• Recently, there has been an explosion in research on time. This book provides a much needed summary of that work. *The Human Organization of Time* will prove a valuable resource to anyone interested in temporal research in organizations.

Leslie PERLOW, *Harvard Business School.*

• Finally a masterful book about time. Bluedorn's work is comprehensive and cutting edge, laying out the interplay of time with fundamental aspects of organizations and individuals. It should be on every serious organizational scholar's bookshelf.

Kathleen eisen hardt, *Department ofManagement Science and Engineering, Stanford University*
Coauthor of *Competing on the Edge: Strategy as Structured Chaos*

• This is a wonderful and important book, full of fascinating information, insights, conjectures, and constructs. Bluedorn forges a compelling case for the importance of time, and of our roles as current stewards of the temporal commons. From the Big Bang to the Bolshevik revolution to the puzzles of Deep Time, from the social construction of zero to the theory of relativity, from the gates of Trenton State Prison to the gates of Dante's Inferno, *The Human Organization of Time* weaves a compelling fabric of temporal threads. Bluedorn has found power and poetry in time.

ramón aldag, *Department ofManagement and Human Resources, University of Wisconsin*

• *The Human Organization of Time* is a broad look at how we truly think about time. It unifies the many human patterns of time-scale concepts and gives depth and perspective to a complex field. Thorough and insightful, it will become the standard work.

Gregory benford, *Department of Physics, University of California, Irvine*
Author of *Deep Time*

• *The Human Organization of Time* stands to be a definitive source for those interested in temporality and time. Bluedorn's knowledge of diverse literatures and his attention both to historical perspectives as well as contemporary theorizing and research is noteworthy. Issues of time and temporality pervade the human experience; Bluedorn helps us to appreciate temporality as a social construction with very real consequences for organizations and their members.

jennifer M. george, *Jesse H. Jones Graduate School of Management, Rice University*

• A remarkable and original contribution to our understanding of the social construction of time and its effects on people and organizations. Playing off against a backdrop of work preoccupied with enduring and stable features of social life, Bluedorn underscores the importance of temporal features—pace, tempo, rhythm, entrainment, and historical turning points.

alan meyer, *Lundquist College ofBusiness, University of Oregon*

The Human Organization of Time

TEMPORAL realities and experience

Allen C. Bluedorn

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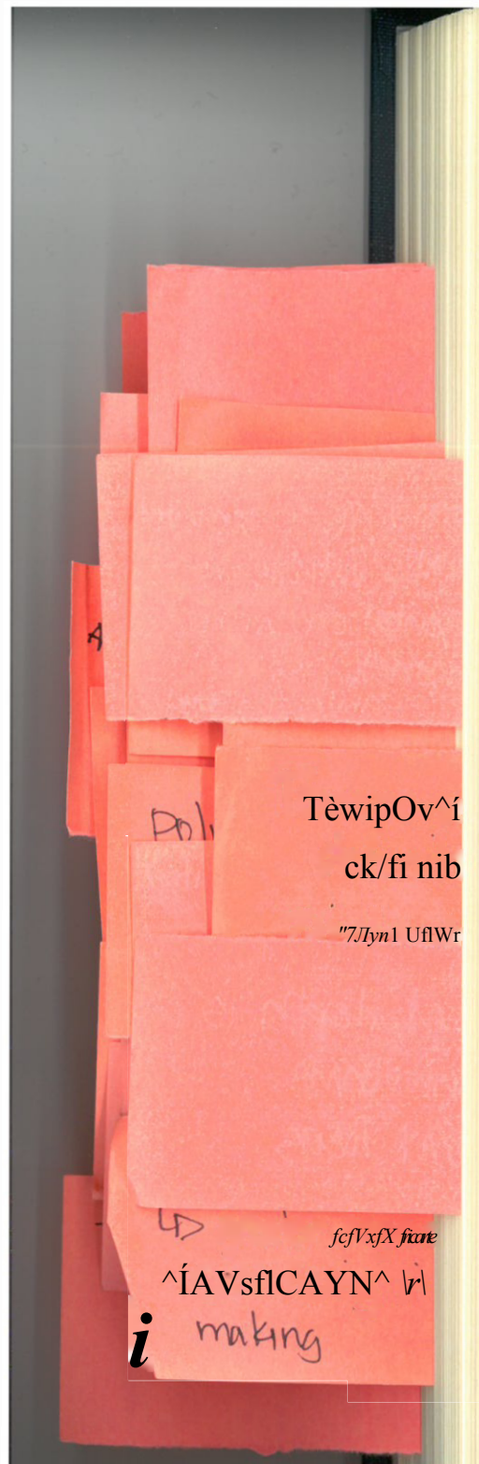
To those who have brought such exquisite meaning to my times; may their times be the best of times always:

To my wife, Betty;
To my sons, John and Nick;
To my brother, Ralph;
To my mother, Evelyn;
To my father, Rudolph, 1905-1988.



Martin (1992) has similarly argued against an overemphasis on cultural homogeneity (i.e., congruence) in the organizational culture domain. But the opposite is also true as revealed by the point that diversity in small groups (Earley and Mosakowski 2000; Watson, Kumar, and Michaelsen 1993) and societies (Bluedorn 2001) does not automatically produce positive outcomes. Sometimes diversity produces what people want, sometimes it does not, and congruence is the same way.

Two thousand years ago Seneca recommended fitting the times (Tempori aptari decet; 1834, p. 10), but this advice would be better yet ifit were tempered with a qualification to take care about which times one fits oneself to. For not only are all times not the same, they are not all equally important. The sunflower seems to have chosen wisely in picking the time to fit itself to, getting its name "because the flower follows the sun's path across the sky each day" (Perry and Perry 2000, p. 85). As the history of fife on this planet shows, one could do much worse than entraining one's activities to the apparent motion of the local star. Indeed, of all the strategies of fife, such entrainment appears to be almost ubiquitous—and almost ubiquitously successful. It is the right thing to fit the times—if one picks the times wisely.

7

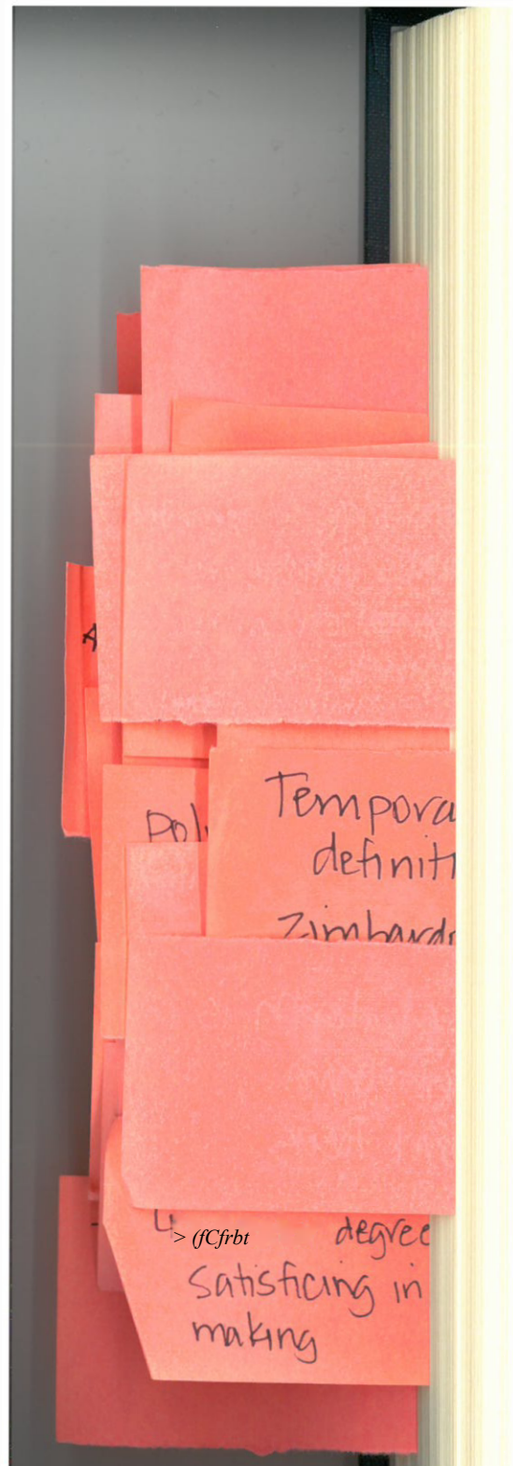
The Best of Times and the Worst of Times

O, call back yesterday, bid time return.

—Shakespeare, *RichardII*

A paradox developed at the end of the last century involving some of the worst of organizational times. Research on meetings, which are often some of the worst of times, resulted in some of the best of times for the people who conducted the study. Not only was the research published in a prominent journal, but it led to a modicum of fame—if not fortune—for the research team (which we shall meet shortly). So some of the worst of times were also closely involved with some of the best of times, a paradox. Although paradoxical thinking does not come easily because it requires thinking about contradiction (Quinn and McGrath 1985, pp. 316-17), paradoxical thinking will be necessary in this encounter with the best and worst of times.

For such times, the best and the worst, and what makes them best and worst, are the topic of this chapter. Obviously not every good and bad time can be discussed in a single chapter—or even in a single book—but several prominent good and bad times can provide a basis for understanding what makes times good and bad. To develop this understanding requires us to address issues of connections and meaning; it requires us to develop a better understanding of the relationship between how rapidly time seems to pass and the quality of the experiences associated with different speeds of those passings, the received wisdom about this association requiring significant revision. Such an understand-



ing requires us to learn about not just the need to let go, but how to move on; and in the final analysis, we must recognize the choices we often make unknowingly, lest all our days become infamous. All of this we shall do and more as we proceed through this chapter, beginning with the paradox about the best and worst of times.

THE IRON LAW OF COUNCIL

Nearly a century ago Robert Michels forged the Iron Law of Oligarchy: "Who says organization, says oligarchy" (Michels 1962, p. 365). But the tendency for those in power to maintain that power is not the only regularity in organizational life. Another phenomenon pervades organizations, perhaps even more universally than oligarchic tendencies, and it suggests the need for social science's foundry to forge another law, the Iron Law of Council: Who says organizations, says meetings.

As ubiquitous as any organizational activity, meetings could even define organizations themselves—as open-ended meetings—if one grants a little conceptual license. Without pursuing that thought further, one can still note how meetings permeate organizational activity regardless of whether that observation is based on personal experience or formal research. For example, Henry Mintzberg studied five chief executives and found they spent 59 percent of their days in meetings, 69 percent if unscheduled meetings are counted (1973, pp. 39–41). But personal experience makes abundantly clear that one does not have to be a CEO to encounter meetings. So it is surprising that so little research has been conducted on meetings (Schwartzman 1986), because as a noncontrived, naturally occurring organizational activity, the meeting would seem to provide an ideal laboratory for small-group research. Perhaps meetings have gone unstudied because they seem to be an ordinary, everyday phenomenon, one too mundane to generate much interest, let alone great passion.

So my colleagues Daniel Turban and Mary Sue Love and I were taken completely offguard when our research on meetings generated not just a Warholian fifteen minutes of fame, but several years' worth, and counting. We thought we had done something creative, something that would generate a modest interest within organization science circles, but the thought that the press, let alone the world press, would have any interest never crossed our minds—until I was asked whether I thought any of my research might be of

interest to the general public, research that my university's media relations office could publicize.

