

Signification in Auditory Display: When are two perceptualizations equivalent, and who cares?

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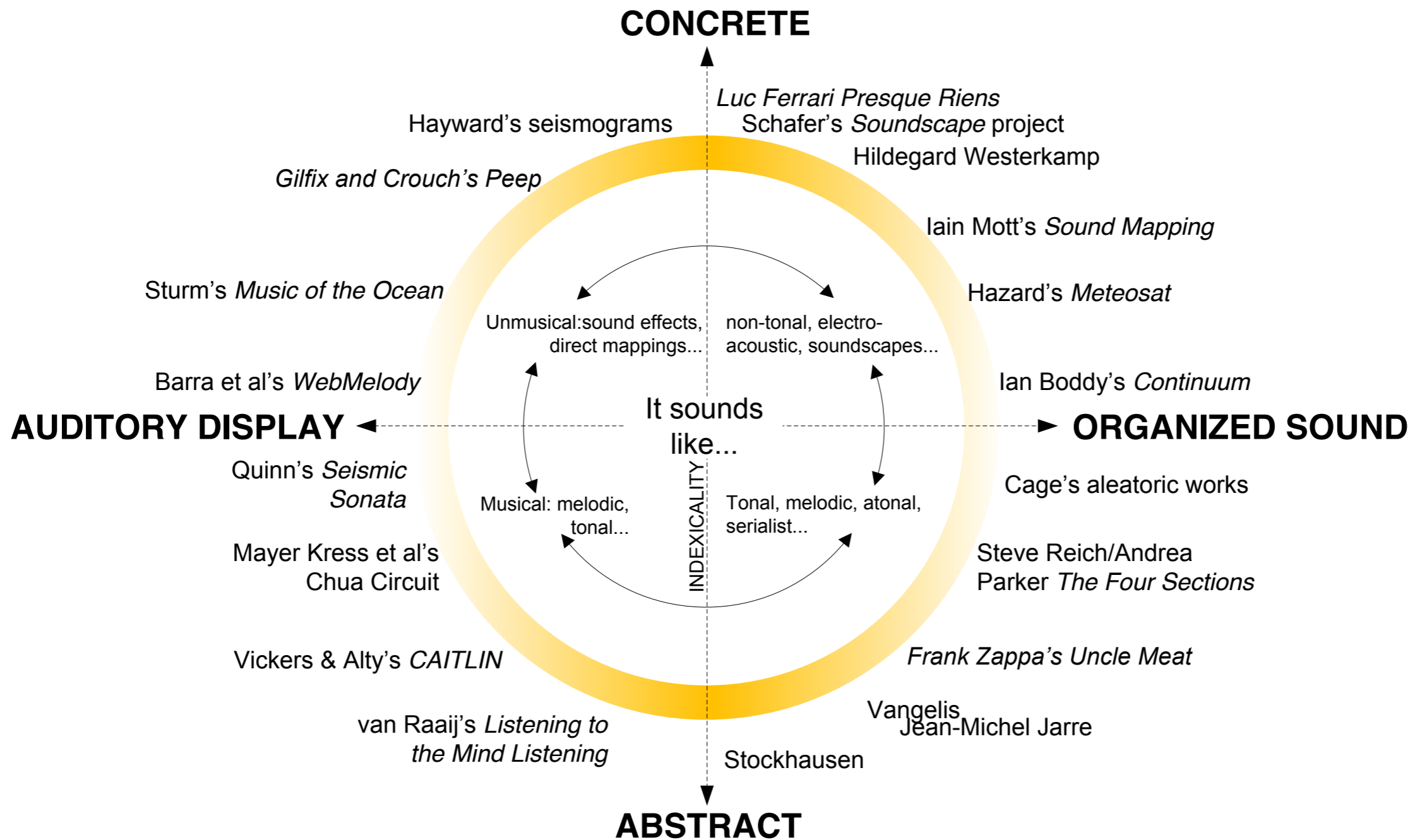
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Typecasting sonification...



P. Vickers, "Ways of listening and modes of being: Electroacoustic auditory display," *Journal of Sonic Studies*, **2**(1), 2012.

P. Vickers and B. Hogg, "Sonification abstraite/sonification concrète: An 'aesthetic perspective space' for classifying auditory displays in the ars musica domain," in *proc. ICAD 2006 - The 12th Meeting of the International Conference on Auditory Display*, pp. 210–216, 20–23 June 2006.

