Everything you always wanted to know about time management

(but didn't have time to ask)

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PRÉCIS

I've structured my dissertation around these three questions. What do we know about time management? Does it actually work? What, exactly, is time management? These are fundamental questions; addressing them is necessary pave the way toward a more thorough, evidence-based and, ultimately, socially useful conception of time management.

The first article asks the question: What do we know about time management? To address this question, my coauthor and I reviewed the literature. We found that scholars usually assess time management's effectiveness by its impact on performance (in school and at work) and wellbeing. However, findings were mixed—we couldn't really tell whether time management boosts performance and enhances wellbeing. We also noticed that the time management literature was surprisingly narrow: there is a plethora of useful insights in sociology, psychology, and behavioral economics that the time management literature had almost completely overlooked. To address this issue, we integrated these insights spanning various disciplines to show how internal (e.g., individual differences) and external factors (e.g., national culture) can affect the way we manage time. Our main point is that unless researchers control for these factors, studies will keep yielding confusing results. The first article of this dissertation thus not only reviews the state of the literature but also offers novel perspectives to guide future research.

The second article asks the question: Does time management actually work? To find out, we conducted a meta-analysis on the topic. In line with the first article, we found that most studies assess time management's effectiveness by its influence on performance and wellbeing. The meta-analysis is, of course, more conclusive than the first article for three reasons. First, the meta-analysis is more comprehensive, covering more than 50,000 people over many decades. Second,

the meta-analysis allows for moderation testing: we can control for factors that affect time management outcomes, such as national culture. Third, the meta-analysis, unlike our qualitative review, is quantitative: we can determine not just whether time management works, but also, and importantly, to what extent. By and large, time management works. It has a moderate impact on performance (both in professional and academic settings) and an even stronger impact on wellbeing (especially life satisfaction). The findings of this meta-analysis also challenge our intuitive ideas of what time management is and what it does. We elaborate on this last point in the third article.

The third article asks the question: What is time management? One may point out that this question should have been addressed at the very beginning of the dissertation. That is a valid point. However, figuring out first what we know about time management (and whether it works) has led me to an interesting conclusion: the literature has a very narrow, ahistorical, Anglo understanding of time management. Only in drawing from sociology, history, psychology, philosophy, economics, and gender studies, at the very least, can we get a fuller picture of time management. Thus, defining time management only at the end of this dissertation makes sense: I needed to first review the literature, figure out what was missing, and take the time to draw from other disciplines to acquire a broader understanding. Only after doing all this was I able to develop a definition of time management that, I think, applies not only in modern North American settings, but also in a wide variety of cultures and historical periods. The third article, of course, goes way beyond just defining time management. This theory paper uses cultural evolution principles to describe how time management, as an idea, evolves in different settings. Just like genes, time management can survive or die out depending on the surrounding environment. The main advantage of this theory

is that it goes beyond the one-size-fits-all approach to time management that many scholars have used until now. There is no one best way to manage time. Rather, people use time management strategies that more or less fit their environment—maladaptive strategies perish; adaptive ones prevail. Overall, the appeal of this paper is not so much that it addresses the question of time management *is* as the question of what time management is *for*.

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CONTRIBUTION OF AUTHORS

I wrote the entirety of the last two articles of this dissertation, although I've received substantial feedback from my supervisor and coauthor, Dr. Alexandra Panaccio. This is why I used "we" instead of "I" in both articles. Alexandra has provided me with valuable insights at each iteration which have significantly contributed to bringing this dissertation to its current form.

I co-wrote the first article with Dr. Herman Aguinis. After putting together an initial outline, I extracted insights (e.g., effect sizes and conclusions) from our set of empirical studies. Dr. Aguinis provided ample feedback on how to frame the manuscript, interpret effect sizes, and contributed to the write-up to all drafts leading up to publication. I identified insights relevant to time management in various disciplines (e.g., sociology and behavioral economics) and Dr. Aguinis played a major role in using those insights to formulate new perspectives that helped us make sense of the existing time management literature.

Pour tous les jours d'une vie sans éclat, le temps nous porte. Mais un moment vient toujours où il faut le porter.

