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Time Pressure, Performance, and Productivity

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Abstract

Purpose: The purpose of this paper is to explore the question of whether there is some optimal level of time pressure in groups.

Design/approach: We argue that distinguishing performance from productivity is a necessary step towards the eventual goal of being able to determine optimal deadlines and ideal durations of meetings. We review evidence of time pressure's differential effects on performance and productivity.

Findings: Based on our survey of the literature, we find that time pressure generally impairs performance because it places constraints on the capacity for thought and action that limit exploration and increase reliance on well-learned or heuristic strategies. Thus, time pressure increases speed at the expense of quality. However, giving people more time is not always better for productivity, since time spent on a task yields decreasing marginal returns to performance.

Originality/value of paper: The evidence reviewed here suggests that setting deadlines wisely can help maximize productivity.

Category: Conceptual paper

Keywords: *Time pressure, deadlines, performance, productivity*

Performance and Productivity Under Time Pressure

Time is precious. The varied and conflicting demands on our time, from professional commitments to domestic responsibilities, push us to squeeze the most from every minute (Hochschild, 1997; Perlow, 1998, 1999). Modern innovations like fast food drive-throughs, cellular telephones, and microwave ovens continually increase our ability get more done in less time. Organizations strain to make the most efficient use of their employees, laying off those who can be spared and pushing those who remain to do more in fewer hours (Schor, 1991). By producing more goods and services with less time, American workers have increased the nation's productivity at an impressive rate, exceeding two percent per year for the last twenty years, consistent productivity growth not seen since the 1960s (Bureau of Labor Statistics, 2011). Yet time pressure imposes constraints that can limit exploration, constrain cognitive capacity, and impair performance. Time pressure can reduce performance on everything from simple math problems (Bryan & Locke, 1967) to piloting airplanes (Raby & Wickens, 1994). In this paper, we will review evidence on time pressure's effects on performance and explore the question of whether there is an optimal level of time pressure that maximizes productivity.

The majority of the research on time pressure's effect on performance focuses on the individual level of analysis, and so we will begin by reviewing evidence on time pressure's effect on solitary performance. There has been less research exploring what effect time pressure has in social contexts of cooperation with others, so we will use what we know about individuals to help explain phenomena occurring at the group level. One important distinction will cut across the domains of solitary and cooperative tasks, and that is the distinction between performance and productivity. Although many have suggested that time pressure is a liability and hinders *performance*, the evidence reviewed here will show that it can be beneficial for *productivity*. In

particular, time constraints can help maximize productive output by cutting people off when better performance is no longer worth the continued time commitment.

Performance vs. productivity

The key distinction running through this paper differentiates performance and productivity. Performance refers to the quality of some product without regard to the time or costs that went into producing it. For example, the number of correct answers on a test would be a measure of individual performance. The number and quality of ideas generated by brainstorming together is an example of group performance. It is important to note also that there can be multiple measures of performance. A team's work can be evaluated on the basis of how many widgets it turned out or how many reports it produced, but also on the basis of how cohesive the group was or how the team affected the work of other teams around it.

Productivity is performance per unit time. For example, standardized test scores are based on the number of correct answers within a given time limit. Another example comes from research on brainstorming: Critical assessment of the value of brainstorming for producing ideas must include a measure of the number of ideas generated *per person hour* (Gallupe, Bastianutti, & Cooper, 1991). Prior research on the effects of time pressure has too often focused on performance without considering the question of productivity. The question of productivity directs attention to utility: Individual and group outcomes must be evaluated on the basis of productivity to assess whether their products are commensurate with the investments that produced them. The value of the products of human labor must be compared with the costs of generating them. We begin our exploration of the consequences of time pressure in groups by

considering its effects on individual performance. This will serve as the foundation on which we then build our analysis of time pressure's role on group and team performance.

