

Tools for non-triviality

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Tl;dr ("too long, didn't read")

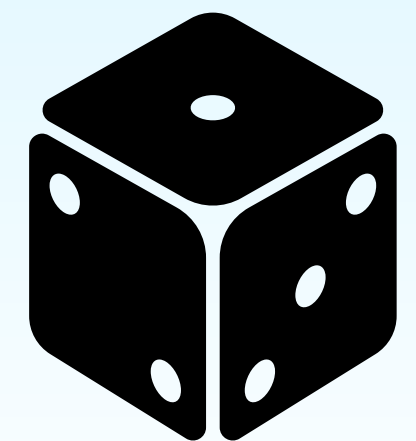
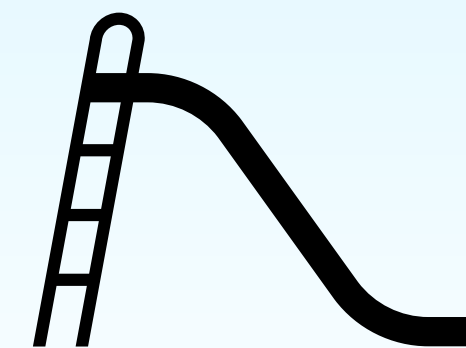
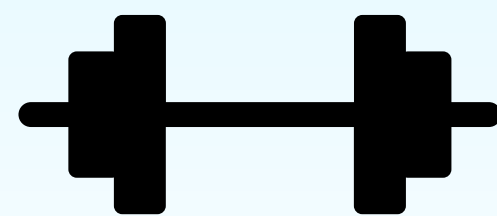
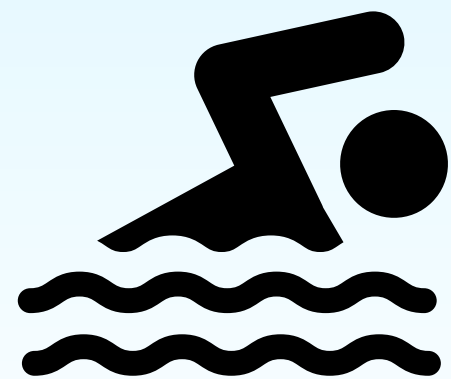
We should stop using necessity and sufficiency and use efficacy instead.

What is non-triviality?

- (1) Mary managed to win the lottery/break her leg.
- (2) Mary can breathe.
- (3) Mary is tough to please.

How can we think about non-triviality?

- Under certain conditions (Kratzer 1991)
- Trying is required (Karttunen 1971, Bhatt 1999, Stephenson 2010)
- Difficulty (Karttunen & Peters 1979)
- Effort is required/interference (Talmy 2000)
- Unexpectedness (Alonso-Ovalle & Hsieh 2017)
- Unlikelihood, unexpectedness, or difficulty (Baglini & Francez 2016)



Recent advances in non-triviality

- **Baglini & Francez 2016** English

Non-triviality: Something (else), a "catalyst", has to cause the event.
(Triviality: Either something is already causing the event, or it happens by itself.)

- **Paul, Ralalaoherivony, & de Swart 2016, Paul & de Swart 2020** Malagasy+

Abiliative and accidental readings go together because they are both "double prevents" (Wolff et al 2010: can have either "cause" or "allow" readings).

- **Alonso-Ovalle & Hsieh 2017, 2018** Tagalog

Abiliative and accidental readings go together because the event is stereotypically unexpected given conditions.

- **Nadathur 2017, 2019, 2021** English

Manage to and ability go together because they both involve available actions; necessity + sufficiency is the relation we want for catalysts.

Two puzzles about non-triviality

1. The accidental action puzzle

Why do abilitative readings and accidental readings often share the same morphology?

- Tagalog abilitative form (Dell 1983, Alonso-Ovalle & Hsieh 2018)
- Malagasy *maha-* (Paul, Ralalaoherivony, & de Swart 2016)
- St'at'imcets "out of control" *ka...a* (Copley to appear)

Two puzzles about non-triviality

2. The reliability puzzle (Nadathur 2021)

Why does *can*, but not *manage to*, convey reliability in causing non-trivial effects?

What level of generality?



