

“Understanding causes and effects as system states: the implications for evaluation”

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The Nature of Cause

- Causes driving change in complex systems are multiple and interactive - COMPLEX comes from the Latin COMPLEXUS meaning woven.
- We should think of causes not as single variables but as themselves complex – any non controlled experimental intervention in a complex system is itself a complex system.
- So meaningful non-experimental interventions are themselves interwoven sets of PROCESSES.
- Processes happen in and through TIME.
- In Complex Systems as indicated by the reality of positive feedback we must see cause and effect as always recursive and not as distinct entities.
- Lewes, G.H. (1874–79) *Problems of Life and Mind*, London: Trubner
- Byrne, D. (2023). Causation in complex systems where human agency is in play. *International Journal of Social Research Methodology*, 27(3), 357–36

What is an effect?

- In complex systems we need to understand effects as the general state of systems. This applies at all levels.
- We can use the imagery of complex system attractors. Systems which in parameter terms stay within a Torus attractor which can be drawn in two dimensions as doughnut – crudely put just bang about a bit in the doughnut – remain the same kind of system.
- Phase shift – change of kind – transformation – changes in systems states.
- Policies are intended if sensible to change system states qualitatively – not just generate incremental changes in any measure
- See Byrne, D.S. ‘What is an effect? Coming at Causality backwards’ in [Vogt, W. \(William\) Paul](#) | [Williams, Malcolm](#) **The SAGE Handbook of Innovation in Social Research Methods (2011)**

IMPLICATION

- Evaluation of Complex Interventions in Complex Systems is not a matter of experimental establishment of what works but rather requires process tracing of what has worked OR not worked.
- Systematic comparison is key to this.
- Methods which can be deployed include:
 - Process Tracing (without the positivist baggage of US Political Science)
 - Qualitative Comparative Analyses
 - BIG DATA methods based on Large Language Models
 - Simple old fashion history

All create NARRATIVES and allow some understand of what works
WHEN and WHERE – CONTEXTS MATTER.

Examples

- Blackman, T., Wistow, J. and Byrne, D.S. (2011) 'A Qualitative Comparative Analysis of factors associated with trends in narrowing health inequalities in England' *Social Science & Medicine* Volume 72, Issue 12, June 2011, Pages 1965-1974
- Proctor, A. and Greaves, J. (2018) *Evaluating Complexity in Context: The Environment Agency and Waste Crime* CECAN Practice Note 11 <https://www.cecan.ac.uk/wp-content/uploads/2020/08/EPPN-No-11-Qualitative-Comparative-Analysis.pdf>

A BIG Problem

The Terrible Weakness of
Institutional Memory in
Organizations and Institutions –
especially in the Public Sector and
with knobs on in the NHS.

References

- See Byrne, D.S. ‘What is an effect? Coming at Causality backwards’ in [Vogt, W. \(William\) Paul | Williams, Malcolm](#) **The SAGE Handbook of Innovation in Social Research Methods (2011)**
- Blackman, T., Wistow, J. and Byrne, D.S. (2011) ‘A Qualitative Comparative Analysis of factors associated with trends in narrowing health inequalities in England’ [Social Science & Medicine Volume 72, Issue 12](#), June 2011, Pages 1965-1974
- Proctor, A. and Greaves, J. (2018) *Evaluating Complexity in Context: The Environment Agency and Waste Crime* CECAN Practice Note 11 <https://www.cecan.ac.uk/wp-content/uploads/2020/08/EPPN-No-11-Qualitative-Comparative-Analysis.pdf>
- Lewes, G.H. (1874–79) *Problems of Life and Mind*, London: Trubner
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