THE EFFECT OF TIME PRESSURE ON SOLITARY PERFORMANCE

Time pressure, in the form of both final deadlines (i.e., a fixed time limit marking an end to some endeavor, like the end of a soccer game) and time costs (the fact that whatever task one is doing currently is time that could be spent doing something else), often impairs solitary performance (Ariely & Zakay, 2001; Payne, Bettman, & Johnson, 1988; Payne, Bettman, & Luce, 1996). Time pressure motivates people to seek closure more quickly, constrains the choice of possible decision strategies (Beach & Mitchell, 1978), and limits the search for potential solutions (Bowden, 1985). Decision makers under time pressure tend to gather less information and act more quickly (Christensen-Szalanski, 1980). As a result, they are less likely to revise their initial impressions (Heaton & Kruglanski, 1991), less likely to deviate from habitual modes of attribution (Chiu, Morris, Hong, & Menon, 2000), more likely to rely on cognitive heuristics (Kruglanski & Freund, 1983), are less accurate (Arkes, 1991; Kelly & Karau, 1993), and are less confident in the accuracy of their decisions (Christensen-Szalanski, 1980). When making choices, people under time pressure focus on information relevant to negative outcomes rather than both negative and positive outcomes, focus on ruling options out rather than in (Ben Zur & Breznitz, 1981; Wright, 1974; Zakay & Wooler, 1984), and tend to gravitate towards the elimination-by-aspects decision strategy which Tversky (1972) found to be flawed. Thus, there is strong converging evidence that time pressure is detrimental to solitary performance.

Time pressure's effects on performance are generally attributable to the constraints it imposes on cognitive capacity (Moray, Dessouky, Kijowski, & Adapathya, 1991). People have limited cognitive and attentional resources (Fiske & Taylor, 1991), and each task requires a set

of choices regarding how to allocate those limited resources. When time is restricted, to save cognitive resources, people are likely to use heuristic processing strategies (or "mental shortcuts") instead of slower, more deliberative cognitive processing. A problem with using heuristics is that, compared to slower cognitive processing strategies, heuristic processing tends to be more vulnerable to biases and systematic errors (Chaiken, 1980; Johnson, Payne, & Bettman, 1993). For example, people tend to show stronger primacy effects when they are under time pressure, focusing too much on whatever they learned first (Kruglanski & Freund, 1983). People under time pressure are more likely to rely on stereotypes to judge others (van Knippenberg, Dijksterhuis, & Vermeulen, 1999). People under time pressure are also more vulnerable to anchoring biases (Kruglanski & Freund, 1983). Even choices between decision-making strategies take cognitive resources, and time pressure reduces the tendency to revise earlier patterns of decision making to adapt to tasks requiring new solutions (Luchins, 1942; Ordoñez & Benson, 1997). Basically, final deadlines limit the possibility for a thorough search for potential solutions (Bowden, 1985), and increase the probability of well-learned, simple, or routinized behaviors.

The above evidence has shown rather convincingly that time pressure usually hurts performance on any given task. However, taking more time on all tasks is obviously not optimal either because people care not only about performance on a single task but also about *productivity*—getting the most done in the limited time we have. The implications for time pressure on productivity need not be negative. The research demonstrates that when people are under time pressure, they select decision strategies that require fewer cognitive resources but that are more prone to error. However, the selection of these flawed strategies may be perfectly rational if the reductions in performance are outweighed by the benefits of increased speed

(Johnson, et al., 1993). For more insight into this tradeoff, we turn to research on Parkinson's Law.

Parkinson's Law and Productivity in Solitary Performance

Quite a bit of research on time pressure has tested the validity of Parkinson's Law in describing the productivity of individuals under time pressure. Parkinson's Law, attributable to British historian C. Northcote Parkinson (1957), states that work expands to fill the time available for its completion. If allotted ten minutes to do an assignment, people will take ten minutes to complete it. If allotted thirty minutes, people will take thirty minutes to complete it, making the rate of work (i.e., productivity) inversely proportional to the time available. In other words, Parkinson's law suggests that people try to maximize performance by taking the full time allotted to them even though doing so will hinder their productivity.

