

Mapping

A relationship between controls and their movements or effects. Good mapping between controls and their effects results in greater ease of use.¹

Turn a wheel, flip a switch, or push a button, and you expect some kind of effect. When the effect corresponds to expectation, the mapping is considered to be good or natural. When the effect does not correspond to expectation, the mapping is considered to be poor. For example, an electric window control on a car door can be oriented so that raising the control switch corresponds to raising the window, and lowering the control switch lowers the window. The relationship between the control and raising or lowering the window is obvious. Compare this to an orientation of the control switch on the surface of an armrest, such that the control motion is forward and backward. The relationship between the control and the raising and lowering of the window is no longer obvious; does pushing the control switch forward correspond to raising or lowering the window?²

Good mapping is primarily a function of similarity of layout, behavior, or meaning. When the layout of stovetop controls corresponds to the layout of burners, this is similarity of layout; when turning a steering wheel left turns the car left, this is similarity of behavior; when an emergency shut-off button is colored red, this is similarity of meaning (e.g., most people associate red with stop). In each case, similarity makes the control-effect relationship predictable, and therefore easy to use.³

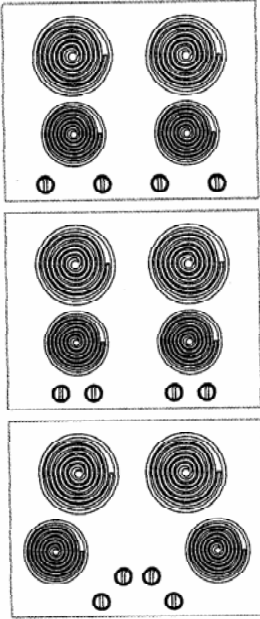
Position controls so that their locations and behaviors correspond to the layout and behavior of the device. Simple control-effect relationships work best. Avoid using a single control for multiple functions whenever possible; it is difficult to achieve good mappings for a one control-multiple effect relationship. In cases where this is not possible, use visually distinct modes (e.g., different colors) to indicate active functions. Be careful when relying on conventions to attach meaning to controls, as different population groups may interpret the conventions differently (e.g., in England, flipping a lightswitch *up* turns it off and flipping it *down* turns it on).

See also Affordance, Interference Effects, Proximity, and Visibility.

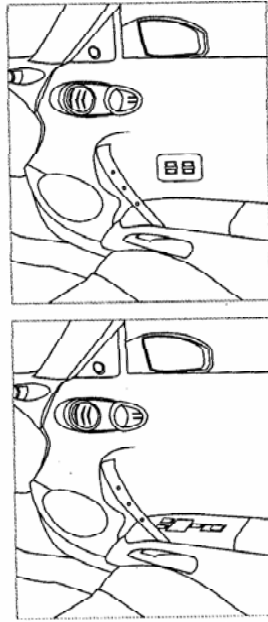
¹ Also known as *control-display relationship* and *stimulus-response compatibility*.

² The seminal work on mapping is *The Design of Everyday Things* by Donald Norman, Doubleday, 1990.

³ For a review of these kinds of issues, see *Spatial Schemas and Abstract Thought* by Merideth Gattis (ed.), MIT Press, 2001.



The relationship between stovetop controls and burners is ambiguous when the controls are horizontally oriented and equally spaced (poor mapping). The relationship becomes clearer when the controls are grouped with the burners, but the horizontal orientation still confuses which control goes with which burner (poor, but improved mapping). When the layout of the controls corresponds to the layout of the burners, the control-burner relationships are clear (good mapping).



The relationship between the window control and the raising and lowering of the window is obvious when it is mounted on the wall of the door (good mapping), but ambiguous when mounted on the surface of the armrest (poor mapping).



The Segway Human Transporter makes excellent use of mapping. Lean forward to go forward, and lean backward to go backward.