

**probabilistic
pragmatic
modeling**

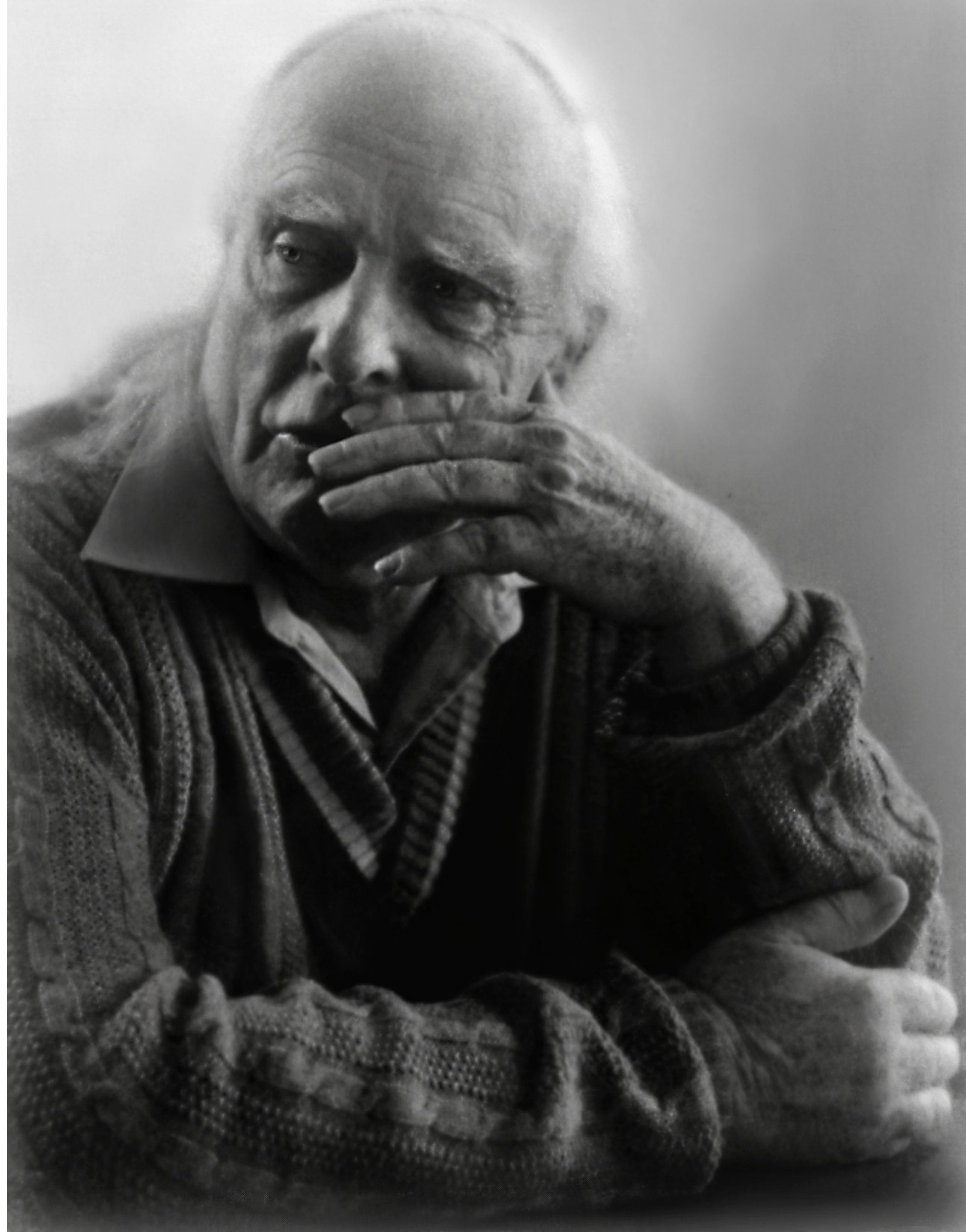


“If I say to any one, ‘**I saw some of your children to-day**’, he might be justified in inferring that I did not see them all, not because the words mean it, but because, if I had seen them all, it is most likely that I should have said so.”

(Mill 1867)

“[O]ne of my avowed aims is to see talking as a special case or variety of purposive, indeed rational, behaviour.”

(Grice 1975)



Maxim of Quality

Try to make your contribution one that is true.

- (i) Do not say what you believe to be false.
- (ii) Do not say that for which you lack adequate evidence.

Maxim of Quantity

- (i) Make your contribution as informative as is required for the current purposes of the exchange.
- (ii) Do not make your contribution more informative than is required.