Davidsonian events

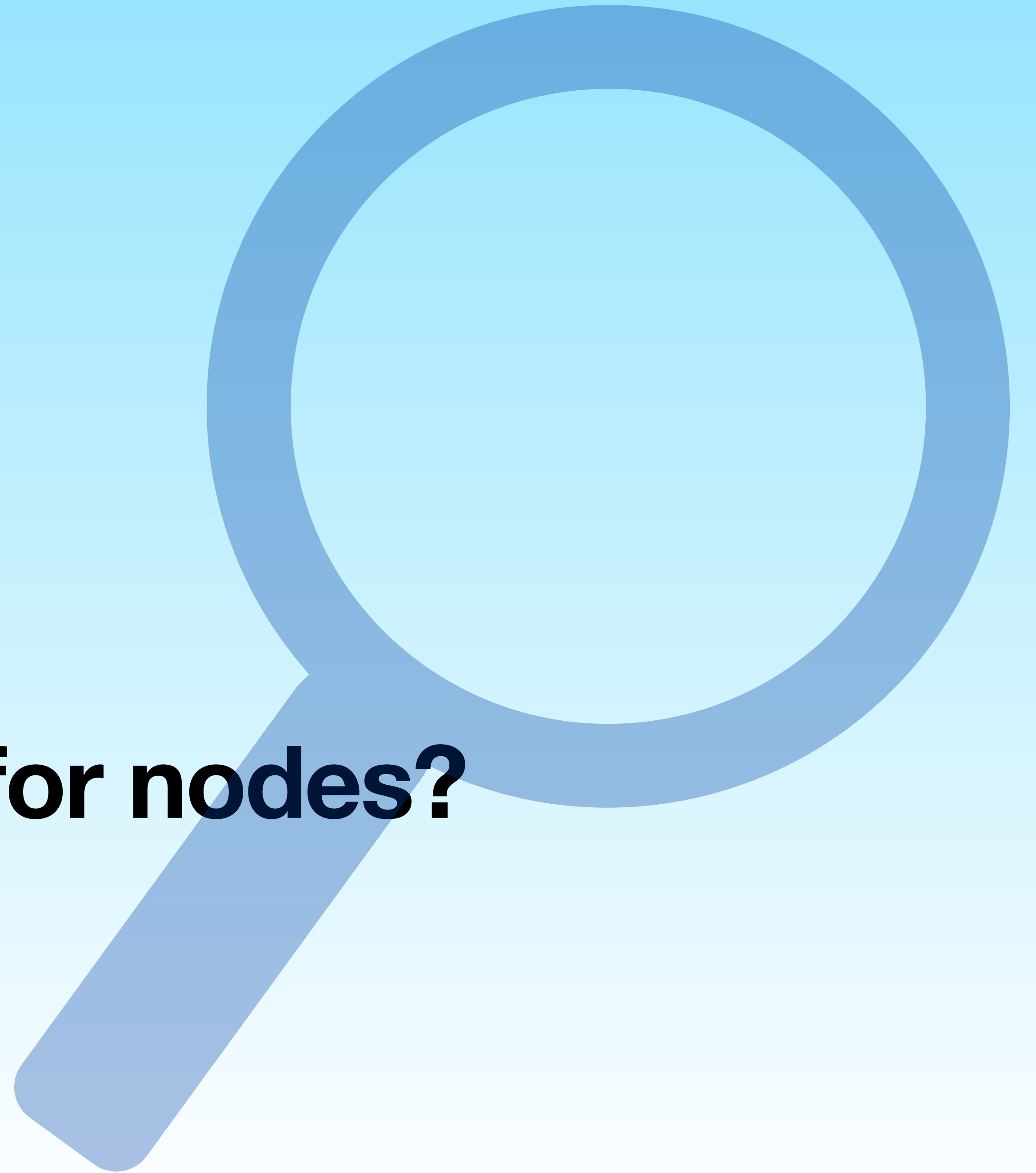


This proposal



Causal models
(out of the box)

What level of generality for nodes?



Nodes and verbs

- **Proposal:** Verbs presuppositionally add a causal structure such as $I \rightarrow E$ to the "common ground causal model".

For instance, goal-directed action is represented by an I(ntention) node which influences an E(vent) (and see Condoravdi & Lauer 2016, Grano 2017, Vogeleer & Guéron 2020).

- The values of the nodes are added as part of the assertion.

A node for abilities and other such properties

Proposal: There's another kind of node that can be a causing node:

$$A \rightarrow E$$

I'm giving it an "A" for ability, but it's not necessarily an ability. It's a non-intentional property of the subject that influences the event. It includes both general and action-dependent abilities (Mari & Martin 2008, see also Baglini & Francez 2016, Nadathur 2021 e.g.).



