

Complex thinking and reasoning: *explaining*, a theoretical basis for scenario planning.

Our Ref: [DSTL/TR112480](#)

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Future Threat Understanding and Disruption *Programme*

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13 December 2018

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Ministry
of Defence

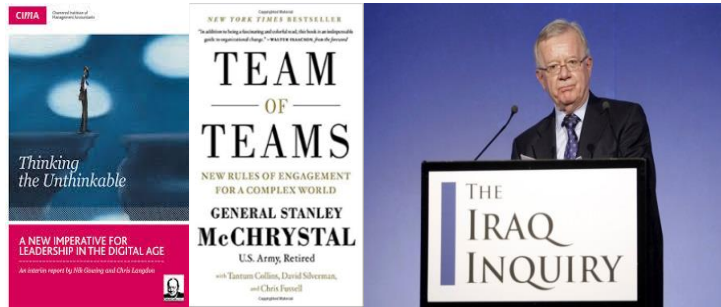
Key Premises

1. Organisational inhibition and constraint
2. Determinism and non-linearity
3. Is Scenario Planning (Foresight method) just a
‘placebo’
4. *Reasoning under conditions of uncertainty*

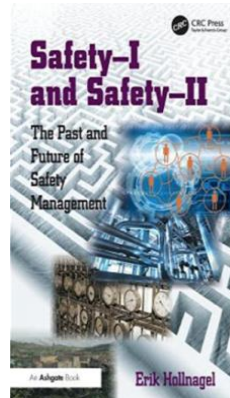
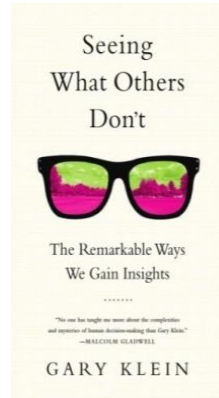
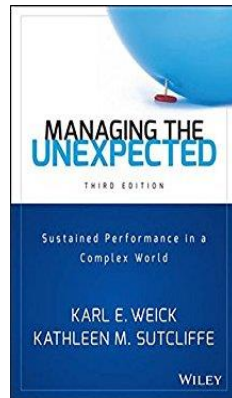
Thought experiments



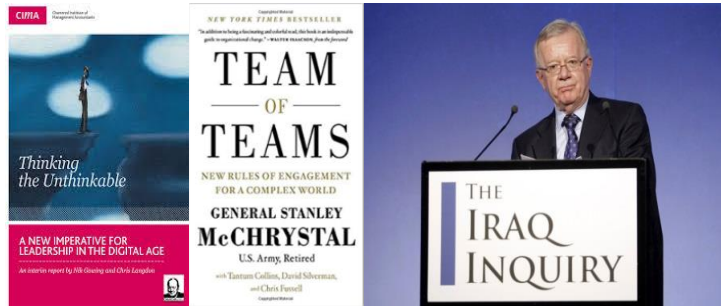
1. Institutional inhibition of abductive reasoning and Macro-cognition



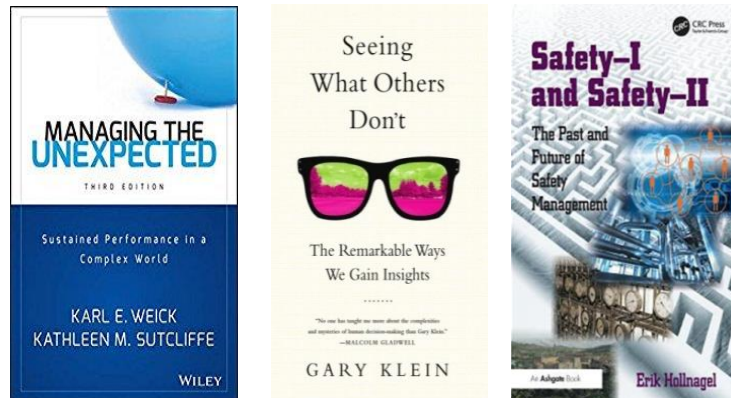
Performance improvement =



1. Institutional inhibition of abductive reasoning and Macrocognition

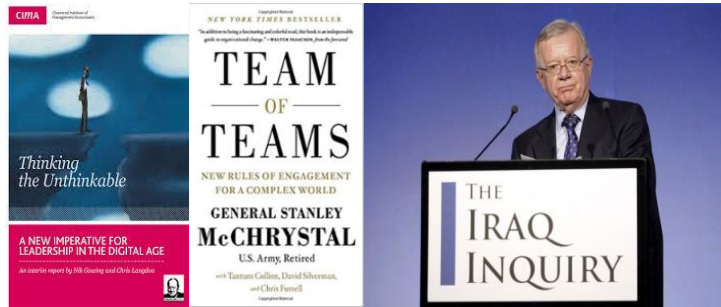


Performance improvement =  +



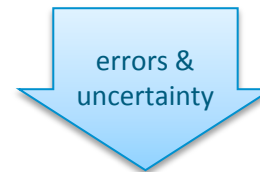
- Standards
- Controls
- Documentation
- Reviews
- Rigor
- Checklists
- Procedures

1. Institutional inhibition of abductive reasoning and Macrocognition

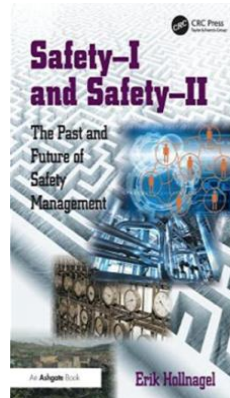
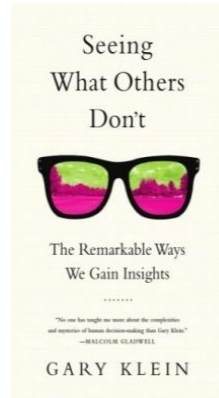
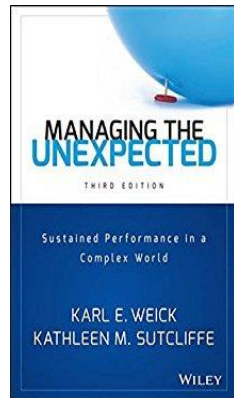


Contradictions
Connections
Coincidences
Curiosity
Creative desperation

Performance improvement =

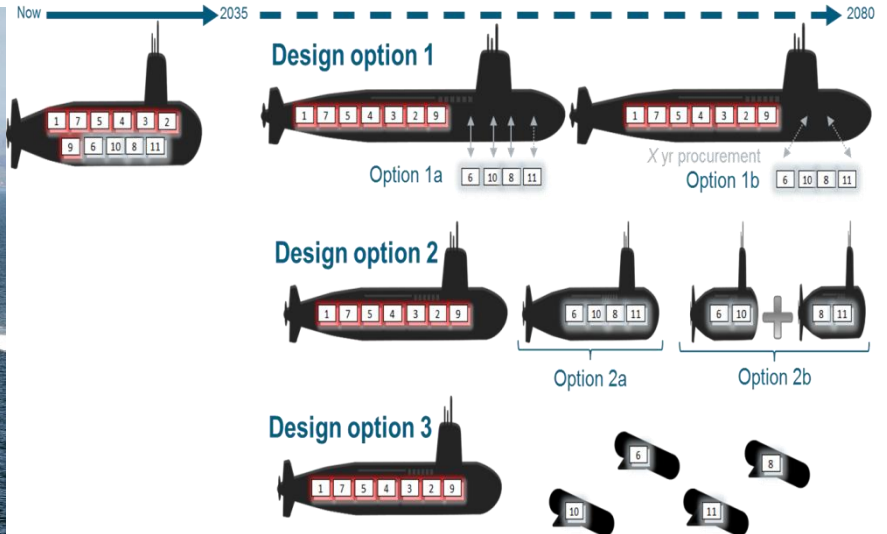


+



Standards
Controls
Documentation
Reviews
Rigor
Checklists
Procedures

Source: after "Seeing what others don't" Garry Klein (2015)