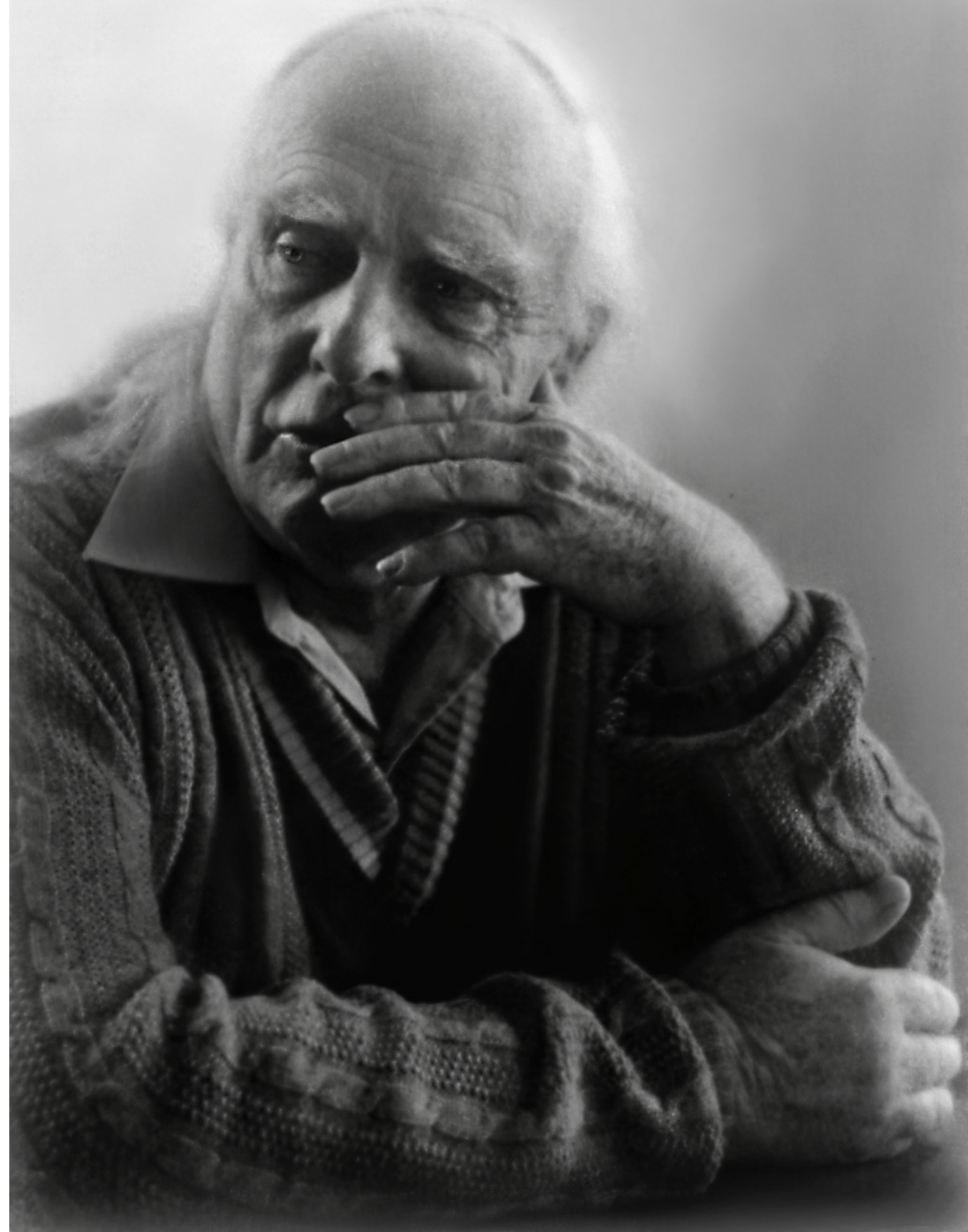
Maxim of Relation

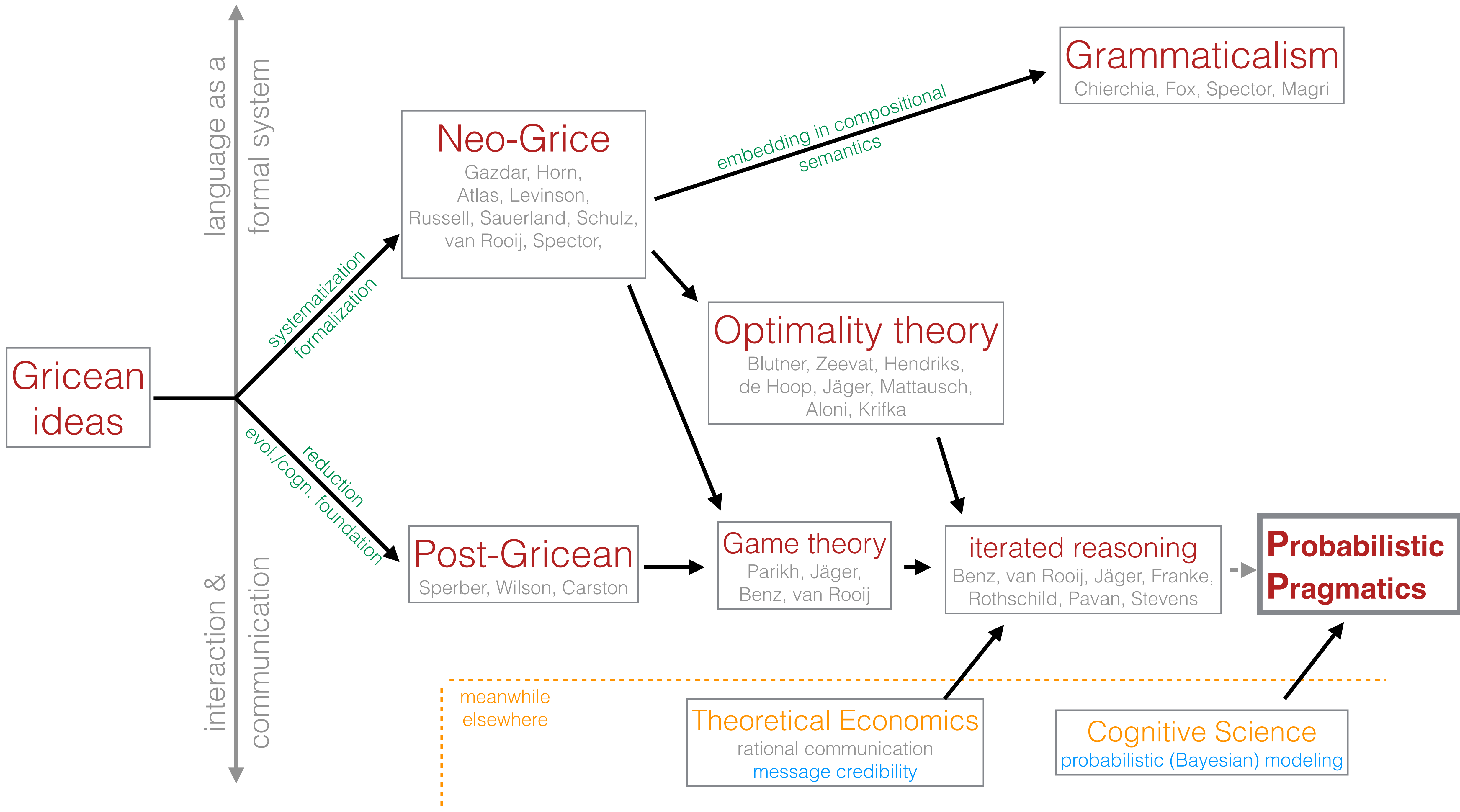
