THE

DESIGN

OF

EVERYDAY

THINGS

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THE PROBLEM WITH DOORS

In chapter 1 we encountered the sad story of my friend who was trapped between sets of glass doors at a post office, trapped because there were no clues to the doors' operation. When we approach a door, we have to find both the side that opens and the part to be manipulated; in other words, we need to figure out what to do and where to do it. We expect to find some visible signal for the correct operation: a plate, an extension, a hollow, an indentation—something that allows the hand to touch, grasp, turn, or fit into. This tells us where to act. The next step is to figure out how: we must determine what operations are permitted, in part using the affordances, in part guided by constraints.

Doors come in amazing variety. Some open only if a button is pushed, and some don't appear to open at all, having neither buttons, nor hardware, nor any other sign of their operation. The door might be operated with a foot pedal. Or maybe it is voice operated, and we must speak the magic phrase. *("Open Simsim!")* In addition, some doors have signs on them: pull, push, slide, lift, ring bell, insert card, type password, smile, rotate, bow, dance, or, perhaps, just ask. Somehow, when a device as simple as a door has to come with an instruction manual— even a one-word manual—then it is a failure, poorly designed.

Appearances deceive. I have seen people trip and fall when they attempted to push open a door that worked automatically, the door opening inward just as they attempted to push against it. On most subway trains, the doors open automatically at each station. Not so in Paris. I watched someone on the Paris Métro try to get off the train and fail. When the train came to his station, he got up and stood patiently

in front of the door, waiting for it to open. It never opened. The train simply started up again and went on to the next station. In the Métro, you have to open the doors yourself by pushing a button, or depressing a lever, or sliding them (depending upon which kind of car you happen to be on).

Consider the hardware for an unlocked door. It need not have any moving parts: it can be a fixed knob, plate, handle, or groove. Not only will the proper hardware operate the door smoothly, but it will also indicate just how the door is to be operated: it will exhibit the proper affordances. Suppose the door opens by being pushed. The easiest way to indicate this is to have a plate at the spot where the pushing should be done. A plate, if large enough for the hand, clearly and unambiguously marks the proper action. Moreover, the plate constrains the possible actions: there is little else that one can do with a plate except push. Unfortunately, even this simple clue is misused. Doors that should be pulled or slid sometimes have plates (figure 4.2). Doors that should be pushed sometimes have both plates and knobs or a handle and no plate.

The violation of the simple use of constraints on doors can have serious implications. Look at the door in figure 4.3 *A*: this fire exit door has a push bar, a good example of an unambiguous signal to push, and a good design (required by law in the United States) because it forces proper behavior when panicked people press against a door as they attempt to flee a fire. But look again. On which side should you push? There is no way of knowing. Add some paint to the part that is to be pushed, or fasten a plate over it (figure 4.3 *B*): these provide strong cultural signals to guide the action properly. Push bars offer strong physical constraints, simplifying the task of knowing what to do. The use of cultural constraints simplifies the task of figuring out where to do it.

Some hardware cries out to be pulled. Although anything that can be pulled can also be pushed, the proper design will use cultural constraints so that the signal to pull will dominate. But even this can be messed up. I have seen doors with a mixture of signals, one implying push, the other pull. I have watched people passing through the door of figure 4.3 (*A*). And they had trouble, even people who worked in the building and who therefore used the door several times every day.

