Rise-fall-rise intonation and secondary QUDs

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DGfS AG3: Secondary Information & Linguistic Encoding
Saarbrücken, March 2017

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Main aim: To explain this distribution, in terms of the core meaning of RFR.

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From Gussenhoven 2004, simplified:

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- For details see Westera 2017.

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- exhaustivity is predicted only relative to $\mathcal{Q}_1$;
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(13) A: Do you accept credit cards?
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Prediction 2: $\neg\Box\,\text{Maxims}(\mathcal{Q}_0)$ and $\Box\,\text{Maxims}(\mathcal{Q}_1)$.

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(13) A: Do you accept credit cards?
B: Visa and Mastercard...
(implied: I accept no other cards; I'm unsure if issue underlying A's question is resolved)

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(5) A: Have you ever been West of the Mississippi?
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More generally, ICM predicts that RFR can mark secondary information:

(1) B: John, who is a vegetarian, envies Fred.
(2) B: John – he's a vegetarian – envies Fred.

2.4. RFR and secondary information (2/2)

(3) B: On an unrelated note, Fred is a vegetarian.

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ICM predicts that (14) is *not* the exact mirror image (contra Jackendoff 1972, in line with Wagner 2012):

(14) A: What about the beans, who ate those?
B: Fred ate the beans...

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Take home message: whenever you run into RFR, ask:

(i) What is the main Q_{UD}?

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(iii) Why is this a reasonable combination of $\mathrm{Q}_{\mathrm{UDS}}$?

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Previous proposals:

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In a nutshell:

- to the extent that previous proposals are adequate,
- ICM generates their core insights from more basic assumptions,
- while also doing some things differently.

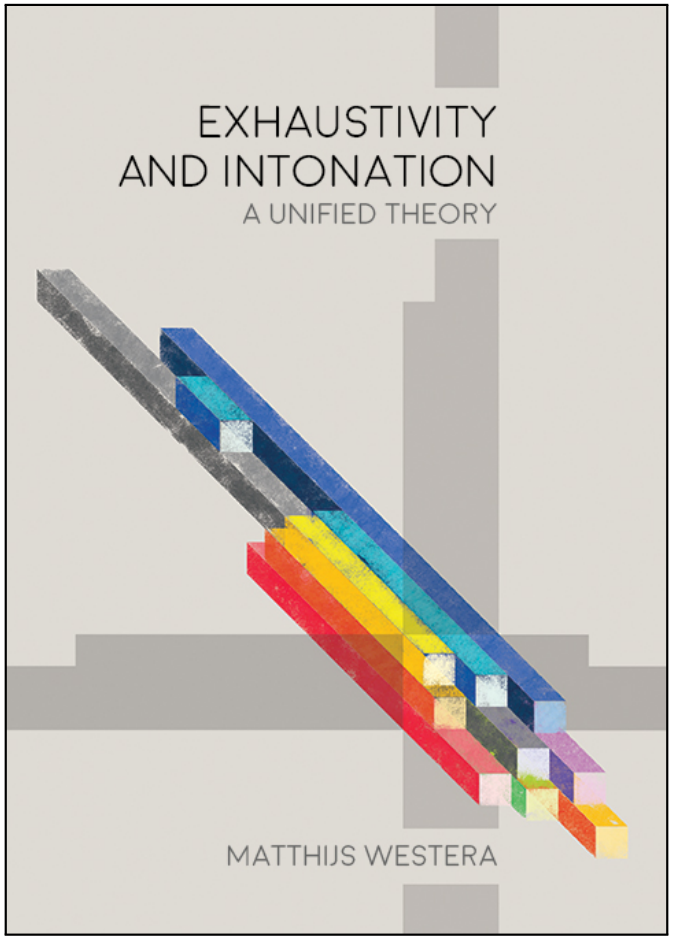
References (1/2)