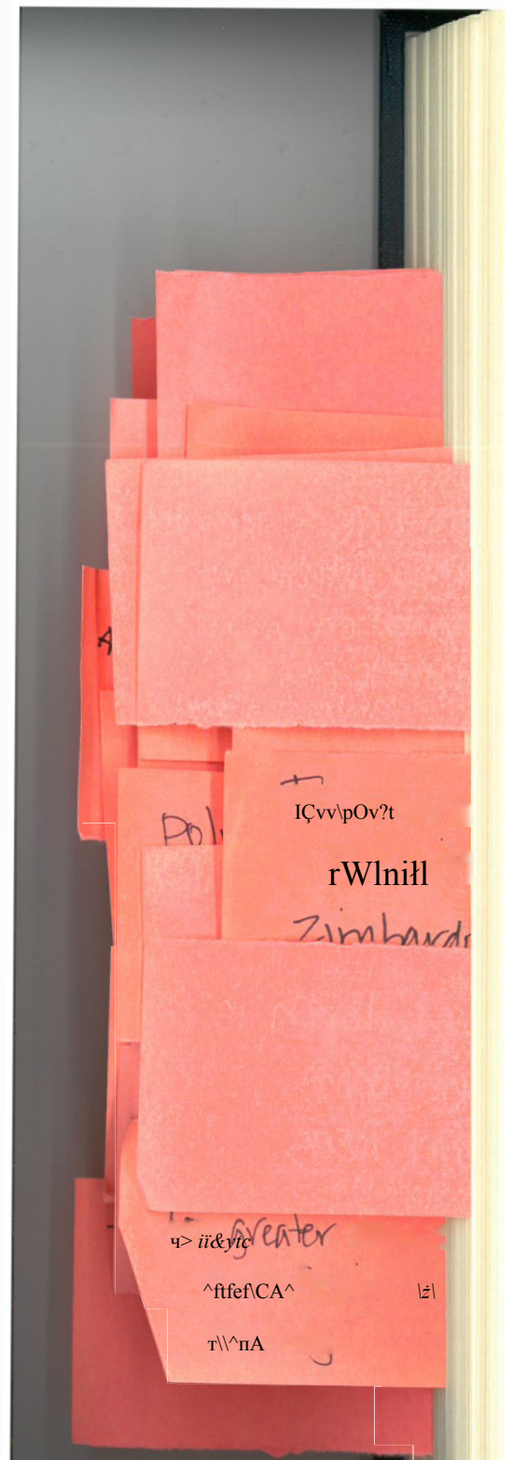
As I inventoried the various projects I was involved with, I was drawn to the meeting project because its novelty seemed like something the general public might find both easily understandable and interesting. That and the fact that the manuscript reporting the research seemed close to acceptance by a major journal led me to answer the inquiry with a description of the research.

Shortly thereafter the *Journal of Applied Psychology* accepted the manuscript for publication, the university's office of media relations interviewed me and issued a press release about the research—and my phone started ringing. A story appeared in the Science Times section of the *New York Times*, and I was interviewed on the BBC—twice.[1] What had we done that generated such attention?

We asked people to stand during their meetings. And we compared those meetings with more traditional meetings in which people sat around a table. More specifically, we had 555 students from an undergraduate management course form III five-member groups. Randomly assigned to the stand-up or sit-down conditions, each of these groups held a meeting to solve the same problem, a problem requiring at least moderate amounts of judgment and creativity, but a problem for which the quality of solutions could be evaluated quantitatively and objectively.[2] The same meeting rooms were used for both conditions (each group met by itself), but all of the furniture was removed from the rooms beforehand when groups were assigned to the stand-up condition; for the sit-down meetings, the furniture consisted of a table and five chairs (see Bluedorn, Turban, and Love 1999, for details).

Why did we do this? We conducted this experiment because advice proffered in the time management literature directed managers to increase meeting speed by having participants stand throughout the meeting (e.g., LeBoeuf 1979, p. 159; Mackenzie 1972, pp. 102-3; Reynolds and Tramei 1979, p. 117). But this advice made no allowance for whether decisions would be made during the meeting or whether the meetings would just be used to give instructions and pass on information. We were *sure* that if the meetings were used to make decisions, the decisions would be better if they were made in the sit-down condition because the participants would take more time and—we thought—more carefully consider information relevant to the decision.

Thus when we examined our results we were flabbergasted, because there was no statistically significant difference between the average quality of the de-



cisions produced in the two conditions. On average, the fifty-six groups in the stand-up meetings produced decisions that were just as good as those produced by the fifty-five groups that conducted their meetings in the traditional sit-down posture. This finding was so contrary to our expectations that we re-checked and re-rechecked our data and records and analyses, but the original results were correct. Even though the sit-down meetings took significantly longer on average—34 percent longer—than their stand-up counterparts, there was no average difference in quality between the two conditions. So our results supported the stand-up imperative given in the time management literature, which is a likely reason the press took such an interest in the study. Had we found what we expected to find, I suspect the press would have ignored the study.

But we had produced results supporting a way to reduce the length of meetings without harming an important and widespread instrumental meeting function, decision making. The reaction our study received as well as the manifest discussions in the time management literature both suggest that people want fewer meetings, and of the meetings they have, they want them to be shorter. A naive scientific management interpretation of this motivation would be that people desire more efficient operations, but one knows that would just be a rationalization. The real reason is more basic, that within organizational life for much of the last century, people have developed an aversion to meetings. They hate them. And the question is, why?

It seems unlikely that hominids innately dislike meetings. After all, much of the several million years of hominid history has involved meetinglike gatherings, from the daytime foraging expeditions to hunt for and gather food, to meals themselves, to the several hours spent together at dusk and into the early evening before sleep would come. So it is doubtful that hominids, including the contemporary model, are genetically hardwired to abhor meetings; if anything, just the opposite may be true. And this suggests there may be something wrong with meetings in organizations, rather than with meetings generally, that makes them so repugnant to most participants, that makes the Iron Law of Council a description of some of the worst of times.

What makes the meetings in organizations so infamous?[3] There are likely several reasons, and I suspect the smaller the group having the meeting, the less salient these reasons become, but reflecting on my own experience and my perceptions of others' experiences, I believe there are at least three factors involved in our distaste for the organizational meeting.

The first factor is the agenda. The purpose of the meeting is usually someone else's, which means the meeting may not be relevant to the goals of most participants—at least as they perceive them. This combines with the second factor, that employees of the organization are expected to do certain things and are often rewarded symbolically and tangibly according to how well they do them. Put these two factors together and one has a prescription for frustration when it comes to meetings. People believe they are rewarded for performing certain tasks, and they often are, but along comes an activity, one for which they will not be rewarded for taking part in—or for at least being physically present—but for which they may be punished if they do not attend. The meeting and its specific agenda items may have little if anything to do with participants' agendas, personal or professional, yet attendance is required. From the participants' perspective this makes the meeting, or at least major portions of it, increasingly frustrating because it seems like wasted time, time people would rather be devoting to activities that promise either greater personal fulfillment or progress toward greater extrinsic rewards. The combination of working on someone else's agenda at the expense of one's own is not a prospect designed to generate enthusiasm.

What may be involved in all of this is a third factor, locus of control. Locus of control refers to an individual's general beliefs about the factors responsible for events, and the most general distinction is between factors under the individual's control, internal, and beyond the individual's control, external (Rotter 1966, p. 1). As just described, the organizational meeting tends to be beyond the individual's control (i.e., someone else's agenda), thus making it largely a set of forces to which the participants must succumb, but a set of forces over which they have little or no influence. The meeting puts most participants in an external locus of control field, which contrasts with most of their regular organizational activities, activities that are likely to be seen as more under the individual's control, hence as involving more internal locus of control than the typical organizational meeting. This contrast in locus-of-control balance is likely to make the meeting seem even more frustrating because the typical attendee often feels powerless in such circumstances.

Consistent with the perception and reality of an external locus of control in meetings is Karl Weick's description of at least some meetings as proceeding with "autocratic leadership, norms that encourage obedience, unwillingness to risk embarrassment by disagreeing with superiors" (1995, p. 186). Ironically,

Weick argued that "people need to meet more often" (p. 185), at least about certain types of issues, but such meetings will not work well if they are conducted the way he described them as typically being conducted (i.e., with "autocratic leadership" and so forth). So Weick, as so many others, recognized a major problem with meetings in organizations, and he identified some meeting processes as candidates for change.

Meetings clearly are not the best of times, far from it, but it would seem that they could be made better times, or at least more palatable times. Interestingly, the type of issues about which Weick felt "people need to meet more often" are the issues of ambiguity, the ones about which clarity is lacking and sense-making is required (see Weick 1995, pp. 185-87). Making sense of something is, of course, either to give it meaning or to alter its meaning, and the meanings of things and events, as we shall see again, come from their connections with other things and events. These connections, hence meanings, make times good or bad.

CONNECTIONS WITH MEANING

The discussions of meaning in Chapters 2 and 5 established the basic premise that significance, hence meaning, originates in the connections among things, requiring, in Whitehead's phrase, "a knowledge of their [things'] relations" (Whitehead 1925a, p. 12). But for the human experience of time, what kind of connections are involved? The answer is likely narrative connections.

Narrative

A narrative consists of three essential elements: past events, story elements, and a temporal ordering (Maines 1993, p. 21). According to Jeffrey Bridger, constructing the plot, which helps create story elements (Maines 1993, p. 21), may be the most important of the narrative tasks because it transforms the events from at most "a chronicle," a list of events arranged in sequence, "into a temporal whole," for he concluded, "A singular occurrence is not particularly meaningful; events take on meaning to the extent that they contribute to the development of the plot" (Bridger 1994, p. 605). So when your companions ask you, "What is your point?" they are asking you to connect your thought or idea to other thoughts and ideas, ones they hope to find relevant (i.e., other thoughts and ideas with which they are connected). Your companions

want to know other elements of the story, especially as those elements relate to their stories.

These conclusions reinforce Whitehead's views about significance by emphasizing the point that an event has meaning only when it is linked to a plot or story, that is, to a greater whole. This is very similar to the concept of temporal context, which Joel Bennett used in his analysis of intimacy in human relationships. Bennett referred to this context as "the dynamic weaving of events, interactions, situations, and phases that comprise those relationships" (2000, p. 27), the dynamic weaving of events, interactions, and situations being very similar to narrative.

So taken together, Whitehead's, Bennett's, and Bridgers' conclusions indicate that events and things must be related to other events and things to give them meaning, and this meaning increases if the relationships form a coherent whole that provides an ongoing interpretation, a story with a plot. Without relationships there can be no plot, and without a plot there can be no meaning. And without meaning what can be hoped for in the way of experience? Friedrich Nietzsche stated this point differently but so very well: "If we have our own *why* of fife, we shall get along with almost any *how"* (Nietzsche's emphases; 1968, p. 468).

And as the literature on alienation suggests, when why is connected to how, all of experience becomes more meaningful.

Meaning and Alienation

Melvin Seeman distinguished several forms of alienation, one of which—meaninglessness—refers to the lack of meaning, the lack of understanding of the events in which the individual is engaged (1959, p. 786). Although Seeman explained how the different forms of alienation were conceptually distinct, he also suggested their empirical connections and described how they might be related to each other. Hence the lack of meaning, the inability to understand events—especially those in which one directly participates—is likely to make it harder to control them (powerlessness), a point at the heart of. a famous statement made by Kurt Lewin, only the final clause of which is usually given:

> Many psychologists working today in an applied field are keenly aware of the need for close cooperation between theoretical and applied psychology. This can be accomplished in psychology, as it has been accomplished in physics, if

> the theorist does not look toward applied problems with highbrow aversion or with a fear of social problems, and if the applied psychologist realizes that there is nothing so practical as a good theory. (Lewin 1951, p. 169)[4]

Lewin's famous final clause, "there is nothing so practical as a good theory," means that understanding (theory) can guide useful action (the practical), so theory (understanding) can be empowering. A lack of meaning and understanding of events also makes it very hard to know what one *should* do (normlessness or anomie), because it is nearly impossible to know what to do in a situation if one cannot comprehend it. Lack of meaning is also involved when an individual does not value goals or beliefs held by the larger group and experiences isolation from that group. The lack of meaning in this case results literally from the lack of connection between the individual and the group. In the final form of alienation Seeman identified—self-estrangement—individuals engage in behavior because of rewards they will receive for performing it, not because the individual achieves intrinsic satisfaction from the behavior. Here, too, the agency of connections is in play, for when self-estrangement occurs, the connections between individual and behavior become indirect because the reward is distinct and separate from the behavior itself. The behavior comes first, the reward later.