Sliding doors seem to present special difficulties. In fact, there are several good ways to signal the operation of a sliding door unambiguously. For example, a vertical slit in the door can be used in only one
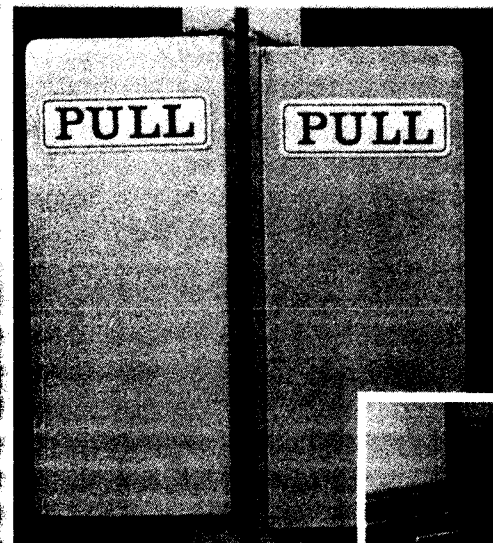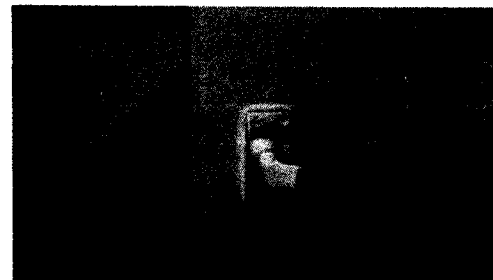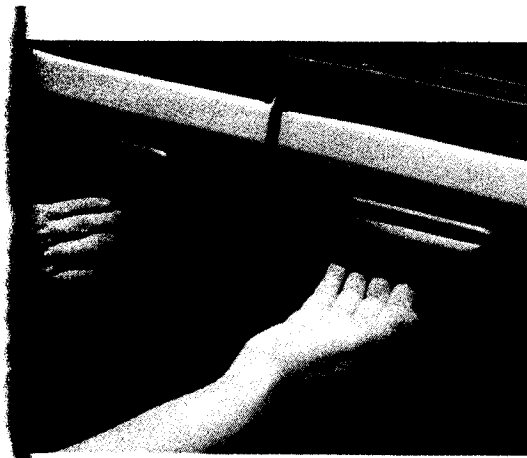
4.2   The Design of Doors. The doors at the left show two excellent examples of design: different handles, side by side on the same automobile, each neatly signaling its proper operation. The vertical placement of the lever on the handle to the left causes the hand to be held in a vertical plane, signifying a slide. The horizontal placement of the lever on the door handle to the right, coupled with the overhang and indentation that neatly afford entrance by the hand, signifies a pull. Two different types of doors, adjacent to one another, and yet there is no confusion between them.

The handle depicted at the left shows inappropriate signals. This form of handle clearly marks grasp, twist, or pull—except that this particular door slides: a classic case of inappropriate design.