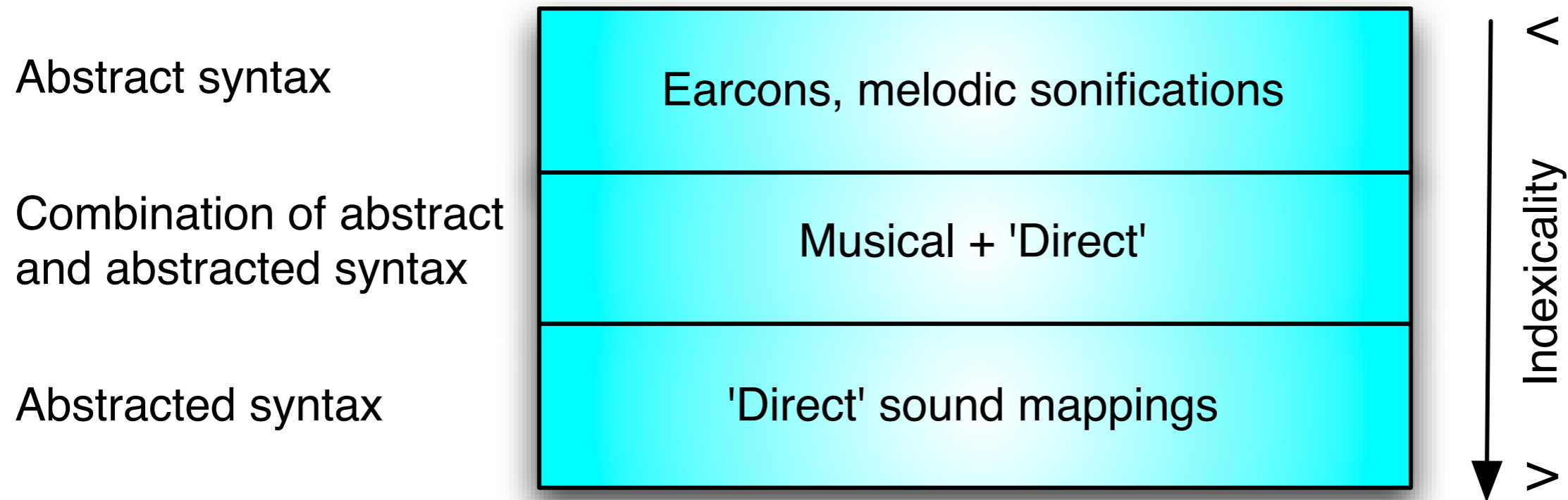
Emerson's language grid

Abstract syntax	1	4	7
Combination of abstract and abstracted syntax	2	5	8
Abstracted syntax	3	6	9
	I: Aural discourse dominant	II: Combination of aural and mimetic discourse	III: Mimetic discourse dominant

P. Vickers, "Lemma 4: Haptic input + auditory display = musical instrument?," in *Haptic and Audio Interaction Design: First International Workshop*, vol. 4129/2006 of *Lecture Notes in Computer Science*, pp. 56–67, Springer-Verlag, 2006.

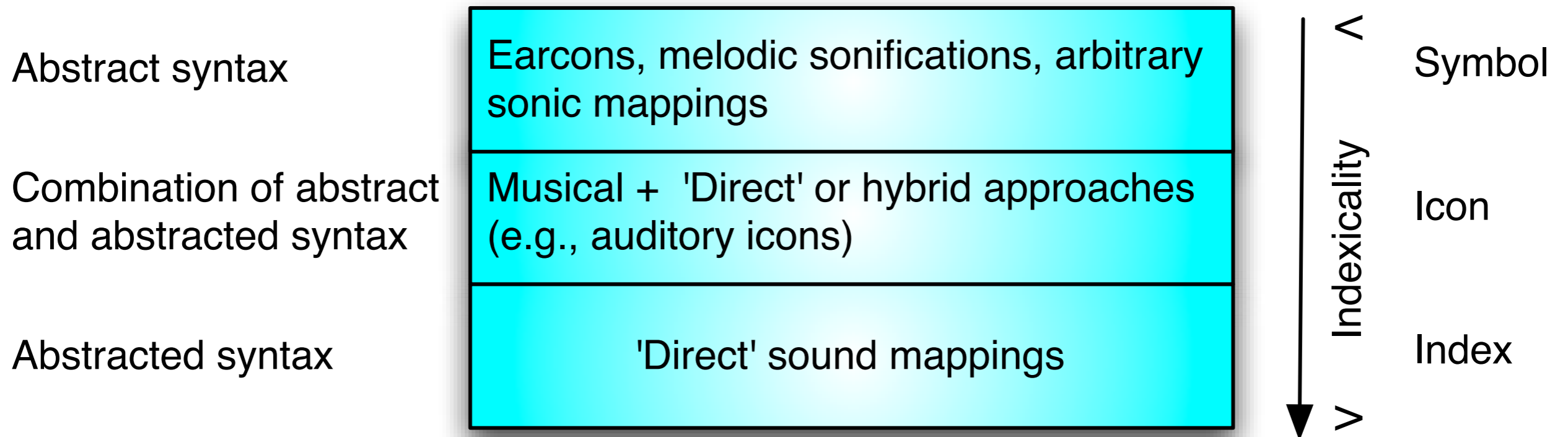
S. Emmerson, "The relation of language to materials," in *The Language of Electroacoustic Music* (S. Emmerson, ed.), ch. 2, pp. 17–39, London: Macmillan, 1986.