Although one could plausibly argue that each form of alienation can and probably does influence the others, connection-engendered meaning is given the central part in this analysis; and it is given the central part because of the fundamental social science and linguistic principles presented in Chapter 1. Put succinctly, these principles indicate that the definition of the situation guides human behavior, and according to the Sapir-Whorf Hypothesis, language is a necessary prerequisite for defining any situation (see Chapter 1). Language provides the elements from which meaning is constructed—the names of things and their qualities and the manner in which they may be related—and the definition of the situation combines these elements to construct sense-making explanations of events, definitions of the situation. Both the definition of the situation and the Sapir-Whorf Hypothesis are about meaning first, not power and control, not what should be done, not about contingent rewards. Sometimes such matters are directly linked, even simultaneously so, but until the basic "is" of the situation is defined, the questions "What should I do?" "How can I influence things?" and "What's in it for me?" are impossible to answer. So connections and the meaning they generate are funda-

mental, which is why the loss of meaning is so troubling—the systematic loss of meaning even more so. And to illustrate the fundamental temporality of connections, hence of meaning, two topics discussed in Chapters 4 and 5, respectively, will be examined in this light: speed and temporal depth.

Speed

Americans value speed, and at least at the level of surface values regard it as a general good. So if fast is good, faster is better. If not, how else could "Do everything faster!" (Cottrell and Layton 2000, p. 34) have been unabashedly offered as time management advice? The prescription is for everything, not just the right things, or judiciously selected candidates for acceleration, but *everything*. This belief in the unlimited virtues of acceleration does have a connection, and that connection is to efficiency, a connection and matter discussed in Chapter 4, but for now, finding other connections, hence meaning, for the belief that speed is a general virtue is difficult, but not impossible.

For example, the idea of entrainment presented in Chapter 6—the adjustment of the pace or cycle of an activity to match or synchronize with that of another activity (Ancona and Chong 1996, p. 253)—does suggest a reason why faster could be better, but it also suggests that faster could be worse. To match the pace of another activity might mean increasing speed if the other activity is moving at a faster pace. But what if the activity one wishes to match is moving *slower*? To speed up in such a situation would decrease the match, making things worse from the perspective of matching the two activities. Deborah Ancona and Chee-Leong Chong (1996, pp. 262-63) provided an example of just such a problem in the case of several Japanese computer companies whose rate of innovation was faster than that desired by the market—so the companies needed to slow down. The companies certainly did not need to accelerate. So what at first might have seemed like a confirmation of the acceleration imperative illustrates instead the contingent nature of speed and its connections to desired and undesired outcomes.

And the *contingent* nature of speed may be more widely realized than pronouncements like "Do everything faster!" indicate, even in the United States. James Gleick certainly seemed ambivalent about speed in his book *Faster*, at one point noting that, at least in some physical activities such as races, "Statistical trends over time suggest that we are, as a species, approaching asymptotically a true maximum speed" (1999, p. 109). If so, at some point doing every-

thing faster becomes impossible in any meaningful way. It is noteworthy that Gleick made this statement in the same chapter in which he described and questioned the premise that intelligent brains are faster (1999, p. 113). He presented his overall conclusion about this premise by quoting Robert Sternberg: "If anything, the essence of intelligence would seem to be in knowing when to think and act quickly, and knowing when to think and act slowly" (quoted in Gleick 1999, p. 114). This, as the entrainment phenomenon and examples illustrate, supports the contingency view of speed, that the appropriate speed varies by activity and context. There is no universally best speed, and faster is not always better. In fact, it is often worse.

Even in the speed-oriented United States, people seem to recognize this at deeper levels. For example, D. Lynne Persing's (1992) results indicate that the participants in her experiment recognized that faster was not always better (see Chapter 6 for a detailed description of her experiment). Her results indicate this because the participants rated the quality of identical work as worse when they were given information that the work was done in shorter amounts of time than when it was done over a longer time.[5] A reasonable interpretation is that taking more time, hence working at a slower pace, was believed to produce better-quality results. The message would seem to be that speed is more positively meaningful when the right speed is selected, "knowing when to think and act quickly, and knowing when to think and act slowly." Otherwise speed tends toward the meaningless, or at least loses its potential for positive meaning. Like the driver who weaves back and forth between lanes, passing cars right and left but gaining only thirty or forty feet on the traffic flow by the next stoplight, greater speed for its own sake is a fast track to nowhere. For meaning, especially positive meaning, speed needs to be connected to things, some of which may be in either the past or the future.

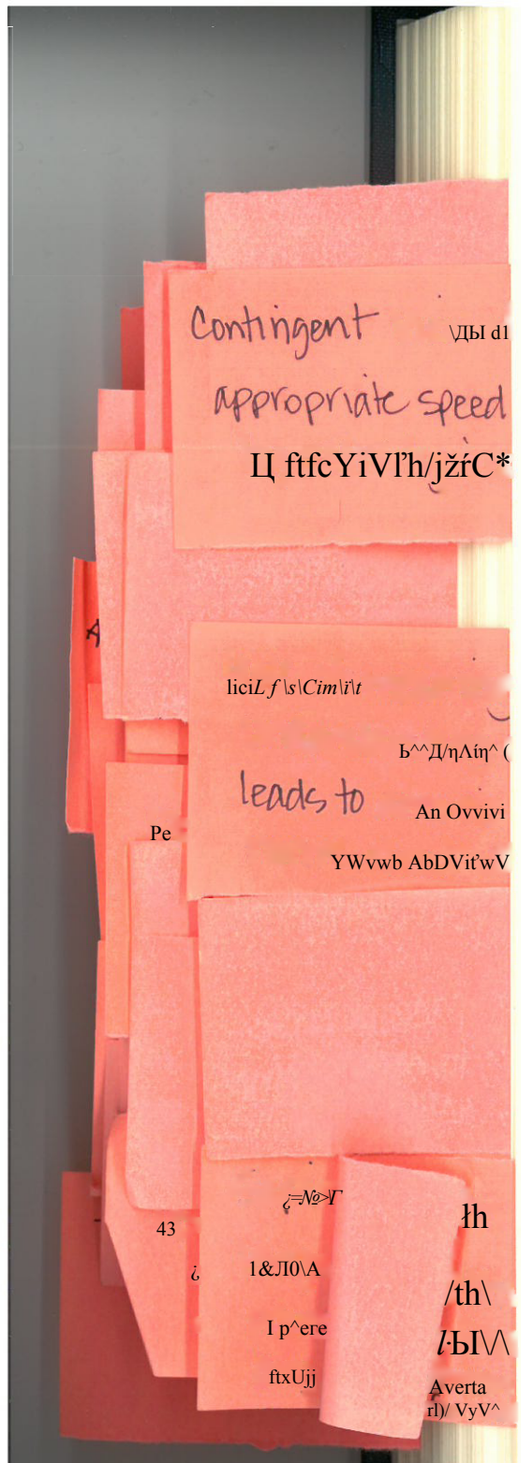
Temporal Depth

Connections to things in the past or the future involve questions of temporal depth, and as the discussion of temporal depth in Chapter 5 indicates, the number of things to be connected to may be shrinking because, at least in the United States, people's temporal-depth intervals maybe getting smaller. Temporal depth has two general components, past and future (see Chapter 5), and connections can be made with elements in both components. But as mentioned, temporal depth may have shrunk and become quite shallow. If true,

this is important because it limits the distance fore and aft that people can search when they try to make connections, when they search for meaning. A shallower temporal depth provides fewer possibilities.

But how do connections with elements in the past or future provide meaning, regardless of how far away they may be temporally? In Chapter 21 quoted Quy Nguyen Huy about the relationship between the past and the present, and that quotation bears repeating here: "Since one cannot distinguish a figure without a background, the present does not *meaningfully* exist without a past" (emphasis added; 2001, p. 608). As the background, the past provides a benchmark for the present against which comparisons can be made. And such comparisons indicate whether the present is the same as the past or different from it. Edmund Husserl has described the nature of this relationship between the past and present by analyzing what makes a sequence of musical notes form a melody, an important part of which is "a direct apprehension of identity, similarity, and difference" (1964, p. 41). If the past appears to be the same as the present, then the interpretation and understanding of the past can simply be employed to interpret the present. But if the past and present differ, the question of how the differences developed helps interpret the present. Thus the past provides a context, a frame, for the present, and the linkages with the past provide an explanation for the present by suggesting how the present came to be, which makes the present more understandable, more meaningful. (See the discussion of the past as metaphor for the present and the future presented in Chapter 5.)

So connections to the past help make the present more meaningful, but connections to which past? As the data regarding temporal depth presented in Chapter 5 indicate (see Tables 5.1 and 5.2), people gravitate toward different temporal depths when they think about the past, and since none of them appeared to go much further into the past than twenty-five or thirty years, at least in that sample, the data also suggest that the totality of the human past is seldom used. People appear to establish a referent past, possibly referent pasts, to create plots that help explain the present. Exactly how this is done in organizational contexts and how such plots are used is just now beginning to be studied by researchers such as Ellen O'Connor (1998, 2000). Nevertheless, even such pioneering work indicates the past is used to interpret and understand the present, and at times to help anticipate the future and cope with it. But which past, which future?



Deep Connections

Gregory Benfords recent work indicates that modern organizations, and a significant portion of contemporary humanity in general, may be shortchanging themselves by looking into the past too shallowly. As discussed in Chapter 5, Benford identified one of the virtues of a deep-time perspective as an increased ability to detect trends, trends invisible when only shorter intervals are considered. Identifying such trends, almost by definition, establishes linkages between the past and the present, linkages that may confer even more meaning than the average linkage with the past because long-term trends somehow seem more powerful. They seem more powerful because they have withstood more rigorous tests of time; that is, by extending over longer intervals, they have been subject to more potentially disruptive influences but have been able to maintain themselves, which makes them a more credible force, a more credible explanation. And connections with deeper times seem involved in generating and maintaining profound meaning, the absence of which Benford was insightfully aware: "Whipsawed by incessant, accelerating change, the modern mind lives in a fundamental anxiety about the passing of all referents, the loss of meaning" (Benford 1999, p. 3). And, "When hatred and technology can slaughter millions in months or even minutes, such terrors deprive life of that quality made scarce and most precious to the modern mind: meaning" (p. 204).

The loss of meaning is a contemporary dilemma—Benford and I are certainly not the only analysts to discuss it—and the two Benford statements support the idea that meaning is lost as connections are severed. At a minimum, severing connections alters meaning, and when enough are severed—the possibility of slaughtering millions in a few minutes—meaning may disappear entirely.