At left and below are photographs of hardware for doors that open by being pulled. The large plates at the left are a signal to push, but in fact the door is supposed to be pulled: no wonder the door needs the signs. The simple U-shaped brackets below is a much better design, but they are ambiguous enough that a sign still seems to be needed. Contrast with the two handles at the top, neither of which needs a sign yet is always operated properly. If a door handle needs a sign, then its design is probably faulty.
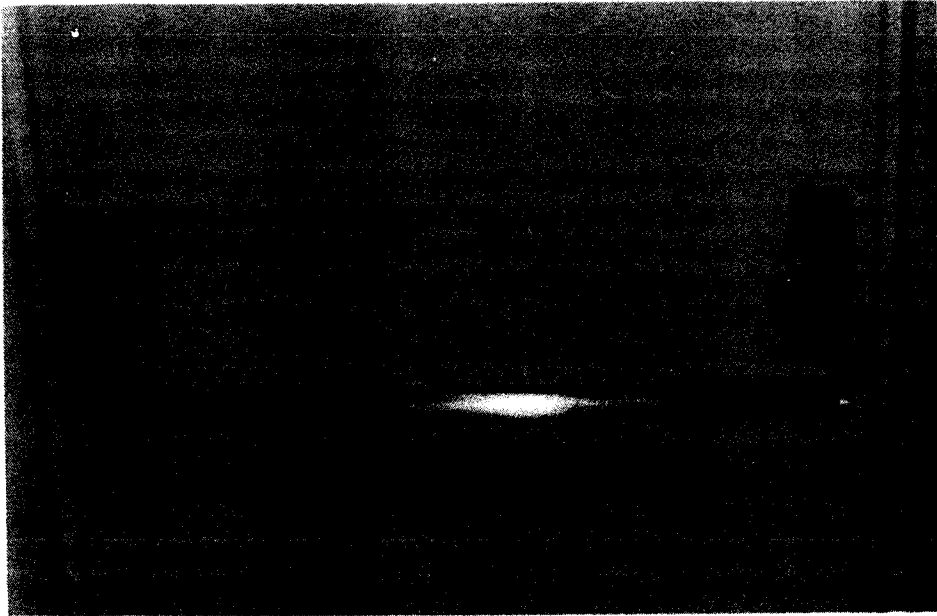
4.3 Doors in Two Commercial Buildings. Pushing the bar opens the door, but on which side do you push? Bar *A* (above) hides the signal, making it impossible to know on which side to push. A frustrating door. Bar *B* (below) has a flat plate mounted on the side that is to be pushed; this is a naturally interpreted signal. A nice design, no frustration for the user.
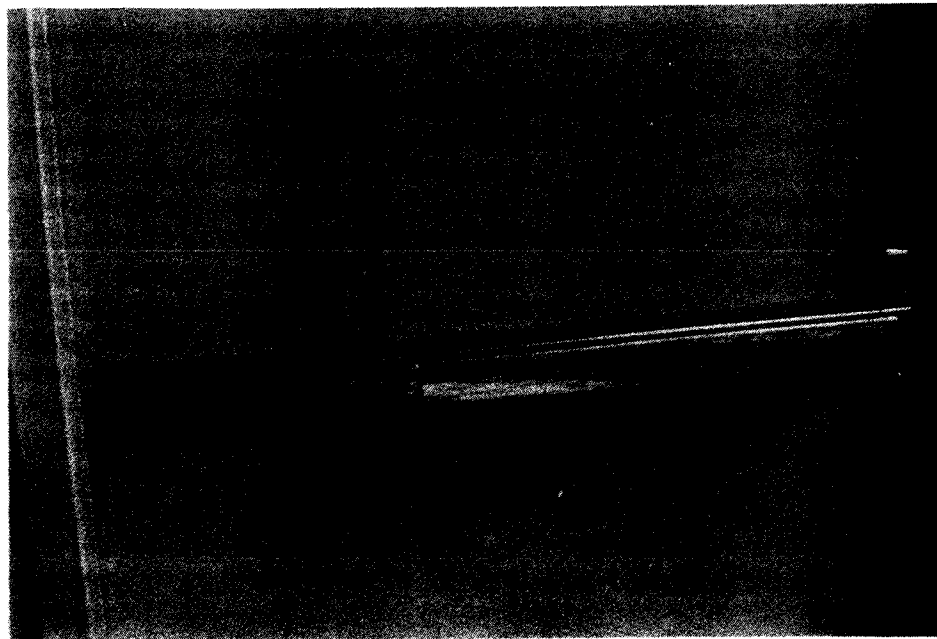
way: the fingers are inserted and the door slid. The location of the slit specifies not only where to exert the force but also in which direction. The critical signal is any depression in the door large enough for the fingers to fit into, but without an overhang. Similarly, any projection will also work, as long as it neither has an overhang nor is appropriate for being grasped with the hand. On a properly designed door, the fingers can exert pressure along the sides of the depression or projection—needed for sliding—but they can't pull or twist. I have seen elegant sliding doors, aesthetically pleasing, yet with clear signals to the user—in a conference room in Italy, on a door on a Métro train in Paris, on some Scandinavian furniture. Yet more often, it seems, sliding doors are built with the wrong signals, with clumsy hardware in positions that jam the fingers. Sliding doors somehow challenge the designer to get them wrong.

Some doors have appropriate hardware, well placed. The outside door handles of most modern automobiles are excellent examples of design. The handles are often recessed receptacles that simultaneously indicate the place and mode of action: the receptacle cannot be used except by inserting the fingers and pulling. Horizontal slits guide the hand into a pulling position; vertical slits signal a sliding motion. Strangely enough, the inside door handles for automobiles tell a different story. Here, the designer has faced a different kind of problem, and the appropriate solution has not yet been found. As a result, although the outside door handles of cars are often excellent, the inside ones are often difficult to find, hard to figure out how to operate, and difficult to use.

Unfortunately, the worst door hardware is found where we spend most of our time: at home and in the office. In many cases, the choice of hardware appears haphazard, used for convenience (or profitability). Architects and interior designers seem to prefer designs that are visually elegant and win prizes. This often means that a door and its hardware are designed to merge with the interior: the door may barely be visible, the hardware merges with door, and the operation is completely obscure. From my experience, the worst offenders are cabinet doors. It is sometimes not even possible to determine where the doors are, let alone whether and from where they are slid, lifted, pushed, or pulled. The focus on aesthetics may blind the designer (and the purchaser) to the lack of usability.

A particularly frustrating design is that of the door that opens outward by being pushed inward. The push releases the catch and ener-

gizes a spring, so that when the hand is taken away the door springs open. It's a very clever design, but most puzzling to the first-time user. A plate would be the appropriate signal, but designers sometimes do not wish to mar the smooth surface of the door. I have such a latch in the glass door of the cabinet in which I store phonograph records. You can see through the door, and it is obvious that there is no room for the door to open inward; to push on the door seems contradictory. New and infrequent users of this door usually reject pushing and open it instead by pulling, which often requires them to use fingernails, knife blades, or more ingenious methods to pry it open.