- (i) Be relevant.

Maxim of Manner

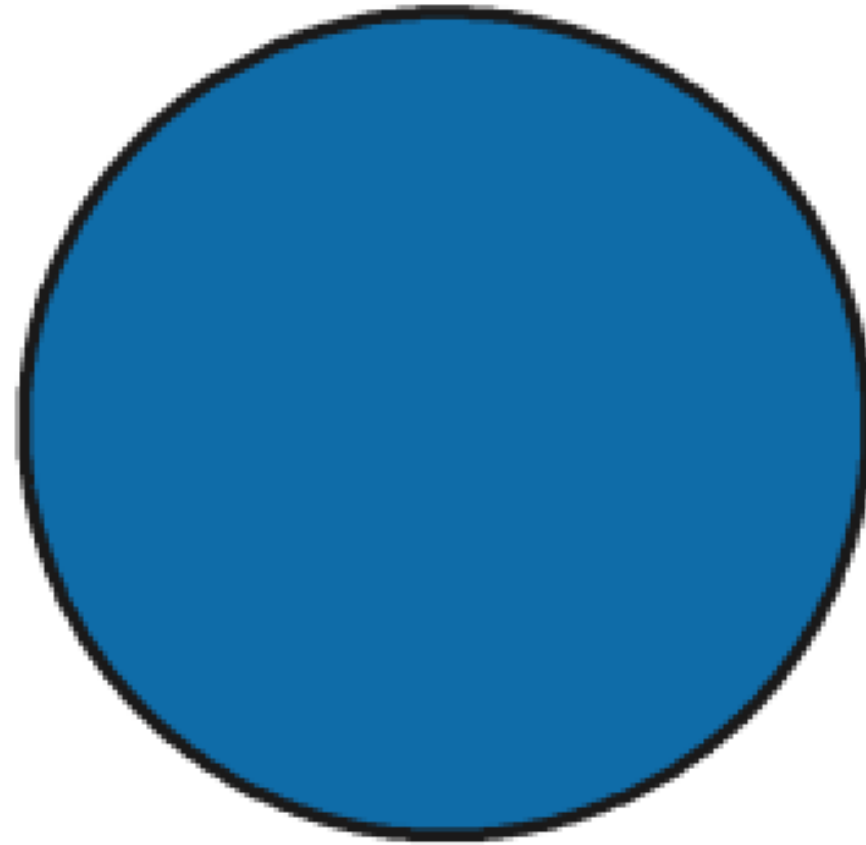
Be perspicuous.

