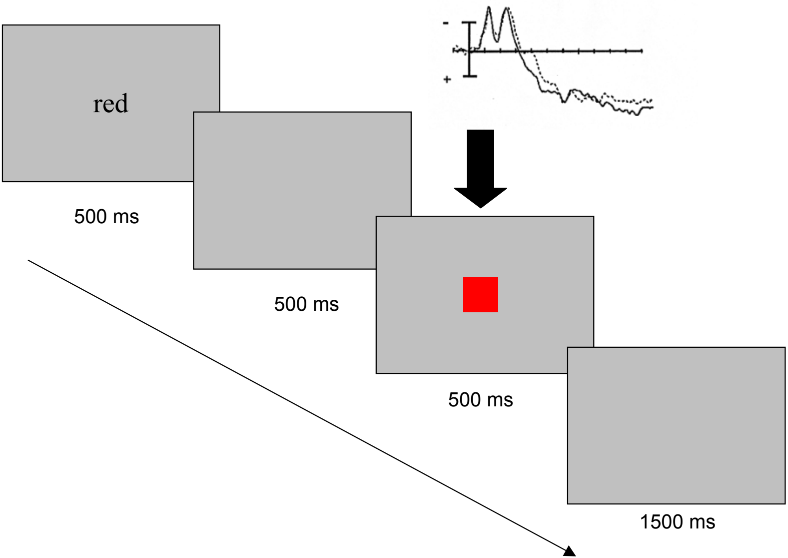
Highlights from VAAG – Uli Sauerland, ZAS, Berlin

Vagueness, Approximation, and Granularity

- Amsterdam: linguistics and philosophical logic
- Lund: theoretical and computational cognitive science
- Zagreb: experimental psychology of language, especially ERP
- Berlin: linguistic semantics and pragmatics
- (Glasgow AP: computer science)

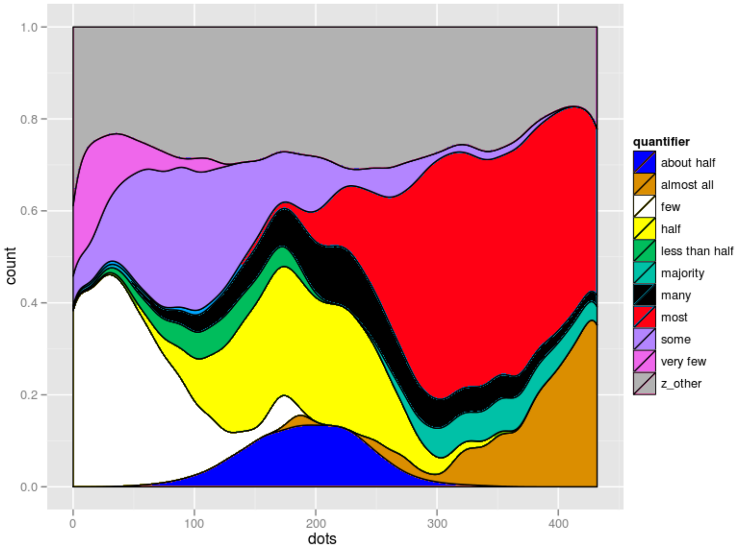
Goal: unified theory of vagueness and related phenomena across the different fields involved

ERP highlight result (Zagreb with Berlin)



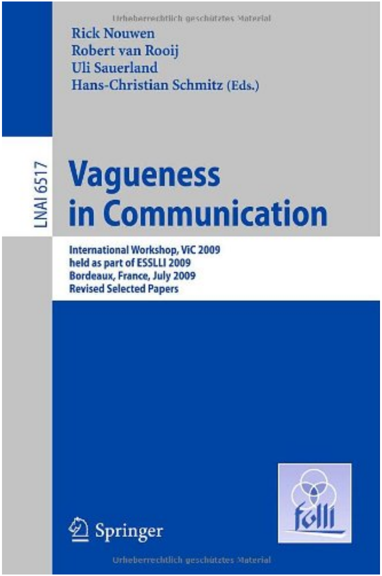
(Gotzner, Palmovic, & Solt on Saturday)

CogSci result (Lund with Berlin)



(Bååth, Sauerland on Sikström on Saturday)

∃ Publications



Borderline Contradictions

(1) A $5'10''$-guy is tall and not tall.

- Fuzzy Logic: Truth value 0.5
- Kamp (1975)/Fine (1975): clearly false
- recent psycholinguistic work (Alxatib & Pelletier 2011, Ripley 2011): quite acceptable
- but actually super-acceptable: A & not A $>$ A & not B (Sauerland forthcoming)

(2) A $5'10''$-guy is tall and a guy with $100,000 isn't rich.

Why are Borderline Contradictions Good?