– Albert Camus, Le mythe de Sisyphe

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IT'S ABOUT TIME: NEW PERSPECTIVES AND INSIGHTS ON TIME MANAGEMENT[1]

Abstract

Time management has helped people organize their professional lives for centuries. The existing literature, however, reveals mixed findings and lack of clarity as to whether, when, how, and why time management leads to critical outcomes such as well-being and job performance. Furthermore, insights relevant to time management are scattered across various disciplines, including sociology, psychology, and behavioral economics. We address both issues by synthesizing and integrating insightful elements from various fields and domains into three novel perspectives on time management. First, we draw on the sociology of time to describe two key concepts: time structures and time norms. We illustrate how time structures and time norms operate at the team, organizational, and national levels of analysis in influencing time management outcomes. Second, we draw on the psychology of time to show how individual differences including time-related beliefs, attitudes, and preferences affect the way people manage time and, consequently, time management outcomes. Third, we rely on the behavioral economics literature to describe how cognitive biases influence individual time management decisions. Integrating insights from a diverse set of fields results in a better understanding of past research and allows us to re-interpret conflicting results prevalent in the time management literature. Finally, we offer directions for future research and discuss implications for how organizations and individuals can implement

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interventions resulting in a stronger and positive relation between time management and desirable outcomes.

INTRODUCTION

The Roman philosopher Seneca (2014) lamented that people trifle with time, because time is "an immaterial thing that doesn't appear to the eyes, and for that reason it's valued very cheaply." Two thousand years later, people still have "neither the necessary economic sophistication nor the perceptual apparatus to account for time in the same way as they account for money" (Soman, 2001).

Systematically accounting for time, or what is commonly referred to as time management, has been studied by numerous disciplines. For example, in sociology, researchers have examined the impact of managing one's time on social coordination among people (Southerton, 2003). A typical approach adopted by sociology researchers is Giddens's (1984) structuration theory, which posits that people are simultaneously constrained by but also shape socially constructed schedules (e.g., Flaherty, 2011). In developmental psychology, researchers have looked at how family stability in early childhood later influences adults' time management (Malatras, Israel, Sokolowski, & Ryan, 2016). Researchers in developmental and other psychology subfields usually study time management through the lens of time-related constructs such as discounted utility (König & Kleinmann, 2007) and procrastination (Ariely & Wertenbroch, 2002; Van Eerde, 2015). In history, some have argued that the industrial age came about not because of the steam engine, but because of our increasing willingness to abide by our own schedules (Mumford, 2010; Thompson, 1967). Historians often use a power perspective to frame time systems (e.g., calendars, work hours) as a locus of struggle and negotiation between opposing groups (Martineau, 2015).

In the particular case of the field of management, Peter Drucker (1967) wrote that "Everything requires time. It is the one truly universal condition. All work takes place in time and uses up time" (p. 22). Unsurprisingly, then, time management plays an important role in numerous sub-domains such as work-life conflict (Adams & Jex, 1999), job performance (Barling, Cheung, & Kelloway, 1996), cross-cultural management (Nonis, Teng, & Ford, 2005), stress (Häfner, Stock, Pinneker, & Ströhle, 2014), creativity (Zampetakis, Bouranta, & Moustakis, 2010), life satisfaction (Macan, Shahani, Dipboye, & Phillips, 1990), and even unemployment (Wanberg, Griffiths, & Gavin, 1997).

The description above shows that key theoretical and empirical insights that can enhance our understanding of time management are dispersed across many disciplines such as sociology (Flaherty, 2003), psychology (Burt & Kemp, 1994), childhood education (Liu, Rijmen, MacCann, & Roberts, 2009), management (Claessens, Van Eerde, Rutte, & Roe, 2004), consumer behavior (Feldman & Hornik, 1981), to name a few. The scattered state of the literature hinders progress because insights from some disciplines and domains are seldom taken into account by others. For instance, Britton and Tesser (1990) studied time management from an educational psychology perspective, and according to *Web of Science* over 91% of this paper's citations were linked to psychology and education outlets, but only 2% were made by sociology-focused publications. Conversely, Zerubavel's (1979) sociological insights on time garnered over 61% of its total citations from sociology outlets, but a mere 5% from psychology-oriented outlets. Furthermore, as we describe later in our manuscript, the time management literature reveals conflicting findings as to whether time management leads to critical and highly desirable outcomes such as enhanced well-being and improved job performance.

OVERVIEW

The goal of our manuscript is to synthesize and integrate theoretical and empirical insights relevant to time management from multiple disciplines and domains in a way that is accessible to a non-specialist audience as well as scholars inside and outside the field of management. This integration of diverse theories and advances based on empirical evidence provides a framework that informs time management in new ways, allowing us to re-interpret and better understand variations and conflicting findings in past studies and also guide future conceptual and empirical research.