- Brazil, D.C. (1975). *Discourse intonation.* Discourse Analysis Monographs 1. University of Birmingham.
- Büring, D. (2003). On D-Trees, Beans and B-Accents.
- Constant, N. (2012). English Rise-Fall-Rise: a study in the Semantics and Pragmatics of Intonation. In: *Linguistics and Philosophy* 35(5), pp.407–442.
- Groenendijk, J. and F. Roelofsen (2009). Inquisitive Semantics and Pragmatics. Presented at the *Workshop on Language, Communication, and Rational Agency* at Stanford.
- Gussenhoven, C. (1983). Focus, mode and the nucleus. In: *Journal of Linguistics* 19.02, pp.377–417.
- Gussenhoven, C. (2002). Intonation and interpretation: Phonetics and Phonology. In: *Proceedings of the First International Conference on Speech Prosody*, pp.47–57.
- Gussenhoven, C. (2004). *The Phonology of Tone and Intonation*. Cambridge University Press.
- Hara, Y. and R. van Rooij (2007). Contrastive topics revisited: A simpler set of topic-alternatives. Presented at NELS 38.
- Hobbs, J.R. (1990). The Pierrehumbert-Hirschberg Theory of Intonational Meaning Made Simple. In: *Intentions in Communication*. Bradford Books (MIT Press), pp. 313–324.
- Jackendoff, R. S. (1972). *Semantic interpretation in generative grammar*. Current Studies in Linguistics 2. MIT Press.
- Ladd, D.R. (1980). *The structure of intonational meaning: Evidence from English.* Indiana University Press.

References (2/2)

- Roberts, C. (1996). Information structure in discourse. In J. Yoon & A. Kathol (Eds.), OSU working papers in linguistics (Vol.49, pp.91–136).
- Malamud, S.A. and T. Stephenson (2015). Three ways to avoid commitments: Declarative force modifiers in the conversational scoreboard. In: *Journal of Semantics* 32.2, pp.275–311.
- Steedman, M. (2014). The Surface Compositional Semantics of English Intonation. In: *Language* 90, pp.2–57.
- Tomioka, S. (2010). A scope theory of contrastive topics. In: *Iberia: An Interna- tional Journal of Theoretical Linguistics* 2.1, pp.113–130.
- Wagner, M. (2012). Contrastive topics decomposed. In: *Semantics and Pragmatics* 5 (8), pp.1–54.
- Ward, G. and J. Hirschberg (1985). Implicating uncertainty: the pragmatics of fall-rise intonation. In: *Language* 61.4, pp.747–776.
- Ward, G. and J. Hirschberg (1986). Reconciling Uncertainty with Incredulity: A Unified Account of the L*+H L H% Intonational Contour. Presented at the Annual Meeting of the LSA.
- Westera, M. (2013). 'Attention, Im violating a maxim!' A unifying account of the final rise. In *Proceedings of SemDial*.
- Westera, M. (2017). *Exhaustivity and intonation: a unified theory*. PhD dissertation, University of Amsterdam.

Further details



Appendix A. The maxims

For a proposition p and a $\textsc{Qud}$ $\mathcal{Q}$ ($\langle\langle s, t\rangle, t\rangle$):

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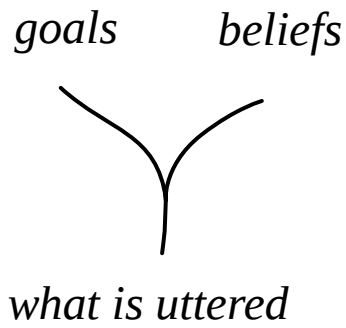
Appendix C. Framework



