

THE LAZY CONTROLLER

I spend a few months each year in Berkeley, and one of my great pleasures there is a daily four-mile walk on a marked path in the hills, with a fine view of San Francisco Bay. I usually keep track of my time and have learned a fair amount about effort from doing so. I have found a speed, about 17 minutes for a mile, which I experience as a stroll. I certainly exert physical effort and burn more calories at that speed than if I sat in a recliner, but I experience no strain, no conflict, and no need to push myself. I am also able to think and work while walking at that rate. Indeed, I suspect that the mild physical arousal of the walk may spill over into greater mental alertness.

System 2 also has a natural speed. You expend some mental energy in random thoughts and in monitoring what goes on around you even when your mind does nothing in particular, but there is little strain. Unless you are in a situation that makes you unusually wary or self-conscious, monitoring what happens in the environment or inside your head demands little effort. You make many small decisions as you drive your car, absorb some information as you read the newspaper, and conduct routine exchanges of pleasantries with a spouse or a colleague, all with little effort and no strain. Just like a stroll.

It is normally easy and actually quite pleasant to walk and think at the same time, but at the extremes these activities appear to compete for the limited resources of System 2. You can confirm this claim by a simple experiment. While walking comfortably with a friend, ask him to compute 23×78 in his head, and to do so immediately. He will almost certainly stop in his tracks. My experience is that I can think while strolling but cannot engage in

mental work that imposes a heavy load on short-term memory. If I must construct an intricate argument under time pressure, I would rather be still, and I would prefer sitting to standing. Of course, not all slow thinking requires that form of intense concentration and effortful computation—I did the best thinking of my life on leisurely walks with Amos.

Accelerating beyond my strolling speed completely changes the experience of walking, because the transition to a faster walk brings about a sharp deterioration in my ability to think coherently. As I speed up, my attention is drawn with increasing frequency to the experience of walking and to the deliberate maintenance of the faster pace. My ability to bring a train of thought to a conclusion is impaired accordingly. At the highest speed I can sustain on the hills, about 14 minutes for a mile, I do not even try to think of anything else. In addition to the physical effort of moving my body rapidly along the path, a mental effort of self-control is needed to resist the urge to slow down. Self-control and deliberate thought apparently draw on the same limited budget of effort.

For most of us, most of the time, the maintenance of a coherent train of thought and the occasional engagement in effortful thinking also require self-control. Although I have not conducted a systematic survey, I suspect that frequent switching of tasks and speeded-up mental work are not intrinsically pleasurable, and that people avoid them when possible. This is how the law of least effort comes to be a law. Even in the absence of time pressure, maintaining a coherent train of thought requires discipline. An observer of the number of times I look at e-mail or investigate the refrigerator during an hour of writing could reasonably infer an urge to escape and conclude that keeping at it requires more self-control than I can readily muster.

Fortunately, cognitive work is not always aversive, and people sometimes expend considerable effort for long periods of time without having to exert willpower. The psychologist Mihaly Csikszentmihalyi (pronounced six-cent-mihaly) has done more than anyone else to study this state of effortless attending, and the name he proposed for it, *flow*, has become part of the language. People

who experience flow describe it as “a state of effortless concentration so deep that they lose their sense of time, of themselves, of their problems,” and their descriptions of the joy of that state are so compelling that Csikszentmihalyi has called it an “optimal experience.” Many activities can induce a sense of flow, from painting to racing motorcycles—and for some fortunate authors I know, even writing a book is often an optimal experience. Flow neatly separates the two forms of effort: concentration on the task and the deliberate control of attention. Riding a motorcycle at 150 miles an hour and playing a competitive game of chess are certainly very effortful. In a state of flow, however, maintaining focused attention on these absorbing activities requires no exertion of self-control, thereby freeing resources to be directed to the task at hand.

THE BUSY AND DEPLETED SYSTEM 2

It is now a well-established proposition that both self-control and cognitive effort are forms of mental work. Several psychological studies have shown that people who are simultaneously challenged by a demanding cognitive task and by a temptation are more likely to yield to the temptation. Imagine that you are asked to retain a list of seven digits for a minute or two. You are told that remembering the digits is your top priority. While your attention is focused on the digits, you are offered a choice between two desserts: a sinful chocolate cake and a virtuous fruit salad. The evidence suggests that you would be more likely to select the tempting chocolate cake when your mind is loaded with digits. System 1 has more influence on behavior when System 2 is busy, and it has a sweet tooth.

People who are *cognitively busy* are also more likely to make selfish choices, use sexist language, and make superficial judgments in social situations. Memorizing and repeating digits loosens the hold of System 2 on behavior, but of course cognitive load is not the only cause of weakened self-control. A few drinks have the same effect, as does a sleepless night. The self-control of morning people

is impaired at night; the reverse is true of night people. Too much concern about how well one is doing in a task sometimes disrupts performance by loading short-term memory with pointless anxious thoughts. The conclusion is straightforward: self-control requires attention and effort. Another way of saying this is that controlling thoughts and behaviors is one of the tasks that System 2 performs.

A series of surprising experiments by the psychologist Roy Baumeister and his colleagues has shown conclusively that all variants of voluntary effort—cognitive, emotional, or physical—draw at least partly on a shared pool of mental energy. Their experiments involve successive rather than simultaneous tasks.

Baumeister's group has repeatedly found that an effort of will or self-control is tiring; if you have had to force yourself to do something, you are less willing or less able to exert self-control when the next challenge comes around. The phenomenon has been named *ego depletion*. In a typical demonstration, participants who are instructed to stifle their emotional reaction to an emotionally charged film will later perform poorly on a test of physical stamina—how long they can maintain a strong grip on a dynamometer in spite of increasing discomfort. The emotional effort in the first phase of the experiment reduces the ability to withstand the pain of sustained muscle contraction, and ego-depleted people therefore succumb more quickly to the urge to quit. In another experiment, people are first depleted by a task in which they eat virtuous foods such as radishes and celery while resisting the temptation to indulge in chocolate and rich cookies. Later, these people will give up earlier than normal when faced with a difficult cognitive task.

The list of situations and tasks that are now known to deplete self-control is long and varied. All involve conflict and the need to suppress a natural tendency. They include:

- avoiding the thought of white bears
- inhibiting the emotional response to a stirring film
- making a series of choices that involve conflict
- trying to impress others