The strong form of Parkinson's Law is obviously wrong because as time shrinks to zero the speed of work does not go to infinity. To pick but one example, limiting a novice pianist's practice time to less than a second does not make the novice learn to play that much faster. However, in its weak form Parkinson's Law predicts that more time will be spent on a task when more time is available. This prediction is supported by a great variety of research beginning with Aronson and Gerard (1966). Aronson and Gerard allowed their participants either 5 or 15 minutes to prepare a speech on a given topic. Not surprisingly, those given more time took longer to prepare their speeches. In addition, those given 15 minutes on the first trial took longer to prepare another speech when told they could take as long as they needed. Other studies have also included measures of performance with similar experimental manipulations, and the data consistently show that tighter final deadlines produce lower absolute performance but faster rates of performance (Bowden, 1985; Freedman & Edwards, 1988; Kelly, 1988; Zakay & Wooler,

1984). Another good example of this pattern is from experiments in which individuals were given anagrams to solve (Kelly, 1988). When participants were given a 5-minute time limit, they solved an average of 23.4 anagrams, or 4.7 per minute. When they had 20 minutes to work, however, their performance nearly doubled to 44.4 anagrams solved, while their productivity (the ratio between performance and time) was cut in half, to 2.2 anagrams per minute. More time was beneficial for performance—people solved more anagrams—but note that performance did not improve linearly. Four times as much time yielded only twice as many anagrams solved. Productivity, which is the *rate* of work or the ratio of performance over time, was better with tighter time constraints.

Why does time pressure increase productivity? Researchers have assumed that increased productivity on tasks with shorter final deadlines can be attributed to increased effort. Some have pointed out that final deadlines increase a task's difficulty, and that achievement goals tend to be higher for difficult tasks than for easy tasks (Bryan & Locke, 1967). Others, however, avoid reliance on such a goal-setting mechanism, and suggest that time pressure naturally elicits increases in the pace in activity, even if people aren't consciously pursuing a higher productivity goal (McGrath & Kelly, 1986). The logic underlying both these arguments rests on the untested assumption that performance is proportional to the time spent working (constant performance rate over the duration of the task). For example, if Kelly's (1988) participants solved 2.2 anagrams per minute for each of the 20 minutes they had, then the increase to 4.7 anagrams per minute under the 5-minute deadline must have represented an increase in their rate of work under the shorter deadline. But another obvious possibility, untested in prior research, is that productivity may be highest early on. It is possible, for instance, that even in the 20 minute condition, participants solved 23.4 anagrams in the first 5 minutes (a rate of 4.7 anagrams per

minute), then solved only 21 anagrams in the next 15 minutes (an overall productivity of 2.2 per minute).

There are at least four reasons why we should expect productivity to be highest at first:

1) Ceiling effects may limit later performance. If there is more than enough time to accomplish a task and the time-performance curve approaches a performance ceiling, more time spent working will not produce a significant increase in performance. Variations of final deadlines within this range will have no impact on performance. Similarly, after you have solved a crossword puzzle, it is not possible to improve your performance by working on it more. Note that ceiling effects will only be relevant for optimizing tasks of limited scope and not for maximizing other types of tasks (Steiner, 1972). If you are trying to solve as many crossword puzzles or knit as many sweaters as possible, ceiling effects will not place hard limits on performance.
2) Although more time is generally better for performance, fatigue is likely to reduce the rate at which performance improves over time.
3) If people follow the common and sensible strategy of solving the easy problems first when all problems have equal value or of approaching a complex problem by solving the most basic elements first, then performance will slow over time as the problems get more difficult.
4) The fourth reason that performance may not necessarily increase with time has to do with evidence suggesting that spending an inappropriately large amount of time on a task can actually impair performance (Payne, Samper, Bettman, & Luce, 2008). More time can reduce performance if that time is spent thinking about factors for which further thought is disruptive (Dijksterhuis, Bos, Nordgren, & van Baaren, 2006; Wilson, Dunn, Kraft, &

Lisle, 1989). Too much time spent analyzing and explaining one's attitudes towards different drinks (Wilson & Dunn, 1986), varieties of jam (Wilson & Schooler, 1991), and even romantic partners (Wilson & Kraft, 1993) can reduce the quality of subsequent judgments. Researchers have explained these decrements in judgmental performance by arguing that excessive introspection can lead people to include in their decision unimportant factors that ought properly to be ignored (Wilson, Hodges, & LaFleur, 1995). In this vein, it is important to remember that greater amounts of time allow for the achievement of multiple aims. Although work under time pressure tends to be task-focused, unpressured work allows for relaxation, socialization, introspection, and distraction.