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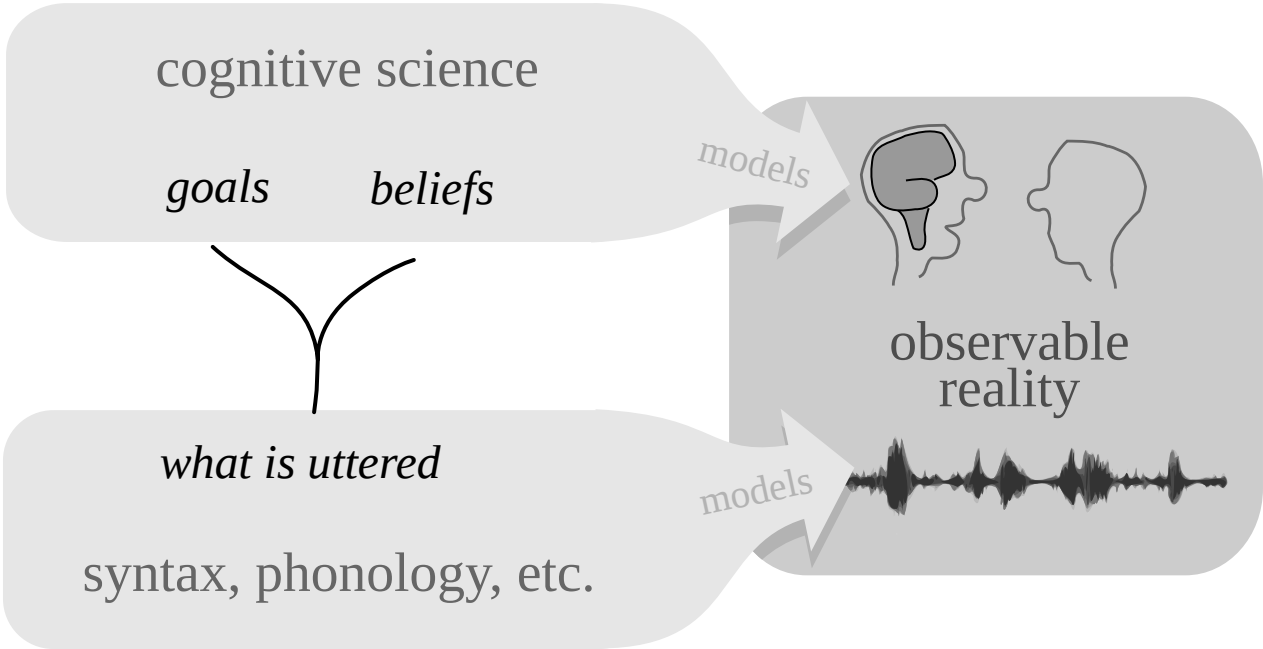

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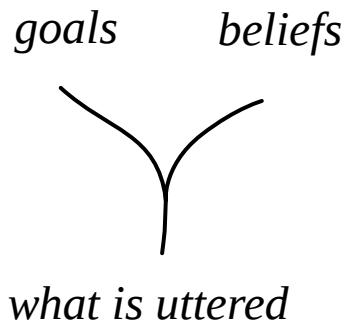

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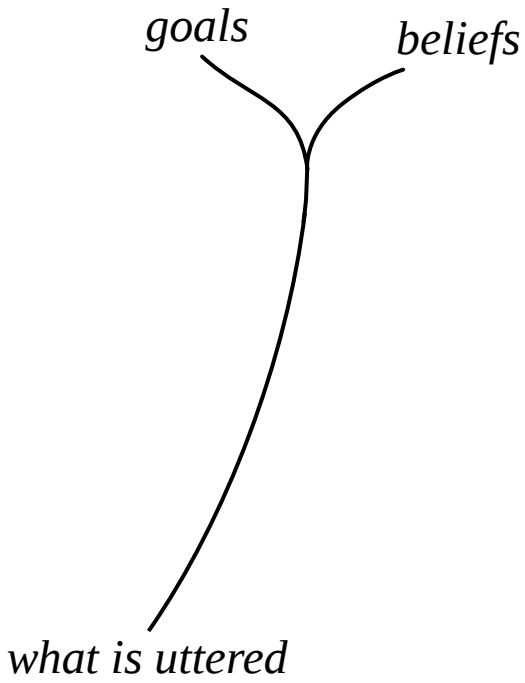