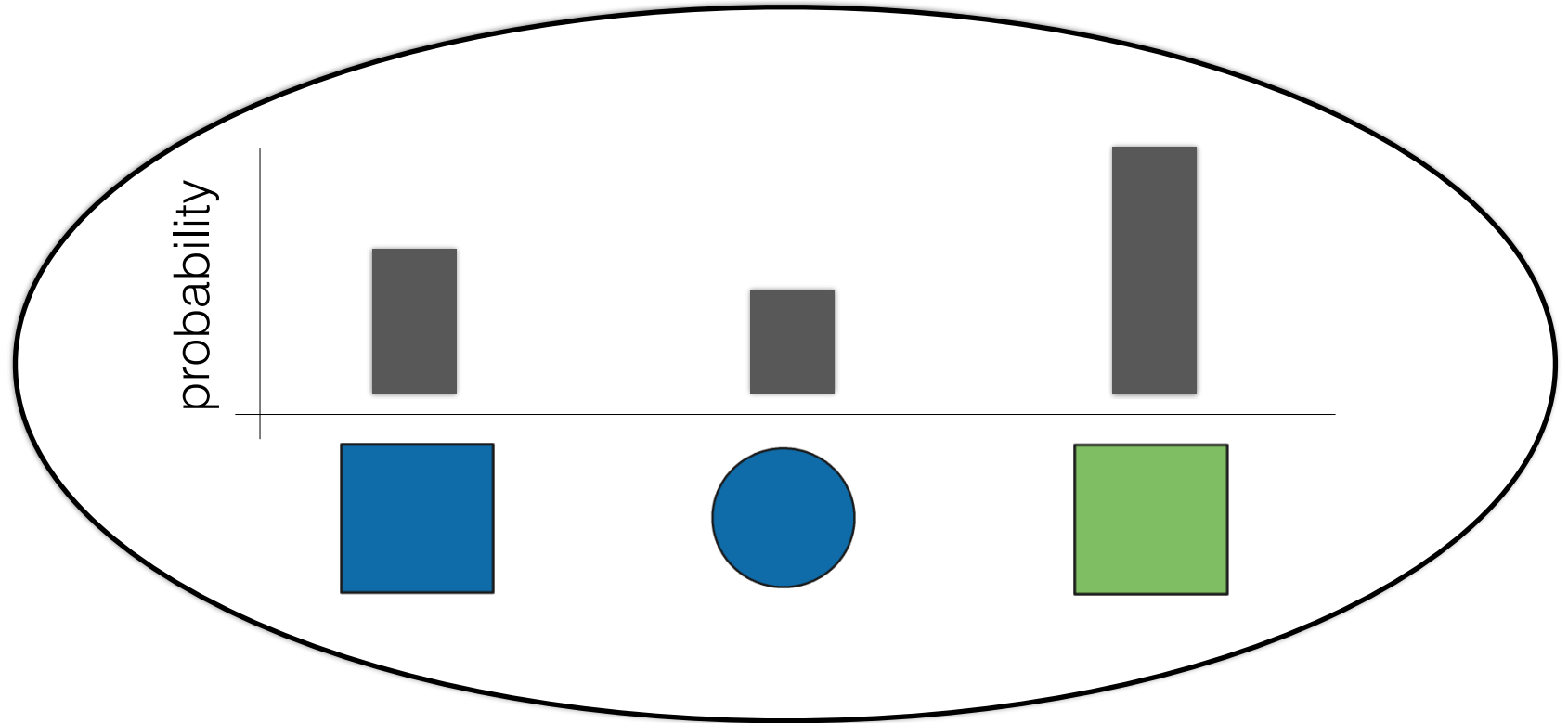
- (i) Avoid obscurity of expression.
- (ii) Avoid ambiguity.
- (iii) Be brief (avoid unnecessary prolixity).
- (iv) Be orderly.