In sum, evidence suggests that performance and productivity follow the patterns illustrated in Figure 1. Performance increases over time for most tasks, but at a decreasing rate. The longer one works at something, the better the final product, but the first hour accomplishes more than the tenth hour. Productivity is highest when work begins, and decreases with time. This relationship is illustrated by the performance curve in Figure 1, and can help explain differences in productivity with different final deadlines. If a final deadline forces an end to work after just a short time, then the average productivity in that interval will be higher than if work is allowed to continue a long time.

The contribution of this approach is that we can then assess the utility of continued work. If the time cost associated with work is uniform, then we may simply subtract this time cost from the utility of performance to assess the utility of work. The important feature to note is that although the time cost of continued work is roughly linear with time (i.e., there are always other tasks to do), if the performance curve is concave, the utility curve has a peak. This peak is the

optimal deadline. This is the point at which the marginal utility of performance is equal to the marginal cost of continued work. The location of this peak depends on the rate of work, the value of that work, and the cost of getting the work done. Imagine, for example, that a young adult working at a farm gets paid $.01 for every apple he picks. His time cost is an opportunity cost: he is forgoing the $10 per hour wage he could make at another job working at a hotel. After he has picked the "low-hanging" fruit and his farm wage drops below $10 per hour, he should stop picking apples and go to work at the hotel. Naturally, differences between people, tasks, and contexts make it necessary to measure work rates, assess the value of work, and determine the time cost of work in each context.

The question then becomes how long the deadline should be. Should the young adult set a deadline on his apple-picking work? A rational analysis would prescribe that if additional effort can increase performance, then work should continue as long as it's worth it (that is to say that the value of marginal increases in performance exceeds the marginal cost of doing the work in time, effort, and opportunity costs). Optimal final deadlines maximize utility. As Simon (1947) pointed out, the rationality of decisions is necessarily bounded by the costs associated with gathering information, analyzing data, predicting outcomes, and choosing among alternatives. You should stop working on polishing that grant application when it does not increase the expected value of applying, relative to the benefits of doing more research or extra teaching. The most effective and productive decision-making processes maximize benefits while minimizing costs. This means local optimization within some limited domain, since considering all the possible alternatives is too costly because it takes too much time (Simon, 1947). Studies that measure utility over time have consistently come to the conclusion that there is an optimal time limit that maximizes utility (Bowden, 1985; Freedman & Edwards, 1988; Kelly & McGrath,

1985). Assuming that time costs accrue linearly with time, then the utility function will have the shape of the middle curve in Figure 1.

If each task has an optimal deadline, one must ask the practical question of how to determine exactly what it is. The clear answer is that the optimal deadline should coincide with the point at which the marginal costs of continued work become equal to or greater than the value of marginal increases in performance associated with continued work. In terms of Figure 1, work should stop at the inflection point on the utility curve where it goes from increasing to decreasing. Every scholarly paper requires some polishing, and we all know scholars who err on either side of the optimum. Some impatient academics routinely send papers out too quickly before they have been sufficiently edited. Then there are those who never submit papers for publication because they want each paper to be perfect before it goes to a journal. Determining exactly how long the deadline should be, in terms of minutes or hours or weeks, however, will depend on a good deal of data surrounding performance patterns over time on the specific task in question, as well as the costs of continued work. These dimensions are also likely to vary between people as well as between tasks. Deciding how long to polish a paper before submitting it depends on several obvious factors: how polishing affects the probability of publication, what other papers you could be working on, how much those efforts could contribute to their likelihood of publication, and your impatience to get papers out—perhaps because of an impending tenure decision. Estimating these quantities must entail some subjectivity and guesswork, but this uncertainty is still probably better than relying on the happenstance influence of norms or rules of thumb that ignore the particulars of your situation.