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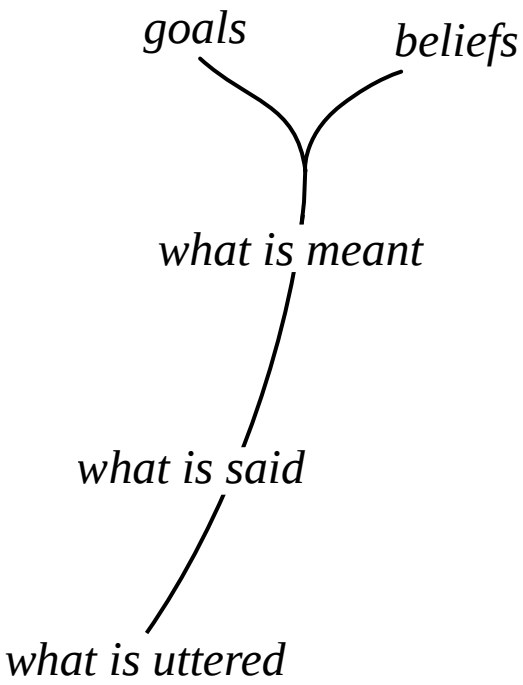

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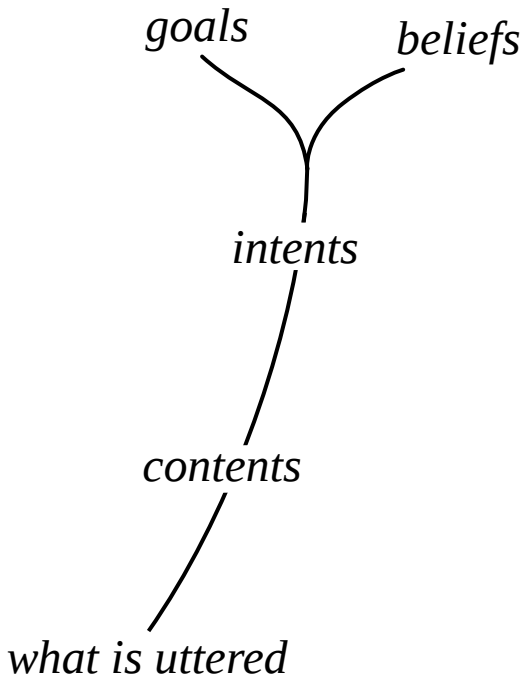

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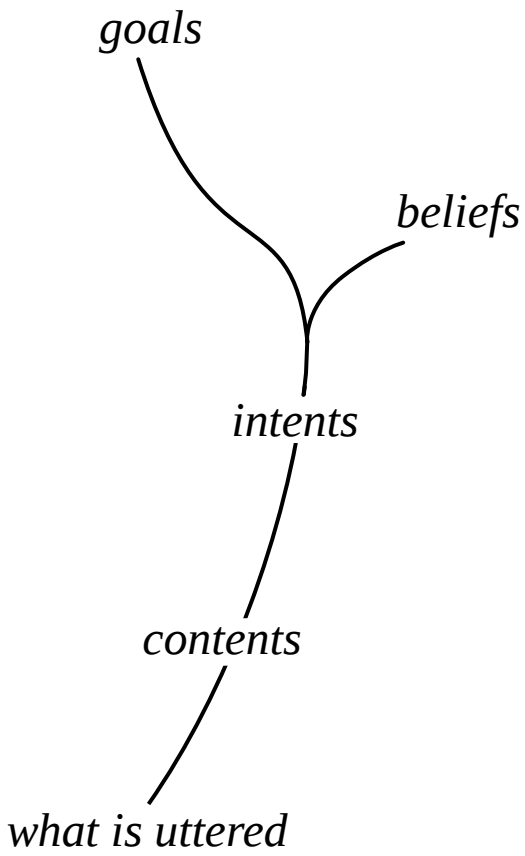