Mimetic sonifications



Mimetic sonifications. Indexicality is least in the abstract syntax work and highest in the abstracted syntaxes

Sonification as representational discourse



Representational discourse. Indexicality is least in the abstract syntax work and highest in the abstracted syntaxes

Les quatre écoutes: the acousmatic reductions

	Abstract	Concrete
Objective	4. <i>Comprendre</i>	1. <i>Écouter</i>
Subjective	3. <i>Entendre</i>	2. <i>Ouïr</i>

Schaeffer's quatre écoutes, or four ways of listening.

Direct listening modes?

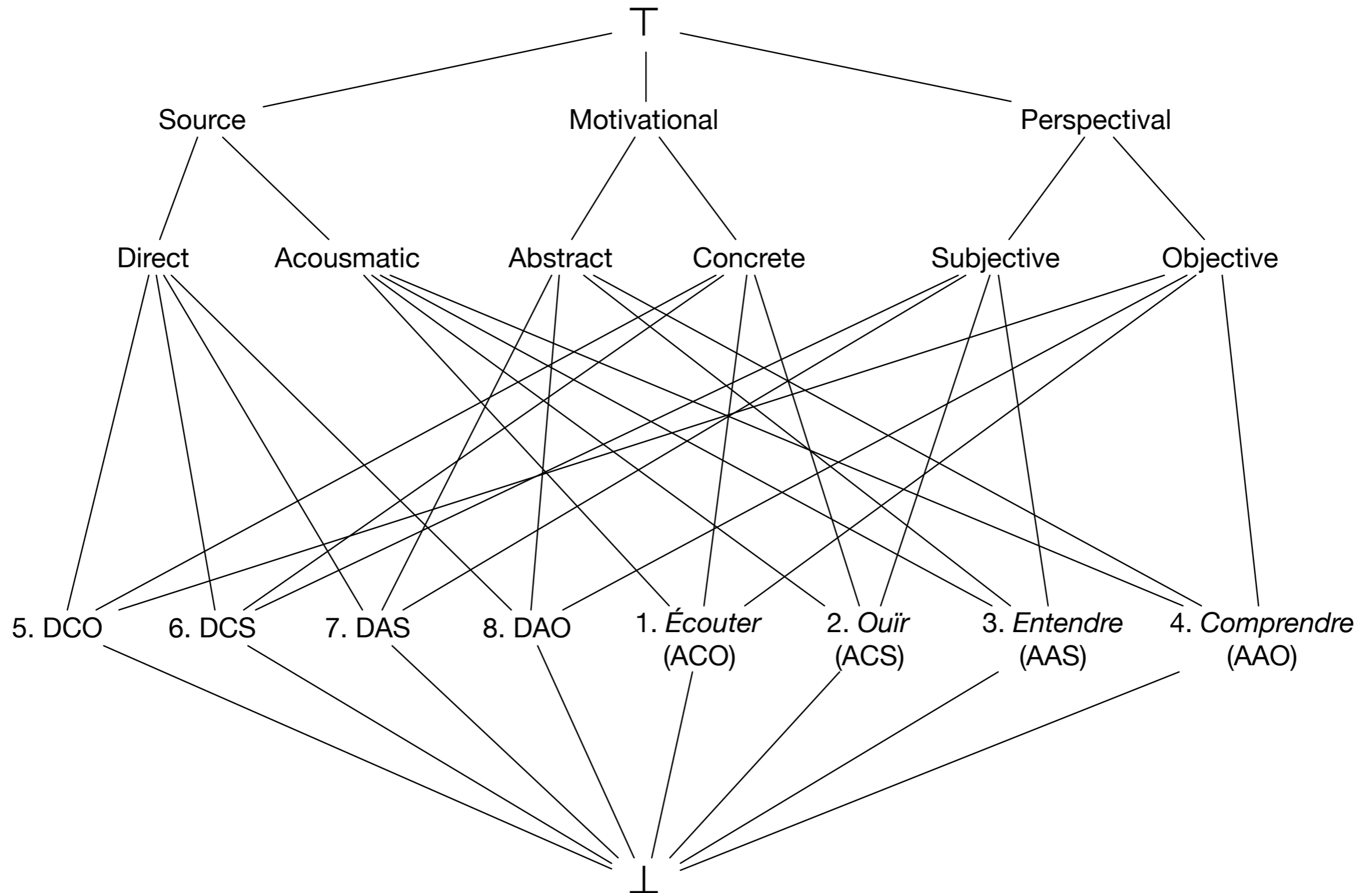
	Abstract	Concrete	
Direct { Acousmatic {	8. ?	5. ?	} Objective
	4. <i>Comprendre</i>	1. <i>Écouter</i>	
	3. <i>Entendre</i>	2. <i>Ouïr</i>	
Musical={2,3}, Everyday= {1,4,5,8}			
Causal={1,5}, Semantic={4,8}			
Direct={5,8}, Acousmatic={1,2,3,4}			
Objective={1,4,5,8}, Subjective={2,3}			

Modes of listening: Schaeffer, Chion, and Gaver. The direct listening space opens up the possibility of further listening modes mirroring those in the acousmatic space. This table shows the positions of the new modes 5 and 8.