TIME PRESSURE IN COOPERATIVE INTERACTION

The rigidity effects (or reliance on stereotypes) shown to affect individuals under time pressure are also evident in the behavior of groups and organizations (Staw, Sandelands, & Dutton, 1981). Evidence indicates that the relationship between time and performance in groups is similar to that for individuals: Groups show an overall benefit to performance given more time, but with decreasing marginal returns (Latham & Locke, 1975). Although this makes sense under the assumption that the best predictor of group behavior is the behavior of the individuals that compose them, groups face issues that individuals do not, such as a need for interpersonal coordination. We thus turn to the issue of how groups operate under time pressure, and when possible we compare groups to individuals. Coordination issues are the first and most obvious challenge that groups have when it comes to integrating the inputs of individuals over time, and we consider it first. We also discuss research results on work pacing in groups. This leads directly to a discussion of pursuing multiple goals because groups necessarily have more complicated motives and goals than do individuals. Finally, we seek to apply some of these lessons to meetings, as they represent the forum for group work and a ubiquitous feature of organizational life.

Coordination Issues

Although groups can complete tasks that are more complex and demanding than any solitary individual could ever accomplish, groups have the added burden of having to coordinate its members. Problems that arise from coordination and lead to a reduction in group performance can be considered *process loss* (Okhuysen & Bechky, 2009; Steiner, 1972; Taleb, 2011; Weick & Roberts, 1993). Many coordination problems center on temporal conflicts (Blount & Janicik, 2002; Kwang & Swann, 2010; McGrath, 1990; Perlow, 1998). For example,

one of the reasons that brainstorming groups are less productive than individuals is that they have to coordinate speaking turns. The person who is talking about his or her own idea is preventing others from talking and may be interrupting others' idea-generating processes (Diehl & Stroebe, 1987; Gallupe, et al., 1991). It is furthermore common for different people to perceive deadlines, time pressure, and the need for speedy action differently—having group members who do not recognize the need for speed can slow the productivity of the entire group (Waller, Conte, Gibson, & Mason, 2001).

In addition to process loss from turn-taking and temporal conflicts, time pressure limits groups' opportunities to plan members' contributions, thereby increasing the probability that they will launch into task execution without a coordinated approach (Wittenbaum, Stasser, & Merry, 1996). The group is especially vulnerable to a disorganized or premature task launch when they lack experience working together. Groups may respond to these coordination problems by adopting a more authoritarian structure (Isenberg, 1981) and becoming less tolerant of dissenters (Kruglanski & Webster, 1991) and more prone to groupthink.

Training a group together can help reduce coordination problems and increase productivity because it gives individuals some basis in experience for predicting others' behavior and they can plan their own contributions accordingly (Fine, 1990; Gevers, van Eerde, & Rutte, 2001; Liang, Moreland, & Argote, 1995; Weick & Roberts, 1993). The term "entrainment" describes the process by which people adjust their work to the pace of activity in a group, in much the same way as individuals tend to match their pace to that of other pedestrians on a crowded sidewalk (Kelly, 1988; Kelly & Karau, 1993; McGrath & Kelly, 1986). One result may be that groups move through phases of task coordination together and establish a pattern (Ancona & Chong, 1996; Gersick, 1988, 1989).

If groups rely on entrainment to coordinate their actions, one would expect that once a group established some routine pace of work that the pace would then be resistant to change. Research has produced some support for the rate persistence hypothesis (McGrath, Kelly, & Machatka, 1984). Groups of three participants generated creative and unusual uses for common objects (e.g., uses for a brick other than building a house). Groups produced as many uses for the objects as they could in trials of 4, 8, and 12 minutes in length. Groups that had time limits of 4-8-12 tended to produce more uses per minute across all final deadlines than groups that had time limits of 12-8-4 (Kelly & Karau, 1993). The results show first that groups were more productive (generating more ideas per minute) the shorter the trial, which fits with the idea that tighter deadlines are good for productivity. Second, the results show evidence of rate persistence: high early productivity established during the shorter (4 minute) timeframe carried over to high later productivity when the timeframe was longer. Participants continued to work quickly, as though they only had 4 minutes, even when they had more time. Similarly, slow productivity established when the timeframe was initially long (12 minutes), carried over to low later productivity when the timeframe was shorter and the pace would have needed to increase to make up for it. This rate persistence effect has also been shown in other group work, such as writing creative essays (Kelly & McGrath, 1985) and solving anagrams (Kelly & Karau, 1999). These studies provide clear evidence of rate persistence in groups, but what causes it? Is rate persistence a product of entrainment, or social coordination, as some researchers have posited, or is it merely a byproduct of individual work patterns?