Hence Benford concluded, "A yearning for connection also explains why ancestor worship appears in so many cultures; one enters into a sense of progression, expecting to be included eventually in the company" (1999, p. 3). The idea of progression in the phrase "a sense of progression" is a form of trend, and being "included eventually in the company" is a form of profound connection with a larger segment of humanity, be that segment a literal company, a profession, a tribe, a country, or even humanity's complete family tree back to the earliest hominids—or before. (Miriam Makeba revealed a similar perspective in her descriptions of her people's relationships with their ancestors

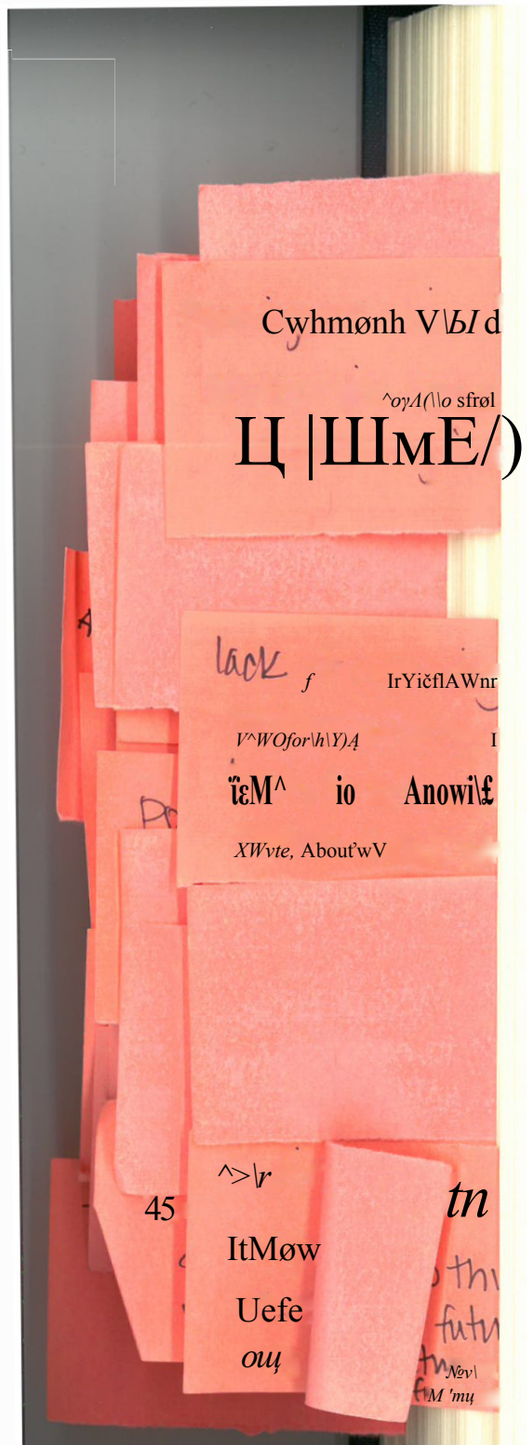
and the relationships among past, present, and future; see Chapter 5.) To sever or ignore the possibility of such connections forfeits much of the possibility for meaning in modern life. And when combined with an equal disconnect from the future, little meaning is left, because, as Benford suggests, "I suspect that deep within us lies a need for continuity of the human enterprise, perhaps to offset our own mortality" (1999, p. 3).

No one enjoys thinking about the prospect of one's own death. Yet in the age of nuclear and biological warfare, contemplating the end of humanity is even worse. But why? We inevitably die as individuals in any case, so why does the thought of us all dying together seem worse? Benfords analysis explains why this prospect, the end of humanity, is so depressing. It is so depressing because it would remove so much meaning from one's own life by eliminating any possibility of a deep-time connection with the future, and as described earlier, these connections across deep time seem so very profound.

This is why Mary Leakey's interpretation of the trail of hominid footprints from nearly 4 million years ago is so moving to us today (see Chapter 2). Without it, the trail of footprints is reduced to merely an important archaeological relic; but with it, a much deeper connection is created between us and them: These were beings with whom we shared common feelings, with whom we shared a common humanity. And that such a connection can bridge a gap of 4 million years makes the connection that much more profound, which is what deep-time connections do: "Deep time in its panoramas redeems this lack [of meaning], rendering the human prospect again large and portentous. We gain stature alongside such enormities" (Benford 1999, p. 204). We gain stature, but only if we connect with such deep-time enormities.

Because Benfords work on deep time proved so insightful to me, I wanted to learn more. So I secured an introduction and asked if I could visit him to discuss deep time.[6] He graciously accepted my request, and I flew out to visit him in his physics department office at the University of California-Irvine. We spent a marvelous four hours together—I think he was slightly amazed that someone would travel across half a continent to discuss time for a few hours, but then, all times are not the same!—and I gained several insights that had not been covered in his book.[7] An especially germane point about connections with the deep future arose in the discussion, which I present now:

> *Benford*: Fundamentally, I mean deep time to be the scale upon which there is no ensured continuity of human culture—of a particular culture. And there-



fore the very context or meaning in your life is lost. That seems to be the working definition of the time scale that produces, shall we say, the most anxiety. Because it's beyond the loss of fife for a person; it is beyond the scale of a century. It's the loss of life of any society that anyone could know or fathom. It's the time scale in which you have to worry about issues of meaning in a very general sense.

Bluedorn·. Not only will I be gone, but I won't be remembered and my work will have gone for nothing.

Benford: Exactly.

Meaning is lost when there is, in the case of the future, an anticipated loss of continuity—going too far ahead to where too many things have changed, where too few things, perhaps nothing, will be familiar. (This could happen with the past too.) And the loss of meaning owing to missing connections with either the past or the future, and especially the deep past and the deep future, creates a present that is one of the worst of times. Henry Wadsworth Longfellow captured the importance of connecting with this great continuity in this stanza from his poem *A Psalm of Life*·.

Lives of great men all remind us
We can make our fives sublime,
And, departing, leave behind us
Footprints on the sands of time.

(Longfellow 1883, p. 13)

Following the arguments about connections and meaning, our fives become sublime when we make more connections with the sands of time, both the strata laid down before us and the sands yet to come. By doing so, our present becomes at least a better time. But we also have beliefs about what leads to the best and worst of times, beliefs that have been accepted uncritically, and these beliefs require closer examination, lest they lead us to worse times when we think we are heading for better.

THE TEMPORAL QUALITY OF EXPERIENCE

A resident of Missouri once asked me whether I would like to hear a story, which he then told me. This is that story:

A patient was visiting a doctor to receive the results of several important tests, and the doctor began the conversation by saying, "I'm afraid that I have some very bad news. The tests indicate that you have only six months left to five."

The patient exclaimed, "That's terrible! Isn't there anything you can do?"

The doctor replied, "I'm sorry, but your condition is something medical science has no cure for right now. However, I have one suggestion that might help."

The patient looked up hopefully and asked, "What's that?"

The doctor answered, "Move to Kansas."

Puzzled, the patient inquired, "Why? How would that help?"

The doctor explained, "You won't five any longer; but it will seem like forever."[8]

We laugh at this joke because of something we believe about time and how we perceive its passage: that time seems to pass quickly while we are experiencing something pleasant and that it seems to pass slowly while we are experiencing something unpleasant. And we have held this belief for a long time. In the year 105, Pliny the Younger wrote, "*nam tanto brevius omne quanto felicius tempus* (the happier the time the shorter it seems)" (1969, pp. 36-37). Nineteen centuries later people say it differently, "Time flies when you're having a good time," but it is exactly the same idea as Pliny's, and though unstated it also implies that the sadder the time the longer it seems, that time drags when you're having a bad time. We believe this uncritically for at least two reasons. First, this has been accepted wisdom for a long time, sometimes even buttressed with evidence from experiments (e.g., Gupta and Cummings 1986). Second, we can all think of times when we have experienced exactly what the accepted wisdom tells us, which seems to confirm these axioms once again.

But these beliefs are not axioms, at least not all of the time, because they only partially describe the relationship between the pleasantness of the experience and the perceived passage of time. For at other times unpleasant experiences seem to pass quickly, whereas pleasant ones may seem to linger. These are the findings reported by Michael Flaherty based on data from 705 descriptions of situations in which time seemed to pass so slowly that the difference was noticeable to the individual involved in the situation (1999, p. 41). Some of these situations were pleasant, others unpleasant. Flaherty also reported accounts of situations that appeared to participants to pass more quickly than normal, but that also consisted of both pleasant and unpleasant experiences.

A New Theory of the Perceived Passage of Time

Flaherty (1999) wanted to discover the determinants of the perceived passage of time, which made the relationship between pleasantness of the experience and the perceived speed of time an important secondary issue for him rather than his primary concern. And his work on the perceived passage of time appears to have produced a theoretical breakthrough, one that moves well beyond the thinking on this issue that goes back at least as far as William James's conclusions: *"In general, a timefilled with varied and interesting experiences seems short in passing, but long as we look back. On the other hand, a tract of time empty of experiences seems long in passing, but in retrospect short*" (James's emphases; 1918, p. 624). And not only does it move beyond James, it appears to advance beyond more contemporary theories as well (e.g., Hogan 1975; Ornstein 1997).

Flaherty's data and theory indicate that rather than the amount and nature of the objective experiences in a situation, what makes time seem to pass extra slowly or quickly is *the extent to which the individual engages in conscious information processing during the time.* When the amount of conscious information processing is about average for the individual, the individual experiences time as passing at what that individual has come to perceive as the usual rate, but when the amount of such processing is high, time appears to slow down (protracted duration); when such information processing is low, time appears to speed up (temporal compression) (Flaherty 1999, pp. 84-114). Using this model, Flaherty accounted for several paradoxes about the perceived passage of time, and he also interpreted, perhaps explained, Mihály Csikszentmihalyi's (1975, 1990) findings about the optimal state of personal experience (one of the best of times), the state described as *flow*.

One wonders whether the flow experience, which is very pleasing because it is, after all, "optimal experience" (Csikszentmihalyi 1990, p. 39), might be responsible for why the time-flies-while-you-are-having-a-good-time maxim has been accepted so readily and been believed for so long. Because when one is experiencing flow, one is experiencing, perhaps, the best of times; and while experiencing flow, "in general, most people report that time seems to pass much faster" (Csikszentmihalyi 1990, p. 66). During flow people are having a good time—this phrase trivializes what is actually a profoundly positive experience—and for them time flies. This type of experience, being quite powerful

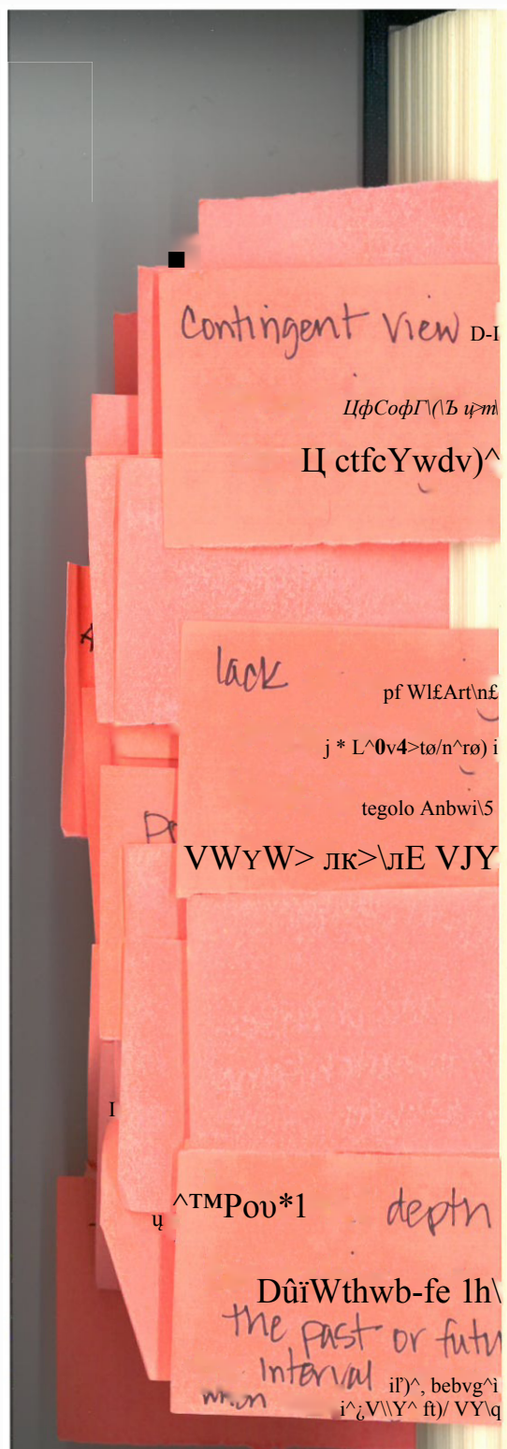
and memorable, may be what people are thinking of when they hear or say that time flies while one is having a good time.

