

Creativity Under the Gun

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People often come up with their best ideas when time is tight – at least that’s what many executives assume. The trouble is, as new research reveals, it’s not true.

Creativity

Under the Gun

TRULY BREAKTHROUGH IDEAS rarely hatch overnight. Consider, for example, Charles Darwin’s theory of evolution, which had a protracted evolution of its own. Darwin spent decades reading scientific literature, making voyages on the HMS *Beagle* to the Galápagos and other exotic destinations, carrying out painstakingly detailed observations, and producing thousands of pages of notes on those observations and his ideas for explaining them. It’s inconceivable that his breakthrough would have occurred if he’d tried to rush it. In business, too, there are striking examples of the value of having relatively unstructured, unpressured time to create and develop new ideas. Scientists working at AT&T’s legendary Bell Labs, operating under its corporate philosophy that big ideas take time, produced world-changing innovations including the transistor and the laser beam. Their ingenuity earned the researchers several Nobel prizes. They, like Darwin, had the time to think creatively.

But we can all point to examples where creativity seemed to be sparked by extreme time pressure. In 1970, during Apollo 13’s flight to the moon, a crippling explosion occurred on board, damaging the air filtration system and leading to a dangerous buildup of carbon dioxide in the cabin. If the system could not be fixed or replaced, the astronauts would be dead within a few hours. Back at NASA mission control in Houston, virtually all engineers, scientists, and technicians immediately focused their attention on the problem. Working with a set of materials

identical to those on board the spacecraft, they desperately tried to build a filtration system that the astronauts might be able to replicate. Every conceivable material was considered, including the cover of a flight procedure manual. With little time to spare, they came up with something that was ugly, inelegant, and far from perfect but that seemed like it just might do the job. The engineers quickly conveyed the design with enough clarity that the cognitively impaired astronauts were, almost unbelievably, able to build the filter. It worked, and three lives were saved.

The business examples of creativity under pressure are decidedly less dramatic than that, but they abound as well. The lauded design firm Ideo has put its innovative spin on personal computers, medical equipment, automotive electronics, toys, and even animatronic movie robots – and many of the new designs for those products were drawn up in three months or less. If you’re like most managers, you have almost certainly worked with people who swear that they do their most creative work under tight deadlines. You may use pressure as a management technique, believing that it will spur people on to great leaps of insight. You may even manage yourself this way. If so, are you right?

Based on our research, the short answer is “no.” When creativity is under the gun, it usually ends up getting killed. Although time pressure may drive people to work more and get more done, and may even make them *feel*

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more creative, it actually causes them, in general, to think less creatively. Of course, the short answer is not the whole story. Let's take a look at what time pressure is, how it feels when people experience it at work, and the different ways it can be managed to enhance creativity.

Fighting the Clock

Maria was a software developer on a team charged with creating an on-line system through which health care providers could access vital information about certain high-risk patients. It was critical that the new system be error-proof because the targeted patients were elderly or severely disabled individuals; in life-threatening situations, accurate information about them had to be communicated instantly. Unfortunately, the original contract for the project had vastly underestimated the time required to develop it. As a result, Maria and her team found themselves under extreme time pressure as the deadline approached. (Maria's identity, like all individual, project, and corporate identities in this article, has been disguised.)

The team was working almost around the clock, even though it was becoming clearer with each passing day that the complex technical problems it encountered simply could not be solved adequately within the original time frame. Yet senior management, as well as the project leader, pressed the team to meet the deadline, no matter what. Maria recorded her experiences during this time in a daily diary:

"At 7:30 this morning, my team leader asked me what my game plan was for the day and if I could be available for a rollout meeting. I wrote out on a flip chart what I thought needed to be done today, looked at the list, and told him it was two or three days of work. Now, as I am burned out and preparing to leave for the day, I look at the flip chart and realize that, at best, 20% of the work has been accomplished. This one-day list is really a four- or five-day list. The thing that most sticks in my mind from the entire day is that blasted flip chart with so little crossed off."

A few days later, Maria seemed even closer to the end of her rope:

"I told my supervisor that the hours I am working are completely unacceptable and that I planned to leave the company if this continued to be the norm on projects

here. The look on his face was a bit aghast. Was he really shocked? Could this possibly be a surprise? All afternoon I felt physically drained, as if I were running on low blood sugar. I slept very poorly last night, several hours awake in the middle of the night. I feel physically exhausted again right now—lack of mental clarity, lack of motivation about the project."

