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How does it work?

Using process-tracing to study policy processes

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DEPARTMENT OF POLITICAL SCIENCE

Outline

1. Existing process evaluation methods
2. What is process tracing?
3. What are we tracing?
4. Standards for validity of process tracing
5. Conclusions

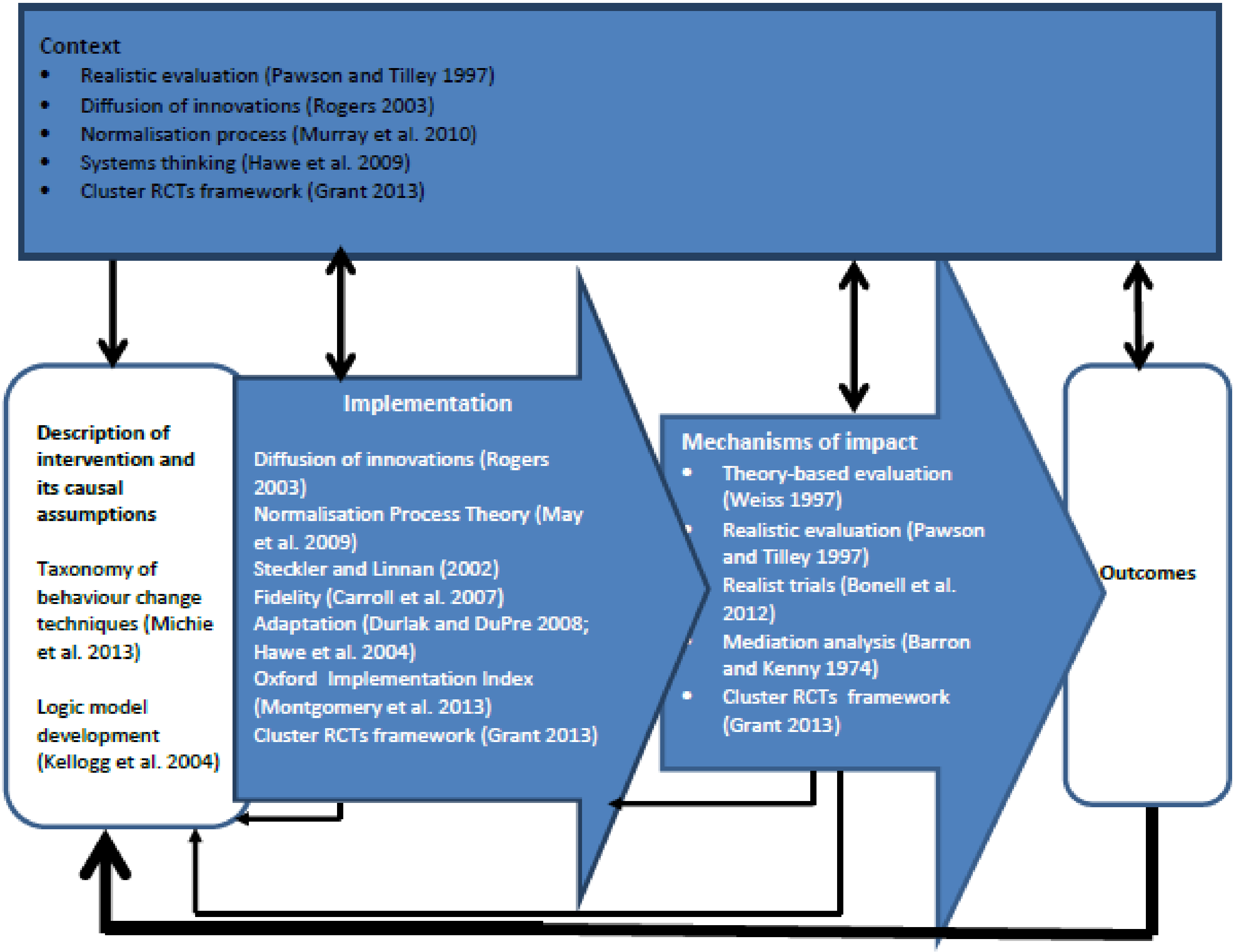
1. Existing process evaluation methods

- Process evaluation
- E.g. - guidelines from 2015

Process evaluation of complex interventions

UK Medical Research Council (MRC) guidance

Types of methods suggested



Context
- Realistic evaluation (Pawson and Tilley 1997)
- Diffusion of innovations (Rogers 2003)
- Normalisation process (Murray et al. 2010)
- Systems thinking (Hawe et al. 2009)
- Cluster RCTs framework (Grant 2013)

Description of intervention and its causal assumptions

Taxonomy of behaviour change techniques (Michie et al. 2013)

Logic model development (Kellogg et al. 2004)

Implementation

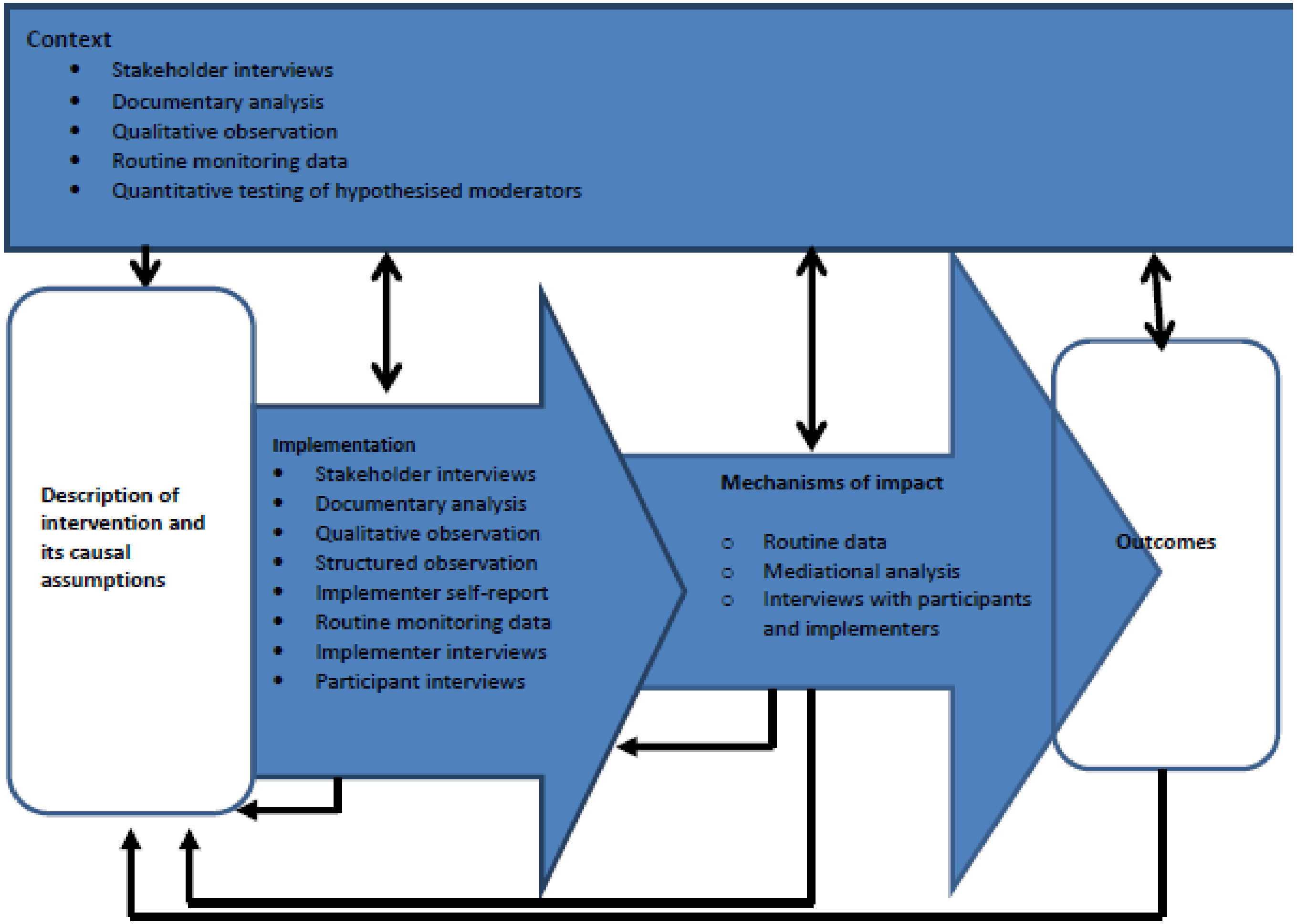
Diffusion of innovations (Rogers 2003)
Normalisation Process Theory (May et al. 2009)
Steckler and Linnan (2002)
Fidelity (Carroll et al. 2007)
Adaptation (Durlak and DuPre 2008; Hawe et al. 2004)
Oxford Implementation Index (Montgomery et al. 2013)
Cluster RCTs framework (Grant 2013)