Csikszentmihalyi does indicate that "occasionally" during flow the reverse occurs, what Flaherty calls protracted duration, and time seems to pass more slowly. But the example Csikszentmihalyi used, of ballet dancers describing decelerated time while performing "a difficult turn" (1990, p. 66), might actually be a brief break in the flow. This is because the "difficult" in the description of the turn suggests they would significantly increase the amount of their conscious information processing, which according to Flaherty's theory would produce a perception of protracted duration. And this, of course, is the perception of time's passage that Csikszentmihalyi was describing as occurring *occasionally* during flow.

The explanatory power of Flaherty's theory stems from the concept of cognitive information processing. As used in his theory it includes a wide array of cognitive activities, including the level of cognitive involvement with the self and the situation, and the individual's emotional activation and involvement, especially about one's ability to deal with the situation (Flaherty 1999, 84-114).[9]

For example, as I will recount in greater detail later in the chapter, I was once so overcome with emotion—a combination of profound sorrow and grief—in front of a large lecture class that I could not speak for what seemed like a long time, an uncomfortably long time. And given Flaherty's theory, I am sure that the length of time seemed longer to me than the amount of time that had passed on my watch. I believe the reasons for this are (1) the intensity of my emotions took me by surprise; (2) to some extent things seemed to be out of control, which generated even more emotional engagement, in this case a combination of anxiety and embarrassment; and (3) my mind was racing to find a "solution" (i.e., What should I do now?), something other than simply not talking. Without forcing it, this example fits very well—high cognitive involvement with myself (i.e., What's going on?), strong emotional activation (i.e., the original emotions of grief and sorrow combined with anxiety and embarrassment), and of course concern about my ability to find a solution. All of this produced an experience of protracted duration, the perception that more time had passed than really had, because the amount of conscious cognitive processing abruptly shifted to a much higher level.[10]

I could not manage this situation completely at the level of automatic processing (Ashcraft 1989, pp. 67-70)—because, among other reasons, I care about



the classroom experience for both myself and my students. But if I had not cared about such experiences, the protracted duration I experienced might have been less severe or might not have occurred at all. Why? Because if I had not cared, my inability to speak would not have generated as much concern, and though unexpected, the surprise would have been less salient, and my indifference would have resulted in little or no search for a solution. According to Flaherty's model all of this should result in a perception of time passing normally (or closer to it) rather than at a slower pace. So it is the individual's involvement with the situation, not the objective situation alone, that determines one's perception of time passing.

What happened to me in front of that class bears a striking similarity to other situations in which people often experience protracted duration. The prisoner whose sentence spans decades, the recently widowed woman, the soldier isolated in a foxhole, the patient with a long-term illness, all of these frequently experience protracted duration, and of course, all of these are generally unpleasant experiences too, bad times (see, respectively, Brown 1998; Lopata 1986, p. 705; Ambrose 1997, P· ²&²> ᵃⁿᶜ^ Charmaz 1991, pp. 87-93).[11] Notably, severed connections are a common element in all of these situations, and in these cases the connections severed are those with other people. Even my example is a case of severed connections, for by not talking I had severed what were at least my usual connections with my class. But sometimes connections need to be severed to end the worst of times. Sometimes closure is required.

Closure

Dante placed an ominous sign above the Gate of Hell, the concluding statement on which is the most famous: "ABANDON EVERY HOPE, WHO ENTER HERE" (Dante 1980, p. 22). The souls in Dante's Inferno received any manner of torture and abuse, but what made the time in hell so terrible was not whatever torture was being inflicted upon any of the souls there. What made hell so terrible was that the experience of it would never end. And the sign at the gate gave fair warning: "THROUGH ME THE WAY TO THE ETERNAL PAIN" (1980, p. 22).

But pain, be it in this life or after, makes the experience worse the longer it lasts. And in our lives, too, some pain seems unending, or beyond the hope of ending. Yet for some of these experiences, closure can reduce the pain, if not end it. An example, a collective example, of this occurred immediately after World War I.

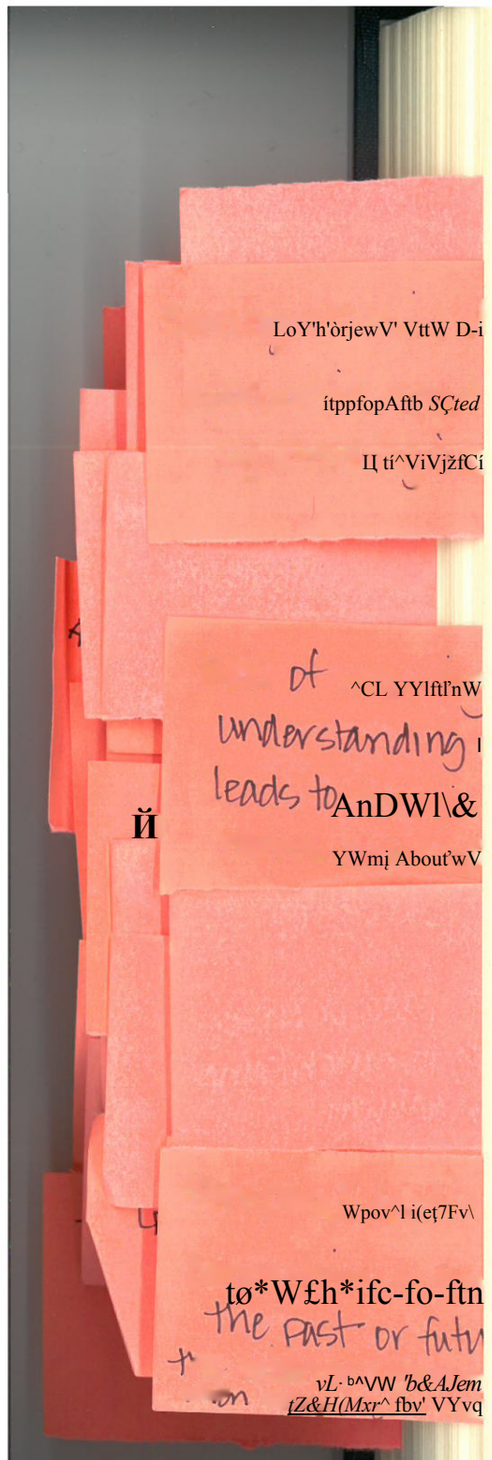
Hundred of thousands of soldiers had been killed during the war but had never been buried in marked graves. As a result, a War Graves Commission was established in England whose task was to locate and rebury such of these bodies as they could, providing proper identification when possible (Gilbert 1994, p. 528). Early on, two members of this commission, Henry Williams and commission head Fabian Ware, had an idea. The idea was to bury one of the unidentifiable soldiers in England to represent all of the vast numbers who had perished and lay in unknown graves. Thus was conceived the concept of the Unknown Solider, one of whom was buried in Westminster Abbey on November 11, 1920; another, in the Arc de Triomphe in Paris on the same day, at the same hour (Gilbert 1994, pp. 528-30).

Thus the unknown multitude would be honored, but honoring them was not the main reason for establishing such a memorial. Rather, the primary purpose for creating this institution was to provide solace for the living, for whom an Unknown Soldier's grave "could become a focal point of prayer and contemplation for the hundreds of thousands of parents, widows and children whose loved ones had no known grave" (Gilbert 1994, p. 528). For this was no lone soldier's grave; instead, "for every one of us who had his own dead could not fail to see that they too went with him; that, after two years of waiting, we could at last lay a wreath to the memory of that great company" (Lascelles as quoted in Gilbert 1994, p. 529). That "every one of us" included the parents, the widows, the children of all the unknown soldiers.

The world's Unknown Soldiers embody the worst of times, the memories of the terrible wars and the loved ones who perished in them. But they also connect to better times, to the release from unceasing grief that comes with laying "a wreath to the memory," which allows mourning to pass its course. And more, for connections to the deceased are maintained because the tangible memorial allows not only grieving but also the renewal of memories of better times when the deceased were alive.

But such combinations of the best and worst of times are not uniquely associated with Unknown Soldiers. They can be generated by other monuments too.

In 1989 my wife and I were in Washington, D.C., for a meeting, and during our stay we visited the Vietnam Memorial. As we walked into the memorial, I was struck by the quiet. The cacophony of traffic noise and people talking ended as if we had entered an oasis of stillness—intimating reverence. Only by listening carefully could one even hear the whispers.



Two of my wife's high school classmates had been killed in Vietnam, and she wanted to see their names on the monument. All of the names on the monument were listed in directories that resembled large telephone books. The directories identified which section of wall in the monument contained each individual's name. We found the names of her two classmates in the directories and walked to the appropriate sections of monument wall to see them. We read the names in the sections and came upon each classmate's name in turn. As we found one of the names, I happened to look at my wife. She was standing close to the wall, and her classmate's name was carved in it fairly high up, a foot or so above the level of her eyes. So she raised her hand above her head to the level of the name, tremulously pointed her index finger at it, and said simply, "Here."

It was a solemn moment, and we did not speak. Indeed, the only sounds were distant whispers accompanied by susurrant shoes on the summer sidewalks. I found the experience profoundly moving, but I did not realize then just how deeply it had affected me.

Several years later I tried to talk about the Vietnam Memorial in class. My reason for doing so was to use it as an example of a cultural artifact, one that genuinely connected to matters believed and valued by much of American society. I described the monument and then started to describe my wife pointing to her classmate's name on the wall—and I had to stop. That scene was just too poignant in my mind's eye. It produced too much emotion, and to regain control I stood silent before a class of three hundred students. The room fell silent too, for they understood what was happening, and all was silent for I am not sure how long. Eventually I regained my equilibrium, briefly explained that the story had been too moving for me to continue telling it, and moved on to other material.

The irony of this story is that to this day I know of no one whom I knew personally whose name is carved into that ebon stone. My connection is with people I never knew. It is indirect, through my wife. And because I shared in her moment of reconnection that summer afternoon, the monument became more meaningful to me, much more meaningful. And perhaps it helped me as well as others transcend a sense of grief and guilt over this tragedy that took place a generation ago. It may have brought some closure in that regard, but I also realize that I have never tried discussing that example in class again.