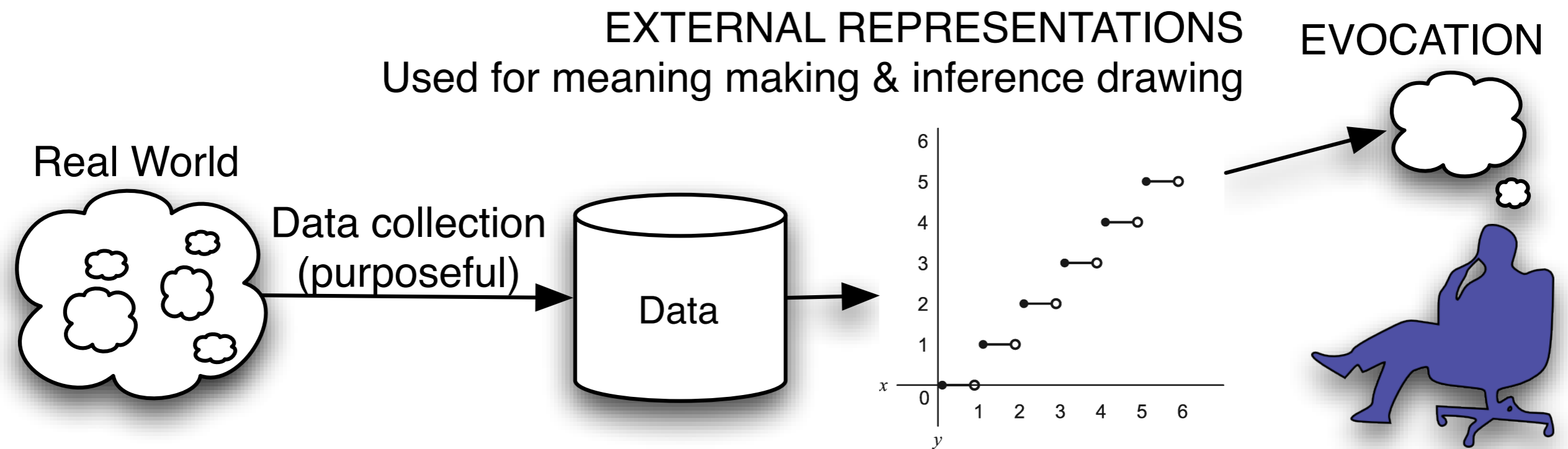
Eight atomic modes of listening.

	Abstract	Concrete	
Direct {	7. DAS	6. DCS	} Subjective
	8. DAO	5. DCO	} Objective
Acousmatic {	4. <i>Comprendre</i>	1. <i>Écouter</i>	} Subjective
	3. <i>Entendre</i>	2. <i>Ouir</i>	} Subjective