Mechanisms of impact
- Theory-based evaluation (Weiss 1997)
- Realistic evaluation (Pawson and Tilley 1997)
- Realist trials (Bonell et al. 2012)
- Mediation analysis (Barron and Kenny 1974)
- Cluster RCTs framework (Grant 2013)

Outcomes

Figure 6. Examples of key frameworks for process evaluation and their relationship to each core function of process evaluation

Techniques to collect evidence



Context

- Stakeholder interviews
- Documentary analysis
- Qualitative observation
- Routine monitoring data
- Quantitative testing of hypothesised moderators

Description of intervention and its causal assumptions

Implementation

- Stakeholder interviews
- Documentary analysis
- Qualitative observation
- Structured observation
- Implementer self-report
- Routine monitoring data
- Implementer interviews
- Participant interviews

Mechanisms of impact

- Routine data
- Mediational analysis
- Interviews with participants and implementers

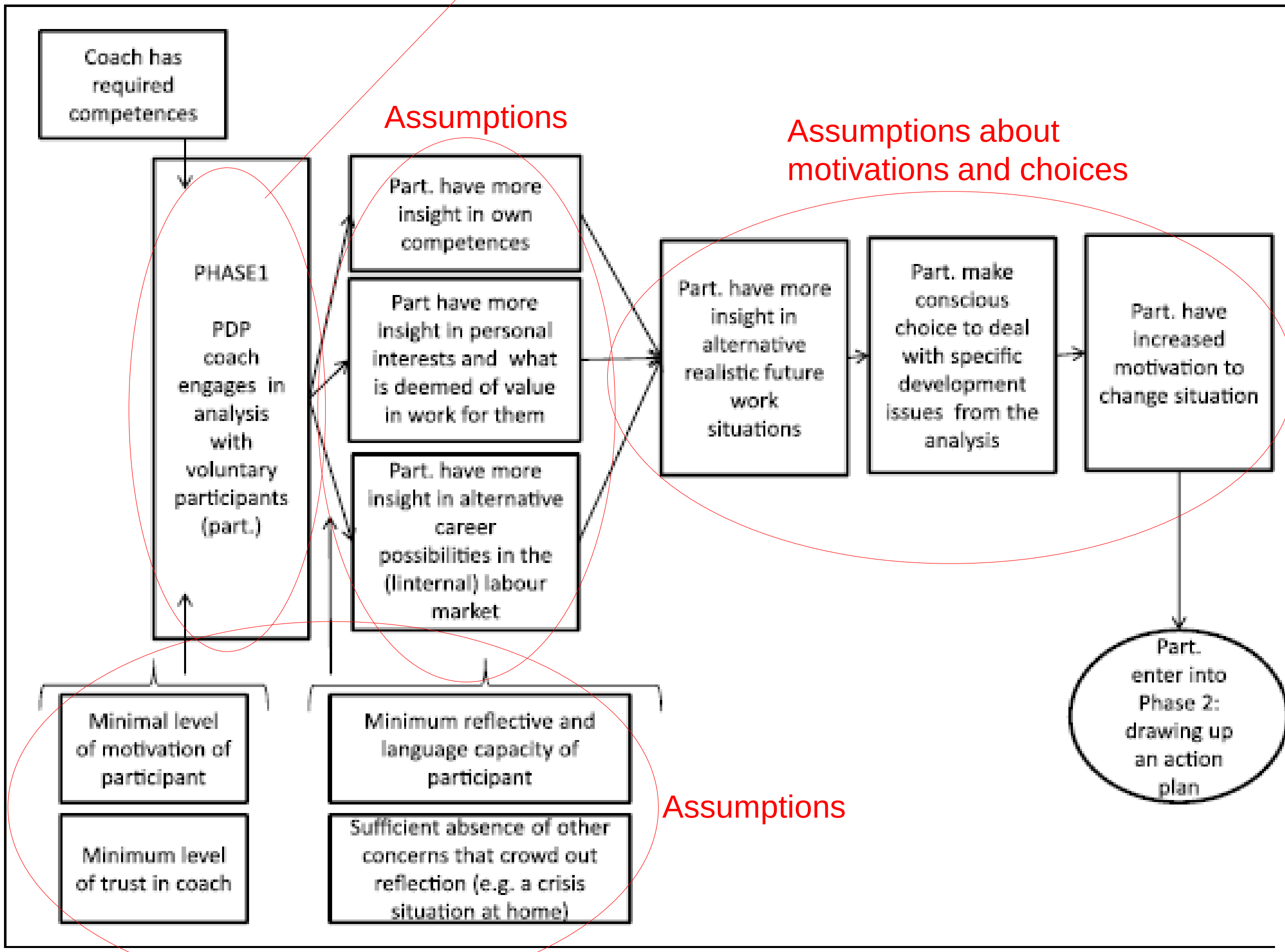
Outcomes

Figure 8. Examples of common methods for process evaluation and their relationship to each core function of process evaluation.