So perhaps the closure comes, not in the complete severing of connections

with events and people, but in changing the nature of the connections. Rather than a complete break in continuity, what closure means in cases involving grief and mourning is that one *phase* of the relationship or continuity has ended, and one has moved on to the next. So what has closed, come to an end, is one part of a sequence, moving from A to B or from B to C, not the end of the entire sequence. We cannot continue the same relationships with the dead that we experienced with them while they were living, but we can still maintain a different kind of relationship, albeit a one-way relationship, through memory, ceremony, and ritual. And the signal that one phase has ended its dominance is a crucial part in dealing with the grief and pain accompanying profound loss that leads the mourner into the next phase of the relationship. An example of such movement involved an entire country's relationship with a single individual, and it was described eloquently in the concluding three lines of Carl Sandburg's magnum opus about Abraham Lincoln:

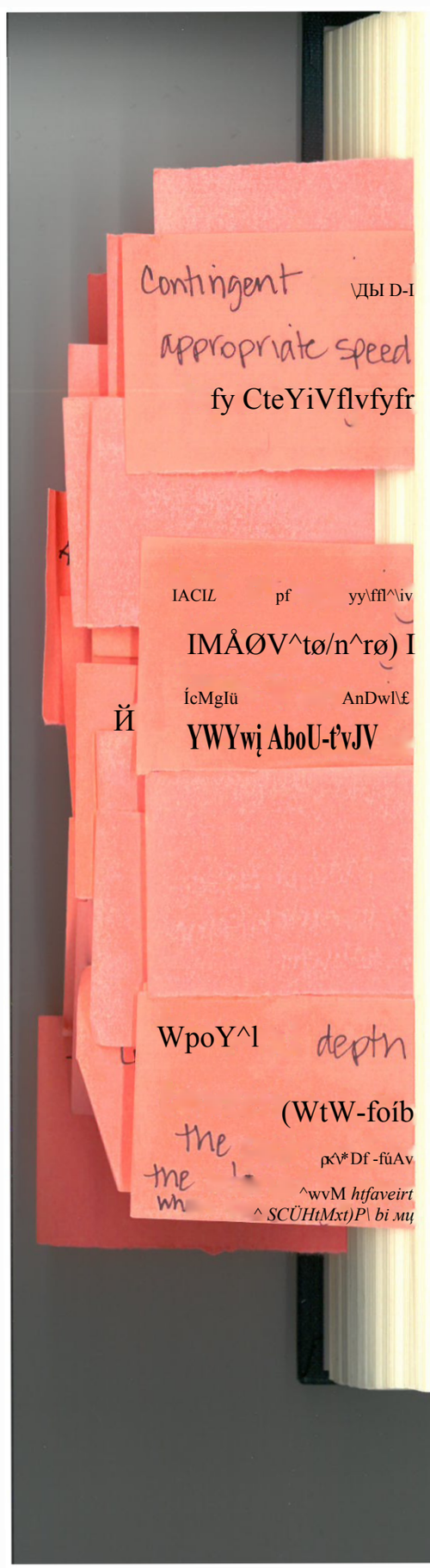
> And the night came with great quiet.
> And there was rest.
> The prairie years, the war years, were over.
>
> (Sandburg 1954, p. B95)

The country's association with Lincoln had not ended, but it had changed and entered a new phase. And just as this change in phase involved pain, as we shall see, changes in phase generally affect the experience of time—for better and for worse.

THE ESSENTIAL IMPORTANCE OF TIMING

Chapter 6 presented the concept of entrainment, describing it in some detail. Entrainment is about what people generally refer to as timing, the relationship between two or more streams of activity. Although Chapter 6 intimated a few possibilities about the consequences of entrainment, that chapter mainly considered the different forms that entrainment might take rather than the effects the different forms might produce. As will be seen here, the different forms produce different experiences.

To understand different forms of entrainment, the concept of phase-angle difference will be reviewed. As described in Chapter 6, phase-angle differences simply refer to whether the phases, the parts of one rhythmic pattern,

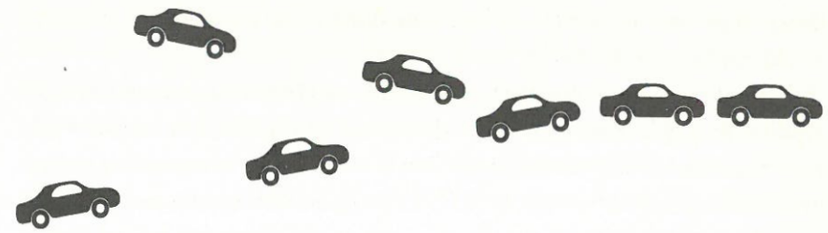


lag, precede, or coincide with those of another. So within Ancona and Chong's (1996) larger distinction between phase and tempo entrainment, lagging, preceding, and coincident phases identify three general categories of phase entrainment. Sometimes even just a simple dichotomy—coincident or noncoincident, in phase or out of phase—will be sufficient.

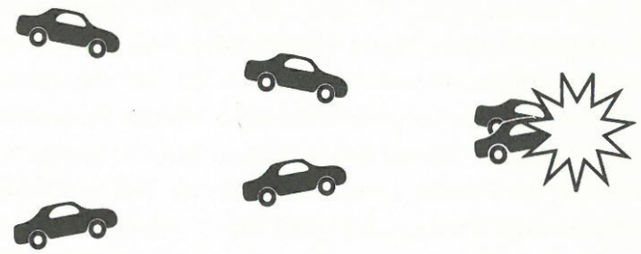
A Few Nearly Intuitive Examples

Every driver who has driven onto a modern interstate-style highway (a.k.a. freeway, tollway) has used an entrainment strategy—because the driver's life depended on it. And in this example, there is definitely a right and a wrong entrainment strategy. The right strategy is an out-of-phase one; the wrong strategy, one that is normally fatal, is an in-phase strategy. The two rhythms involved are (1) the flow of traffic on the highway and (2) the rhythm of the car being driven onto the highway, and each rhythm consists of two phases: (1) a vehicle-is-present phase and (2) a vehicle-is-absent phase (i.e., space). These two strategies are diagrammed in Figure 7.1. As Figure 7.1b indicates, the in-phase strategy produces a collision between vehicles, which at interstate highway speeds could easily result in the death of the people in either or both vehicles. The out-of-phase strategy illustrated in Figure 7.1a puts the merging car onto the highway safely because this strategy matches the merging vehicle with a vehicle-not-present phase (space) of the highway's traffic flow. Competent drivers recognize which strategy works and employ it daily. The point is that whichever entrainment strategy is used makes a huge difference for both the merging driver and other drivers on the highway.

Other entrainment strategies must be crafted for unique situations—millions of drivers use the out-of-phase merging strategy daily—but idiosyncratic strategies can be just as effective for the people involved as are those used by millions. An example is the entrainment strategy Kay Napier, vice president of Proctor and Gamble's North American pharmaceutical business, developed to deal with the chemotherapy and radiation treatments she was receiving for her breast cancer. To cope with the treatments in a way that would allow her to continue working, she scheduled the treatments for Wednesday evenings. The side effects from such treatments usually took over a day to develop, so taking the treatments on Wednesday evenings allowed her to work on Thursdays, and if the side effects did begin on Friday, Napier came to work a little late and dealt with the worst of the side effects on the weekends (details from Nelson 2001, p. Aí). This is a sobering, courageous example, but any of the other choices facing Kay Napier would have been sobering too.



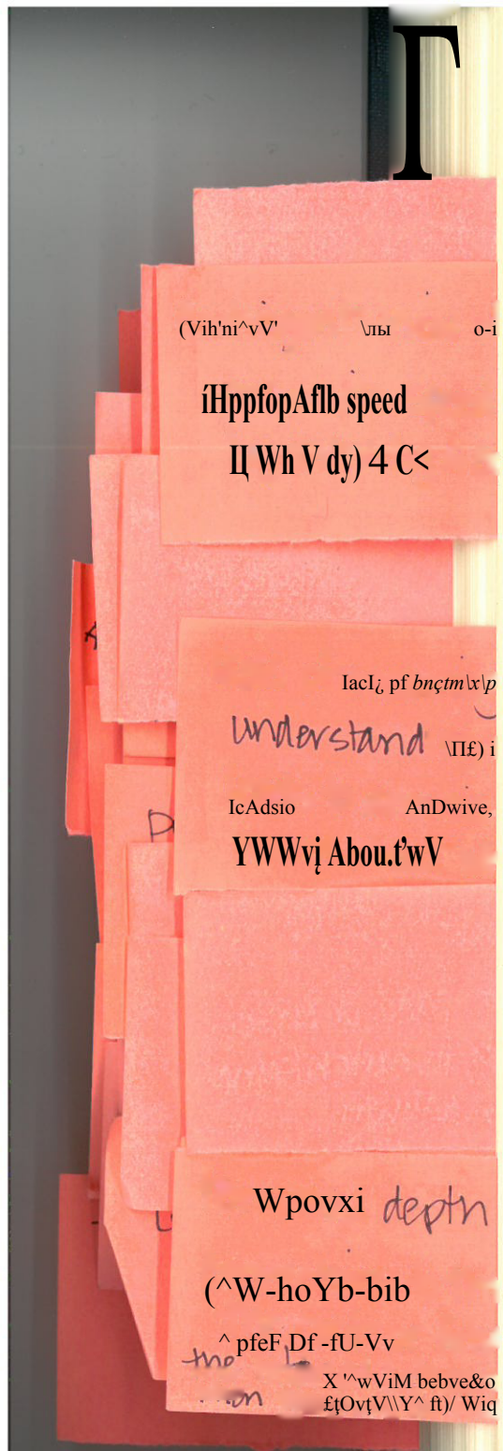
(a) Out-of-phase merging strategy



(b) In-phase merging strategy

FIGURE 7.1. Illustrations of out-of-phase and in-phase strategies for merging traffic flows

In terms of entrainment strategies, Kay Napier's was an out-of-phase strategy. An in-phase strategy would have had her taking the treatments on the weekend or earlier in the workweek, so she would have experienced the worst of the side effects during the workweek (side effects and work time in phase), likely making it impossible for her to continue working during that portion of the week. Her strategy was to time her treatments so that most of the side effects would occur after the workweek rather than during it (side effects and work time out of phase). The strategy was to have one rhythm, her pattern of side-effects-free and side-effects-present times, lag the pattern of workweek and nonworkweek cycles. Obviously this entrainment pattern did not result in an ideal life—life would have been unpleasant regardless of the strategy over the treatment period—but it did allow Kay Napier to continue doing many



things that were important to her, something other entrainment strategies would not have permitted her to do.

Both of these examples illustrate how out-of-phase entrainment strategies produce favorable outcomes, better times, and how in-phase strategies would have been disastrous. But this trend should not be taken to mean that out-of-phase strategies are always the best. Often in-phase entrainment strategies produce the more favorable outcomes. And one example concerns what is known as "morningness."

Morningness is the extent to which people prefer to do things in the morning rather than in the evening (Guthrie, Ash, and Bendapudi 1995). Carlia Smith, Christopher Reilly, and Karen Midkiff (1989) developed a questionnaire to measure morningness and used it to learn that students who were morning types reported that they preferred classes scheduled during the morning more than evening types and believed they performed better in classes that were scheduled during the morning. James Guthrie, Ronald Ash, and Venkat Bendapudi (1995) extended this research. In their large sample of 454 undergraduate students at a major Midwestern university, using Smith, Reilly, and Midkiff's morningness scale, they found that the students who were more oriented to the morning were indeed more likely to schedule courses in the morning, were more likely to study from 6 a.m. until noon, and were more likely to sleep during the intervals from 6 p.m. to midnight and from midnight to 6 a.m. In terms of performance, "students with a morning orientation fared significantly better in early morning classes than those with an evening orientation" (Guthrie, Ash, and Bendapudi 1995, p. 189).

