



# CAUSAL MAPPING HAS BEEN USED FOR OVER 50 YEARS IN MANY DISCIPLINES

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From (Powell et al. 2024)

Causal mapping – diagramming beliefs about what causes what – has been used since the 1970s across a range of disciplines from management science to ecology.

The idea of wanting to understand the behaviour of actors in terms of their internal maps of the world can be traced back further to field theory (Tolman 1948) which influenced Kelly’s ‘personal construct theory’ (Kelly 1955). A seminal contribution was made by Robert Axelrod in political science, with the book *The Structure of Decision* (Axelrod 1976). Causal mapping is largely based on ‘concept mapping’ and ‘cognitive mapping’, and sometimes the three terms are used interchangeably, although ‘causal mapping’ strictly involves maps that only include explicit causal links, rather than, for example, relationships like ‘membership’.<sup>3</sup> Axelrod’s book presents a comprehensive idiographic approach to how individuals make decisions which he himself mostly refers to as ‘cognitive mapping’ (although his definition makes it clear that all links are causal). An appendix to the book (Wrightson 1976) gives details about how to code causal links. Bougon et al. (1977) applied a similar approach to a study of the Utrecht Jazz Orchestra as an organisational unit, eliciting ‘cause maps’ from several individual members and amalgamating them. One strand of literature about causal mapping can be located within the wider literature on sensemaking in organisations pioneered by Weick (1995), and applications within organisations were present almost from the start.

By 1990, there were many different applications of similar ideas, including an edited book (Huff 1990) that offered a unitary approach to ‘concept mapping’ in the United States. Most authors (Ackermann & Alexander 2016, p. 892; Clarkson & Hodgkinson 2005, p. 319; Fiol & Huff 1992, p. 268; Laukkanen 2012, p. 2; Narayanan 2005, p. 2) use a broadly similar definition of a causal map: A causal map is a diagram, or graphical structure, in which nodes (which we call factors) are joined by directed edges or arrows (which we call links), so that a link from factor C to factor E means that someone (P) believes that C in some sense causally influences E. There is a constructive ambiguity (Eden 1992) about what a collective map is a map of: While maps constructed as a consensus within a group can plausibly be claimed to map ‘what the group thinks’, this is more problematic for maps constructed post hoc by synthesising individual maps.

We found no significant deviations from this basic definition of a causal map across all the variants of causal mapping reviewed in the following sections, with the caveat that there is variation in how explicit different authors are in describing causal links as representing bare causation as opposed to beliefs about causation.

In the following decades, Eden et al. (1992) applied the approach to understanding and supporting decision-making in organisations, increasingly using the phrase ‘causal mapping’ rather than ‘cognitive mapping’, and they subsequently extended the application of causal maps to fields as varied as risk elicitation and information systems development (Ackermann & Eden 2011; Ackermann et al. 2014), also developing a series of software packages beginning with Decision Explorer (Ackermann et al. 1996). There is now a wealth of literature on using causal mapping for decision support in organisations (including sophisticated approaches to formalise decision support (Montibeller et al. 2008) and even to rank options (Rodrigues et al. 2017)).

Laukkanen (1994, 2012; Laukkanen and Eriksson, 2013) also wrote extensively on causal mapping and developed a software programme called CMAP3 for processing both idiographic and comparative causal maps by importing, combining and analysing factors and links attributed to one or more sources. A broadly similar approach was taken by Clarkson and Hodgkinson (2005) with their Cognizer approach and software.

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