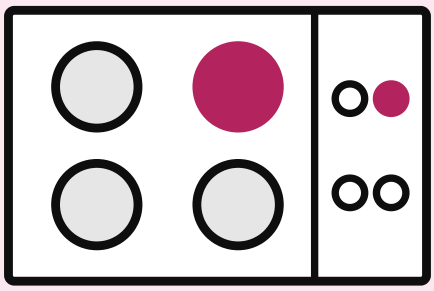
Concept

Stimulus–response compatibility

We respond faster and with fewer errors when the layout of the controls matches the layout of what they control.



In Spanish
Compatibilidad estímulo-respuesta

Origin
Fitts and Seeger (1953)

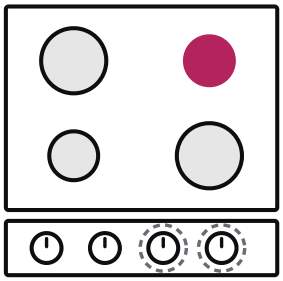
What problem it addresses

It explains why we turn the wrong knob on the stove. It asks design to place and move each control the way people expect, without relying on labels.

An example

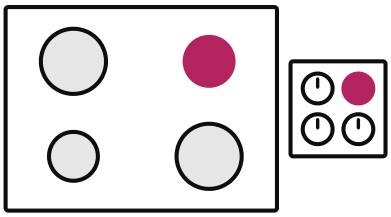
A cooktop with four burners set in a square.

Knobs in a row



Four knobs in a line for four burners in a square. **You have to read the drawing on each knob.**

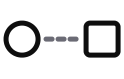
Knobs in a square



The knobs repeat the position of the burners. **You pick the knob without thinking.**

Norman calls this relationship mapping. When the layout of the controls mirrors the layout of what they control, labels become unnecessary (Norman, 2013).

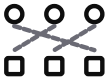
Why it happens

1 

Before acting, we translate what we see into the movement we need to make.

2 

If the two layouts match, the translation is almost automatic.

3 

If they don't, we have to think, and in a hurry we make mistakes.

Applications in design

✓ Use it like this

Place each control in the same layout as what it controls, and make it move in the expected direction.

✗ Avoid

Fixing with labels a layout that doesn't correspond.

👁 Don't fall for it

If people have to read to know which knob to touch, the layout isn't helping.

0.39 s vs. 1.11 s



What the research says

Mean response time when each light had its key in the same position and when the pairings were random. Errors rose from 1.9% to 15.1% (Fitts and Deininger, 1954).

●●● **Solid evidence.** Fitts and Seeger (1953) had already shown that what matters is the pairing. The same light panel works well or badly depending on the keyboard it is combined with.

Connections

Used in

- Interaction design
- UI design
- Automotive HMI design

Related to

- Mental model

Authors and works

1953	**Paul M. Fitts and Charles M. Seeger**	Coined the term and showed that performance depends on how stimulus and response fit together.
1954	**Paul M. Fitts and Richard L. Deininger**	Measured how much time and errors worsen when the pairings are reversed or shuffled.
2013	**Donald A. Norman**	Brought the idea to the design of everyday things under the name natural mapping.

Sources

Original sources

- Fitts, P. M., & Seeger, C. M. (1953). S-R compatibility: Spatial characteristics of stimulus and response codes. Journal of Experimental Psychology, 46(3), 199–210. View source (https://doi.org/10.1037/h0062827)
- Fitts, P. M., & Deininger, R. L. (1954). S-R compatibility: Correspondence among paired elements within stimulus and response codes. Journal of Experimental Psychology, 48(6), 483–492. View source (https://www2.psychology.uiowa.edu/faculty/mordkoff/InfoProc/pdfs/Fitts%20&%20Deininger%201954.pdf)
- Norman, D. A. (2013). The design of everyday things (Rev. and expanded ed.). Basic Books.

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