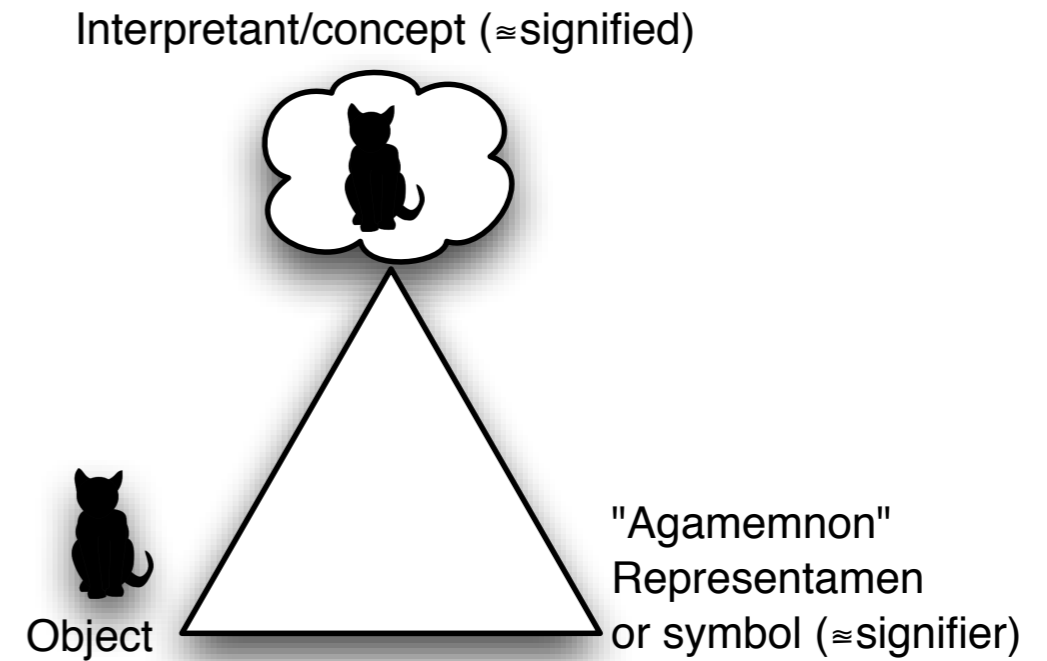
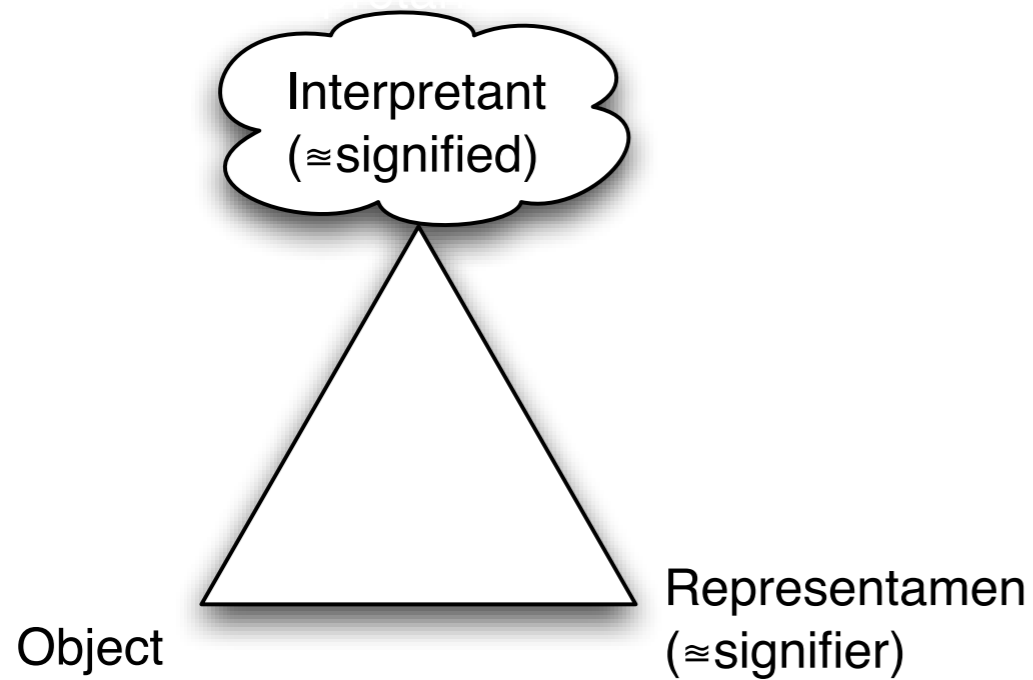
Les huit écoutes