1. Existing process evaluation methods

- But does not answer the HOW does it work question
- Causal linkages are black-boxed as assumptions
- If we do not theorize causal linkages (activities) and trace them empirically, no *causal* inferences are possible

1. Existing process evaluation methods


Coach has required competences
PHASE1
PDP coach engages in analysis with voluntary participants (part.)
Part. have more insight in own competences
Part have more insight in personal interests and what is deemed of value in work for them
Part. have more insight in alternative career possibilities in the (internal) labour market
Part. have more insight in alternative realistic future work situations
Part. make conscious choice to deal with specific development issues from the analysis
Part. have increased motivation to change situation
Part. enter into Phase 2: drawing up an action plan
Minimal level of motivation of participant
Minimum level of trust in coach
Minimum reflective and language capacity of participant
Sufficient absence of other concerns that crowd out reflection (e.g. a crisis situation at home)

Activities, but what are they?

Assumptions

Assumptions about motivations and choices

Assumptions

Figure 1. Phase 1 PDP Theory of Change. Adapted from De Rick et al. (2014).

Evaluation
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Process tracing and congruence analysis to support theory-based impact evaluation

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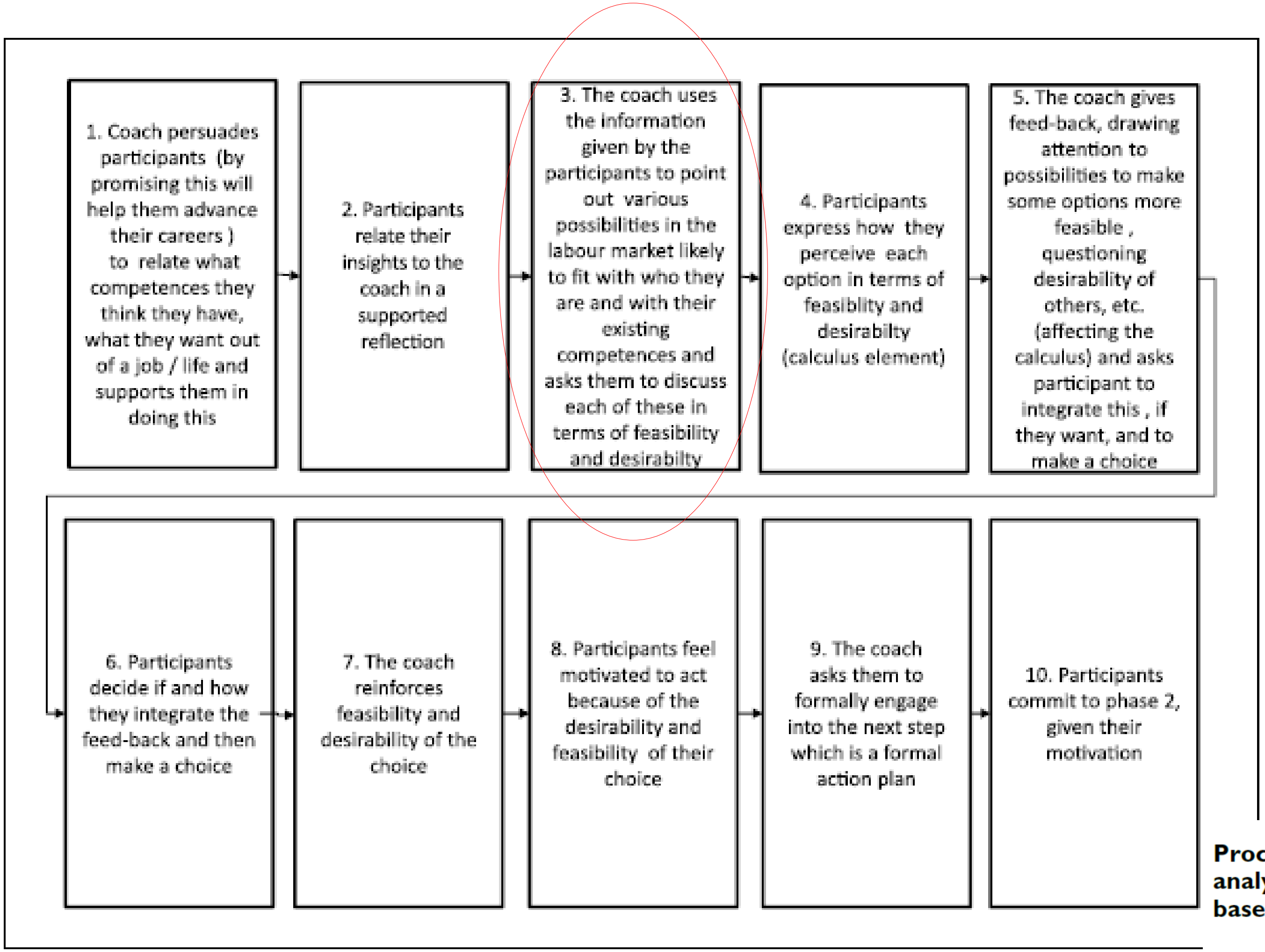
1. Existing process evaluation methods



1. Coach persuades participants (by promising this will help them advance their careers) to relate what competences they think they have, what they want out of a job / life and supports them in doing this

2. Participants relate their insights to the coach in a supported reflection

3. The coach uses the information given by the participants to point out various possibilities in the labour market likely to fit with who they are and with their existing competences and asks them to discuss each of these in terms of feasibility and desirabilty

4. Participants express how they perceive each option in terms of feasiblity and desirabilty (calculus element)

5. The coach gives feed-back, drawing attention to possibilities to make some options more feasible , questioning desirability of others, etc. (affecting the calculus) and asks participant to integrate this , if they want, and to make a choice

6. Participants decide if and how they integrate the feed-back and then make a choice

7. The coach reinforces feasibility and desirability of the choice

8. Participants feel motivated to act because of the desirability and feasibility of their choice

9. The coach asks them to formally engage into the next step which is a formal action plan

10. Participants commit to phase 2, given their motivation

Figure 3. Mechanism display.
Source: author's own adaptation of De Rick et al. (2014).

Process tracing and congruence analysis to support theory-based impact evaluation

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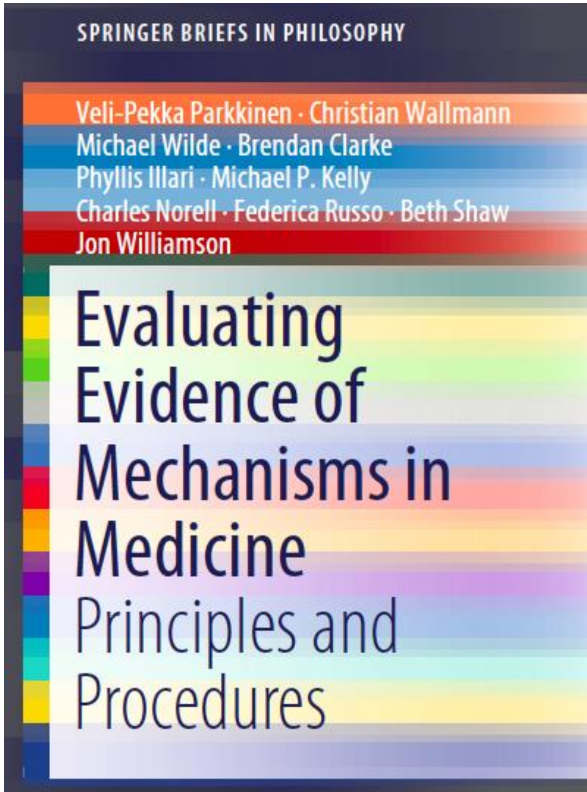
2. What is process tracing?