2. Too deterministic



- Human centred
- Reasoning
- Challenge

2. Too deterministic

UKERC Energy Systems Theme

Reflecting on Scenarios

Working Paper

June 2014

Will McDowall
Evelina Trutnevyte
Julia Tomei
Ilkka Keppo

UCL Energy Institute and UCL Institute for Sustainable Resources



- Human centred
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2. Too deterministic

UKERC Energy Systems Theme

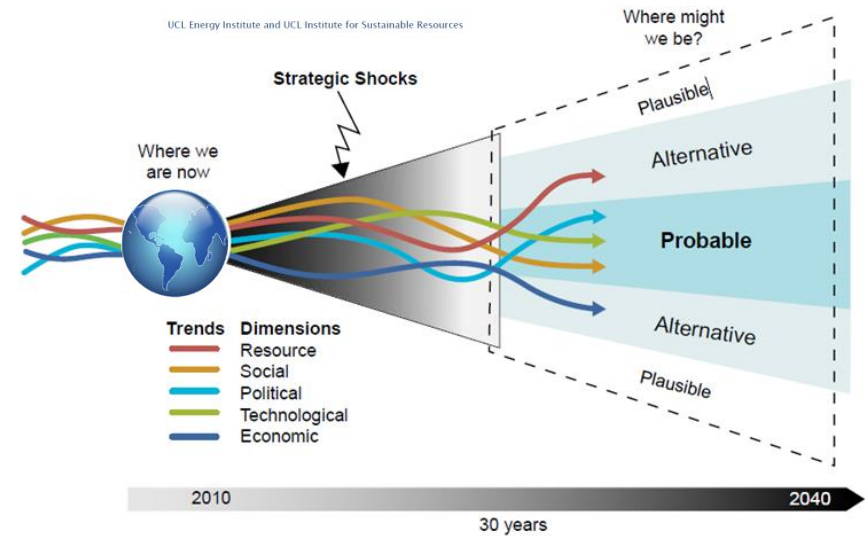
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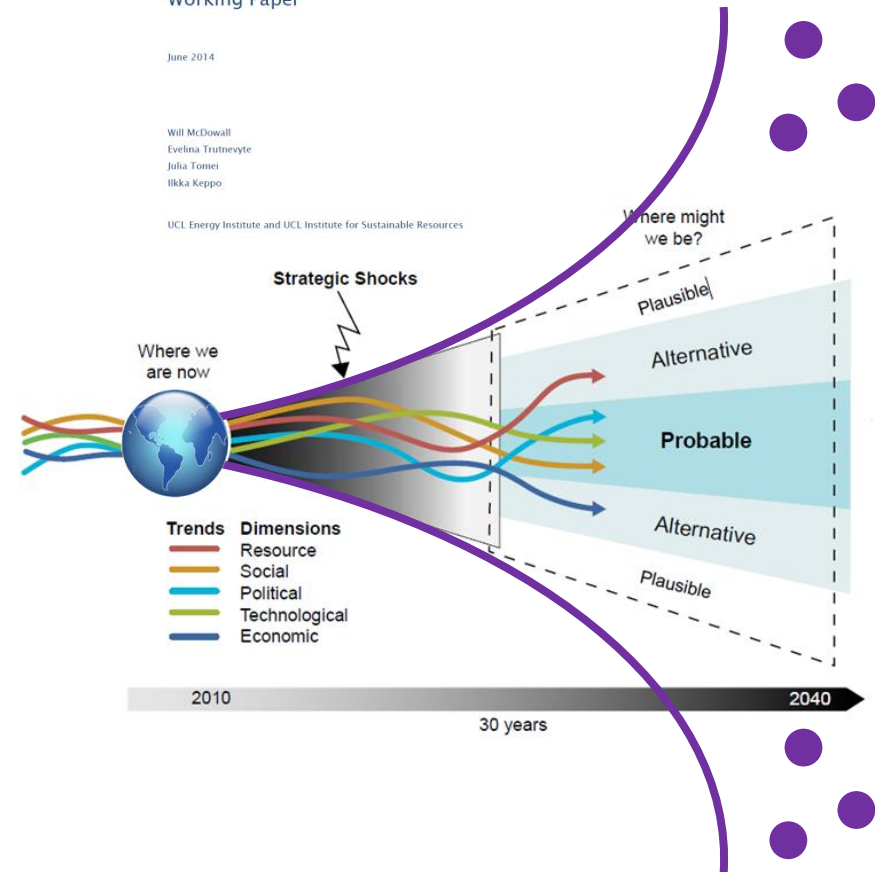
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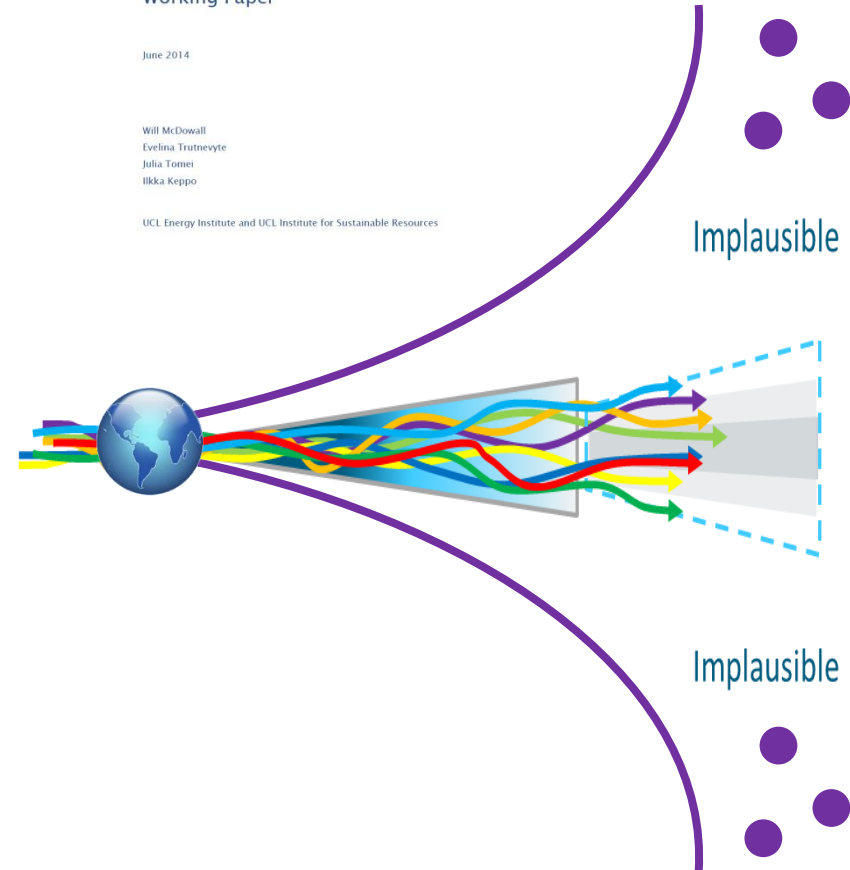
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- Human centred
- Reasoning
- Challenge

How do we know Scenario Planning works?