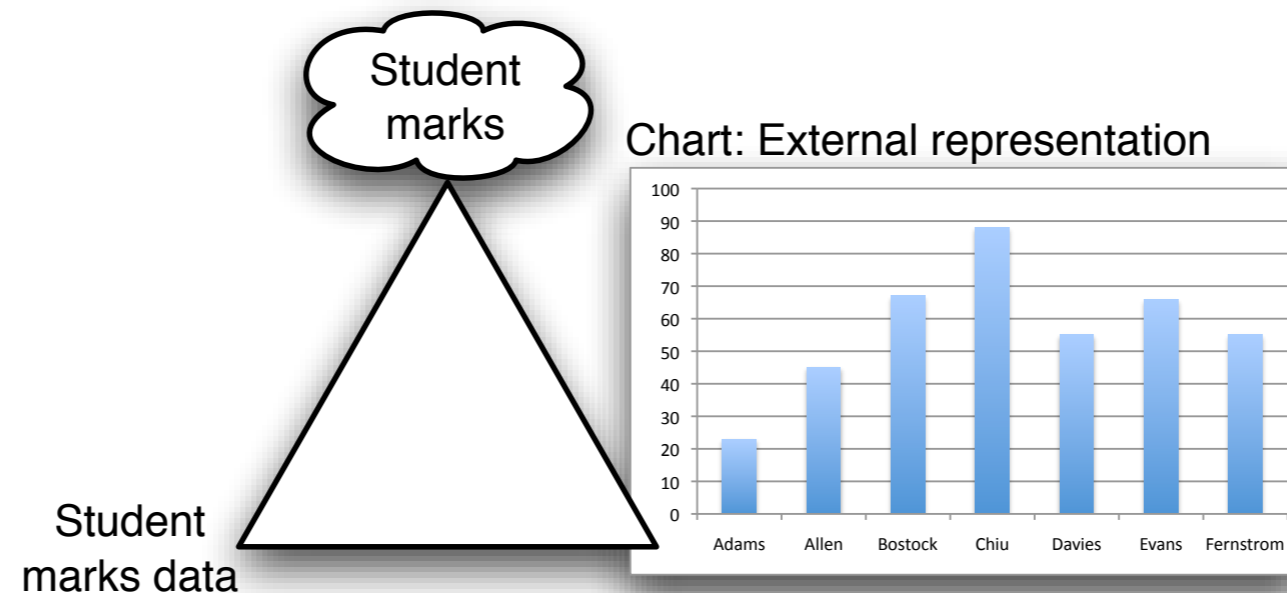
Perceptualization as a process



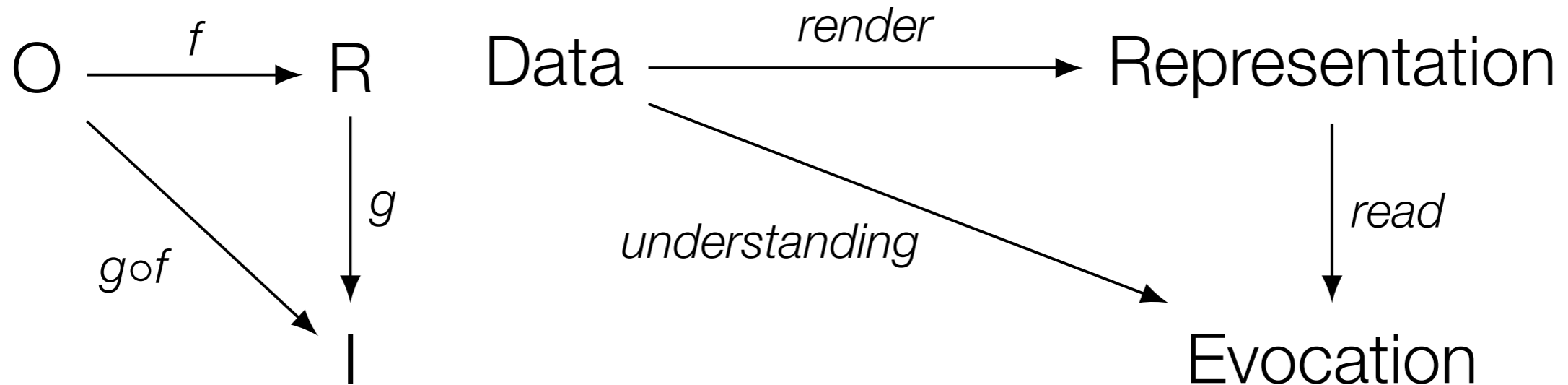