1. Unpacked causal process theory (mechanism), broken down into parts composed of (social) entities engaging in activities in which causal logic linking it to next part is clear
2. Activities are assessed empirically using the traces (mechanistic evidence) that they leave

2. What is process tracing?

- Interesting work on mechanism-focused research in the philosophy of science in medicine and biology (Craver, Darden, Illari, Russo, Williamson)

  (see http://ebmplus.org)



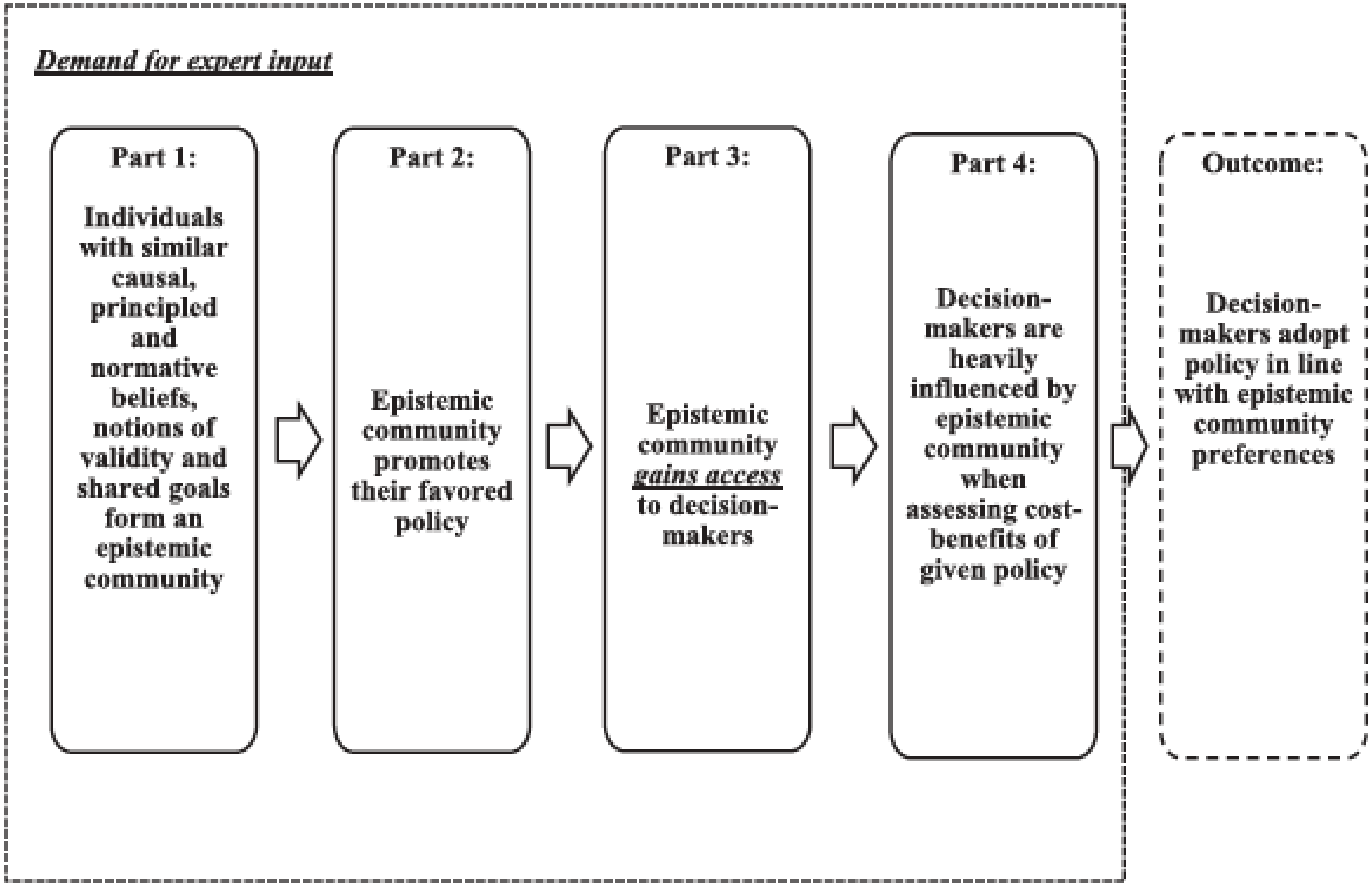
SPRINGER BRIEFS IN PHILOSOPHY

Veli-Pekka Parkkinen · Christian Wallmann
Michael Wilde · Brendan Clarke
Phyllis Illari · Michael P. Kelly
Charles Norell · Federica Russo · Beth Shaw
Jon Williamson

Evaluating
Evidence of
Mechanisms in
Medicine
Principles and
Procedures

3. What are we tracing?

- Investigating how things work involves studying causal mechanisms
- Causal mechanisms are the processes that bind causes and outcomes together
- Process-tracing case study methods are one way to study mechanisms


Demand for expert input
Part 1:
Individuals with similar causal, principled and normative beliefs, notions of validity and shared goals form an epistemic community
Part 2:
Epistemic community promotes their favored policy
Part 3:
Epistemic community gains access to decision-makers
Part 4:
Decision-makers are heavily influenced by epistemic community when assessing cost-benefits of given policy
Outcome:
Decision-makers adopt policy in line with epistemic community preferences

Note: The central scope condition is reconceptualized as demand rather than uncertainty. Access becomes an integral part of the causal mechanism, rather than one of the options for influence.

Figure 2. Revised Causal Mechanism for Epistemic Communities' Influence.