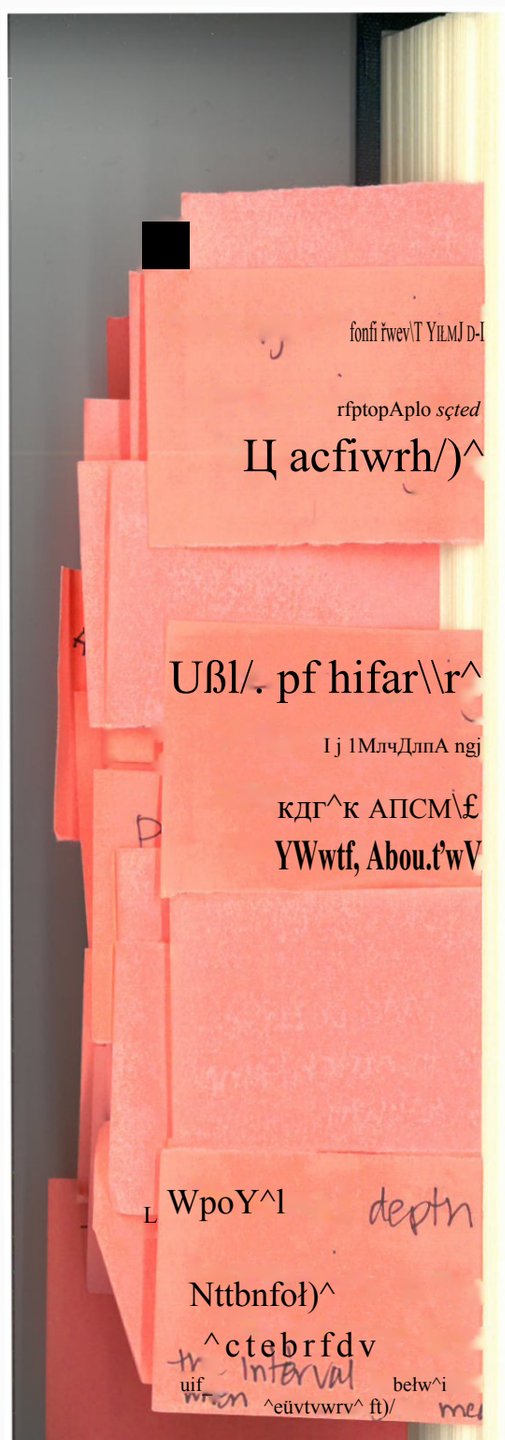
The data from both studies suggest that an in-phase strategy produced the best outcomes for morning-type students. These students preferred activities during the morning, and when they had the freedom to do so, scheduled their activities during the morning. Further, their performance during the early morning (i.e., in classes that began at 8:00 or 8:30 a.m.) tended to be better than that of their evening-oriented counterparts. In fact, evening-oriented students tended to do things later in the day and did better than their morning-oriented counterparts later in the day. Thus an in-phase strategy—scheduling activities when students preferred them—seemed to produce better results (for morning-oriented students, schedule activities during the morning; for evening-oriented students, schedule activities later in the day). Although these studies do not involve random samples of the general population, the quantitative

measures of performance allowed the researchers, especially Guthrie, Ash, and Bendapudi (1995), to rigorously examine the potential relationship between morningness and performance.

Studies of such relationships with performance and other outcomes have been conducted on shift work, and a considerable literature has developed regarding this phenomenon. Jon Pierce, John Newstrom, Randall Dunham, and Alison Barber (1989) conducted a major review of this research and, as will surprise no one, found many more negative effects of shift work than positive. Consistent with the argument about entrainment strategies presented in this discussion, Pierce et al. concluded about the negative effects of shift work, "These problems appear to be caused by the incompatibility of the nontraditional work hours with individual and community rhythms" (1989, p. 93). Indeed, Pierce et al. concluded, "the majority of worker problems occur when the worker is out of phase with either established physiological or social rhythms. But when there is harmony between the hours of work and the employee's physical and social rhythms, the level of adjustment predictably increases and the negative consequences associated with shift work [lessen]" (1989, pp. 101-2).

Although Pierce et al. did not use the entrainment concept explicitly, their explanations clearly fall into the entrainment frame (e.g., the phrases "out of phase" and "harmony"). Further, they used as an explanatory mechanism Muhammad Jamal's (1981, p. 536) suggestions about the importance of routine formation in employees' lives, a conclusion they then linked to rotating shifts, which Pierce et al. saw as making it "difficult for people to establish routines" and leading people to "experience a more disrupted life" (1989, p. 101).

Working rotating shifts puts one out of phase with more general social rhythms—such as the 4:00 p.m. to midnight period in which the bulk of traditional community activities normally occur (Dunham 1977, p. 628). And even more than the interface between the rotating-shift worker and the cycle of general community activities, a special challenge is interacting with one's family. Several studies have revealed the increasing number and intensity of problems organizations and work are creating for family life in general (e.g., Bailyn 1993; Hochschild 1989; Perlow 1997), and when one or more family members work rotating shifts the problems and stresses seem to increase (see Hochschild 1997, pp. 145-48, for an example). Families are trying to cope through mechanisms such as day care facilities that provide their services twenty-four hours a day



(Carton 2001), but even with such support facilities, shift work, especially rotating shift work, is stressful.

So shift work in general and rotating shifts in particular stress not only the shift workers but also the communities and families of which they are a part. And as Pierce et al. found, and neatly summarized in a table (1989, p. 99), nontraditional schedules, and especially rotating shifts, are associated with a large variety of physiological and social problems. Rotating shifts would be especially disruptive because they will more frequently upset the phase relationships that are being reestablished, hence leading to more of the problems. One should note that subsequent research continues to associate shift work with these types of problems (e.g., Martens et al. 1999; Totterdell et al. 1995).

Among the problems associated with shift work are sleep problems. These problems include reduced amounts of sleep, difficulty getting to sleep, awakening during sleep more often, and not feeling as refreshed upon awakening (Pierce et al. 1989, p. 94). But as will be discussed next, shift work is not the only phenomenon that causes sleep problems, and sleep problems lead to other difficulties.

Days That Will Live in Infamy

The problems just discussed may directly affect the roughly 25 percent of the U.S. labor force that works under some form of shift work (Pierce et al. 1989, p. 92), and they undoubtedly indirectly affect many shift workers' families and friends through their effect on the shift worker. So the number of people affected is large indeed.

Larger still is another phenomenon that affects every person in the United States and many other countries. This phenomenon is the change into and out of daylight saving time.[12] Overlooked by many as but a minor inconvenience, the human costs of this shift have begun to be cataloged, and they are much more serious and pervasive than perhaps anyone even thought possible when experiments with daylight saving time began—if anyone thought there might be serious problems at all.

The modern form of daylight saving time was proposed in 1907 by an English builder named William Willett, but Germany was the first nation to actually use it, adopting it in 1915, one year before England followed suit in 1916. The United States adopted daylight saving time after it entered World War I, but in 1919 Congress repealed the law that created it. Today the United States

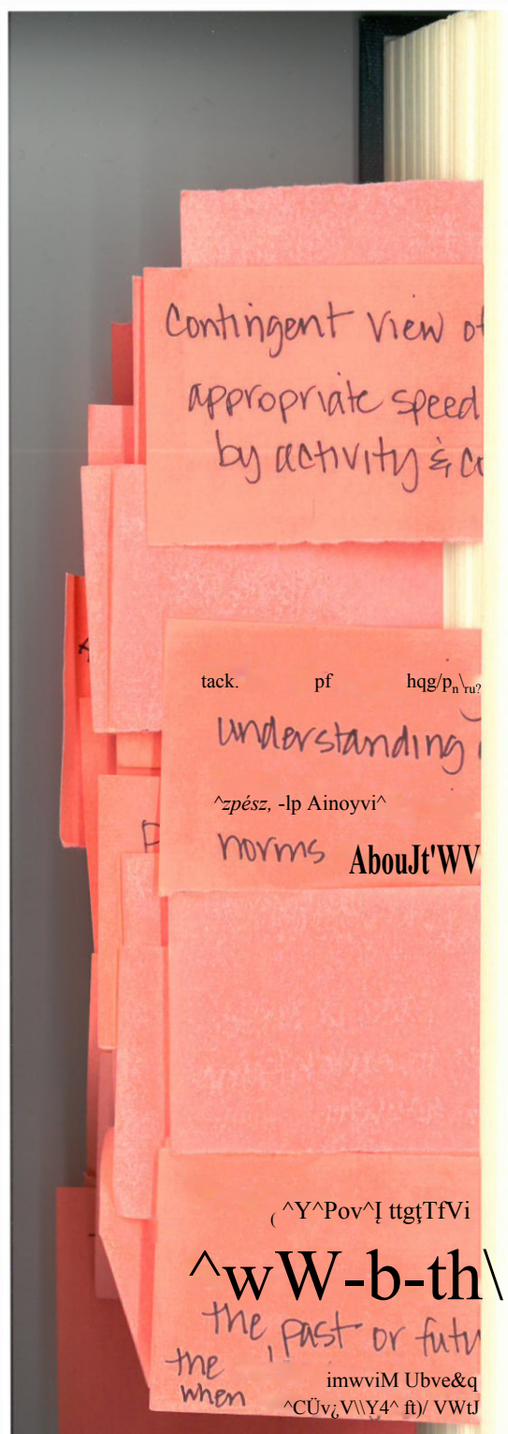
moves its clocks ahead one hour on the first Sunday in April (in part because of the efforts of the Daylight Savings Time Coalition [see Chapter 6]) and moves them back one hour on the last Sunday in October (historical details from Stephens 1994, p. 576).[13] Although no longer the espoused motivation, at times countries adopted daylight saving time to conserve energy. Ian Bartky (2000, p. x) indicated, however, that one study found no evidence of net energy savings in the United States resulting from daylight saving time, but it did suggest a link to increased fatalities of schoolchildren during weekday mornings of January and February in 1974, the United States having shifted to daylight saving time during the winter as one response to a major energy crisis.

Even though that experiment was soon abandoned in favor of the cycle in use today—seven months of daylight saving time followed by five months of standard time—questions still remain: Does daylight saving time have effects other than just shifting daylight from the morning to the evening, thereby increasing the possibilities for daylight recreation and leisure activities for much of the population? That seems reasonably benign. But are there negative effects? Is there a cost to be paid for the extra leisure possibilities?

With each study the answer becomes a more certain yes, and the reason is the same reason that shift work, especially rotating shift work, causes problems: Both changes disrupt established entrainment patterns. In fact, the shifts into and out of daylight saving time can be thought of as similar to very slowly rotating shifts, albeit the magnitude of the shift change is only about one-eighth as great as that between rotating shifts (as measured in fungible hours).[14] Perhaps the long interval between the shift changes and the smaller magnitudes of the changes have masked the effects to everyday observers, but systematic observations are beginning to change this.

Timothy Monk and Lynne Aplin (1980) studied the effects of both the spring and the fall daylight saving time shifts on a sample of about one hundred adults in Great Britain. Two findings indicated there might be problems generated by these shifts. First, the disruption in waking time lasted for about one week after *both* the fall and the spring changes. Second, moods seemed to be affected, with the fall change seeming to improve moods, whereas moods deteriorated after the spring change. Note that sleep problems are associated not only with shift work but also with the daylight saving time shifts.

Shifts in sleep patterns and mood sound more inconvenient than threatening, but findings from several additional studies are much more ominous be-



cause they are directly related to life and death. Timothy Monk (1980) performed the first of these studies, and he investigated the impact of the spring shift into daylight saving time on traffic accidents. Using weekly traffic-accident data from all of Britain for 1972 and 1973, he compared the change in the number of accidents that occurred in the week before the shift with the number that occurred in the week following the shift. To provide a second base of comparison, he compared the accident statistics for the comparable two weeks in both 1970 and 1971, when there was no spring shift in Britain. His findings? In 1970 and 1971, when *no* shift occurred, the difference between the two weeks was a slight decrease of about 0.6 percent, whereas in 1972 and 1973, the week following the shift into daylight saving time revealed a 10.76 percent increase in the number of accidents in all of Britain.