Peircean semiotic triangle



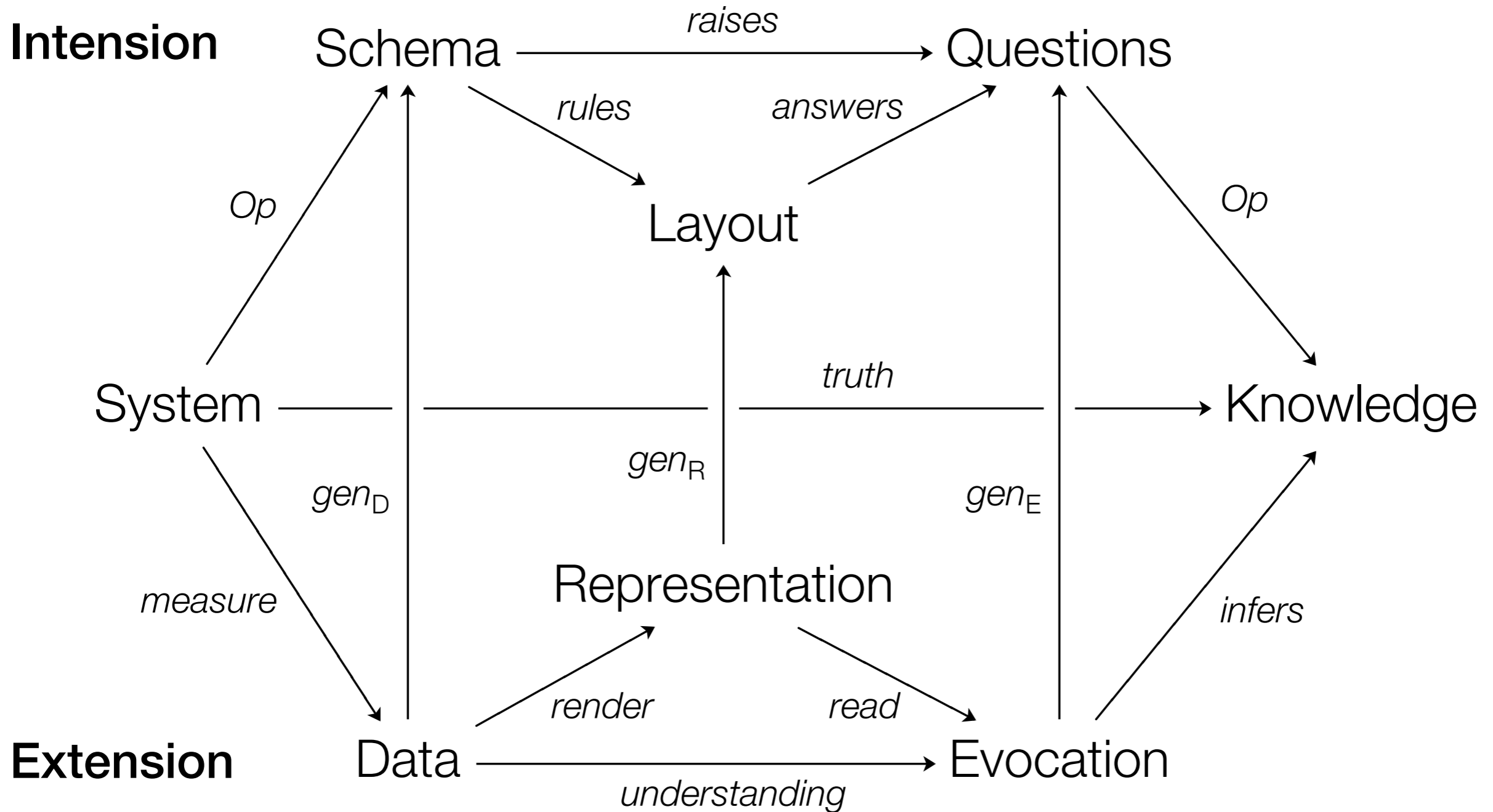
Evocation: inferred beliefs about the world of the student marks