Research at the individual level shows that individuals demonstrate exactly the same tendency of rate persistence in their performance across trials as groups (Aronson & Gerard, 1966; Aronson & Landy, 1967; Bryan & Locke, 1967). If individuals demonstrate rate

persistence, it is possible that rate persistence is *not* influenced by entrainment or social coordination, but instead occurs in groups because individuals do it regardless of whether they are cooperating or coordinating with others.

Work Pacing

How quickly groups anticipate having to work is an important influence on how they pace their efforts. Therefore, an important question is whether groups show the same planning fallacy as do individuals—believing that plans will be carried out more quickly than they often are (Buehler, Griffin, & Ross, 1994). The answer is an emphatic yes. Indeed, groups tend to show an even stronger planning fallacy (Buehler, Messervey, & Griffin, 2005). Individuals are routinely optimistic regarding the speed with which they will get work done. Groups are even more optimistic, perhaps because of added social pressure to give a desirable response (e.g., to say the task will be done quickly) when others are around (Pezzo, Pezzo, & Stone, 2006). The planning fallacy has profound implications for how people manage their time together.

One way to avoid the planning fallacy is to have an external deadline rather than ask the people involved to make one themselves. For example, a teacher should have students turn in assignments on specific days spaced evenly throughout the semester rather than let students choose when to submit them. If allowed to choose, they do not leave themselves sufficient time at the end of the semester because they incorrectly estimate the amount of time the assignments will require (Ariely & Wertenbroch, 2002). An external deadline (set by someone or something with a better vantage point) will force action and eliminate the problems associated with the planning fallacy.

Given the value of deadlines and how frequently people encounter them, it is surprising that people are poor at setting optimal deadlines for themselves. Why this is the case has partly

to do with excessive optimism regarding their discipline and work productivity in the future, but it is also caused by the fact that people are not very good at anticipating the beneficial effects of deadlines for productivity on themselves and their groups. In a study of participants in a simulated negotiation situation, participants wrongly believed that a time deadline would hurt their outcome more than it would hurt their opponent's outcome. Participants were even worse at anticipating the effects of deadlines on the behavior of other people and other groups (Moore, 2005). People seem to have an expectation that deadlines will constrain them and leave them at a disadvantage. In light of evidence that deadlines can actually help planning and productivity, people would be wise to reconsider their distaste for deadlines.

Pursuing Multiple Goals

How groups use their time depends on their goals, and groups necessarily have more complicated motivations and goals than do individuals. Groups serve numerous functions, and not all of a groups' goals can be pursued simultaneously (McGrath, 1990). Time pressure may force increased attention to some tasks at the expense of others, as proposed by the attentional focus model of time pressure in groups (Karau & Kelly, 2004; Kelly & Karau, 1999; Kelly & Loving, 2004). A group under time pressure may work at a furious pace to maximize output without regard for the quality of that output. For example, researchers had groups of three people formulate written essays on current events and varied the length of time the group had to work on their essays, either 10, 20, or 30 minutes. The researchers measured performance in terms of length, creativity, and adequacy. Although groups with short deadlines were able to produce essays of adequate length, creativity took longer to achieve, suggesting that the goal of producing something of adequate length took precedent over the goal of writing something creative (Karau & Kelly, 1992). Time pressure might be costly to performance but beneficial to

productivity because under time pressure, production goals are given priority. Similarly, McGrath (1990) argued that groups with more than enough time to complete their task-related work would put more attention and effort into second-order goals of group well-being and member support functions, which might have received short shrift in a task-focused race under time pressure (Zaccaro, Gualtieri, & Minionis, 1995).