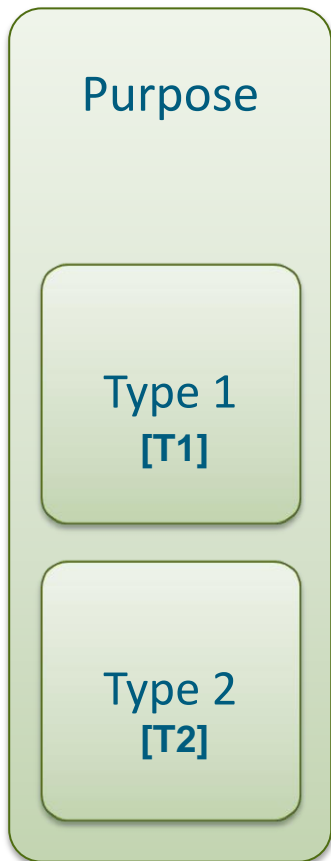
"Most of the planning I've seen in about 250 American and foreign companies is like a ritual rain dance performed at the end of the dry season to which any rain that follows is attributed.

Rain dancing has no effect on the weather even though it may have therapeutic effects on the dancers.

Despite this, I find that as a so-called professional planner, I am repeatedly asked to help improve corporate dancing, not to help control the weather."

Ackoff, R. (p. 3, 1977)