3. What are we tracing?

› Causal mechanisms are causal processes that bind causes and outcomes together

› NOT series of events (descriptive)

› Two positions in the debate on the nature of mechanisms:

1. counterfactual

2. productive account

3. What are we tracing?

- Causality = **counterfactuals**

…if the first object had not been, the second never had existed.' (Hume, 1927: 157)

- claim that cause was the cause of outcome based upon studying whether the *absence* of cause results in the *absence* of outcome, all other things being held equal

3. What are we tracing?

- Causality = **counterfactuals**
- causal mechanisms are lower-level counterfactuals (Woodward, 2003)
- counterfactual *dependency* between X ->M and M -> Y
- M treated as intervening variable in-between cause and outcome

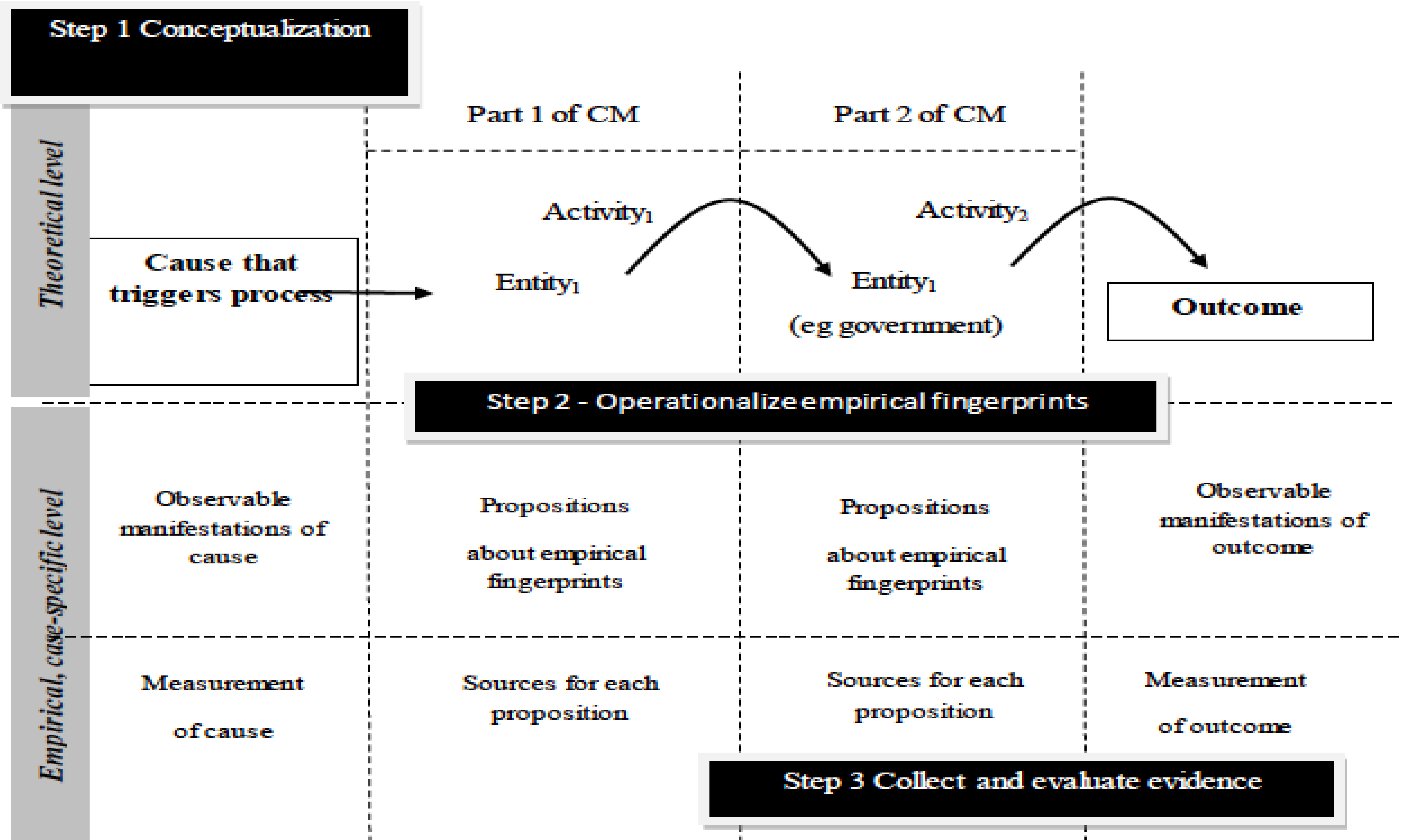
3. What are we tracing?

- have to assess the *difference t*hat variation in M makes for values of Y *across* cases, controlled for confounders
- mediation analysis (large-n)
- matching techniques (small-n)
- comparison does NOT tell us how mechanism works within case
- *mechanism identification* occurs through within-case (pathway) analysis

3. What are we tracing?

- Productive account of causal mechanisms
- Open up ‘black box’ between cause and outcome
- Process theory makes explicit the *causal logics* binding parts of a process together
- is a ‘how does it work’ explanation
- causal inference **and** identification through tracing of fingerprints left by operation of activities within case (mechanistic evidence) (Clarke et al, 2014)

Theory-testing process tracing



Step 1 Conceptualization

Theoretical level

Part 1 of CM

Part 2 of CM

Cause that triggers process

Activity$_1$

Entity$_1$

Activity$_2$

Entity$_1$

(eg government)