Reference game





PRAGMATIC INTERPRETER

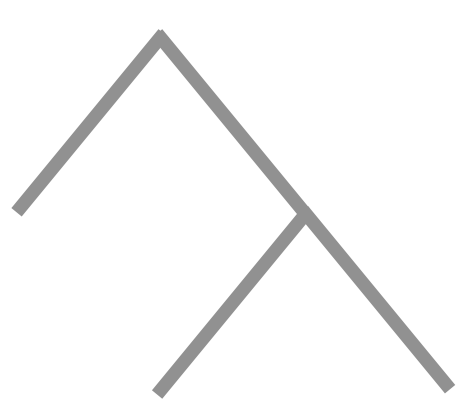
ACTUAL SPEAKER

This box shows the actual speaker's perspective. A thought bubble contains a blue square. A speech bubble contains the word "blue".


MODEL OF SPEAKER BEHAVIOR

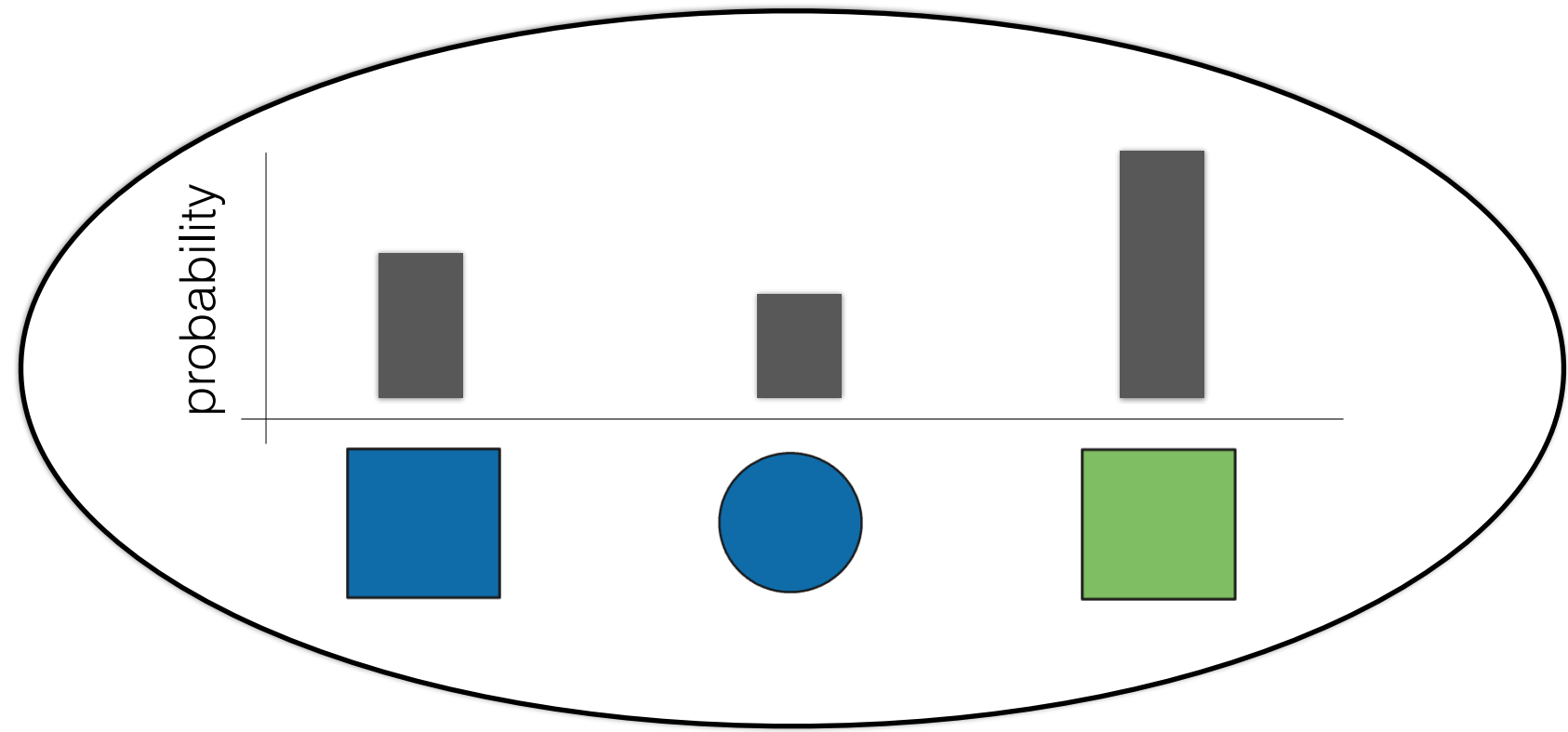
ALTERNATIVE UTTERANCES & INTERPRETATIONS

This box shows an alternative interpretation. A thought bubble contains a blue circle. A speech bubble contains the word "circle".