Maria wasn't alone in her sense of the extreme time pressure the group was working under. Richard, another member of the team, kept his own diary during this period and had this to say:

"The team leader announced that the project's core hours—when everyone is expected to be in the office and working—have been extended: 'They are now 8 AM to 7 PM, and don't make social plans for the next three weekends, as we will likely be working.' This project is now officially a death march in my mind. I can't fathom how much work we have left, how severely we underestimated this project, and how complex this dog has become. At every turn, we uncover more things that are unsettled, incomplete, or way more complex than we ever thought."

We collected more than 9,000 such diary entries in a recent study of 177 employees in seven U.S. companies. Our objective was to look deeply at how people experienced time pressure day to day as they worked on projects that required high levels of inventiveness, while also measuring their ability to think creatively under such pressure. Specifically, we asked each of the participants—most of whom were highly educated knowledge workers—to complete a diary form on-line in which they rated several aspects of their work and their work environment that day, including how much time pressure they felt. In a separate section of the form, we also asked them to describe something that stood out in their minds about that day, and we carefully analyzed those short entries for evidence of creative thinking. (See the sidebar "Trapping Creativity in the Wild" for a detailed description of our research method, including our study's specific definition of "creative thinking.")

What we saw in those diary entries was both fascinating and sobering. Many of the people in our study reported experiences similar to Maria's: They often felt overworked, fragmented, and burned out. At the most basic level, then, we found support for recent observations in the popular press that Americans are feeling a time crunch at work, creating what one *Newsweek* reporter called a nation of "the quick, or the dead-tired." The problem has been with us for some time. As early as 1995, *U.S. News & World Report* described a nationwide poll showing that more than half of Americans wanted more free time, even if it meant earning less money. And in 1996, according to a *Wall Street Journal*–*NBC News* survey, 75% of those people earning

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Trapping Creativity in the Wild

Many of the findings we report in this article are drawn from a study of time pressure and creativity that we recently conducted with Jennifer Mueller of Yale School of Management and William Simpson and Lee Fleming, both of Harvard Business School. That study included data from 177 employees who were members of 22 project teams from seven U.S. companies within three industries (chemical, high tech, and consumer products). More than 85% of the participants had college degrees, and many had graduate education. In order to be included in the study, a team had to be identified by senior management as working on a project where creativity was both possible and desirable. In other words, these projects, and our participants, were considered the “creative lifeblood” of their organizations. We believed that we could better understand what these people were experiencing each day, and what was really influencing their creativity, if we tracked what was happening in real time.

To accomplish this, we e-mailed each member of each team a brief daily questionnaire throughout the entire course of their projects. We asked them to fill it out and return it to us at the end of each workday. Somewhat amazingly, 75% of the questionnaires that we sent out were returned completed even though some of the projects we followed lasted more than six months. This yielded the very high number of returns (9,134) that we analyzed in this study. The questionnaires contained several numerical-scale items about the work and the work environ-

ment, including one that asked participants to rate the day’s time pressure on a seven-point scale. A similar item asked them to rate the creativity of their work that day.

The most interesting part of the questionnaire was the narrative diary entry, in which we asked participants to briefly describe one event that stood out in their minds from the day—anything at all that related to the project, the team, or their work. (We did not ask them to focus on creativity.) Because we asked for just one standout event each day, the diaries do not present a comprehensive account of everything that happened that day. We assume, though, that they are a representative sample of the important things that were happening. And although we saw some clear patterns in the results, further research will be necessary to determine definitively what is causing what.

The diary entries provided rich information about what people were doing and experiencing each day. We derived a “creative thinking” measure by coding each diary narrative. A narrative was considered to have evidence of creative thinking if it described an event in which the person was engaged in any form of creative thinking as the term is used in everyday language; this included mentions of discovery, brainstorming, generating ideas, thinking flexibly, or “being creative.” We also included many of the cognitive processes that theorists believe are important in facilitating creative thinking: learning, insight, realization, awareness, clarification, remembering, and focused concentration. All of these processes are included in what we call “creative

thinking,” “thinking creatively,” or “creativity” in this article. (For more details on the methods and findings of our research, see the working paper by Teresa M. Amabile, Jennifer M. Mueller, William B. Simpson, Constance N. Hadley, Steven J. Kramer, and Lee Fleming, “Time Pressure and Creativity in Organizations: A Longitudinal Field Study,” HBS, 2002.)