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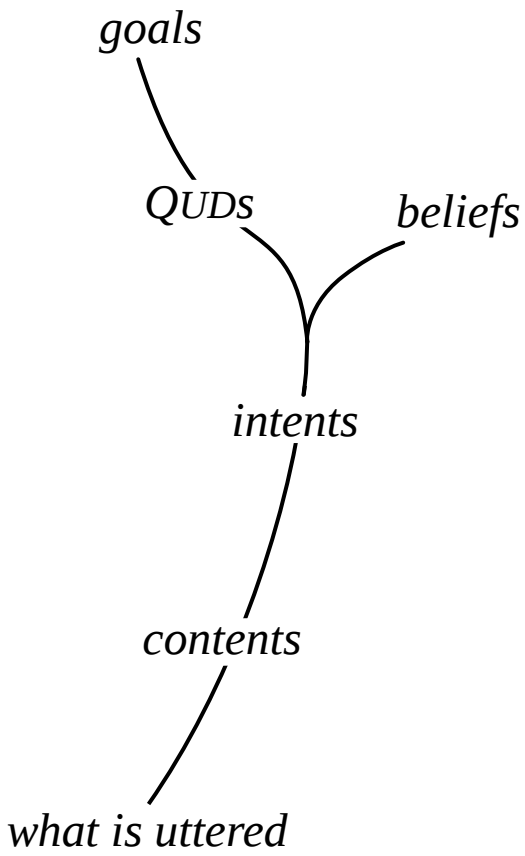

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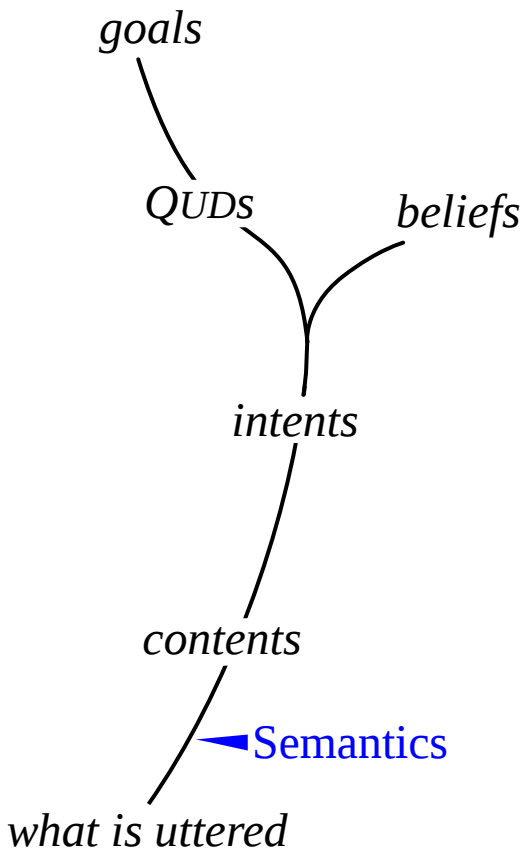

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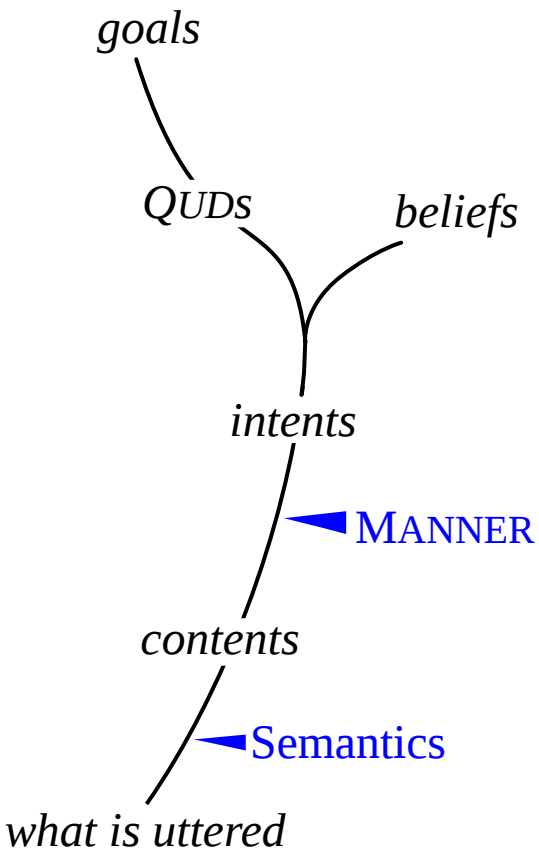