What level of generality for arrow relations?

Relations we have been using



e_1 CAUSE/leads to e_2



causal necessity:
 $A \rightarrow B$ and

A	B
1	{0,1}
0	0

causal sufficiency:
 $A \rightarrow B$ and

A	B
1	1
0	{0,1}

Let's think about "efficacy" instead

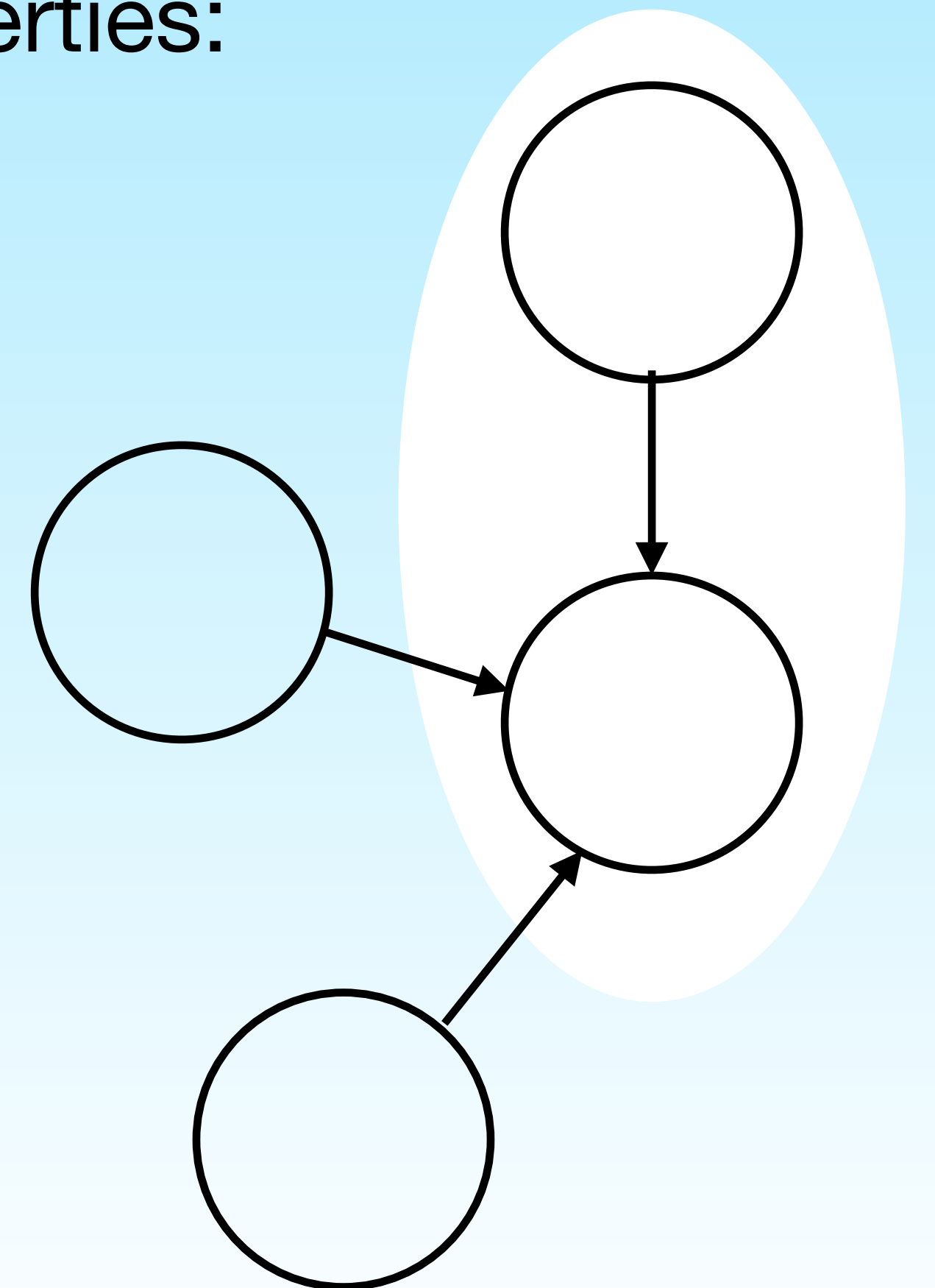
- "Getting what you want", "winning" (Copley 2005a,b, Copley & Harley 2015)
- This notion owes a lot to force-theoretic approaches: Talmy 1988, 2000; Wolff 2007 e.g.
- A map is not the territory (Korzybski 1933)
- *efficacious*(A, E) iff $A \rightarrow E$ is in the model, and the value of $f_{\overrightarrow{AB}}(A)$ in the model is the value of B in the world
- Efficacy \neq necessity + sufficiency; it has a greater flexibility.