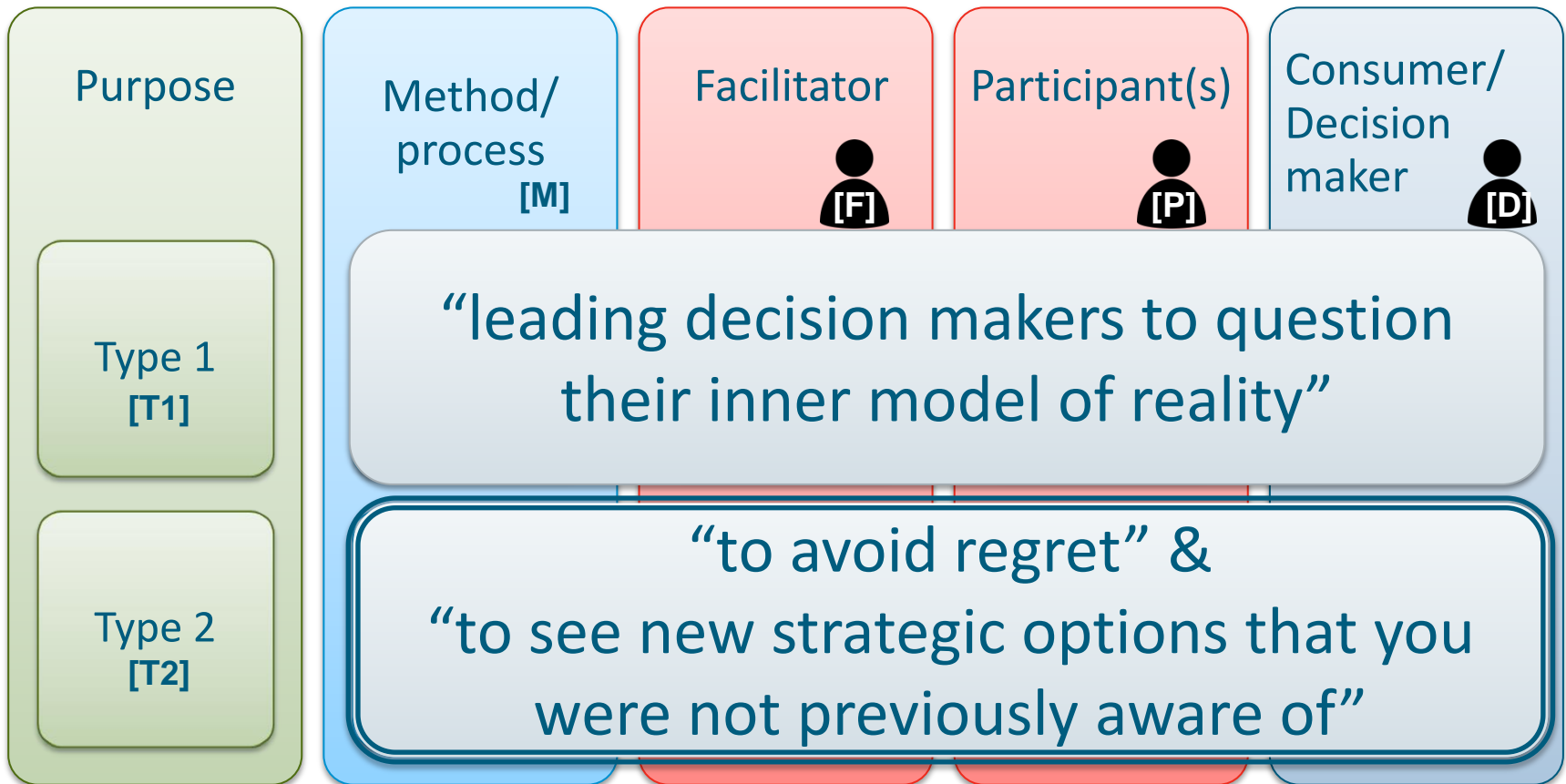
Foresight Types



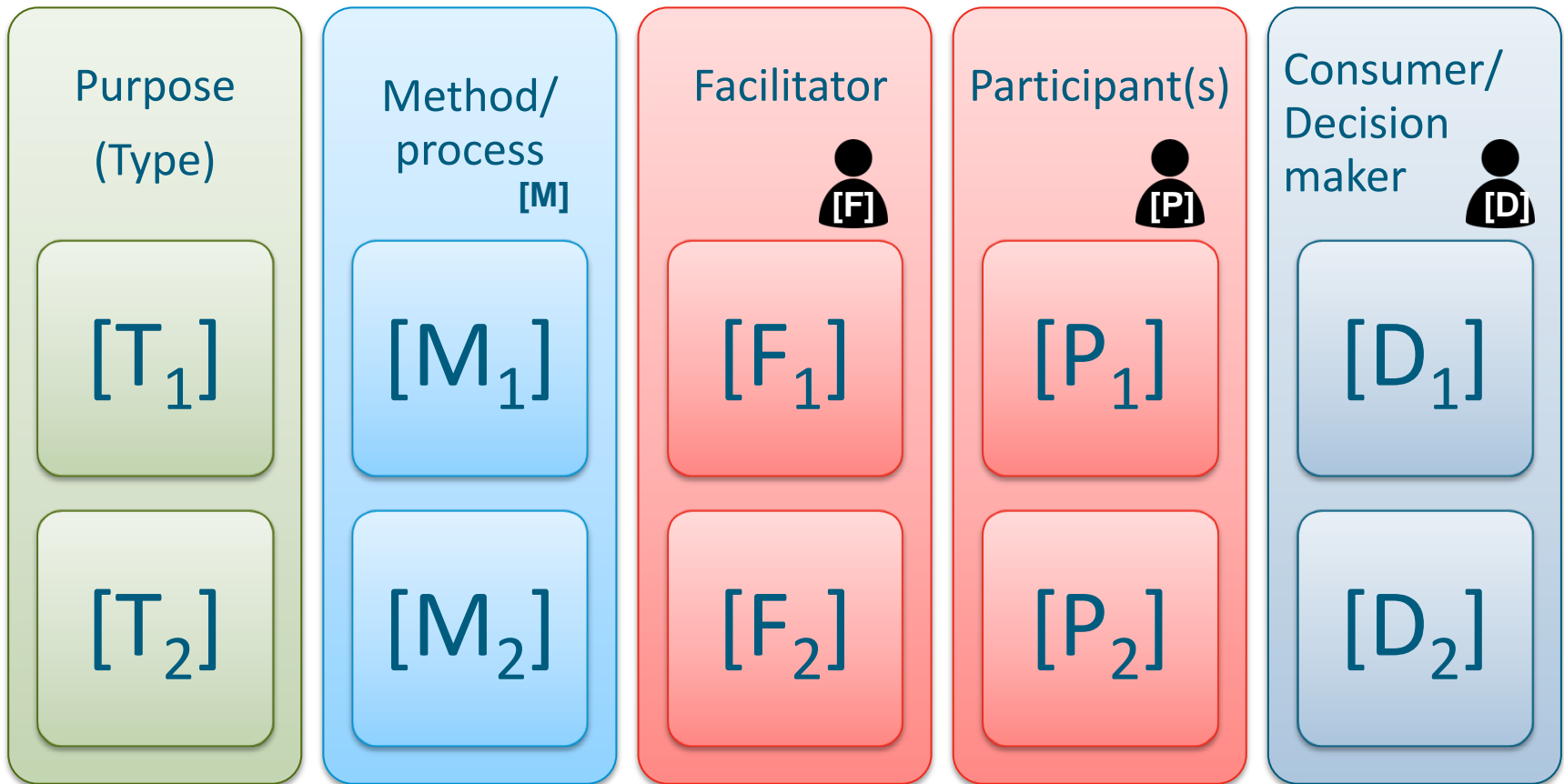
“leading decision makers to question their inner model of reality”

“to avoid regret” &
“to see new strategic options that you were not previously aware of”

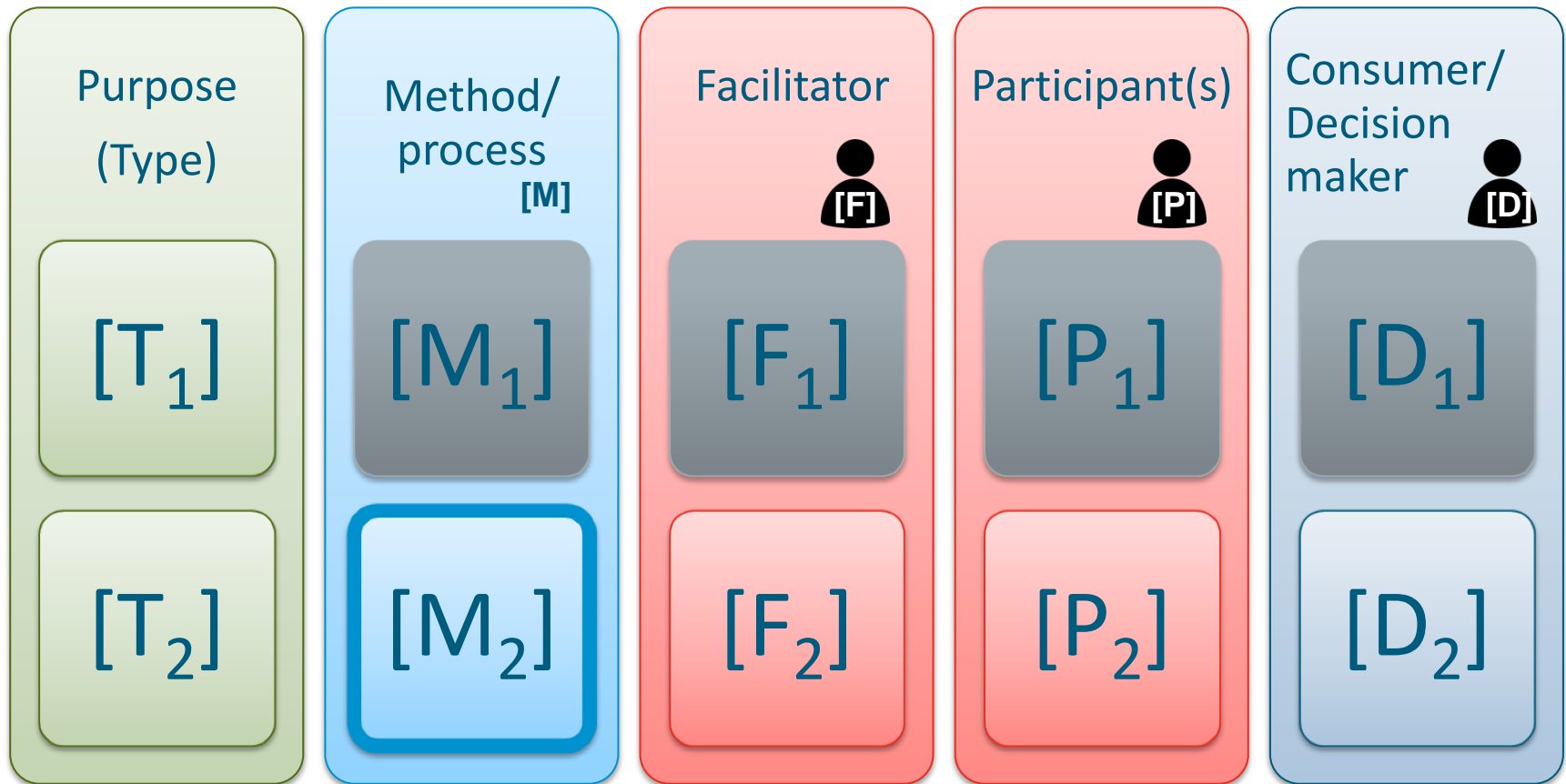
Foresight process vs participation



Foresight elements



3. Is Foresight method a 'placebo'?



3. Clinical decision aids: mostly placebo?

- In only 11% (15/131) judgment is actually assessed
- In only 9.5% (2/21) decision aid outperformed judgment

