



GST 26 Constraints, Causality, and Organised Possibility

Formal Description

This module introduces the concept of constraints and conditions as higher-level descriptions of organised causal networks. It explains how constraints regulate the range of behaviours and arrangements possible within systems and physical reality. The module also distinguishes between configurational and causal constraints and explains how recurring organisation, pattern, and information emerge through constrained causal organisation.

Constraints and conditions are complex causal networks delivering multiple enabling or inhibiting inputs to a system, thereby defining the range of behaviours in which the system can or cannot engage.

The precise causal mechanisms involved are often unknown, distributed, or analytically impractical to specify directly, requiring simplification through the concepts of constraint and condition. These do not denote fundamentally different ontological categories, but rather different emphases within organised causal systems.

In the case of constraints, the emphasis lies on behaviours excluded or limited, while in the case of conditions the emphasis lies on behaviours enabled or permitted. Constraints therefore regulate organised possibility.

Two major forms of constraint may be distinguished. Configurational constraints regulate possible arrangements in space-time and include factors such as spatial exclusion, dimensionality, topology, continuity and discreteness, and kinematic limitations. Causal constraints regulate possible interactions and forms of causal organisation, including enabling and inhibiting conditions, thresholds, rates, capacities, coupling, and feedback.

Constraints and conditions do not exist independently of causality. Rather, they represent higher-level descriptions of organised causal regularities. Recurring organisation therefore emerges not from unrestricted variation, but through constrained causal possibility.

Plain English Explanation

Physical reality does not allow everything to happen equally.

- Some arrangements are possible.
- Others are impossible.
- Some behaviours are permitted.
- Others are limited or prevented.

These limitations and possibilities arise because physical reality contains constraints.

For example:

- gravity constrains motion;
- roads constrain traffic flow;
- ecosystems constrain population behaviour;
- and social rules constrain human interaction.

Importantly, constraints are not separate from causality. Rather, they are simplified ways of describing large and complex networks of causal interaction. In many situations, the exact mechanisms involved are too complicated to analyse directly. Instead of tracing every individual causal interaction, we describe the overall effects as constraints or conditions.

This allows us to understand:

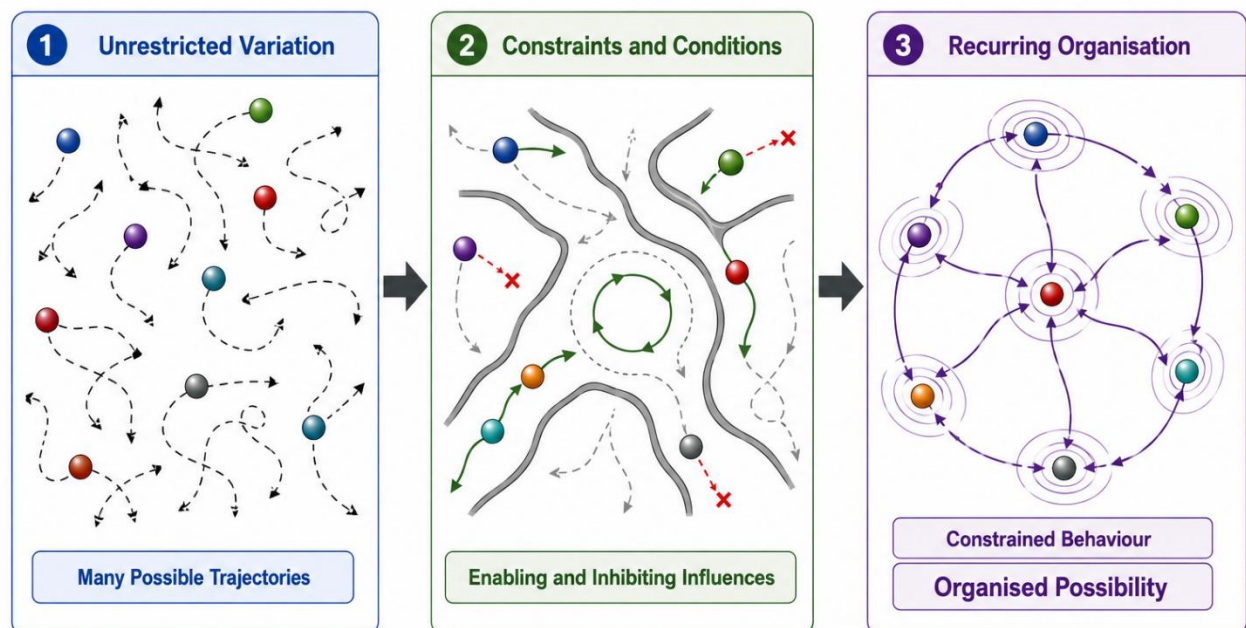


- what systems can do;
- what systems cannot do;
- and why certain forms of organisation recur while others do not.

Constraints therefore create organised possibility spaces. They channel behaviour into certain pathways while excluding others. This idea is extremely important for later discussions of:

- landscapes;
- attractors;
- viability;
- systems; and
- social organisation.

Constraints and Organised Possibility



Recurring organisation emerges through constrained causal possibility.

Example 1 — Riverbanks

Riverbanks constrain the possible pathways available to flowing water. The water flow itself results from causal processes, while the banks regulate the possible trajectories.

Example 2 — Gravity and Planetary Motion

Gravity constrains planetary trajectories, producing recurring orbital organisation.

Example 3 — Traffic Systems

Road layouts, speed limits, and traffic signals constrain vehicle movement and influence possible traffic patterns.



Example 4 — Biological Survival

The availability of oxygen, food, and temperature ranges constrains the possible behaviours and survival of organisms.

Provenance and Links

The concept of constraints and conditions developed in this module draws particularly upon General Systems Theory, complexity theory, thermodynamics, Critical Realism, and Cognitive Physicalism. Systems theorists such as von Bertalanffy (1968) and Ashby (1956) recognised that system behaviour is shaped not only by individual components, but also by the organisational conditions under which interactions occur. Complexity theory and thermodynamics further demonstrated how recurring organisation emerges through constrained pathways and regulated interactions rather than unrestricted variation (Prigogine & Stengers, 1984; Mitchell, 2009). Critical Realism, particularly in the work of Bhaskar (1975), contributed the idea that observable regularities often arise from deeper generative mechanisms that may not be directly observable, while Cognitive Physicalism grounds such mechanisms within a fully physical ontology. The present framework builds directly upon earlier discussions of causality, structure, pattern, and information by treating constraints and conditions not as independent ontological entities, but as higher-level descriptions of organised causal regularities. In this view, constraints simplify the analysis of complex, distributed causal organisation by describing the ranges of behaviour enabled, channelled, or limited within systems. The module also prepares the conceptual basis for later discussions of landscapes, attractors, viability, systems dynamics, and social systems more generally.

Practical Exercise

- Explain the difference between constraints and conditions.
- Give three examples of configurational constraints and three examples of causal constraints.
- Explain why constraints are not separate from causality.