Outcome

Step 2 - Operationalize empirical fingerprints

Empirical, case-specific level

Observable manifestations of cause

Propositions about empirical fingerprints

Propositions about empirical fingerprints

Observable manifestations of outcome

Measurement of cause

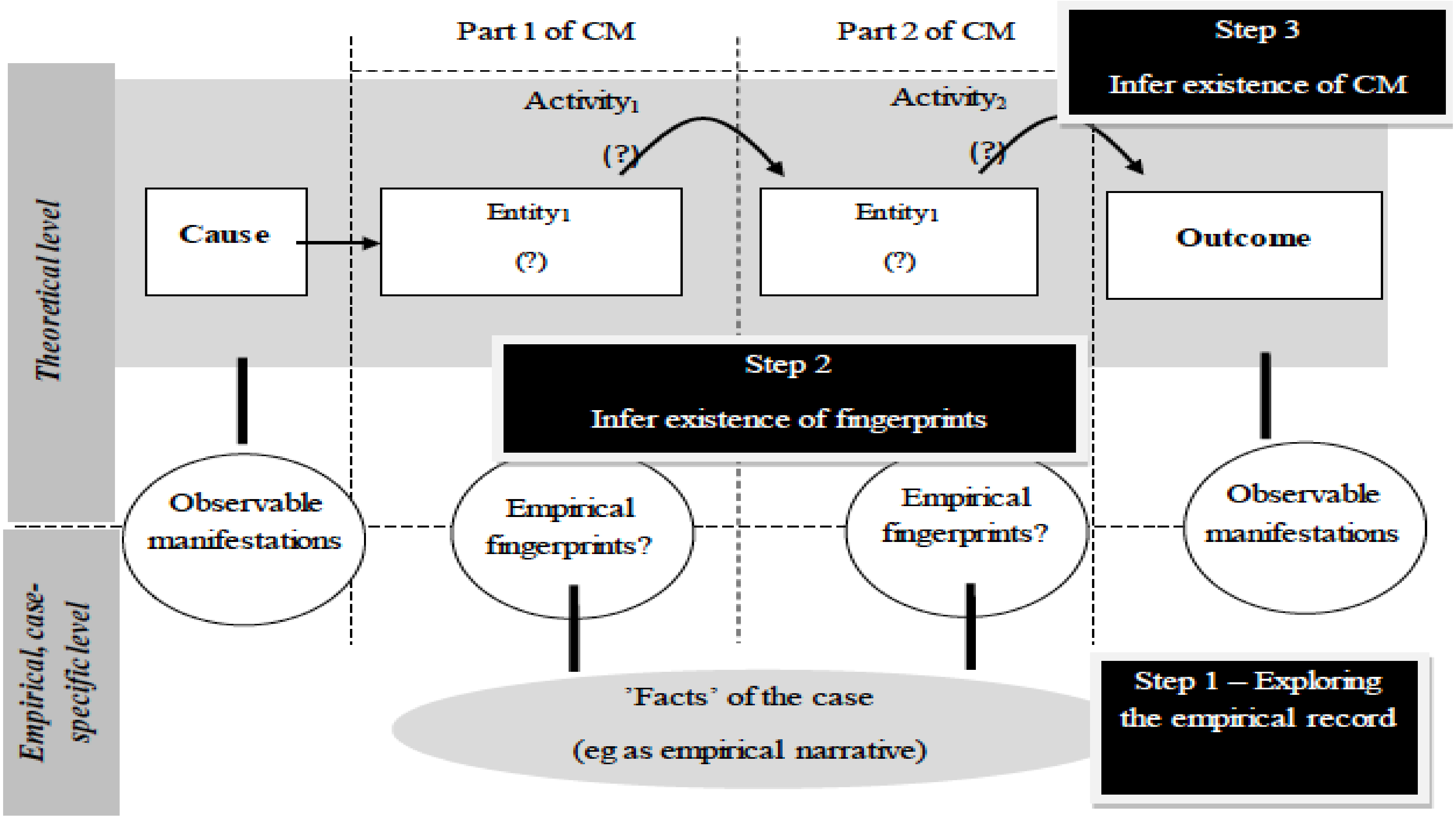
Sources for each proposition

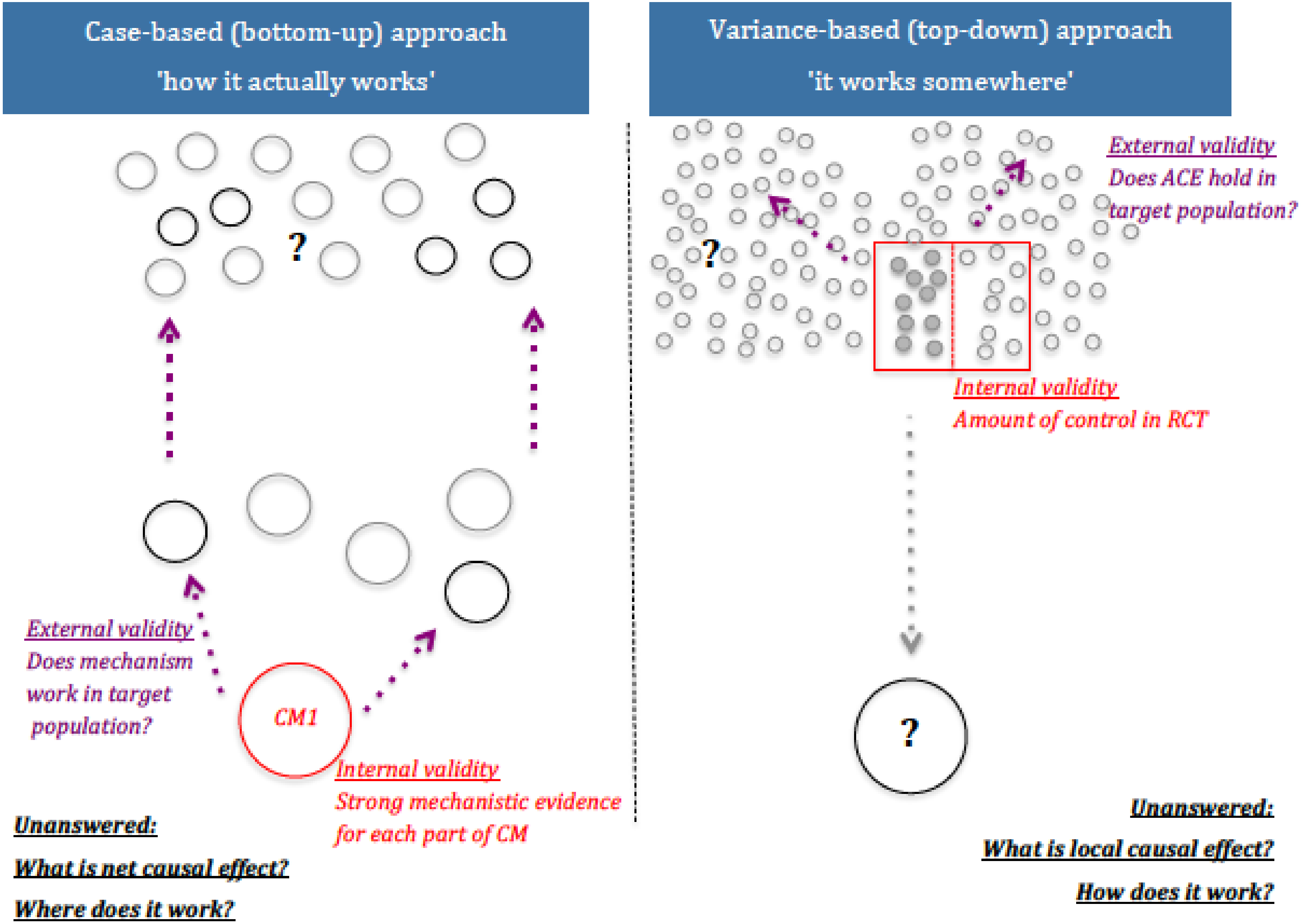
Sources for each proposition

Measurement of outcome

Step 3 Collect and evaluate evidence

Theory-building process tracing


Part 1 of CM
Part 2 of CM
Step 3
Infer existence of CM
Activity₁
Activity₂
(?)
(?)
Theoretical level
Cause
Entity₁
(?)
Entity₁
(?)
Outcome
Step 2
Infer existence of fingerprints
Observable manifestations
Empirical fingerprints?
Empirical fingerprints?
Observable manifestations
Empirical, case-specific level
'Facts' of the case
(eg as empirical narrative)
Step 1 – Exploring the empirical record


Case-based (bottom-up) approach
'how it actually works'
?
CM1
External validity
Does mechanism work in target population?
Internal validity
Strong mechanistic evidence for each part of CM
Unanswered:
What is net causal effect?
Where does it work?
Variance-based (top-down) approach
'it works somewhere'
?
External validity
Does ACE hold in target population?
Internal validity
Amount of control in RCT
?
Unanswered:
What is local causal effect?
How does it work?