Other research consistent with this idea shows that group polarization (the tendency to make extreme, one-sided decisions) depends on group time limits and the length of discussion (Bennett, Lindskold, & Bennett, 1973). The argument is that groups whose discussions are limited by tight final deadlines focus on shared perspectives and on building consensus quickly compared to groups who have more time, and this tendency results in greater group polarization. Time pressure also exacerbates the common-information bias, in which group discussion tends to focus on information that the group members share (Gruenfeld, Mannix, Williams, & Neale, 1996; Stasser & Titus, 1985, 1987). Unique, unshared information is more likely to emerge later in discussion (Larson, Christensen, Abbott, & Franz, 1996; Larson, Christensen, Franz, & Abbott, 1998). These ideas are consistent with the threat-rigidity effects of Staw et al. (1981), who argue that groups under heavy time pressure will revert to what they know best and respond in well-learned ways to threats or pressure.

Finally, it is important to note that the question of productivity takes on increased importance in group settings simply because there are more people involved. For example, when time is being wasted at a meeting, the opportunity cost of that time must be multiplied by the number of people present. Groups can accomplish more than individuals, but groups can also waste more time. Appropriate deadlines can reduce the amount of time wasted and maximize productivity.

MEETINGS

Meetings are such an important and ubiquitous feature of organizational life that they deserve their own mention. The first thing many people think of at the mention of a meeting is time costs—the opportunity cost of the time spent, and all the other things they could be doing if they were not meeting. Indeed, when managers entering a meeting are asked what they want, the most popular answer may be that they want the meeting to adjourn punctually (Dao, 2011). Long, pointless meetings may be the very best way for an organization to waste the time of and impair the productivity of its members, in part because the time costs must be multiplied by the number of people present to compute its full cost. Given the time costs associated with meetings, it becomes especially valuable to think about how to set final deadlines appropriately to maximize the meeting's utility.

Group decision rules vary along a wide continuum from dictatorship to consensus, and some types benefit from optimal deadlines more than others. Decisions made by an individual "dictator" can be faster and more efficient than decisions made by a group, even when that individual is thorough in his or her consideration of information and alternatives (Eisenhardt, 1990). Dictators benefit from setting optimal deadlines. So too do autocrats, who have the power to limit deliberation and set a deadline for the group. By contrast, decisions made by consensus necessitate the assent of all the members of the group. They therefore take longer, draw out more information, and allow greater opportunities for dissent. Consensus decisions are not amenable to deadlines, since any one member can delay consensus by withholding assent. Nevertheless, leaders of all kinds, including consensus decisions, can guide discussion and manage group expectations regarding the pace of progress by being explicit about time limits. So what is the right deadline to set in a meeting? The answer to this question comes from

comparing the benefits of holding the meeting with the opportunity costs of group members' time, employing the framework proposed in this paper.

LOOKING FORWARD

When considering the question of whether time pressure is beneficial or an obstacle for accomplishing tasks, previous research has yielded mixed results. However, drawing a distinction between performance and productivity as we have attempted to do in this chapter clarifies the role that time pressure plays. When organized in this way, past research shows a clearer pattern: time pressure generally hinders performance but helps productivity. We argue that distinguishing performance from productivity is a necessary step towards the eventual goal of being able to determine optimal deadlines and ideal durations of meetings. We hope that future research will conceptualize and measure performance and productivity separately.

An interesting question to explore might be when does performance actually *improve* with time pressure. As we mentioned earlier, there are some instances when taking time and cognitive effort to deliberate could yield suboptimal decisions and outcomes (Payne, et al., 2008; Wilson, et al., 1989). A time deadline that stops people before they have a chance to "overthink" could be beneficial to performance. More research is needed to determine the types of tasks in which more time impedes performance and what the cutoff or deadline should be in these exceptional cases.