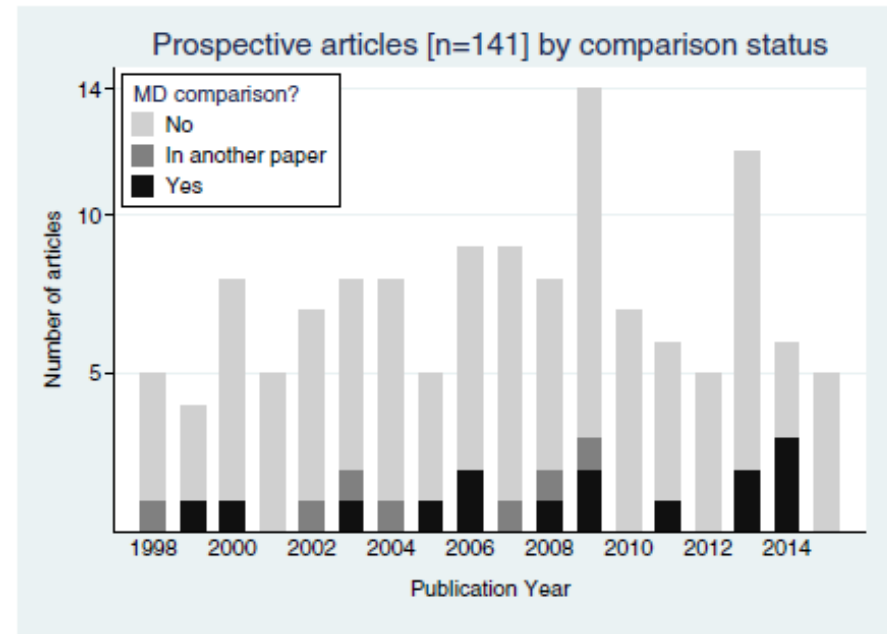


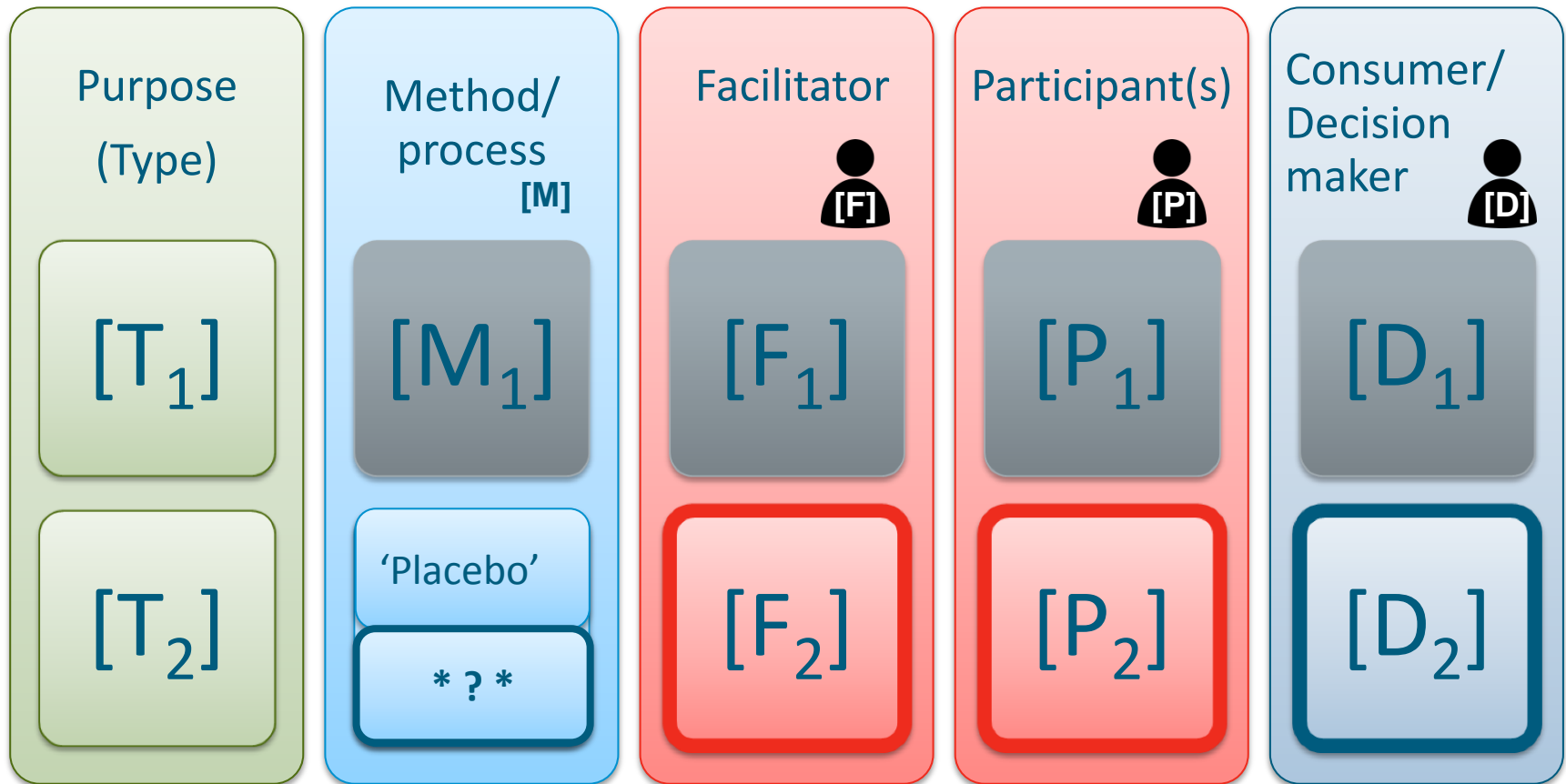
Figure 2. For each year, the graph depicts the total number of studies about decision aids and indicates how often the aid was compared with physician judgment either in the article (black bars) or in “another article” (light gray bars). There is no obvious trend over time.

3. Foresight method – mostly placebo?

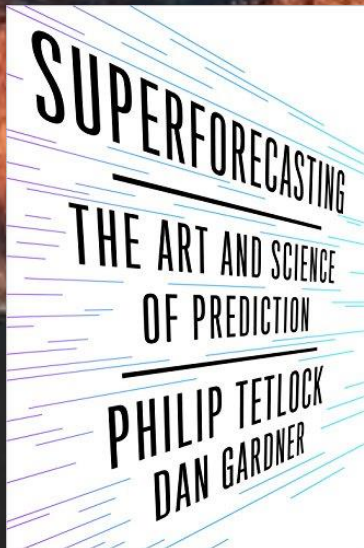
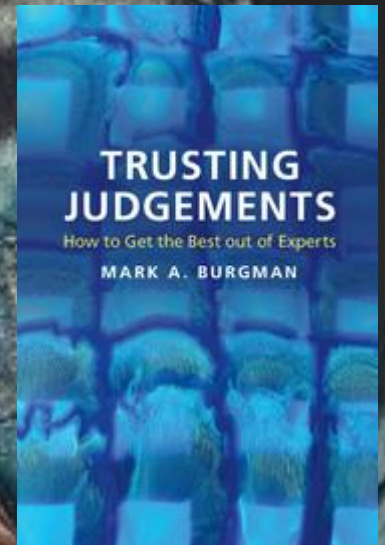
- Reframing
- Structuring
- Group participation and interaction
- Diversity of the group
- ~~Simplification and time~~