Case-based **Within-case, mechanistic claims about process linking cause and outcome**		**Variance-based** **Cross-case, counterfactual claims about average causal effects**
Multiple PT case studies in population	*external validity*	Meta-study of lab experiments
PT case study	*internal validity*	Lab experiment
Non-mechanistic case study		Field experiment
Small-n comparison		Natural experiment
Medium-n comparison		Large-n comparison
		Small-n comparison

Two parallel evidence hierarchies

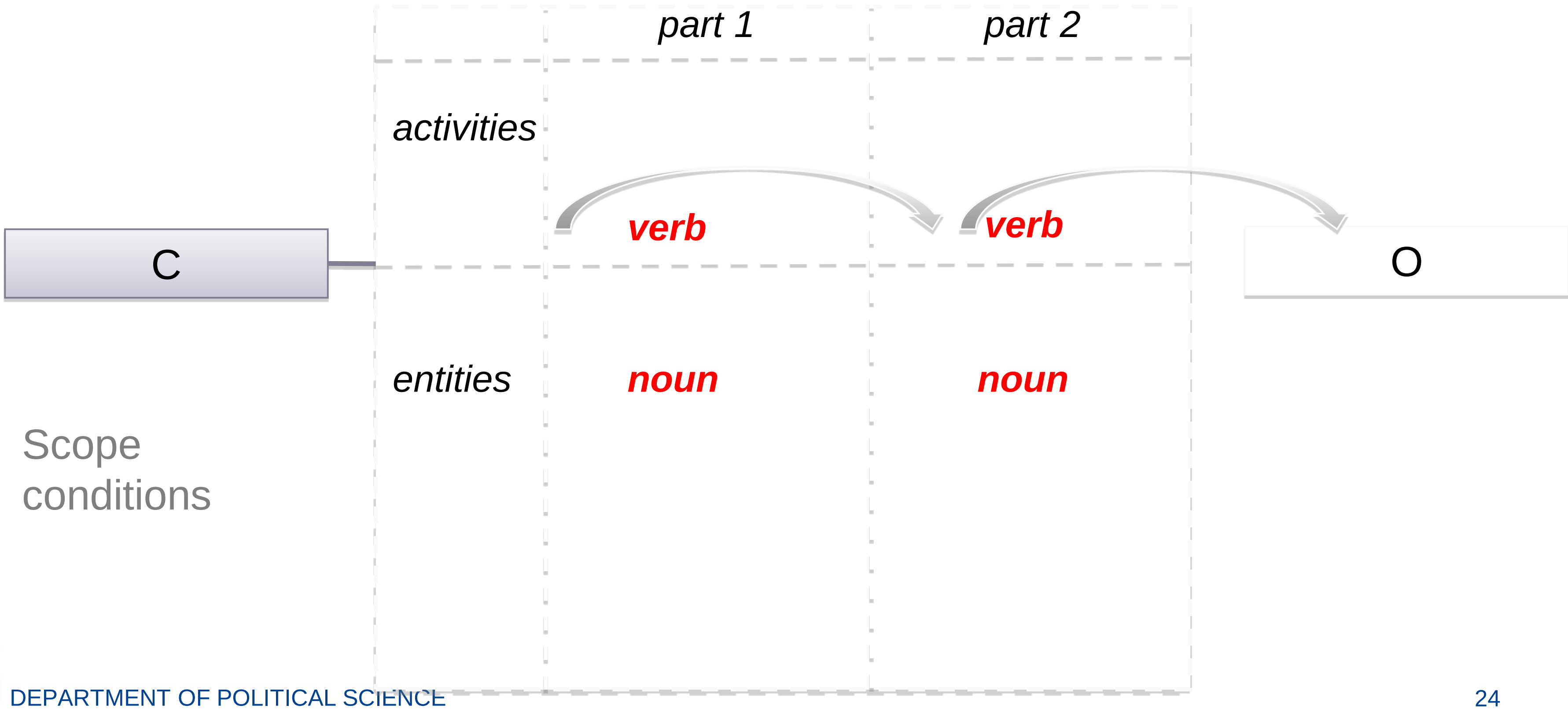
4. Standards for validity of process tracing

- Internal validity = strength of causal inferences
  - achieved through tracing activities of each part of causal process (mechanism) linking cause(s) to outcome within a case
- External validity = does it travel?
  - achieved through multiple case studies to assess whether similar causal processes operative

4. Standards for validity of process-tracing

	High plausibility	Low plausibility
Theoretical mechanism	Productive continuity with unbroken chain of activities	Black-boxed mechanism (minimalist)
What evidence in theory tells us	Direct and unique mechanistic evidence (smoking guns)	Indirect, low uniqueness evidence (straw-in-the-wind)
Actual evidence	Strong sources and full access to empirical record	Weak sources and/or lack of access to empirical record

4. Standards for validity of process-tracing



part 1

part 2

activities

verb

verb

C

O

entities

noun

noun

Scope
conditions

4. Standards for validity of process-tracing

- Parts = factors that are composed of entities that engage in activities (not intervening variables!)

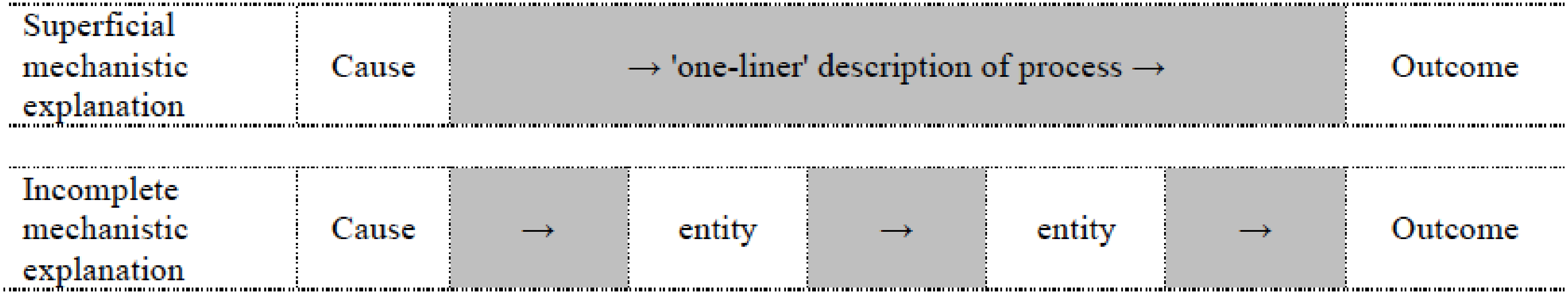
- *Entities* = social object (actors) engaging in activities (noun)
- *Activities* = producers of change or what transmits causal forces through CM (verbs)

- Context important

4. Standards for validity of process-tracing

To qualify as a mechanistic explanation = explains ’how it works’

- productive continuity = no significant holes in the causal mechanism
- activities – what entities are doing (causal logics made explicit)