Another avenue for future research is to explore how time pressure and attention to time changes people's moods or attitudes toward the task they are working on. For example, being unaware of the passage of time is associated with higher intrinsic motivation, the belief that one is completing a task out of one's own uncoerced desire to do so (Conti, 2001). Thus, deadlines, which put time at the forefront of people's minds, might undercut intrinsic motivation. Working

under a deadline might make people believe they are completing a task because they have to and not because they want to. On the other hand, working at a fast pace to meet a deadline could cause people to think quickly, focus rather than allow the mind to wander, and believe that time has passed quickly rather than slowly, all of which have been associated with increased happiness and/or enjoyment of the task at hand (Killingsworth & Gilbert, 2010; Pronin, Jacobs, & Wegner, 2008; Sackett, Meyvis, Nelson, Converse, & Sackett, 2010). As one example of this research, study participants listened to a song they liked while watching a song timer that was either sped up or slowed down by 20%. When the timer counted up quickly, making it seem like time was passing quickly, participants reported liking the song more than when the timer counted up slowly, making it seem like time was dragging. The song itself did not change, only the perception of time and what that meant to the participants. How deadlines change the way time is experienced, whether the experience of time passing quickly is always enjoyable, and whether this enjoyment would offset potential negative side effects of deadlines (e.g., stress) warrants further discussion. There are many interesting unanswered questions regarding how deadlines and people's interpretation of the passage of time affect individual and group progress on different types of tasks.

More research on deadlines and groups would also be useful to organizations and managers. Questions to explore in this domain include: when does the vast amount of research on individuals generalize to groups and when does it not? Does the effect of time pressure on groups change depending on the type of task at hand (e.g., a complicated or simple task)? What role do interim deadlines and meetings play on the tradeoff between performance and productivity? How might group dynamics change when group members work together

repeatedly (e.g. Gevers, Rutte, & Van Eerde, 2006)? These questions essentially ask for information on the role of time pressure in more complex, real-world situations.

CONCLUSIONS

Time pressure constrains cognitive capacity and the ability to get things done because both thinking and acting take time. Although training can improve performance under time pressure (Lin & Su, 1998), time pressure generally leads to impairments in performance in solitary tasks. Time pressure is ubiquitous, and people have cognitive strategies for dealing with it, but they come at a cost. These strategies tend to trade accuracy for speed by increasing motivations to seek early closure (Kruglanski & Webster, 1996), with resulting increases in primacy effects (Heaton & Kruglanski, 1991), increased reliance on stereotypes (van Knippenberg, et al., 1999), and increased use of well-learned cultural response patterns (Chiu, Hong, & Dweck, 1997; Luchins, 1942). Patterns in performance generally show decreasing marginal returns to time (Bowden, 1985; Kelly, 1988). This means that performance rates are highest early in a task, and decrease over time. Practically, that means that more time will generally be associated with higher performance. However, as long as time has some cost, then there exists some time limit that maximizes productivity.

In groups, a number of the consequences of time pressure appear to be a direct result of time pressure's effects on the individuals in the group. Groups (Kelly & McGrath, 1985), like individuals (Aronson & Gerard, 1966), show persistence in rates of performance across tasks. Groups (Karau & Kelly, 1992), like individuals (Bowden, 1985), show attentional narrowing and increased need for closure under time pressure. However, time pressure also increases problems of interpersonal coordination in groups. In response to time pressure, groups adopt a more

stratified, hierarchical structure (Isenberg, 1981) and become less tolerant of dissenters (Kruglanski & Webster, 1991).

This review has attempted to clarify what we do know by reviewing the effects of time pressure in both solitary and cooperative tasks. As the evidence reviewed here demonstrates, time pressure tends to have a deleterious effect on performance. At the same time, appropriate use of final deadlines can maximize productivity. Deadlines can catalyze work that would have otherwise languished and it can stimulate groups to take action where they might not otherwise have done so. Individuals or organizations seeking to implement final deadlines that maximize productivity would do well to understand both the shape of the performance curve and the cost of time.

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Figure 1. Performance, productivity, and utility of work as a function of time