3. Is Foresight method a 'placebo'?



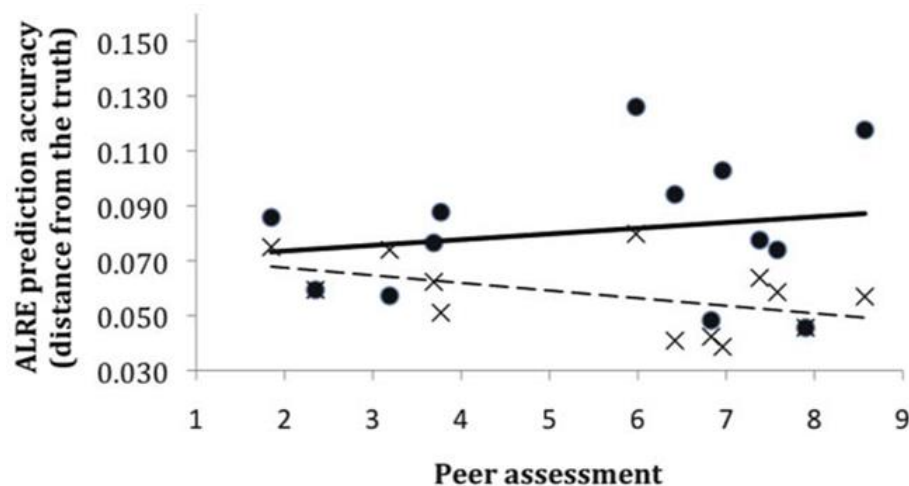
4. Reasoning The “Supers”



- We all have ‘Super’ potential
- Reasoning skill

4. Expert/ human performance

bad/biased vs mistaken/unpractised



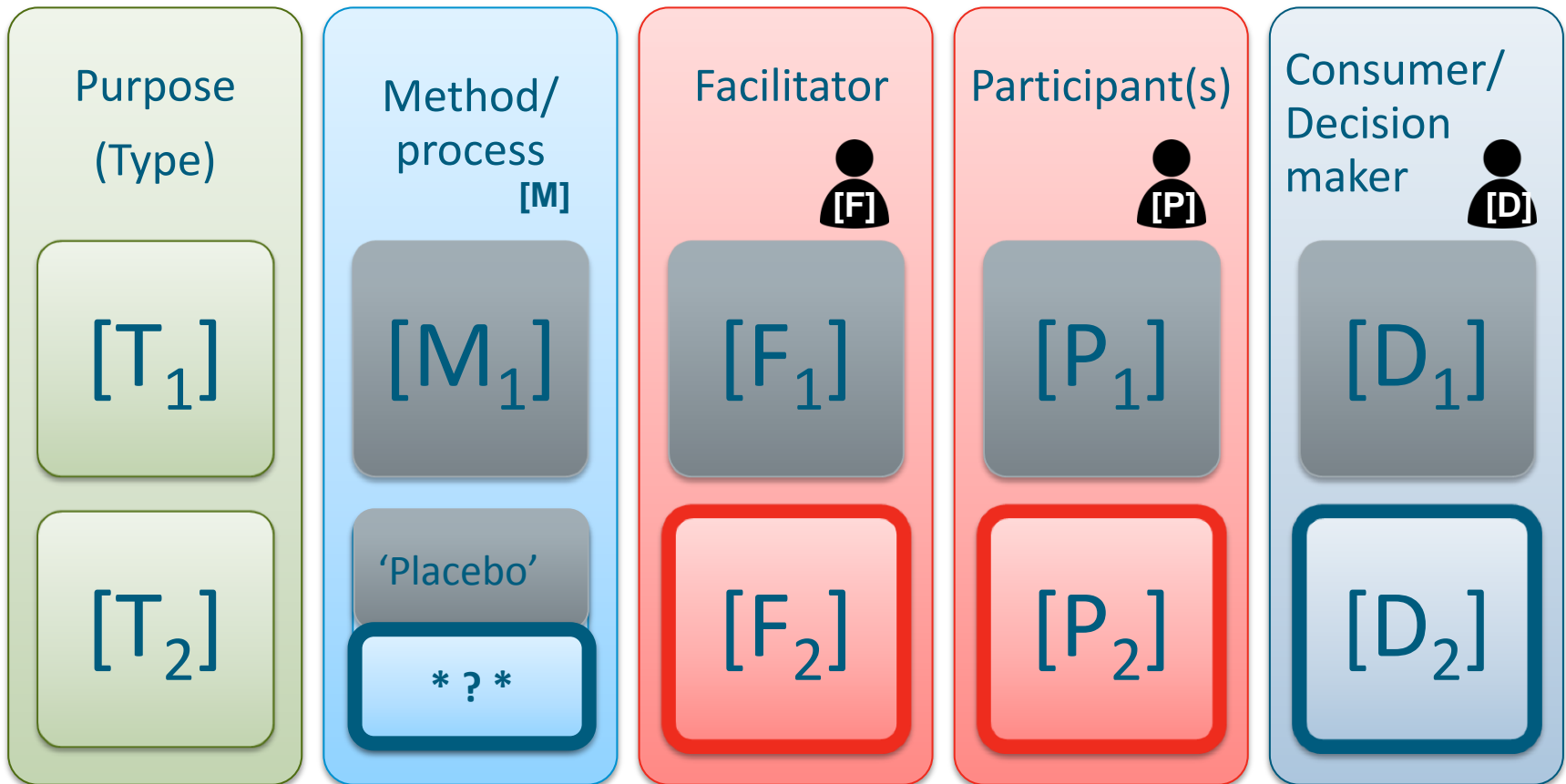
Source: after Burgman MA, McBride M, Ashton R, Speirs-Bridge A, Flander L, et al. (2011) Expert Status and Performance.

