)



- Two problems with this structure:
  - no contrariety
  - no context-dependence

- absolute *tall*

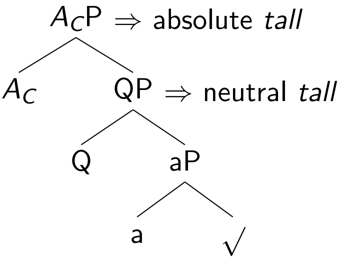
(30) Kurt is tall.

- neutral *tall* (no reference to a contextual standard)

(31) a. How tall is Kurt?
b. Kurt is 1.5m tall

(32) a. Kurt is (half/twice) as tall as Lisa.
b. Kurt is not as tall as Lisa.
c. Kurt is taller than Lisa.

(33)

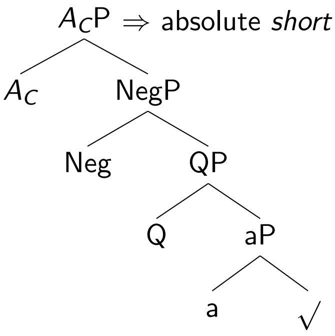


- absolute and neutral *tall* differ in the size of their tree

(34) $A_C\text{P} = \lambda x.POS_{DIM}(x) \supset A_C$

- A_C
- QP $= \lambda x.POS_{DIM}(x)$
  - Q
  - aP
    - a
    - $\surd$

(35)



(36)

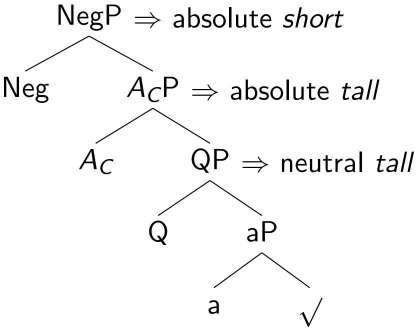
$$[_{A_C\mathrm{P} = \lambda x.NEG_{DIM}(x) \supset A_C}\ A_C\ [_{\mathrm{NegP} = \lambda x.NEG_{DIM}(x)}\ \mathrm{Neg}\ [_{\mathrm{QP} = \lambda x.POS_{DIM}(x)}\ \mathrm{Q}\ [_{\mathrm{aP}}\ \mathrm{a}\ \surd\ ]]]]$$

Outline

(37) a. $A_C > (\text{Neg}) > \text{Q} > \text{a} > \surd$
b. $(\text{Neg}) > A_C > \text{Q} > \text{a} > \surd$

(37)
a. $A_C > (\text{Neg}) > \text{Q} > \text{a} > \sqrt{}$
b. $(\text{Neg}) > A_C > \text{Q} > \text{a} > \sqrt{}$

(38)



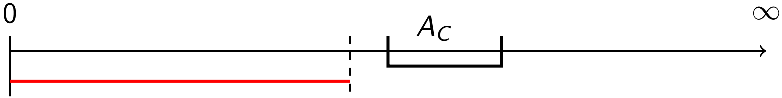
(39)

NegP $= \lambda x.\neg[POS_{DIM}(x) \supset A_C]$

- Neg
- A_CP $= \lambda x.POS_{DIM}(x) \supset A_C$
  - A_C
  - QP $= \lambda x.POS_{DIM}(x)$
    - Q
    - aP
      - a
      - $\surd$

(40) a. $[\![\text{short }(x)]\!] = \lambda x.\neg[POS_{DIM}(x) \supset A_C]$
b. $[\![\text{short(Kurt)}]\!] = POS_{DIM}(Kurt) \not\supset A_C$

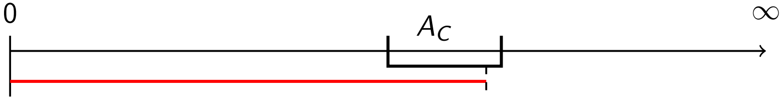
- $d(\text{Kurt}) = 167$



- $POS_{DIM}(\text{Kurt}) \not\supset A_C$, hence (40b) comes out as true
- that is the desired result

(41) $[\![\text{short(Eva)}]\!] = POS_{DIM}(Eva) \not\supset A_C$

- d(Eva) $= 182$



- POS_{DIM}(Eva) $\not\supset A_C$, hence (41) comes out true
- but it should come out false, because Eva is neither tall nor short
- (41) gives contradictory opposition with *tall*, not contrariness

- based on the semantics, we conclude that the correct functional sequence is as in (42a), not (42b):

(42) a. $A_C >$ Neg $>$ Q $>$ a $> \surd$
     b. Neg $> A_C >$ Q $>$ a $> \surd$

Outline

- **Neg** in negative adjectives is **contradictory** negation
- **Contrary** opposition in antonymic pairs derives from
  - interval semantics
  - the notion of a negative extent, which enters into the truth conditions of negative adjectives
  - the presence of a contextually dependent average A_C.
- the relation between neutral *tall* and absolute *tall* is one of the size of the syntactic tree.

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