Slightly Idealized Facts Assumed:

(3) A $5'10''$-guy is tall. – false/not assertable

(4) A $5'10''$-guy is and isn't tall – true/assertable

(5) A $5'10''$-guy is or isn't tall – false/not assertable

Spectrum of current approaches:

- Ambiguity? 'tall' in one sense, but not another (e.g. Kamp & Partee 1995)
- Idiom? 'is and isn't tall' = 'borderline tall' (Pagin p.c.)
- Pragmatic Cobreros, Egré, Ripley and van Rooij (2011): classical contradictions trigger lower standard of truth
- Semantic Alxatib, Pagin, and Sauerland (submitted): semantic version, A & not A triggers scaling of truth to [0,1]

Today: only compare pragmatic and semantic approaches

The Pragmatic Proposal: Notions of Truth

similar with respect to P — $x \sim_P y$ iff./ x and y are indistinguishable with respect to their membership in predicate P (a non-transitive, reflexive, symmetric, and convex relation)

classical truth — $[\![P(a)]\!]^{c,M} = 1$ iff $[\![a]\!]^{c,M} \in I_M(P)$

tolerant truth — $[\![P(a)]\!]^{t,M} = 1$ iff $\exists x[x \sim_P [\![a]\!]^{c,M} \& [\![P]\!]^{c,M}(x) = 1]$

strict truth — $[\![P(a)]\!]^{s,M} = 1$ iff $\forall x[x \sim_P [\![a]\!]^{c,M} \rightarrow [\![P]\!]^{c,M}(x) = 1]$

Borderline cases: tolerantly, but not strictly true

(6) A 5′10″ guy is tall.

Duality of strict and tolerant with negation:

(7) $[\![\neg\phi]\!]^{t,M} = 1$ iff $[\![\phi]\!]^{s,M} = 0$, $[\![\neg\phi]\!]^{s,M} = 1$ iff $[\![\phi]\!]^{t,M} = 0$

(8) A 5′10″-guy isn't tall. (tolerantly: true, strictly: false)

The Pragmatic Proposal: Strongest Meaning Hypothesis

Strongest Meaning Hypothesis (cf. Dalrymple, Kanazawa, Kim, Mchombo, & Peters 1998):

SMH Speakers judge a sentence according to the strongest notion of truth for which there exists a possible scenario such that the sentence is true.

Predictions:

(9) A $5'10''$-guy is and isn't tall. – tolerant eval.: true

(Assuming standard of tallness depends on the scenario:)

(10) Bill/A $5'10''$-guy is tall. – strict eval. : false

(11) A $5'10''$-guy is tall and a guy with \$100 000 isn't rich. – strict eval.: false

(12) A $5'10''$-guy either is tall or isn't tall. – strict eval. : false

(13) Bill is and isn't tall or he's blond. – strict eval.: false

Our Semantic Proposal: Fuzzy Logic Basis

(14) Let v be a function from well formed formulas to the interval [0,1], then given a model M

- (i) For any predicate letter P and term t, $v_M(P(t)) = 1$ iff $v_M(t) \in v_M(P)$
- (ii) $v_M(\neg\phi) = 1 - v_M(\phi)$
- (iii) $v_M(\phi \vee \psi) = \max(v_M(\phi), v_M(\psi))$
- (iv) $v_M(\phi \wedge \psi) = \min(v_M(\phi), v_M(\psi))$

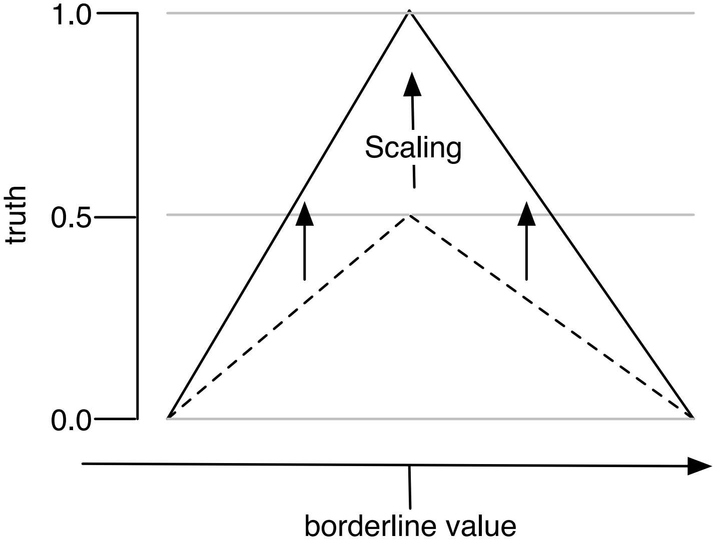
(15) A 5′10″-guy is tall. – value: 0.5

(16) A 5′10″-guy isn't tall. – value: 0.5

(17) A guy with $100 000 is(n't) rich. – value: 0.5

Conjunction cannot be truth-functional.

Scaling of Contradictory Conjunctions



Formal Definitions

(18) (C) $^{\wedge}\Phi = \sup\{k : \text{for some model } M,\ v_M(\Phi) = k\}$
(F) $^{\vee}\Phi = \inf\{k : \text{for some model } M,\ v_M(\Phi) = k\}$

Definition of 'and':

$$v_M(\phi \text{ and } \psi) = \begin{cases} v(\phi \wedge \psi) & \text{if } ^{\wedge}(\phi \wedge \psi) =^{\vee} (\phi \wedge \psi) \\ \frac{v(\phi\wedge\psi)-^{\vee}[\phi\wedge\psi]}{^{\wedge}[(\phi\wedge\psi)]-^{\vee}[\phi\wedge\psi]} & \text{otherwise} \end{cases}$$

Predictions of the Semantic Proposal

Assume that truth-value 0.6 threshold for felicitous assertion.

(19) A $5'10''$-guy is and isn't tall. – value: 1.0

(20) Bill/A $5'10''$-guy is tall. – value: 0.5

(21) A $5'10''$-guy is tall and a guy with \$100 000 isn't rich. – value: 0.5

(22) A $5'10''$-guy either is tall or isn't tall. – value: 0

(23) Bill is and isn't tall or he's blond. – value: 1.0

Conclusion

- uniform theory of vagueness: intermediate values
- connectors like and are intensional