GST 102 Latent Causal Potential and Its Activation

Formal Description

Latent causal potential comprises processes within an assembly that are physically present but are not currently exercised. A suitable input or a change in conditions can bring them into operation. Activation exercises an existing capability. Reorganisation of the assembly can instead create a capability that did not previously exist.

Activation can depend on the type, amount, timing or combination of inputs. A reduction in input can also permit activity if that input was sustaining an inhibition. So, the same input can have different effects depending on the receiving organisation.

By the end, the learner should be able to identify a source of latent potential, explain what allows or prevents its activation and trace how its effects can spread.

Plain English Explanation

Example of latent Potential

Consider a standby pump connected to a drainage installation. A rising water level causes a sensor to signal the controller. If power is available and the discharge path is open, the controller starts the pump. The signal activates a retained pumping capability. The electricity supplies the energy that moves the water.

The sensor signal is an output of one component and an input to another. It need not be a fresh input from outside the installation. The water entering the installation, by contrast, crosses its boundary. If the controller cannot receive the signal, the automatic pathway can remain inactive even though the pump still works.

Installing and connecting a pump where no pumping path previously existed creates a capability at the installation level. Starting the installed pump later exercises it. The distinction depends on the level being studied: the pump may already have been capable of moving water before it was installed.

Where Latent Potential Comes From

An existing component can have an unused capability, as with the standby pump. Alternatively, the same components may be able to take up another arrangement that permits a different interaction. This is alternative configurational potential. Part of the bacterial protein RfaH, for example, can change shape and then interact with the cell's protein-making machinery (Burmann et al., 2012).

An assembly can also retain an entity that does not participate in the relationships defining the organisation under study. This is known as a configurationally entrained component (CEC). Fluid trapped in quartz is retained by the crystal but is not part of its lattice. Under suitable conditions, pressure in the inclusion can deform or fracture the host (Bodnar et al., 1989). CECs are one possible source of potential; the standby pump illustrates another.

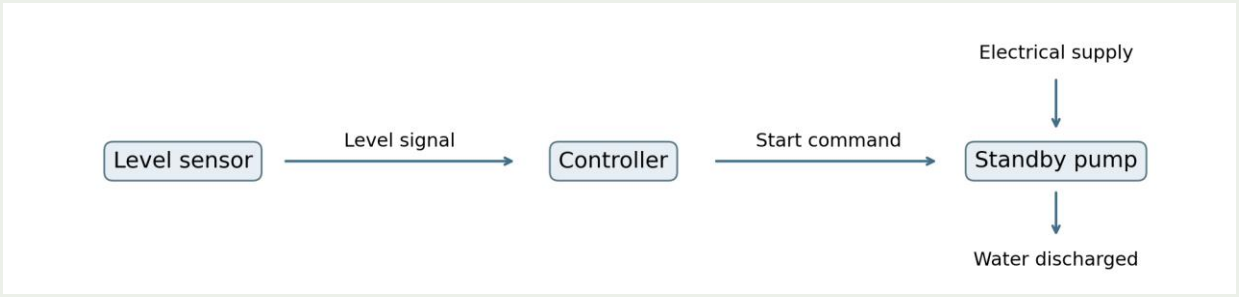
When an assembly joins a larger one, it can carry capabilities into the larger organisation. Access can change, however. A new enclosure may block an input or prevent a component from changing shape. Losing a component can also remove a possible future response while leaving current activity unaffected.

When Activation Spreads

A realised process can produce an output that activates another process. The effect can spread when the transfers reach recipients that are able to respond. It can also stop where a link is blocked,

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a threshold is not met or a required resource is missing. A small signal can lead to substantial effects when the organisation and resources for the response are already present.
Bogdanov distinguished processes that support an organised whole from those that undermine it. Activation gives one way to explain either outcome. Starting the standby pump may protect the installation from flooding; pressure in a fluid inclusion may damage the host crystal.
An effect can be harmful to one part but protective of the larger assembly. For example, when a fuse blows, the circuit immediately loses power. But that interruption can prevent the wiring from overheating and protect the installation from more serious damage. So, when judging the effect, we should say what we are assessing and over what period.



Each arrow shows a transfer. The start command can close an open switch on the electricity supply and pumping will only occur if the pump has power, receives water and has an open discharge path.

Examples of Activated Latent Causal Potential
A baker adds water to dried yeast. Dried baker's yeast retains the capacity to ferment, but it needs water before it can become active. In moist dough, with suitable sugars and temperature, the yeast produces carbon dioxide. The gas helps the dough rise. Adding water helps bring an existing capability into use.
A latch releases a spring. A compressed spring can move a lever, but a latch holds it in place. When the latch is lifted, the spring expands and moves the lever. Lifting the latch removes the restraint; the energy that moves the lever was already stored in the spring.
A call brings a reserve crew into action. An organisation has a trained reserve crew, with people assigned to roles and equipment ready for use. A call tells the crew when and where to report. The call brings an existing capability into use. If the crew still had to be recruited, trained and equipped, the organisation would first have to build that capability.

In each case, we ask what was already in place, what kept the capability from being used, and what changed to bring it into action.

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Provenance and Links

This module applies the account of retained potential and activation in *Causal Assembly Theory: Assembly and Disassembly as Causal Processes*. It follows GST 101 on nested organisation and prepares for the next module on flexibility and adaptability.

Challoner, J. A. (2026). Causal assembly theory: Assembly and disassembly as causal processes. Rational Understanding. https://rational-understanding.com/efgst

Bogdanov, A. (1980). Essays in tektology (G. Gorelik, Trans.). Intersystems Publications.

Bodnar, R. J., Binns, P. R., & Hall, D. L. (1989). Synthetic fluid inclusions—VI. Quantitative evaluation of the decrepitation behaviour of fluid inclusions in quartz at one atmosphere confining pressure. Journal of Metamorphic Geology, 7(2), 229–242. https://doi.org/10.1111/j.1525-1314.1989.tb00586.x

Burmann, B. M., Knauer, S. H., Sevostyanova, A., Schweimer, K., Mooney, R. A., Landick, R., Artsimovitch, I., & Rösch, P. (2012). An α helix to β barrel domain switch transforms the transcription factor RfaH into a translation factor. Cell, 150(2), 291–303. https://doi.org/10.1016/j.cell.2012.05.042

Practical Exercise

Trace the standby pump sequence from the rising water to discharge. Name each transfer and one condition needed for it to have its effect. Explain how an interruption would stop the sequence, and whether it would prevent activation or remove the capability.

Choose a second case. Identify the organisation under study, what carries the latent potential and what can activate it. Explain whether the effects would support or undermine the organisation at that level and over the period you chose.

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