In preparing this article, we went beyond the statistical analyses of the time-pressure study to develop a richer view of the conditions under which time pressure may or may not have negative effects. For that purpose, we looked at four extreme conditions: days of very high time pressure when creative thinking did happen; days of very high time pressure when creative thinking didn’t happen; days of very low time pressure when creative thinking did happen; and days of very low time pressure when creative thinking didn’t happen. We took a sample of 100 diary entries from each of these four work conditions and read them carefully to discern patterns that distinguished them from one another—for instance, that creativity seemed more likely when people were able to focus on a single activity for most of the day.

In addition to that qualitative analysis, we used the numerical ratings that the participants reported in the questionnaires to examine the number of hours they worked; the degree of challenge, involvement, and time pressure they felt; the number of people they worked with; and the degree of distraction they felt. The results of our analyses are summarized in the exhibit “The Time-Pressure/Creativity Matrix.”

more than \$100,000 a year cited managing their time as a bigger problem than managing their money.

Time pressure has become a fact of life for the American worker. On the average day, our study participants reported feeling “moderate” time pressure—and that was the average. A great many of the participants’ workdays were characterized by “extremely” high levels of time pressure. “Today I realized that our time to get ready for the upcoming presentations was almost nonexistent,” wrote one

participant in a fairly typical entry. Another, in a different company, lamented that, “Overnight, I had to come up with a fully detailed plan for the remainder of the development phase, to let us know how far behind we were.”

Perhaps not surprisingly, although our participants said time pressure was rather high most of the time, we noticed a trend whereby time pressure seemed to build as work projects went from early to later stages; as with Maria’s project, people felt more and more pressed for

The Time-Pressure/Creativity Matrix

Our study suggests that time pressure affects creativity in different ways depending on whether the environment allows people to focus on their work, conveys a sense of meaningful urgency about the tasks at hand, or stimulates or undermines creative thinking in other ways.

		Time Pressure	
		low	high
Likelihood of Creative Thinking	high	<p>Creative thinking under low time pressure is more likely when people feel as if they are on an expedition. They:</p> <ul style="list-style-type: none"> • show creative thinking that is more oriented toward generating or exploring ideas than identifying problems. • tend to collaborate with one person rather than with a group. 	<p>Creative thinking under extreme time pressure is more likely when people feel as if they are on a mission. They:</p> <ul style="list-style-type: none"> • can focus on one activity for a significant part of the day because they are undisturbed or protected. • believe that they are doing important work and report feeling positively challenged by and involved in the work. • show creative thinking that is equally oriented toward identifying problems and generating or exploring ideas.
	low	<p>Creative thinking under low time pressure is unlikely when people feel as if they are on autopilot. They:</p> <ul style="list-style-type: none"> • receive little encouragement from senior management to be creative. • tend to have more meetings and discussions with groups rather than with individuals. • engage in less collaborative work overall. 	<p>Creative thinking under extreme time pressure is unlikely when people feel as if they are on a treadmill. They:</p> <ul style="list-style-type: none"> • feel distracted. • experience a highly fragmented workday, with many different activities. • don’t get the sense that the work they are doing is important. • feel more pressed for time than when they are “on a mission” even though they work the same number of hours. • tend to have more meetings and discussions with groups rather than with individuals. • experience lots of last-minute changes in their plans and schedules.

time as deadlines approached. Interestingly, we also observed a slight trend in time-pressure changes during the week: The time pressure started out relatively low on Mondays, increased through the week to a peak on Thursdays, and decreased on Fridays. This may be because managers' expectations for productivity are somewhat lower on Mondays and Fridays. Or perhaps it's simply that, on the days bracketing the weekend, people are already (or still) in a weekend mind-set and less subject to feeling the time pressure that exists. We also found that people were more likely to report high levels of time pressure on days when they were traveling for work or working off-site. It's possible that people try to pack more work into such days to minimize the total time spent away from the office. And, of course, the many hassles of travel itself undoubtedly contribute to feelings of being pressed.