But Monk did not examine the fall shift because both his earlier work (e.g., Monk and Aplin 1980) and that of others seemed to indicate that the fall shift was beneficial. So Robert Hicks, Kristin Lindseth, and James Hawkins (1983) conducted a study similar to Monk's on traffic accidents in California from 1976 to 1978. Using data on all accidents in the state for one week before and one week after each change in each year, they found that traffic accidents increased after *both* the spring and the fall changes. Over the three years, the number of accidents increased an average of 3.6 percent for the week immediately following the change.[15]

One more researcher took up this question and expanded these findings to yet a third country. Stanley Coren (1996a, b) used data for all traffic accidents in Canada (except Saskatchewan, which did not observe daylight saving time) in 1991 and 1992 to compare the number of accidents on the Monday preceding shifts into and out of daylight saving time with the Monday immediately following each shift. Based on 21,603 accidents for these eight days combined (four from each year), Coren found a statistically significant *increase* of about 8 percent in accidents after the spring change, and a statistically significant *decrease* in accidents of "approximately the same magnitude" (1996a, p. 924) after the shift out of daylight saving time in the fall.

All three studies found statistically significant increases in the percentage of traffic accidents after the shift *into* daylight saving time, which is consistent with the sleep problems experienced by those who work on rotating shifts, but the results for the fall shift are mixed. Hicks, Lindseth, and Hawkins (1983) found an increase in accidents in the fall, but Coren (1996a, b) found a signif-

icant decrease. Monk (1980) did not study the effect of the fall shift on traffic accidents.

Two other studies may inform this issue, although they concern daylight saving times' effect on phenomena other than traffic accidents. In the first of these studies, Mark Kamstra, Lisa Kramer, and Maurice Levi (2000) examined the association between the two annual daylight-saving-time shifts on stock market indexes in the United States, Canada, the United Kingdom, and Germany. Several indexes were examined for the United States for periods up to seventy years, with those for the other three countries ranging from twenty-six to thirty years. The investigators examined the indexes on "the first trading day following a daylight saving time change using several different indices" (Kamstra, Kramer, and Levi 2000, p. 1007). The investigators noted previous findings of general weekend effects, so comparisons with the "mean regular weekend" were especially important, and they compared returns from the daylight saving weekends with those from the "average regular (non-daylight saving) weekend," which is the average of all nondaylight saving weekends (2000, p. 1007).

There was a strong *negative* association between both daylight saving time shifts in Canada, the United Kingdom, and the United States. (Negative means the stock markets went down.) Indeed, the negative returns for the spring daylight saving weekend were much larger than those for the means of the non-daylight saving weekends—200 percent to 500 percent greater in the spring, and even larger for the fall-change weekend (Kamstra, Kramer, and Levi 2000, p. 1008). The magnitude and direction of the association for the German exchange was similar to that for the exchanges in the other three countries, but large variance added to the German data by data from 1970 kept the German results from being statistically significant (Kamstra, Kramer, and Levi 2000, pp. 1008-9).

These findings indicate the two daylight saving changes have important statistical associations with stock market behavior, but in substantive terms, how big of a difference do these effects seem to have? According to Kamstra, Kramer, and Levi, "In the United States alone, the daylight saving effect implies a one-day loss of $31 billion on the NYSE, AMEX, and NASDAQ_exchanges" (2000, p. 1010).

The other study is one I conducted to see whether people themselves perceive one daylight saving change or the other as more difficult. To do this I

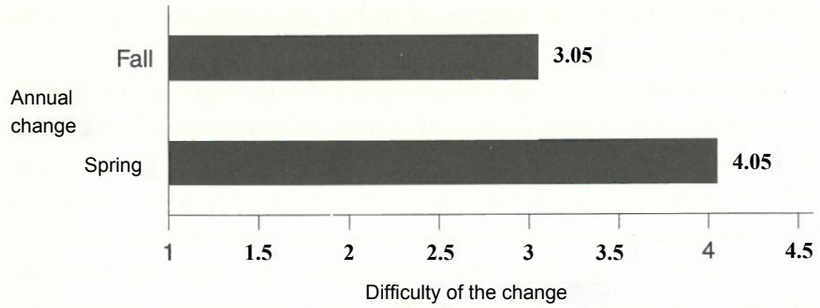


figure 7.2. Average difficulty experienced by student samples for the spring change into daylight saving time and the fall change out of daylight saving time. *Note*: The spring ratings were collected on the Tuesday following the change *into* daylight saving time; the fall ratings, on the Tuesday after the change *out of* daylight saving time.

developed questionnaire scales to measure the perceived difficulty of changing into daylight saving time in the spring and changing out of it in the fall. I administered these scales to two large samples of college students, 406 students in the fall of 1997 and 313 in the spring of 1998. Consistent with designs developed in the other studies of these shifts, the questionnaires were administered to *both samples* on the first Tuesday afternoon following the shift into or out of daylight saving time. Thus all respondents in both samples completed the questionnaires about two-and-one-half days after the time change, which is well within the period in which previous research had found effects related to these changes (e.g., Hicks, Lindseth, and Hawkins 1983; Monk 1980; Monk and Aplin 1980; Monk and Folkard 1976). The results are presented in Figure 7.2.

As Figure 7.2 shows, the spring shift into daylight saving time was perceived as substantially more difficult for respondents than the fall change out of daylight saving time.[16] That the fall change would be seen as the easier of the two—relatively speaking—is not surprising given Monk and Aplin's (1980) finding about a positive mood shift after the fall change. But one would expect a more positive rating about the ease of the fall change if all that were occurring was the addition of an hour of sleep, which Coren (1996a, b) indicated should produce positive effects. The fall change was rated on the easy side of the midpoint, the average of 3.05 falling almost exactly at the slightly disagree

(that the change was difficult) anchor on the seven-point scale respondents used to indicate agreement or disagreement with the statements about the difficulty of the change (see note 16). This suggests that although receiving that extra hour of sleep may help—the fall change was perceived as significantly easier to cope with than the spring change—other disruptions are likely to still be involved with that change.

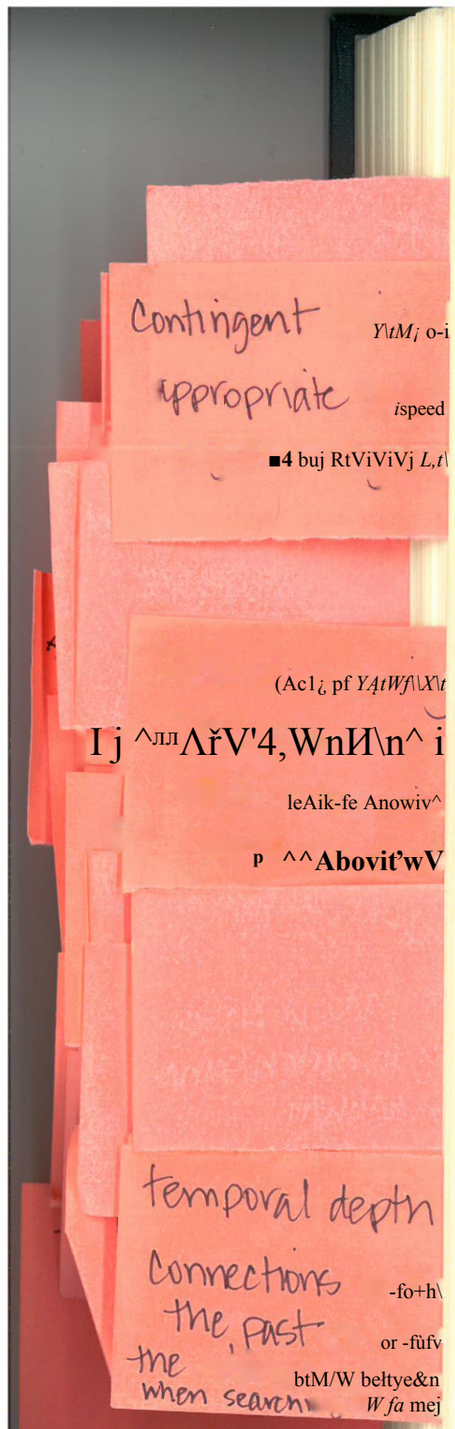
Having now inventoried several serious problems associated with daylight saving time, what is to be done? Notably, the authors of two of these studies explicitly suggested that the changes into and out of daylight saving time may not be worth the costs (Hicks et al. 1983; Kamstra, Kramer, and Levi 2000). Indeed, Kamstra, Kramer, and Levi (2000), based on their own stock exchange research and other findings about daylight saving time, came right out and said it: "An obvious policy implication is to do away with the time change altogether" (p. 1010). One is tempted to agree, because the *unintended* consequences of daylight saving time correspond unsettlingly with the effects obtained or anticipated by those who would deliberately disrupt sleep patterns.

For instance, Aleksandr Solzhenitsyn described a deliberate arrest strategy employed by the KGB: "The kind of night arrest described is, in fact, a favorite, because it has important advantages. Everyone living in the apartment is thrown into a state of terror by the first knock at the door. The arrested person is torn from the warmth of his bed. He is in a daze, half-asleep, helpless, and his judgment is befogged" (1974, p. 6).

Sleep is disrupted, the prisoner is dazed, and "his judgment is befogged." This could be describing a shift worker rotating to a new shift, ergo the maladies inventoried in Pierce et al. (1989). Or it could describe all of us on the day after the shift into daylight saving time.

William Shirer recognized these effects too, and he even saw a way to turn them to military advantage. Then an American foreign correspondent working in Berlin, Shirer wrote this entry in his diary on September 18,1940:

> Churchill is making a mistake in not sending more planes over Berlin. A mere half-dozen bombers per night would do the job—that is, would force the people to their cellars in the middle of the night and rob them of their sleep. Morale tumbled noticeably in Berlin when the British visited us almost every evening. I heard many complaints about the drop in efficiency of the armament workers and even government employees because of the loss of sleep and increased nervousness. (Shirer 1941, p. 507)



Again, the idea was to disrupt people's sleep patterns so their ability to function would decline. And in both cases, the disruption was intended, not to help them, but to produce harm to those whose sleep would be disrupted. So why do this to ourselves *voluntarily* in the case of daylight saving time?

Humanity constructs its times, and daylight saving time is no exception. Perhaps it is time to rethink the practice and sever our connections with it. Deconstruction may be in order. Should policy makers require further study before ordering its demolition, let the funding agencies support such research, but with connections to deadlines on the order of three or four years, not thirty or forty. And whatever the time frame for conducting the research and making the policy decisions, let it all proceed with a greater sense of urgency than that which moved the Board of Longitude (see Chapter 4). Otherwise, latter-day Dantes will have far too much material to draw upon as they make each new day in their Infernos the first day after the switch into daylight saving time. Mistaking the worst of times for the best of times is a nasty error.

8

Carpe Diem

> The utility of living consists not in the length of days,
> but in the use of time; a man may have lived long,
> and yet lived but a little.
>
> —Michel Eyquem de Montaigne, *Essays*

What is the most impressive project in human history? What project is most impressive, that is, if impressiveness is gauged by the project's complexity and scope, its audacity and importance, and ultimately, of course, by its success. There is no right or wrong answer to this question, value-laden as it is, but one could certainly agree on legitimate contenders: the pyramids of ancient Egypt and Mesoamerica, the Great Wall of China, the Apollo program (moon landings), and the mapping of the human genome would generate few objections. All of these projects were efforts to seize the day (carpe diem), to seize it grandly, and all of them involved *preparations* to seize the day as well—seizing the day and preparing to do so being the subjects of this chapter. But there is another project, little known to the general public, often unknown even to major portions of the professorate, that deserves to be included in this list.

The project was proposed in 1857, and what was proposed was nothing less than a complete inventory of every word in the English language, past and present. But not just a fist of these words, though the outcome envisioned would certainly include such a list, but a list that would describe the origin of every word and include the first written sentence in which the word was published. Further, the list would also include additional published sentences illustrating every major meaning the word had taken on as well as the important subtleties