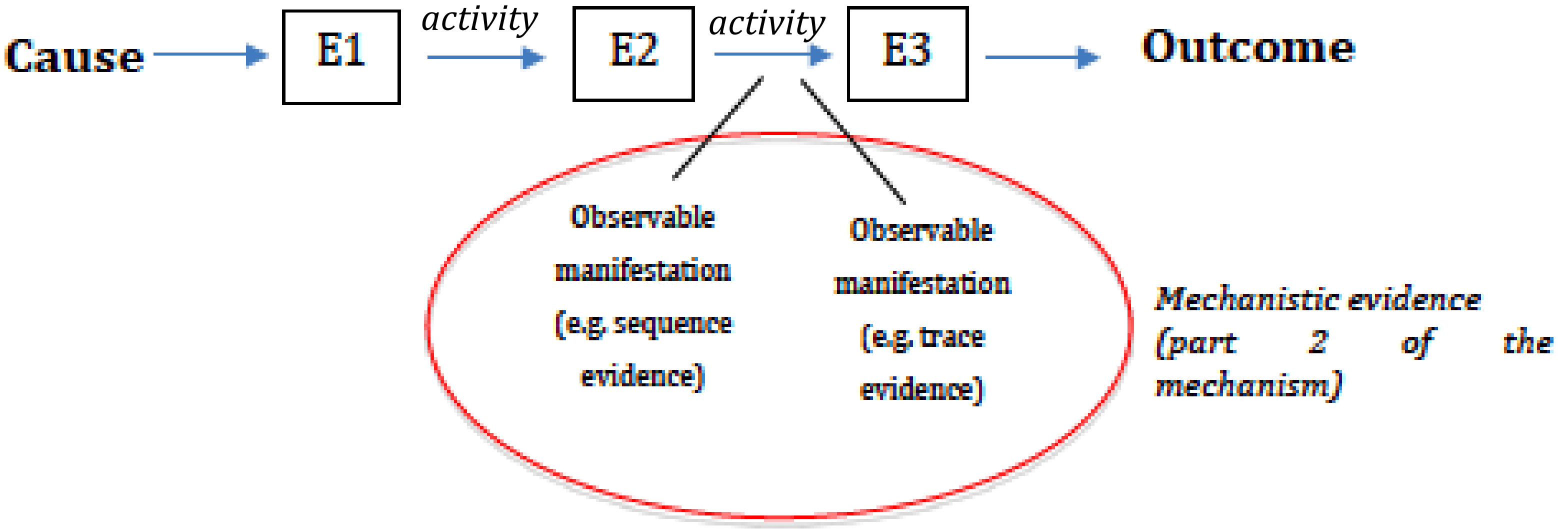
Superficial mechanistic explanation	Cause	→ 'one-liner' description of process →					Outcome
Incomplete mechanistic explanation	Cause	→	entity	→	entity	→	Outcome

Table 2.2 – Incomplete mechanistic explanations - superficial and incomplete
Source: adapted from Craver and Darden, 2013: 83-95.

4. Standards for validity of process-tracing

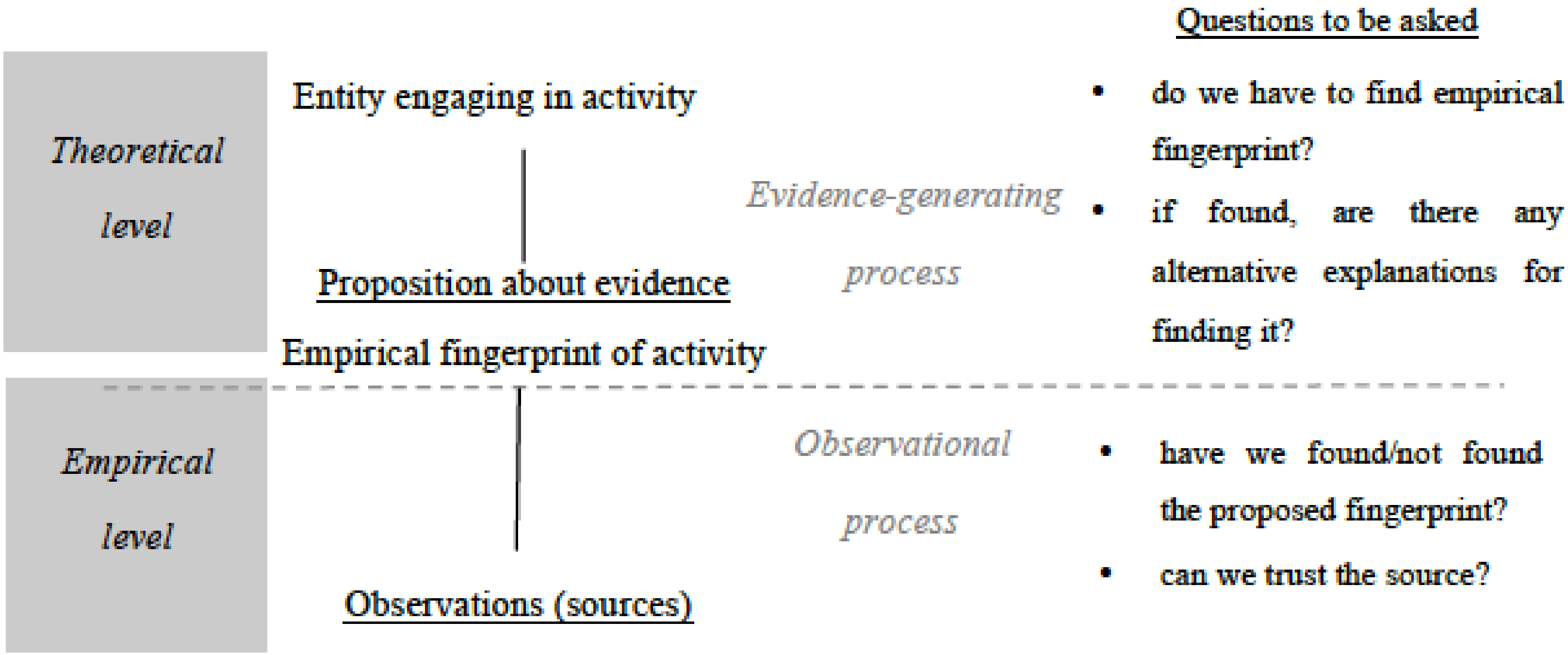
Mechanistic evidence

- activities should leave observational traces in actual cases


Cause
E1
activity
E2
activity
E3
Outcome
Observable manifestation (e.g. sequence evidence)
Observable manifestation (e.g. trace evidence)
Mechanistic evidence (part 2 of the mechanism)

4. Standards for validity of process-tracing

Mechanistic evidence = observable manifestations of activities of parts of mechanism



Questions to be asked

Theoretical level

Entity engaging in activity

Proposition about evidence

Empirical fingerprint of activity

Evidence-generating process

- do we have to find empirical fingerprint?
- if found, are there any alternative explanations for finding it?

Empirical level

Observations (sources)

Observational process

- have we found/not found the proposed fingerprint?
- can we trust the source?

Figure 5.1 - A two-stage evidence-evaluation framework for turning empirical material into evidence of mechanisms

5. Conclusions

- Process tracing case study methods are one way to study mechanisms
- Strong internal validity (but varies depending on...)
- Very resource-intensive and often weak external validity

Suggestions for further reading

- Clarke, B., D. Gillies, Phyllis Illari, Federica Russo, Jon Williamson. 2014. Mechanisms and the Evidence Hierarchy. *Topoi*, 33(2): 339-360.
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