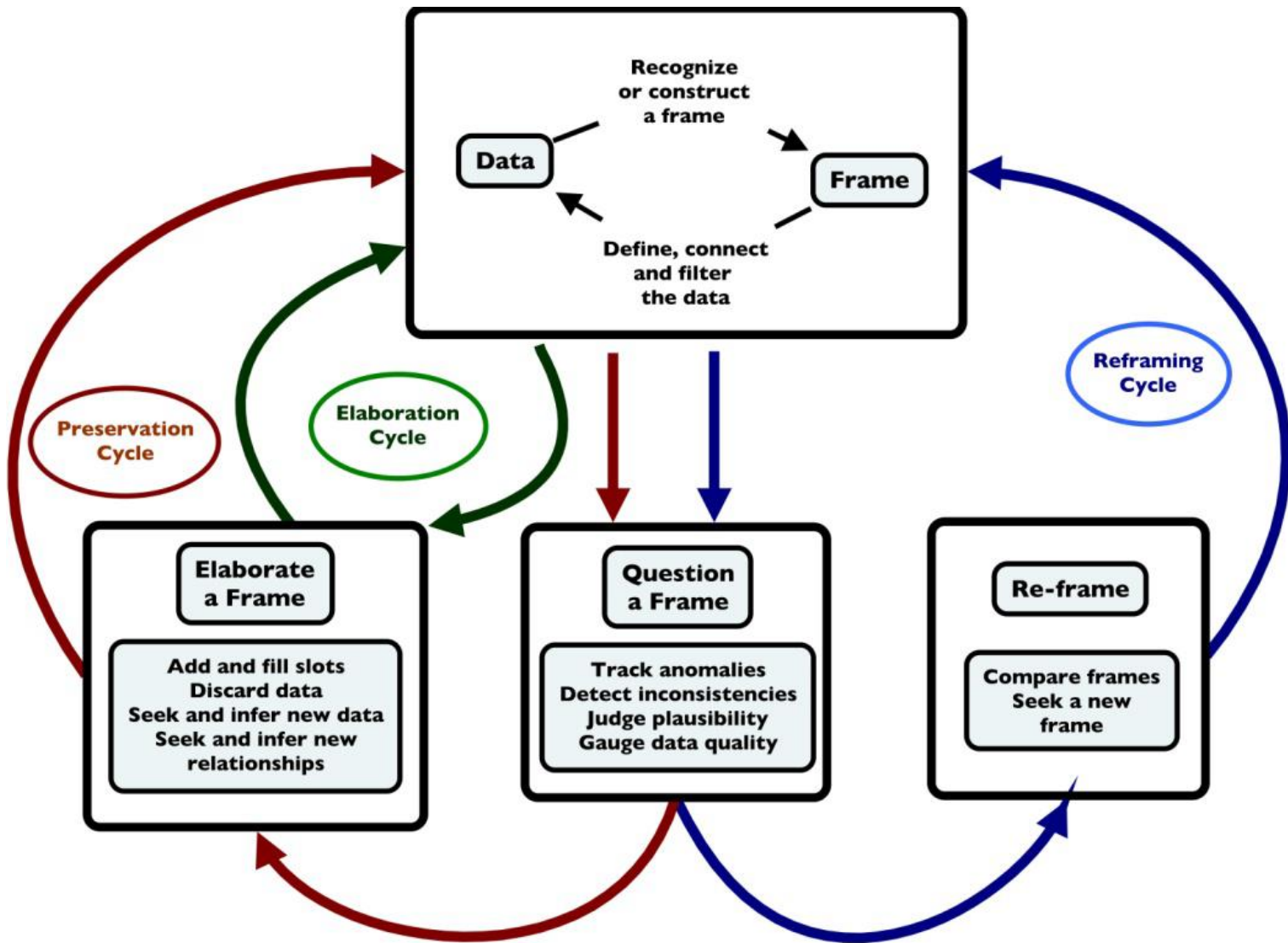
- Naturalistic Decision Making (NDM)
- Intuition, Heuristics, ecological rationality
- Feedback
- Practice
- Dilemma: future & uncertainty

Key Premises - recap

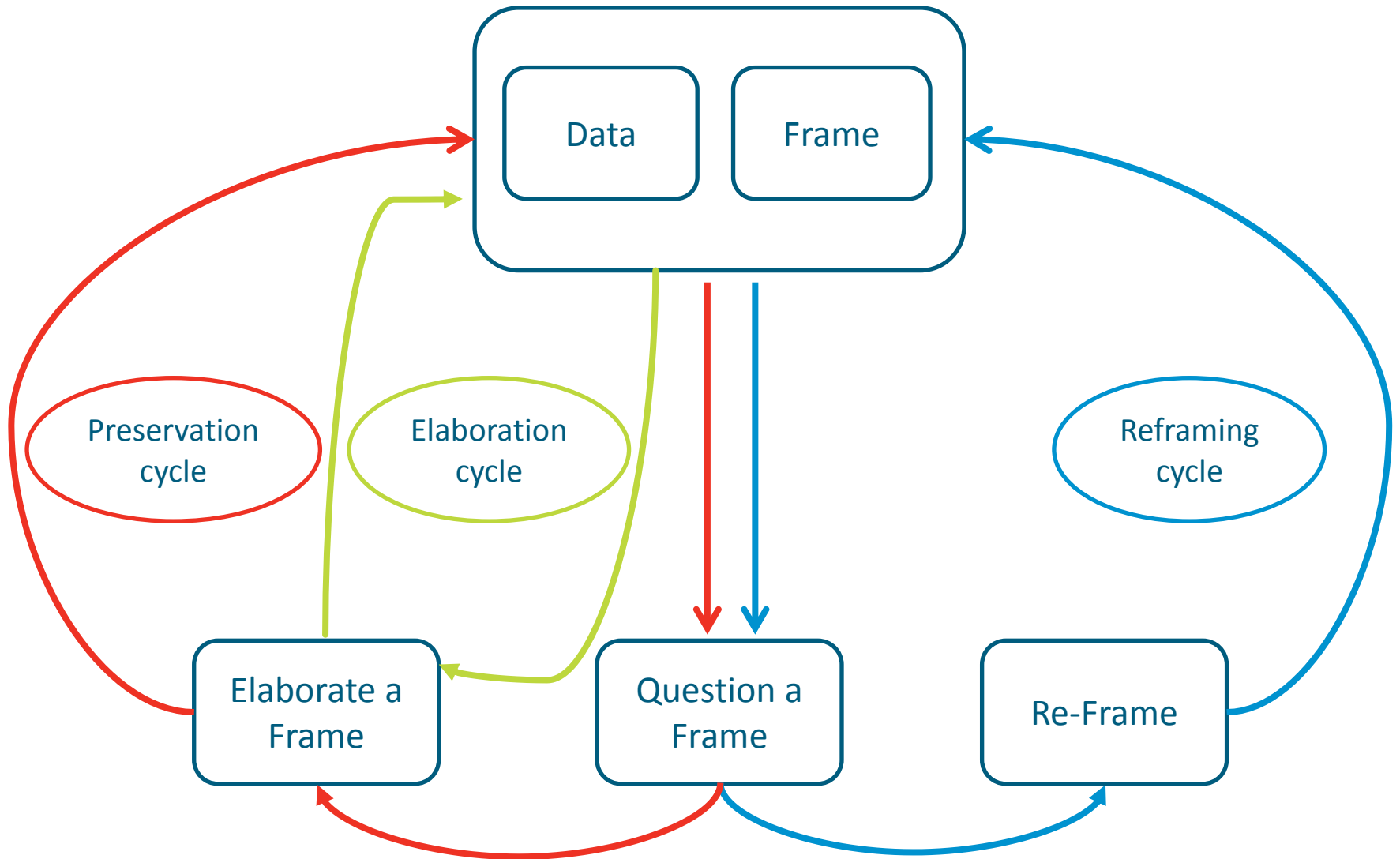
1. Organisational inhibition and constraint
2. Determinism and non-linearity
3. Foresight method 'placebo'
4. *Thinking skill (Reasoning) of people under conditions of uncertainty (e.g. the Future(s)) is important.*

New basis for Foresight (SP) theory






Source: after Hoffman, R. (2013). An Integrated Model of Macrocognitive Work and Trust in Automation..



Key features of Macrocognition

A silhouette of a person sitting on a path that leads towards a sunset. The sky is a mix of blue and orange, with clouds. The person is centered in the frame, looking out over a vast landscape.