Energy and Frustration

As described in the diaries, the days when our study participants felt extreme time pressure were noticeably different from the days when they felt less time pressure. People tended to work more hours and were involved in a greater number of activities, having to switch gears more often, on time-pressured days. That provides us with our first clue about how time pressure might affect creativity—a clue to which we will return later.

People experienced different feelings as time pressure increased, but we can't simply say that they felt better or worse. It was a mixed bag. At first, people felt more involved in and challenged by their work: "I am under a lot of pressure to start up the manufacturing machine for our new product this week...I was actually happy to run to the hardware stores for hose fittings and bolts. For the first time, I feel like we are truly making real progress." And, in surprising contrast to Maria's reaction of feeling drained, people generally felt more energized under high pressure. As one diarist reported, "We are three-quarters of the way there! I really enjoy seeing the team pull together."

But some people also experienced deep frustration as time pressure increased: "I frequently feel I am swimming upstream on this project and always buried with work." In particular, they seemed frustrated by constant distractions from other team members on time-pressured days. One of our study participants told a particularly vivid story about his frustration with a colleague:

"We had a meeting about what is going wrong with the filtration program and how to come to an acceptable level of understanding and information gathering. As usual, Paul, Emilio, Sarah, and I were going at breakneck speed trying to make sure we're all pulling together. But Raj could only repeatedly say, 'But what part of my job don't you want me to do, if you expect me to do that?' He was

argumentative and negative, and all I could think was, 'Stop it!' I was able to control myself and didn't scream at him, but I was close."

When we look at the whole picture of how people were experiencing time pressure, it seems they were working hard, spending long hours on the job, and sometimes feeling jazzed about what they were doing. But at the same time, there was a lot of frustration—another clue that will help us understand time pressure's effects on creativity.

The Pressure Trap

Our study indicates that the more time pressure people feel on a given day, the less likely they will be to think creatively. Surprisingly, though, people seem to be largely unaware of this phenomenon. In their assessments of their own creativity each day, the participants in our study generally perceived themselves as having been *more* creative when time pressure was high. Sadly, their diaries gave the lie to those self-assessments. There was clearly less and less creative thinking in evidence as time pressure increased.

Moreover, the drop in creative thinking was most apparent when time pressure was at its worst. In the daily diary form, participants were asked to rate the time pressure they felt on a scale of one to seven, with seven being the highest level of pressure. On the days rated a seven, people were 45% less likely to think creatively than they were on any of the lower-pressure days.

Managers might think that the occasional uncreative day is simply the price paid for keeping work on a highly productive schedule. If your creative juices freeze up on a particularly busy Thursday, they might argue, you'll be able to get back to creativity on Friday when the demands have died down a bit. But maybe not. To our surprise, more time pressure on a certain day meant less creative thinking that day, the next day, *and* the day after that. In other words, whether because of exhaustion or enduring postpressure cognitive paralysis, our study participants seemed to experience a "pressure hangover" that lasted a couple of days at least.

That lingering time-pressure effect showed up whether we examined time pressure day to day or over longer periods. The higher the overall sense of time pressure that participants felt during the first week of their projects, the lower the level of creative thinking we saw from them during the first half of their projects (a period that varied from three weeks to four months). And the higher the overall sense of time pressure at the midpoint, the lower the level of creative thinking in the second half.

Why does time pressure have this dampening effect on creativity? Psychological research over the past 30 years, along with theories about how creativity happens, can

A Peek into the Diaries

These diary excerpts were written by study participants who experienced the four work conditions described in this article. See if you or your employees might say something similar about experiences in your own organization.

On a Mission

(High Time Pressure, High Likelihood of Creative Thinking)

“At the end of the day today, after getting the documents ready, it hit me as to how creative Katherine and I had been together when we had worked in a room, away from the telephones, noise, interruptions, and other distractions. I felt very satisfied with the work we produced.”

“Just as I was knee-deep in 1s and 0s, staring at an execution trace of the firmware (which was acting strangely), I got three phone calls in a row. I was about ready to throw the damn phone across the room. Fortunately, it stopped ringing after that, and I was able to refocus and find the problem. Hooray!”

“We found out today that the drop test on one of our products was not done properly, and we needed a way to pad our product in a rush. I remembered that we had \$10 million worth of an obsolete cell cushion that we were getting ready to write off, and I suggested we use that. It worked great!”