Our manuscript is organized as follows. First, we define time management and dispel some common myths. We show that, for instance, contrary to popular belief, time management is no fad from the 1970s; rather, time management has been of interest to philosophers, businesspeople, and politicians for centuries. Second, we review the evidence regarding the relation between time management and two critical and widely examined outcomes in management and other fields: well-being and performance. Results exhibit much variation, are often contradictory, and reveal a murky literature in need of clarification. Third, we integrate dispersed insights from multiple disciplines to offer three novel perspectives that advance our understanding of time management. In particular, we focus on time structures and norms, two key concepts from the sociology of time that help us understand how environmental factors influence time management. Then, we discuss time-related individual differences—key concepts from the psychology of time that heavily influence people's temporal behaviors. We subsequently proceed to examine how temporal decision-making, a sub-field of behavioral economics that is also informed by psychology and social cognition, sheds light on the underlying dynamics of time management. Fourth, using our framework based on our integration of insights from these multiple disciplines, we make sense of

seemingly conflicting findings. For instance, our perspective on time structures and norms shows how employees who exhibit stellar time management might not necessarily receive excellent performance appraisals in organizations where time norms prioritize long work hours and "face time" rather than actual efficiency. As a result, studies that fail to take into account organizations' time structures and norms produce inconsistent findings on whether time management does, in fact, have a positive effect on job performance. Similarly, our time-related individual differences perspective shows that some people simply are less likely to benefit from time management training than others. Thus, failing to consider individual differences compromises the validity of statements regarding time management training effectiveness and its various outcomes. What's more, our temporal decision-making perspective shows that some byproducts of time management training (e.g., the temporal sunk-cost effect) might actually be detrimental to job performance. In sum, our framework based on diverse disciplines management domains, and also adopting a multilevel perspective, allows us to gain new perspectives and insights regarding the meaning of time management as well as whether, when, how, and why time management leads to critical outcomes such as well-being and job performance. Finally, we conclude by offering directions for future research on time management as well as practical implications for organizations and individuals.

TIME MANAGEMENT: DEFINITION AND OUTCOMES

Time management predates the modern Gregorian calendar and the mechanical clock. As mentioned earlier, scholars and laypeople alike have reflected on how to best use time for centuries (Alberti, 1971; Aurelius, 1949; Bennett, 1910; Franklin, 1964; Penn, 1794; Seneca, 2014; St. Benedict, 1975), a fact that attests to the perennial pervasiveness of time management. There is, however, no widely established definition of time management (Claessens, Van Eerde, Rutte, &

Roe, 2007). Some define it as "as a combination of time assessment, goal setting, planning, and monitoring activities" (Häfner & Stock, 2010) or a "self-controlled attempt to use time in a subjectively efficient way to achieve outcomes" (Koch & Kleinmann, 2002), while others do away with the need to define time management altogether (Barling et al., 1996; Trueman & Hartley, 1996).

The problem of defining time management is compounded by the fact that different disciplines have slightly different takes on what time management means. In sociology, for instance, the emphasis might be on the structure of personal time whereas in psychology the emphasis might be on the ability to stick to plans and make accurate estimates of how long a task will take. For this reason, we need a definition that subsumes, integrates, and applies to a wide range of disciplines. We adopt a person-centered perspective in which we conceptualize individuals as proactive and intentional agents (Aguinis & Glavas, in press; Rupp, 2011). In line with this perspective, we contend that individuals make decisions about how they allocate time. Accordingly, we define time management as *a form of decision-making used by individuals to structure, protect, and adapt their time to changing conditions*. This definition is consistent with an agentic perspective of time (Granqvist & Gustafsson, 2016). Indeed, calendars, schedules, holidays, semesters, clock time, and weekends are not "brute physical facts" (Searle, 1995); rather, they are social constructions subject to change and negotiation (Berger & Luckmann, 1966; Zerubavel, 1981). At the individual level of analysis, people are arguably free to organize their time as they see fit (Zerubavel, 1976) by drawing on existing time models (Orlikowski & Yates, 2002) or creating their own unique time structures (Flaherty, 2003; Kreiner, Hollensbe, & Sheep, 2009). In fact, sociological research suggests that even when people complain of having little control over their time, the reality is that they often do, but prefer to absolve themselves from

responsibility by denying their ability to manage it (Flaherty, 2011).