Abduction
Reframing
Iteration
Satisficing
Feedback

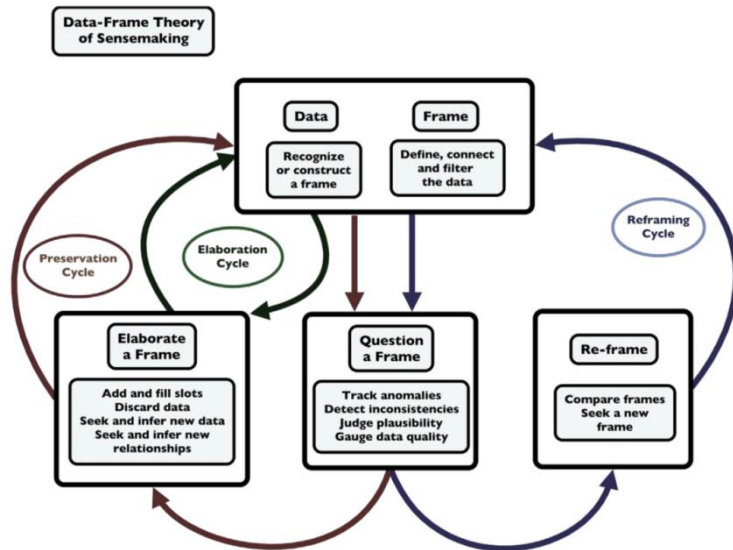


i & ii Abduction & Reframing

iii) Iteration

Not “How can cognitive work be automated?” but “In what ways and to what extent might technology and software amplify and extend the human ability to engage in cognitive work?” [26. p. 76-77]

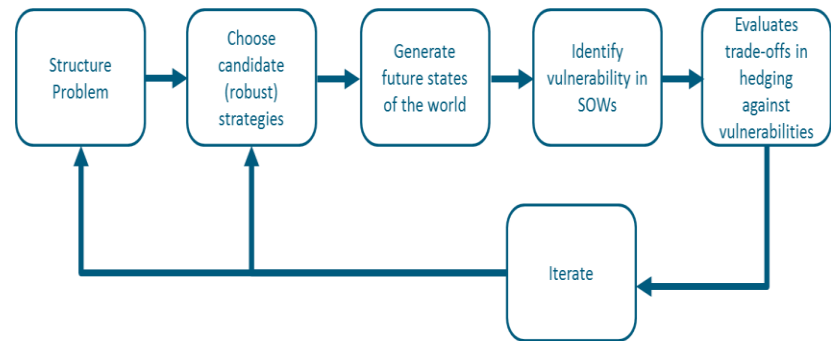
(Macro)Cognition



Source: after Hoffman, R. (2013). An Integrated Model of Macro-cognitive Work and Trust in Automation..

Modelling & Computation

RDM Process Steps (Lempert et al 2006)



iv) Satisficing: trade-off

- “Satisficing”, Simon
- “Resilience”, Holing
- “Potential Surprise Theory”, Savage
- “Robustness”/ “Robust Decision Making”, Lempert and Popper
- “Anti-fragility”, Taleb



v). Feedback

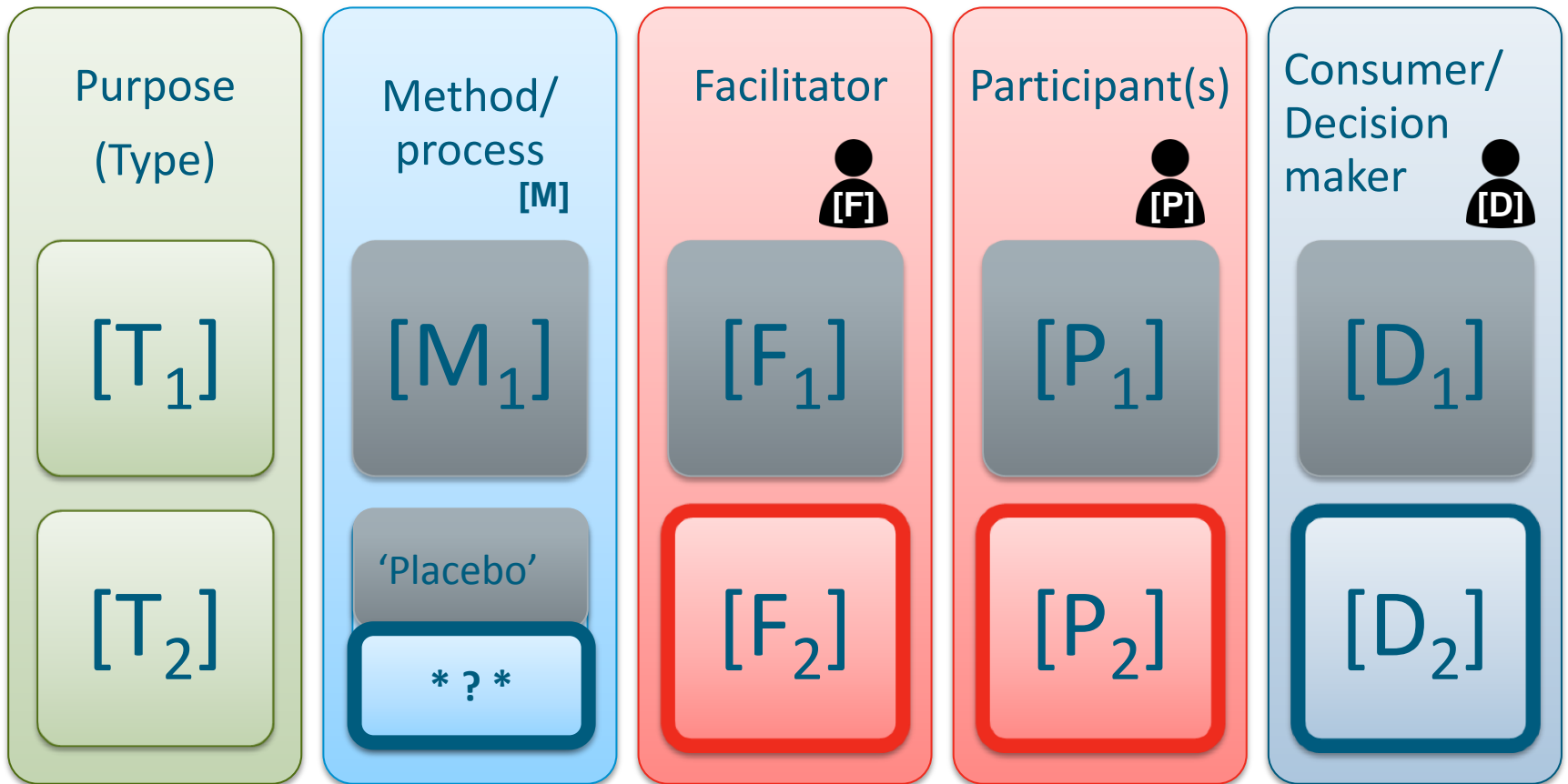
“A professional cricketer runs up, bowls, and immediately turns back to his mark without looking to see whether his effort is on target. That is of no interest to him. Only rarely has he thought it might be good to see if he actually hits the wicket, and he has never considered statistically calculating the accuracy of his bowling and comparing it to the bowling of others. Lacking good feedback, he never adjusts how he bowls. He just keeps doing the same thing over and over again, expecting things to work out fine.

Of course this is silly. A cricketer who behaved this way would not be selected. And yet this is a workable analogy for what many forecasters, whose predictions shape all of our lives, actually do.”



Tetlock and Gardner, 2015

Summary



Questions?

- Do these premises hold true?
- Is there current or planned work addressing these ideas?
- Other thoughts?

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*Abstract co-author

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