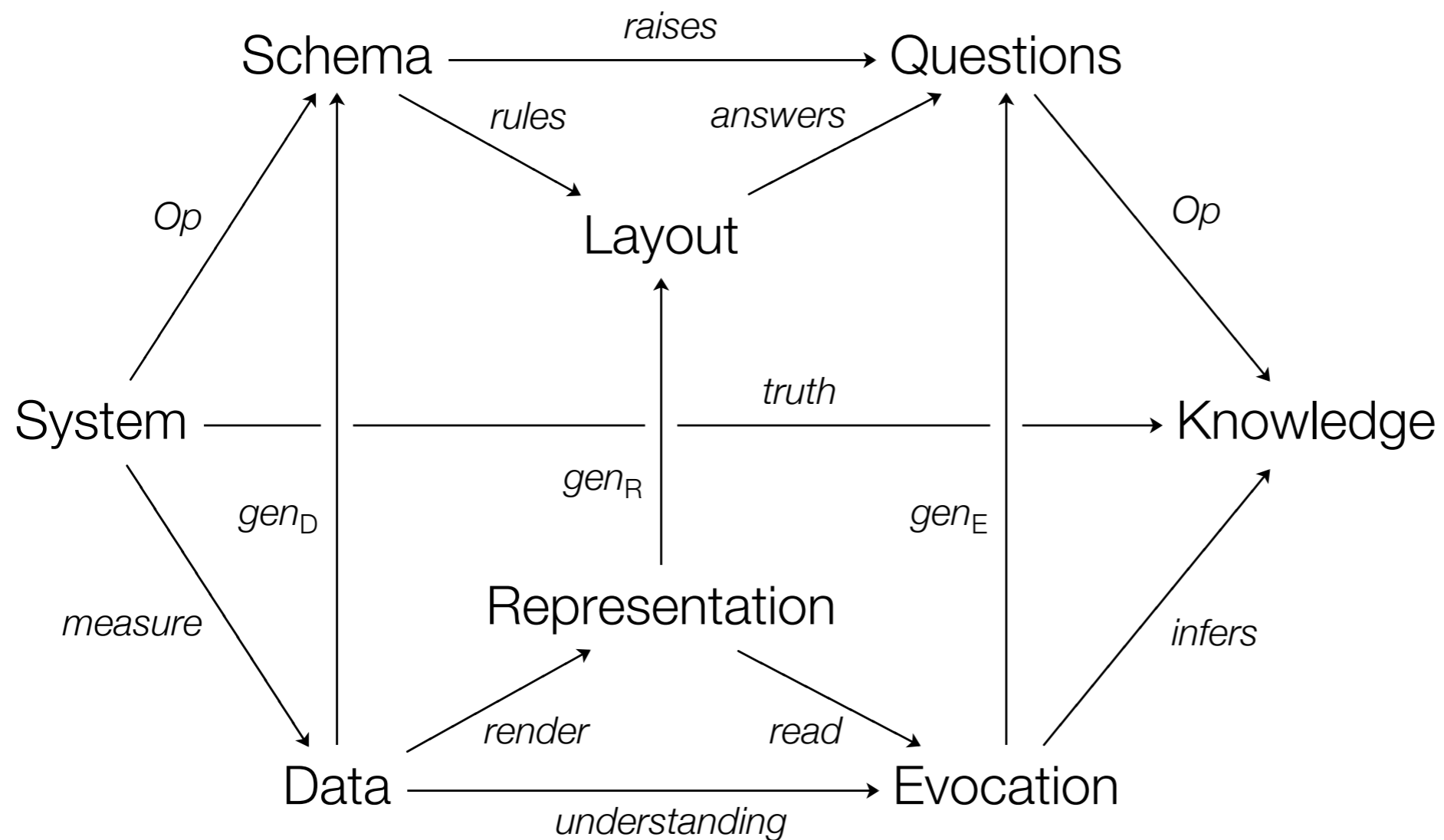
Semiotic triad as a commuting triangle



Visualization as a mathematical category



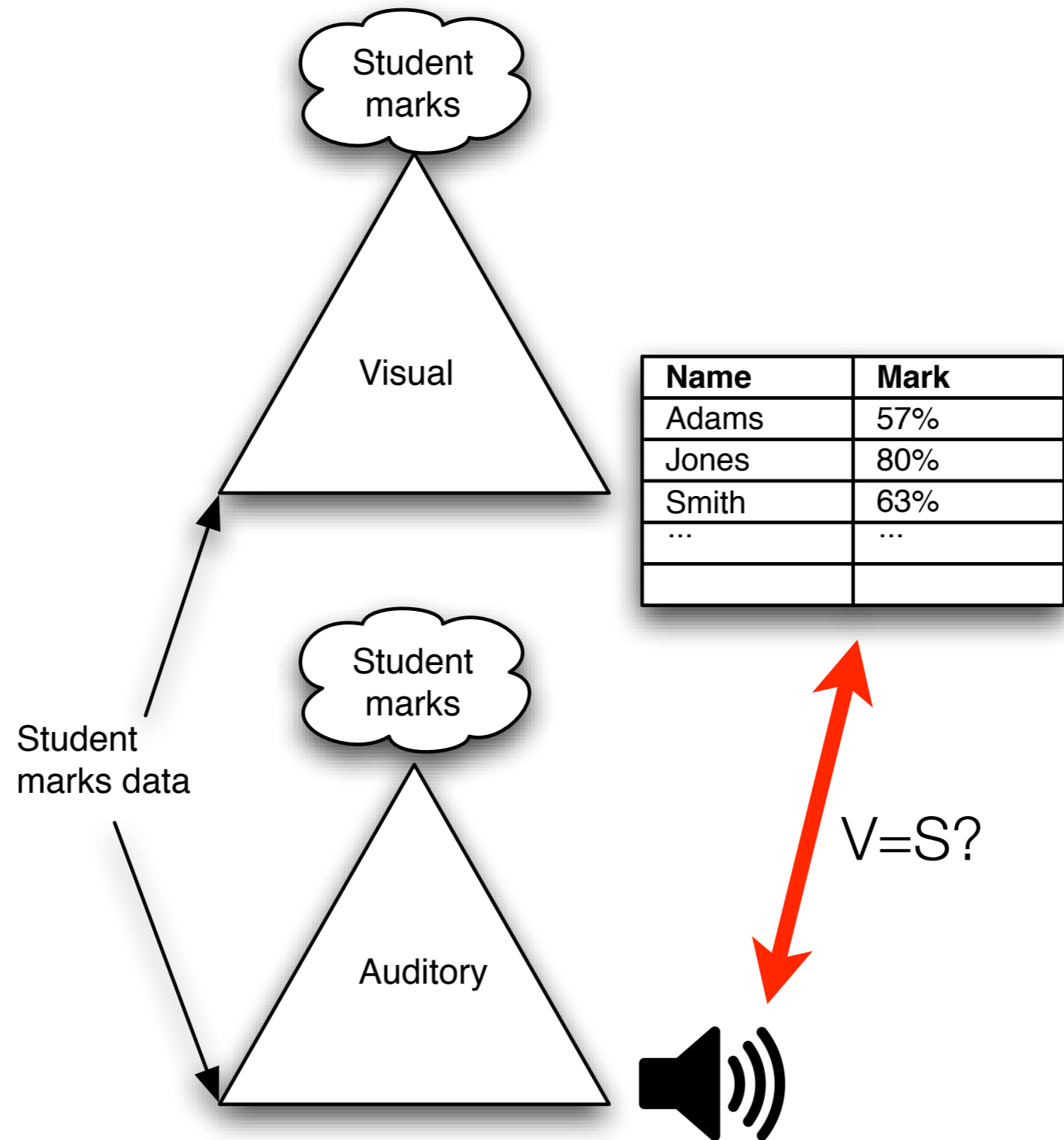
Perceptualization: answering questions



Evocation = *read* ◦ *render*

Questions = *answers* ◦ *rules*

Who cares?



References

P. Vickers, J. Faith, and N. Rossiter, “Understanding visualization: A formal approach using category theory and semiotics,” *IEEE Transactions on Visualization and Computer Graphics*, **19**(6), pp. 1048–1061, June 2013.

P. Vickers, “Ways of listening and modes of being: Electroacoustic auditory display,” *Journal of Sonic Studies*, **2**(1), 2012.

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