Adjectives and Negation: deriving Contrariety from Contradiction

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2 Claim
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6 Syntax
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1. The problem
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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**

0 \hspace{2cm} short \hspace{2cm} 175 \hspace{2cm} not tall \hspace{2cm} 185 \hspace{2cm} tall \hspace{2cm} ∞

not short
**contrariety vs contradiction**

- **contrariety**
  - $A \cup B \neq U$
  - $A \cap B = \emptyset$

- **contradiction**
  - $A \cup B = U$
  - $A \cap B = \emptyset$
(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** = \(~\)

(6) \[
\begin{array}{c|c}
p & \neg p \\
1 & 0 \\
0 & 1 \\
\end{array}
\]

**Law of the Excluded Middle (LEM)**

\[ p \lor \neg p \]

**Law of Contradiction**

\[ \neg (p \land \neg p) \]
• De Clercq and Vanden Wyngaerd (2017): negative adjectives contain a Neg feature

(7) \[ \text{NegP} \Rightarrow \text{negative gradable adjective (e.g. short)} \]

\[ \text{Neg} \quad \text{QP} \Rightarrow \text{positive gradable adjective (e.g. tall)} \]

\[ \text{Q} \quad \text{aP} \]

\[ \text{a} \quad \sqrt{\text{v}} \]
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*  ¬  contradictory opposition  
    b. *short*  Neg  ?  contrary opposition
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Claim

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

\[
(9) \quad \forall p_1, p_2 \in E, \forall p_3 \in S, [p_1 < p_3 < p_2 \rightarrow p_3 \in E]
\]
- any degree on the scale defines a **positive extent** and a **negative extent**.

\[
\begin{array}{ccc}
0 & 167 & \infty \\
\hline
\end{array}
\]

(10)  

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

b. \( NEG_{DIM}(x) = \{ p \in \langle S, <_{DIM} \rangle \mid \neg[p \leq d(x)] \} \)
any degree on the scale defines a positive extent and a negative extent.

\[
\begin{array}{c c c c c}
0 & 167 & \infty \\
\end{array}
\]

(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) \( d(Kurt) = 167 \)

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

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

bit.ly/2pcTxDG
Negative and positive extents are related by **contradictory** opposition:

\[
\begin{align*}
(13) \quad & \quad \text{NEG}_{DIM}(x) = \neg \text{POS}_{DIM}(x) \\
(14) \quad & \quad \text{POS}_{DIM}(x) \cup \text{NEG}_{DIM}(x) = \langle S, <_{DIM} \rangle \\
& \quad \text{POS}_{DIM}(x) \cap \text{NEG}_{DIM}(x) = \emptyset
\end{align*}
\]
- a positive gradable adjective denotes a positive extent
- a negative gradable adjective denotes a negative extent

\[(15)\]
\[
\begin{align*}
\text{a. } & \left[\text{tall}(x)\right] = \text{POS}_{\text{HEIGHT}}(x) \\
\text{b. } & \left[\text{short}(x)\right] = \text{NEG}_{\text{HEIGHT}}(x)
\end{align*}
\]

\[
\begin{array}{cccc}
0 & 167 & \infty
\end{array}
\]

\[(16)\]
\[
\begin{align*}
\text{a. } & \left[\text{tall}(\text{Kurt})\right] = \text{POS}_{\text{HEIGHT}}(\text{Kurt}) = \text{the extent to which Kurt is tall} \\
\text{b. } & \left[\text{short}(\text{Kurt})\right] = \text{NEG}_{\text{HEIGHT}}(\text{Kurt}) = \text{the extent to which Kurt is not tall/short}
\end{align*}
\]
• the Neg feature in negative adjectives is logical negation $\neg$
• **Neg** derives **contradictory** opposition

(17) \[ \text{NegP} = ]167, \infty[ \text{ (short)} \]

\[
\begin{array}{c}
\text{Neg} \\
\text{QP} = [0, 167] \text{ (tall)}
\end{array}
\]

So where does the contrary nature of the opposition in *tall-short* come from?
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(18) Kurt is tall.

- does not mean: ‘Kurt has a degree on the scale of \textit{HEIGHT}’.
- but: ‘Kurt’s degree on the scale of \textit{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 \textit{for a Bolivian}.
  b. Kurt is not tall \textit{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:

$$
\begin{align*}
0 & \quad short & 175 & \quad 185 & \quad tall & \quad \infty \\
& & A_S & & & \\
\end{align*}
$$
• the contextual standard
  = the interval of average height $A$
  = those degrees of HEIGHT that qualify as neither short, nor tall:

\[0 \quad short \quad 175 \quad 185 \quad tall \quad \infty\]

\[A_S\]

