

The TOTE model

TOTE is an acronym for Test-Operate-Test-Exit (Miller, Galanter, & Pribram 1960).

Eugene Galanter recounts (in Hirst 1988:40) how the idea of the TOTE emerged from dissatisfaction with the 'self-imposed limits of the classical behaviourist paradigm':

'... the three of us (i.e. Galanter, George Miller and Karl Pribram) were arguing about what the conceptual basis for a new theory of psychology could be. At one point, George proposed that we examine some intentional human act.

"Flying a plane," I suggested.

"No – too much. How about crossing a street? An equally dangerous act in the Bay area," Karl responded. I went to the blackboard and started a flow chart. The boxes, lines, and arrows snaked around the board as step after step was drawn.

"No," George said, "all that stuff on the board is only a string of reentrant reflexes. Let a whole piece of action be repeated until it's finished."

"How will it know?" from Karl.

"With a cybernetic test," replied George.

"But how do I draw it?" I asked.

"Like this," said George, and the TOTE replacement for the reflex was designed.'

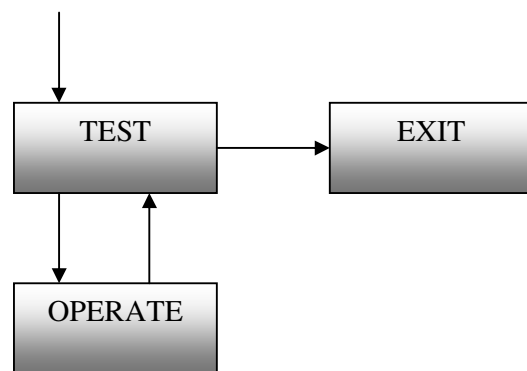


Figure 1: The basic TOTE model

How does the TOTE work?

First the system *tests* or evaluates the extent to which a goal has been achieved. It then performs an *operation* designed to bring the system closer to achieving it. Then there is another *test*. If the goal has been achieved, then the system can *exit* the operation.

Furthermore, following a seminal paper by Tolman (1948), Miller *et al* recognised the crucial role of internal representations (which they often referred to as *plans*) in this process, arguing that they were necessary in order for any activity to be carried out successfully. Without an organism's ability to (re)construct an internal representation or map, either of experience or of a *future* outcome, there could be no meaningful behaviour. Thus:

'A human being – and probably other animals as well – builds up internal representations, a model of the universe, a schema, a simulacrum, a cognitive map, an image'.

(Miller, Galanter, & Pribram 1960:7)

For example:

What will I cook the family for supper tonight? How about spaghetti? As I think about this, I see, in my mind's eye, the saucepan full of bubbling tomato sauce, followed by an image of a heaped plate of spaghetti liberally doused in fragrant, red tomato sauce with just a hint of basil. How would I know what to cook for supper if I were unable to generate such images to begin with, that informed me what I needed to get at the supermarket?

Miller *et al* proposed that people continuously test or monitor what they are doing and what is happening in the environment in relation to the achieving of a goal. The activity of the TOTE always involves *comparing* the system's present state with information about the future outcome it is endeavouring to achieve.

The TOTE as a cybernetic model

The TOTE is a template of a cybernetic system. Some features of the TOTE model that mark it as distinct from the classical behaviourist stimulus-response mode are:

- Intentionality; people's goals, not 'forces' or 'drives', are causes.
- Causality is also circular, not lineal¹; a crucial component is the inclusion of feedback (Dilts et al. 1980:27).
- There must be some representation of the goal, which refers to a future state.
- It entails a comparison, between present state and desired state (or goal).
- It focuses on 'chunks' of behaviour ('a whole piece of action').

The TOTE dynamic may operate at many levels in living systems. TOTEs are nested within TOTEs. It has a fractal aspect, as a dynamic repeated at myriads of levels of organisation from the social through to the sub-cellular. The contraction of a muscle fibre in the arm of a composer writing music is as much governed by the action of the TOTE as is the completion of a symphony.

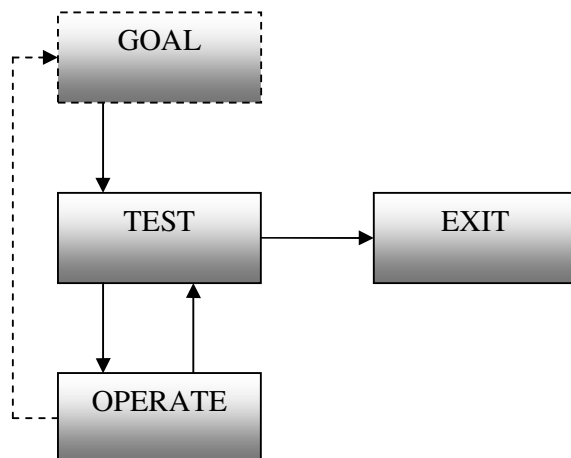


Figure 2: The TOTE, showing feedback from operation to goal.

A criticism of the TOTE is that it can encourage us to reduce human cognition to a rational, information-processing model. In principle, though, it allows for emotion and unconscious processing in human action.

¹ Bateson used the term 'lineal' instead of 'linear'.

The TOTE in NLP

This 'TOTE' model was adopted in early NLP (Grinder, DeLozier, & Bandler 1977:6) and elaborated by Robert Dilts (Dilts, Grinder, Bandler, & DeLozier 1980:26; Dilts 1983). John Grinder was once seconded for a year to George Miller's department at Rockefeller University in New York (Bostic St.Clair & Grinder 2001:123). Miller's interests in cybernetics, psycholinguistics and problems of cognition, prefigured the combination of interests found in NLP. The idea that all action was driven by outcomes has become one of the central tenets of NLP, and the TOTE is especially evident in its goal-setting exercises.

References

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