“I brought in some of my personal camera equipment today and used it to create a high-magnification video analysis system...I felt this was very creative work on my part—passing on my knowledge of optics and photography to an engineer who will continue with this work.”

On an Expedition

(Low Time Pressure, High Likelihood of Creative Thinking)

“In my meeting with Seth to discuss the imaging model, several ideas he mentioned meshed with ideas I had, and I came away with a better and more detailed model!”

“Wendy brought in her samples of the ILP films and presented them to me in a way that really made sense and triggered a lot of good ideas on my end.”

“John spent time discussing promotional opportunities with me, and I felt like I was really learning something.”

“I tried out my patterned adhesive wine labels in the lab. Bought wine at the grocery store and committed sacrilege by pouring it into the sink. My patterned adhesive didn’t really work well, but I made some interesting observations that helped me understand the problem a little better.”

“While brainstorming ideas for solving the axle retention problem, I discovered a way to reduce the cost of our current wheeled container. In addition, this may give us a better product that is easier to produce. I made a few calls to begin investigating the feasibility.”

help to explain. Psychologists have long believed that creativity results from the formation of a large number of associations in the mind, followed by the selection of associations that may be particularly interesting and useful. In a sense, it’s as if the mind is throwing a bunch of balls into the cognitive space, juggling them around until they collide in interesting ways. The process has a certain playful quality to it; in fact, Einstein once referred to creativity as “combinatorial play.” If associations are made between concepts that are rarely combined—that is, if balls that don’t normally come near one another collide—the ultimate novelty of the solution will be greater.

Considerable research, drawn from experiments and from observations of creative activities, supports this view

of the creative process. And some recent research suggests that the success of the combinatorial process depends both on having sufficient time to create the balls to juggle—exploring concepts and learning things that might somehow be useful—and having sufficient time to devote to the actual juggling. For example, one study we and our colleagues conducted found that people who allocate more time to exploratory behaviors while doing a task produce work that is rated by experts as more creative. Another study found that simply having a few minutes to think through a task—studying the materials, playing around with them—can lead to more creativity than having to dive into the task cold. So we have still more clues about how being under the gun might affect the creative process.

On a Treadmill*(High Time Pressure,
Low Likelihood
of Creative Thinking)*

“I spent the day trying to get a business plan finished – or at least started – for this strategic alliance. I was very frustrated by constant interruptions, which make it necessary to get this type of work done before or after hours.”

“Today was a very long day spent in several meetings. We spend so much time covering old issues instead of driving the business forward.”

“I was informed that I have to come up with a new launch rationale by Monday so it can be reviewed by the operating team. The relaunching of the old printers is devoid of any logical strategy. Now I have to make up one that sounds good.”

“One problem after another occurred today. I had intended to complete several different items for the product transfer, but I spent the day fighting fires instead.”

On Autopilot*(Low Time Pressure,
Low Likelihood
of Creative Thinking)*

“Very low energy today. Must be the weather, but I feel whipped. Focused on organizing and planning. Put out an agenda for the optimization meeting tomorrow.”

“Overall feeling of depression today.”

“Mostly just doing paperwork. I cleaned up a lot of outstanding items.”

“The team had an all-day meeting with the general manager. He just raised three questions, rather than giving us a clear leadership response to what we’ve done.”

“Today I gave a two-hour presentation on product strategy and plans for the new product launch to our European marketing managers. I was disappointed by their [apathetic] response. The same old issues came up and a moderately negative attitude prevailed.”

of focus. People were able to concentrate on a single work activity for a significant portion of the day. As one diarist jubilantly declared: “The event of the day was that I had no standout events. I was able to concentrate on the project at hand without interruptions.” This focus was often hard-won, as the individuals or their managers went to great lengths to protect their work from interruptions and other disturbances: “There were so many interruptions for chit-chat that I couldn’t get any decent work accomplished. I eventually had to go work very quietly in another room to get some of it done.”

Indeed, this sense of focus implies some degree of isolation. On the time-pressured days that still yielded creative thinking, we noted that collaboration was limited. When it happened, it was somewhat more likely to be done in a concentrated way—for instance, working with another individual rather than in a group: “I had a chance to talk at the end of the day with Susan. She helped confirm that the path I was taking was right and helped me figure out some of the differences in the codes. Her help will keep me going.”