(21)  a. $A_S = [175, 185]$ (Swedish men)
  b. $A_B = [145, 155]$ (Bolivian men)
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(22) Linus is tall.
\[= \text{the extent to which Linus is tall includes } A_S\]
\[= POS_{HEIGHT}(Linus) \supset A_S\]

(23) For two extents $X$ and $Y$, $X \subset Y \iff X \cup Y = Y$. 
(22) Linus is tall.
\[= \text{the extent to which Linus is tall includes } A_S\]
\[= \text{POS}_{\text{HEIGHT}}(\text{Linus}) \supset A_S\]

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

(24) $d(\text{Linus}) = 193$
(25) Kurt is short.

\[ = \text{the (negative) extent of Kurt’s tallness includes } A_S \]

\[ = \text{NEG}_{\text{HEIGHT}}(Kurt) \supset A_S \]

(26) \(d(Kurt) = 167\)
(27) \( d(\text{Eva}) = 182 \)

\[
\begin{array}{c}
0 \quad 182 \quad \infty \\
\hline
\end{array}
\]

\( A_S \)

(28) a. \( \text{POS}_\text{HEIGHT}(\text{Eva}) \not\leftrightarrow A_S \)
b. \( \text{NEG}_\text{HEIGHT}(\text{Eva}) \not\leftrightarrow A_S \)

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

(17) \[ \text{NegP} = ]r, \infty [_{DIM} \]

- 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) \( A_C P \Rightarrow \text{absolute } tall \)

\[
\begin{array}{c}
\text{absolute and neutral } tall \text{ differ in the size of their tree}
\end{array}
\]
(34) \[ A_C P = \lambda x. POS_{DIM}(x) \supset A_C \]

\[ A_C \]

\[ QP = \lambda x. POS_{DIM}(x) \]

\[ Q \]

\[ aP \]

\[ a \]

\[ \sqrt{ } \]
(35) \( A_C P \Rightarrow \) absolute \emph{short}

\[
\begin{array}{l}
A_C \\
\downarrow \\
\text{NegP} \\
\downarrow \\
\text{Neg} \\
\downarrow \\
\text{QP} \\
\downarrow \\
Q \\
\downarrow \\
aP \\
\downarrow \\
a \\
\downarrow \\
\sqrt{ }
\end{array}
\]
(36) \( A_C P = \lambda x. NEG_{DIM}(x) \supset A_C \)

\[
\begin{align*}
A_C & \quad \text{NegP} = \lambda x. NEG_{DIM}(x) \\
\text{Neg} & \quad \text{QP} = \lambda x. POS_{DIM}(x) \\
Q & \quad \text{aP} \\
a & \quad \sqrt{a}
\end{align*}
\]
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(37)  
a.  \( A_C > (\text{Neg}) > Q > a > \checkmark \)  
b.  \( (\text{Neg}) > A_C > Q > a > \checkmark \)
(37) a. \( A_C > (\text{Neg}) > Q > a > \sqrt{\text{}} \)
   b. \( (\text{Neg}) > A_C > Q > a > \sqrt{\text{}} \)

(38) \( \text{NegP} \Rightarrow \text{absolute short} \)

\[
\begin{array}{c}
\text{Neg} \quad A_C P \Rightarrow \text{absolute tall} \\
\quad A_C \quad Q P \Rightarrow \text{neutral tall} \\
\quad Q \quad a P \\
\quad a \quad \sqrt{\text{}} \\
\end{array}
\]
(39) \[ \text{NegP} = \lambda x. \neg [POS_{DIM}(x) \supset A_c] \]

\[
\text{Neg}
\]

\[ A_c P = \lambda x. POS_{DIM}(x) \supset A_c \]

\[ A_c \]

\[ QP = \lambda x. POS_{DIM}(x) \]

\[ Q \]

\[ aP \]

\[ a \]

\[ \sqrt{\text{a}} \]
(40)  
   a. \([\text{short } (x)] = \lambda x. \neg[\text{POS}_{\text{DIM}}(x) \supset A_C]\)
   b. \([\text{short}(Kurt)] = \text{POS}_{\text{DIM}}(Kurt) \not\supset A_C\)

- \(d(Kurt) = 167\)

- \(\text{POS}_{\text{DIM}}(Kurt) \not\supset A_C\), hence (40b) comes out as true
- that is the desired result
(41) $\lceil \text{short(Eva)} \rceil = POS_{DIM}(Eva) \not\supset A_C$

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

- $POS_{DIM}(\text{Eva}) \not\supset A_C$, hence (41) comes out true
- but it should come out false, because Eva is neither tall nor short
- (41) gives contradictory opposition with $\text{tall}$, not contrariness
- based on the semantics, we conclude that the correct functional sequence is as in (42a), not (42b):

(42) a. \( A_C > \text{Neg} > Q > a > \sqrt{\text{X}} \)
   b. \( \text{Neg} > A_C > Q > a > \sqrt{\text{X}} \)
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- **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.
References