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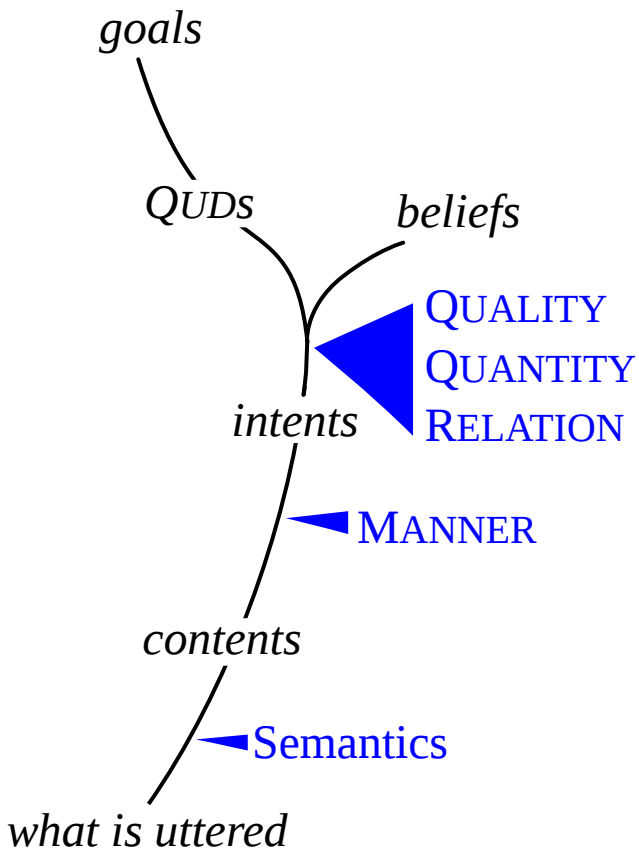

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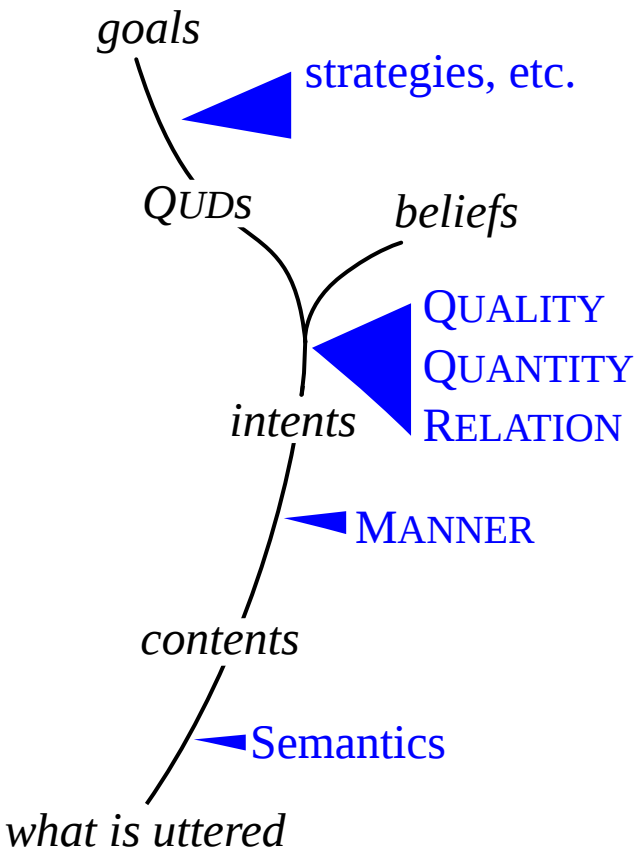

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