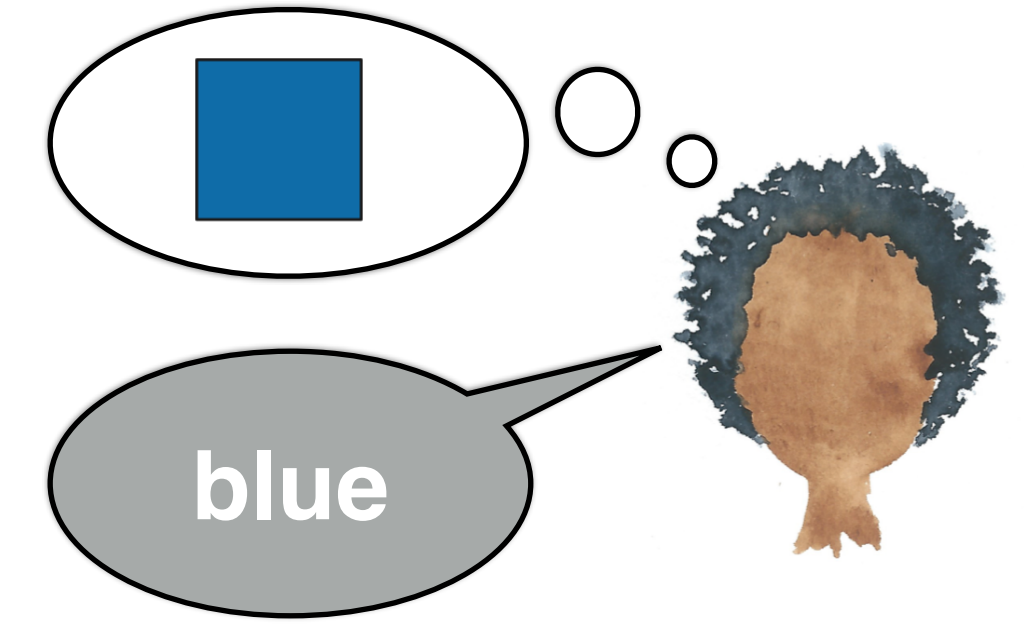

 /lɪŋ'ɡwɪstɪks/
 $[[\text{Joe}]] = \lambda e . \lambda w . \text{Joe}(e, w)$
KNOWLEDGE OF LANGUAGE

