Causality

Note

There are many ways to think of causality, or 'cause-and-effect' relationships. Systems Planning℠ seeks the *mechanisms* (e.g. pathways) that describe 'how' and/ or 'why' *changes* (e.g. effects, impacts, outcomes) arise from *actions* or other changes (Perdicoúlis, 2014b). The changes themselves (e.g. magnitude, probability, geographic extent) carry the importance of data or information, but should not overshadow the 'mechanisms' that provide the understanding of 'how things work' (Perdicoúlis, 2014c).

1 Discovery

Heuristics	Premises/ Assumptions
Precedence	Effects follow their causes
Proximity	Effects and their causes occur in the spatial and/ or temporal vicinity
Similarity	Effects and their causes relate within common themes (e.g. pollution, health)
Covariation	Effects and their causes follow similar numerical patterns (Perdicoúlis, 2013)
Sine qua non	Certain conditions are necessary (but maybe not sufficient) for an effect to occur
Mechanisms[a]	Effects and their causes are related in directed pairs, thus forming chains or networks

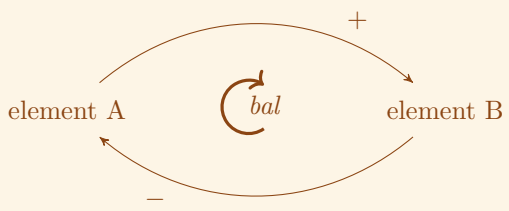
[a] This provides a proof of concept — i.e. evidence or demonstration of how the causal argument stands

Different ways to understand or 'prove' causality (Perdicoúlis, 2010, pp.51–55)

2 Description

2.1 System

Reverse blueprints (RBP) express cause-and-effect relationships in *relative* terms — i.e. either *directly proportional* (+) or *inversely proportional* (−) — that may form feedback loops (Perdicoúlis, 2014a).



Generic RBP

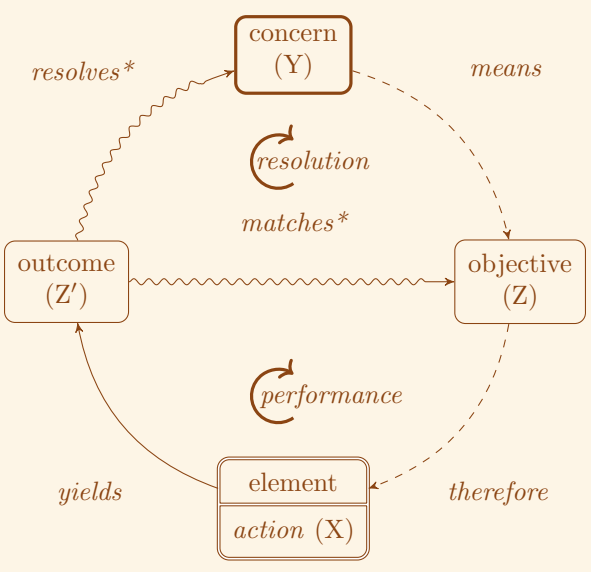
2.2 Process

Process diagrams — e.g. concise (CPD) and/ or extended (EPD) — describe action-induced changes in 'action-state' sequences, thus considering causality in a complementary way (Perdicoúlis, 2014a).

Generic EPD

2.3 Plan

Descriptive causal diagrams (DCD) express causality in 'absolute' or *descriptive* terms — i.e. either as *logical causality* or reasoning (e.g. means, requires: - - - - - - →), or 'real' *physical causality* (e.g. increase, decrease: ——→) (Perdicoúlis, 2014a).



Generic DCD

3 Shortcomings

Category	Flaws
Elements	Omission of elements Generalisations (e.g. 'hydrology', 'ecology')
Relationships	Omission of relationships
Actions	No actor, point of application, or receiver No action at all Uncertainty in the type of action
Effects	Incomplete identification and/ or presentation
General	Uncertainty in time and/ or space specifications Use of esoteric language (jargon)

Sample flaws in the communication of causality (Perdicoúlis and Glasson, 2012; Perdicoúlis et al., 2015)

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