+		-	
A	B	A	B
1	0	1	0
0	1	0	1

An efficacy model

An efficacy model is a causal model with the following properties:

- The entropic causal principle
- Local determinacy
- Local listening
- Local efficacy
- Competitive global indeterminacy



The entropic causal principle

Most events are non-trivial, e.g. they don't just happen without energy added.

Entropy-raising events are trivial; they happen on their own (and see Haspelmath 1993).

Local determinacy

For all arrows \overrightarrow{AB} , we define a function $f_{\overrightarrow{AB}}$ such that $f_{\overrightarrow{AB}}(A) = B$

Simplifying assumption: $f_{\overrightarrow{AB}} : \{0,1\} \rightarrow \{0,1\}$

Local listening

+

A	B
1	0
0	1

-

A	B
1	0
0	1

Excluded by local listening (!):

A	B
1	1
0	1

A	B
1	0
0	0

Local efficacy

- f_{AB}^{\rightarrow} would determine whether $B = 1$ in the world if all other influences on B represented by nodes in the model were absent.

That is, f_{AB}^{\rightarrow} is a good map for the territory.

- Local efficacy works for both stimulatory and inhibitory influences

+

A	B
1	0
0	1

-

A	B
1	0
0	1

Competitive global indeterminacy

- Too many values!
- Simplifying assumptions:
 - Exactly one influence is efficacious
 - We don't care why or how it is efficacious
- Map/territory issue again

(Global) efficacy

f_{AB} wins



(An aside about efficacy and probabilities)

Probability of winning: $P(F_B(A, C) = f_{\overrightarrow{AB}}(A))$

Let's get this show on the road...

Inferred influences

$X \rightarrow Y$ is in the model AND $f_{\overrightarrow{XY}}(X) = Y = 1$ AND X is not efficacious for Y

⇓

$X = 0$ AND $f_{\overrightarrow{XY}} = \mathbf{+}$ OR $X = 1$ AND $f_{\overrightarrow{XY}} = \mathbf{-}$

⇓

$\exists Z : Z \rightarrow Y$ is in the model AND $f_{\overrightarrow{ZY}}(Z) = Y = 1$ AND Z is efficacious for Y

cf. Baglini & Francez's (2016) "catalyst", Paul et al's (2016) "double prevent"

The abilitative/accidental puzzle

manage to VP_E

Presupposed: $A \rightarrow E$ is in model

AND \sim efficacious(A, E)

Asserted: $f_{\overrightarrow{AE}}(A) = E = 1$

Entailed: $\exists Z : Z \rightarrow Y$ is in model

AND $f_{\overrightarrow{ZY}}(Z) = Y = 1$

AND efficacious(Z, E)

$A \xrightarrow{\otimes} E$
!

$A \xrightarrow{\otimes} E$
1!

$A \xrightarrow{\otimes} E (\xleftarrow{\checkmark} Z)$
1!

The abilitative/accidental puzzle

Abilitative reading of *manage to*

$$\begin{array}{ccc} A & \xrightarrow{+} & E (\leftarrow Z) \\ (0) & \otimes & 1! \quad \checkmark \end{array}$$

A : a property of the subject that **stimulates** (ensures that) $E = 1$.

Normally, since $A = 0$, subject ensures that $E = 1$; but this time they don't!

Accidental reading of *manage to*

$$\begin{array}{ccc} A & \xrightarrow{-} & E (\leftarrow Z) \\ (1) & \otimes & 1! \quad \checkmark \end{array}$$

A : a property of the subject that **inhibits** (prevents that) $E = 1$.

Expected: since $A = 1$, subject prevents that that $E = 1$; but this time they don't!

The reliability puzzle

Manage to:

$$A \xrightarrow[\otimes]{1!} E (\xleftarrow{\checkmark} Z)$$

Can of ability (English):

$$A \xrightarrow[\checkmark]{+} E_1$$

Morphology (St'at'imcets, Tagalog, Malagasy) that allows both *manage to* and *can* readings: If the meaning of the morphology is non-efficacy, this predicts that on the *can* reading, the event is not going on (at the time of utterance).

Thanks!