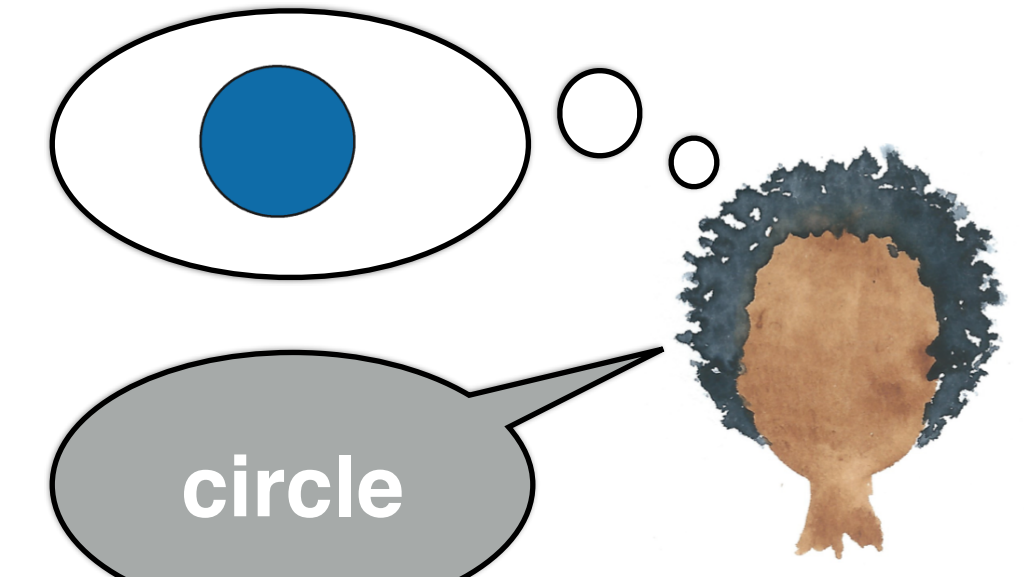

GENERAL WORLD KNOWLEDGE


ACTUAL CONTEXT OF CONVERSATION



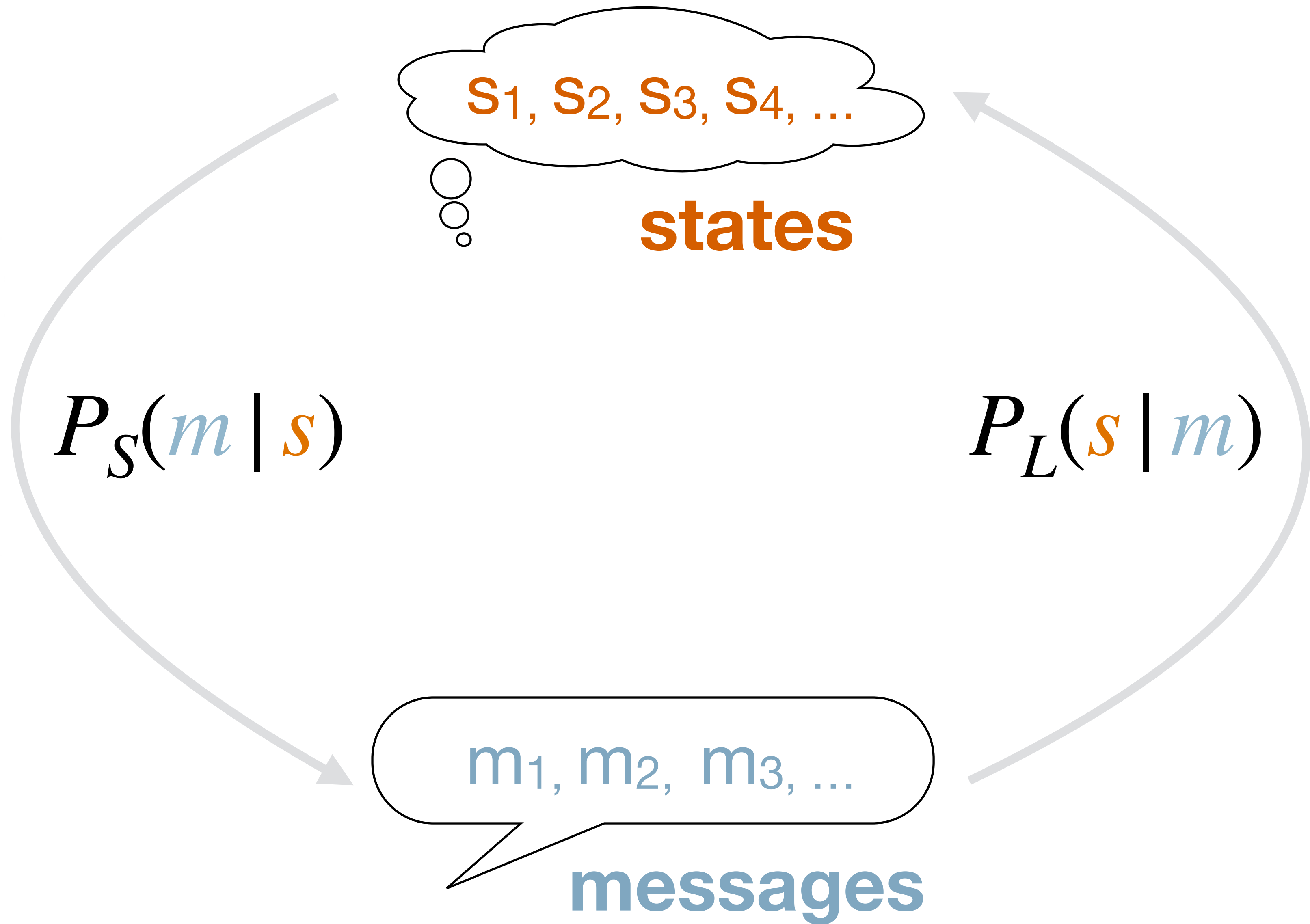
PRAGMATIC INTERPRETER


ACTUAL SPEAKER

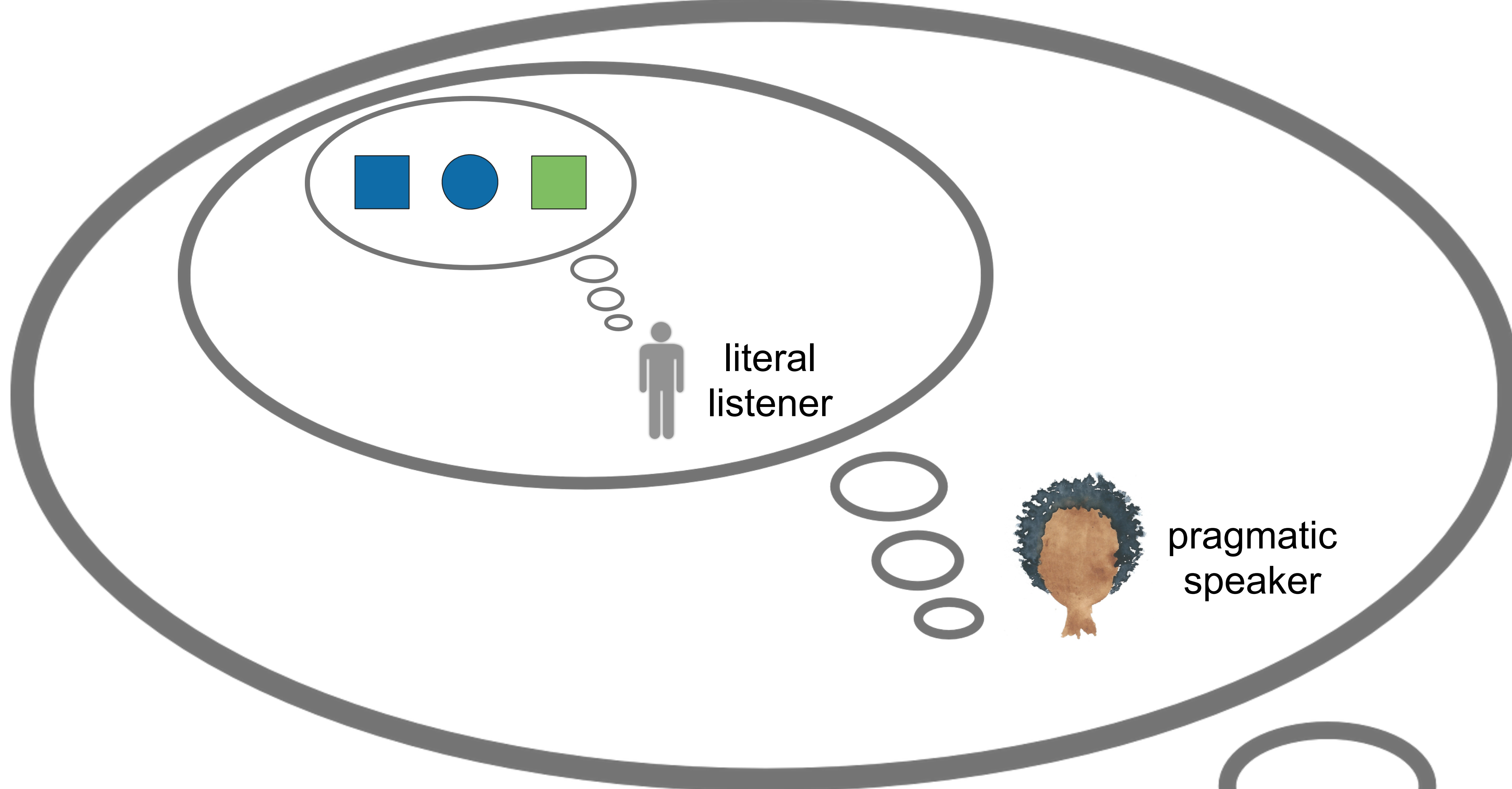

MODEL OF SPEAKER BEHAVIOR
ALTERNATIVE UTTERANCES & INTERPRETATIONS



speaker



listener



literal
listener

pragmatic
speaker

pragmatic
listener



Rational Speech Act (RSA) model



LITERAL INTERPRETATION

$$P_{lit}(s | u) = P(s | \llbracket u \rrbracket)$$






PRAGMATIC SPEAKER




$$P_S(u | s) = \text{SM} (\log P_{lit}(s | u) - C(u))$$






PRAGMATIC INTERPRETATION

$$P_L(s | u) \propto P(s) P_S(u | s)$$

			
“square”	.5	0	.5
“circle”	0	1	0
“green”	0	0	1
“blue”	.5	.5	0

	“square”	“circle”	“green”	“blue”
	.5	0	0	.5
	0	.89	0	.11
	.11	0	.89	0

			
“square”	.82	0	.18
“circle”	0	1	0
“green”	0	0	1
“blue”	.82	.18	0