Another key condition for achieving creativity on the high-pressure days was interpreting the time pressure as meaningful urgency. People understood why solving a problem or completing a job was crucial, and they bought into that urgency, feeling as though they were *on a mission*.

(See the exhibit “The Time-Pressure/Creativity Matrix” for a summary of the work conditions our study participants experienced.) They were involved in their work and felt positively challenged by it. The sense of urgency and the ability to focus are probably related, for two reasons. If people believe that their work is vitally important, they may be more willing and able to ignore a variety of distractions in their workdays. Meanwhile, managers who share this sense of urgency may free people from less-essential tasks. This was clearly the case in the Apollo 13 mission: All nonessential work was abandoned until the air filtration problem was solved and the astronauts were returned home safely.

Protecting Creativity

Even though time pressure seems to undermine creative thinking in general, there are striking exceptions. We know, from our own study and from anecdotal evidence, that people can and do come up with ingenious solutions under desperately short time frames. What makes the difference? It’s time to put the clues together.

When we compared the diary entries from the time-pressured days when creative thinking happened to the entries from the time-pressured days when no creative thinking happened, we found that the creative days featured a particular—and rather rare—set of working conditions. Above all else, these days were marked by a sense

But when this protected focus was missing on time-pressured days – and it very often was – people felt more like they were *on a treadmill*. On these days, our diarists reported a more extreme level of time pressure even though they were not working more hours, and they felt much more distracted. When recording the number of different activities they performed, they were likely to use words like “several,” “many,” and “too numerous to count.” They were pulled in too many directions, unable to focus on a single activity for any significant period of time. One diarist, paraphrasing the oft-repeated lament, said: “The faster I run, the behinder I get.”

Our first clue, that people might have to switch gears more often under time pressure, underlies this treadmill condition; many things are clamoring for people’s attention simultaneously. Remember, too, our clue that feelings of time pressure are associated with frustration, especially frustration with other members of a team. We suspect that interruptions contribute to that frustration. Other evidence adds to the picture of a distracted, disturbed, confusing environment on treadmill days. People had many more meetings and discussions with groups rather than with individuals. Moreover, they often had to cope with last-minute changes to schedules and plans. In many ways, they seemed to be operating under greater uncertainty: “At the meeting, we discovered that the work we have done to date may have to be completely redone because of a decision made by upper management to change the way the new system will process customer orders.” On these low-focus, time-pressured days, people weren’t very likely to see what they were doing as important or to feel a meaningful sense of urgency to complete a project or task.

Did an absence of time pressure guarantee that people would be more creative? Certainly not. Under any level of

Don’t be fooled into thinking that time pressure will, in itself, spur creativity. That’s a powerful illusion but an illusion nonetheless.

time pressure, low or high, reports of creative thinking were relatively rare; they showed up in only about 5% of the 9,000-plus daily diary reports. Under low time pressure, the differences in whether creativity happened or not seem to lie in the way people were spending their days. Most noticeably, when people exhibited creativity in the absence of time pressure, they were more oriented

toward exploring and generating new ideas than identifying problems to be solved. (Remember our clue from the psychological literature on combinatorial play.) People behaved as if they were *on an expedition*. In addition, if people in this condition worked with someone else, they tended to spend the day (or part of it) collaborating with only one other person; collaboration with many people was rare. Having a single focal point to bounce new ideas off of might help people stay oriented toward the work on these more relaxed days, in contrast to having many “playmates” at once.

Finally, of course, there were days when people didn’t feel under much time pressure and didn’t show any evidence of creative thinking. They seemed to be doing their jobs, putting one foot in front of the other, without engaging too deeply in what was happening. They behaved as though they were *on autopilot*. On these days, there was a generally low level of collaborative work, although there were more meetings and discussions that involved groups rather than individuals. And people felt the least encouragement from high-level management to do creative work. Perhaps if creativity had been encouraged more, these individuals would have made better use of their relatively low-pressure days.

Lessons for Management – and Self-Management

Our research focused on knowledge workers – people who, according to researcher Leslie Perlow, are most likely to suffer from a “time famine” in contemporary American organizations. These are the people from whom we need and expect the highest levels of creativity; they are developing the products, services, and organizations of tomorrow. They are also the people who are most handicapped in their quest to be creative.

There’s no doubt that creative thinking is possible under high – even extreme – time pressure. But this seems to be likely only in a situation that, research suggests, is not the norm in modern organizations: being able to become deeply immersed, and stay deeply immersed, in an important, urgent problem. Given the demands in most organizations for communication and process checks, as well as the prevalence of highly interdependent work roles, protected creativity time does not occur naturally.

What, then, can managers do to minimize the negative effects of time pressure and use it appropriately in the service of creativity? What can each of us do to maintain our own creativity in today’s pressured organizations?

Our first suggestion is the obvious one: Avoid extreme time pressure whenever possible, particularly if you are looking for high levels of learning, exploration, idea gen-

eration, and experimentation with new concepts. Don't be fooled into thinking that time pressure will, in itself, spur creativity. That's a powerful illusion but an illusion nonetheless. Complex cognitive processing takes time, and, without some reasonable time for that processing, creativity is almost impossible.

Of course, it would be foolish to think that the ideal for creativity is a complete absence of time pressure on a particular work project. Given the demands that modern life puts on people, it's too likely that other things would steal attention from the project – the urgent would drive out the important – and nothing would be accomplished. Moreover, it would be easy for people to slip into autopilot mode if there were no sense of urgency. Our research suggests that low time pressure doesn't necessarily foster creative thinking – but that it can do so when people are encouraged to learn, to play with ideas, and to develop something truly new. Consider the creativity-shielding practices at 3M. For many years, that innovation powerhouse has had a tradition of protecting 15% of the workweek for creative endeavors. All its R&D scientists devote that time to exploring whatever new ideas or pet projects most intrigue them personally, even if those ideas and projects are far afield from their assigned work.

For most companies, the best way to avoid undue time pressure is to articulate goals at all levels of the organization that are realistic and carefully planned, avoiding the optimism bias that plagues a lot of corporate planning. Announcing that a certain number of new products will be developed in the coming year, without a sense of the feasibility of that goal, will probably cause extreme time pressure to ripple through the organization – right down to the people who are actually supposed to be coming up with the ideas for those products. Signing a contract that promises to deliver items to a client by a certain date, without careful scoping of what the project will likely involve, can lead to the treadmill mentality that we saw on Maria's team. People may continue to advance the work, but they won't have the creative insights that will send the project leapfrogging ahead to truly exciting solutions.

In situations where time pressure can't be avoided, managers should focus on protecting time-pressured people who are supposed to be doing creative work from interruptions, distractions, and unrelated demands for a significant portion of each workweek. This concentration on "real work" can reduce the time fragmentation that we saw in so many of our participants' daily diaries.

Perlow's research in a high-tech firm, as reported in her book *Finding Time: How Corporations, Individuals, and*


Families Can Benefit from New Work Practices (Cornell University Press, 1997), showed that engineers who agreed to give one another such uninterrupted quiet time during specified periods each day were able to get more done on their projects and felt better about their workdays. Her research also suggested, unfortunately, that it is difficult to sustain such a major change in workday norms without deep cultural change in the organization.

Creativity can also be supported under time-pressured conditions if managers can help people understand why

Signing a contract that promises to deliver items to a client by a certain date, without careful scoping of what the project will likely involve, can lead to the treadmill mentality.

tight time frames are necessary. It's much easier to feel that you are on a mission if you accept that there is an important, urgent need for the work you are doing, rather than feeling that an arbitrary deadline has been handed down simply to make you run ever faster on your treadmill. Our research suggests that managers should also encourage one-on-one collaborations and discussions, avoiding an excess of the obligatory group meetings that may contribute to feelings of fragmentation and wasted time. Finally, people may be better able to concentrate on their work if managers minimize abrupt changes in scheduled activities and plans.

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In short, the key to protecting creative activity – including your own – is to offset the effects of extreme time pressure. The obvious way to do that is to reduce the time pressure. But in cases where it is unavoidable, its negative effects can be softened somewhat by getting your people and yourself in the mind-set of being on a mission – sharing a sense that the work is vital and the urgency legitimate. It also means ruthlessly guarding protected blocks of the workweek, shielding staff from the distractions and interruptions that are the normal condition of organizational life. The best situation for creativity is not to be under the gun. But if you can't manage that, at least learn to dodge the bullets. 

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