We conducted a selective review of the literature by searching for "time management" in *EBSCO*'s *Business Source Complete* database. We also gathered additional sources by identifying papers that used time management measures (Britton & Tesser, 1991; Macan et al., 1990) and articles featured in (Claessens et al., 2007) overview of the literature. Virtually all of the studies focused on two main outcomes of time management: well-being and performance. This emphasis is not surprising because they are key outcomes for individuals and organizations and the focus of most management theories as well as the target of many interventions and practices (Aguinis, Davis, et al., 2016; Grant, Christianson, & Price, 2007; Salas, Kozlowski, & Chen, 2017). The set of articles we gathered in our search divides into two groups of 20 empirical articles, one about well-being, the other about job performance (see Tables 1 and 2). In the following sections, we assess how time management affects these two outcomes. Our intent is not to cover the full breadth of the literature. Rather, because our paper's goal is to integrate and offer new perspectives and insights, we focus on the core conclusions of the literature.

Time Management and Well-Being

Table 1 includes summaries of studies that examined the relation between time management and well-being. Well-being is the experience of "pleasant emotions, low levels of negative moods, and high life satisfaction" (Diener, Lucas, & Oishi, 2002). Bond and Feather (1988) were among the first to study the impact of time management—using their *Time Structure Questionnaire*, which measures the degree to which people's time is structured and purposeful— on various facets of well-being. The authors administered the questionnaire to a cohort of psychology students and found time management to be associated with a stronger sense of purpose, higher self-esteem, better health, and optimism. They also found that managing time was

associated with lower levels of depression, psychological distress, anxiety, and hopelessness, with

effect sizes ranging from $r = -.13$ for anxiety to $r = .65$ for sense of purpose in life. Subsequent

studies found time management to be associated with greater life satisfaction (Macan et al., 1990)

and job satisfaction (Macan, 1994), lower anxiety (Lang, 1992), and lower strain (Jex & Elacqua,

1999).

Authors	Sample	Research Design and Measures	Conclusions
(Bond & Feather, 1988)	Undergraduate psychology students (Sample 1 = 336; Sample 2 = 193; Sample 3 = 217)	Self-report questionnaire	Time management is positively associated with better health ($r = .27$), a sense of purpose ($r = .65$), and negatively related to depression ($r = -.44$), psychological distress ($r = -.37$) and anxiety ($r = -.56$), and positively associated with optimism. ($r = .31$)
(Misra & McKean, 2000)	249 university students	Self-report questionnaire	Time management correlates with less academic stress ($r = .006$ to $-.39$)
(Kelly, 2003)	130 undergraduate students	Self-report questionnaire	Time management is negatively related to worry ($r = -0.21$); although an alternative measure of time management showed no significant correlation ($r = .04$)
(Häfner, Stock, et al., 2014)	177 undergraduate students	Experiment (time management intervention)	Time management training reduces perceived stress (partial $\eta^2 = .03$) and increases perceived control of time (partial $\eta^2 = .03$)
(Häfner, Stock, & Oberst, 2015)	23 undergraduate students	Non-equivalent dependent variable design (time management intervention)	Time management training increases perceived control of time and reduces perceived stress
(Macan, 1994)	Study 1: 353 employees (various organizations). Study 2: 341 undergraduate students	Self-report questionnaire	Time management is related to perceived control of time ($r = -.04$ to $.43$), which in turn relates to increased job satisfaction ($r = .29$) and reduced stress ($r = -.32$).
(Macan, 1996)	44 employees (social service agency)	Quasi-experimental field study (in-house time management training)	Time management training increases perceived control of time and reduces somatic tensions
(Häfner & Stock, 2010)	71 employees (trading company)	Experiment (time management training)	Time management training is negatively related to stress and increases perceived control of time
(Chang & Nguyen, 2011)	111 undergraduate students	Self-report questionnaire	Time management correlates positively with job satisfaction ($r = .31$) and psychological well-being ($r = .31$)
(Adams & Jex, 1999)	522 working adults / part-time students	Self-report questionnaire	Time management correlates with health ($r = .39$) and job satisfaction ($r = .27$) indirectly through perceived control of time and a reduction of work-family conflict
(Lang, 1992)	96 full-time and part-time employees (taking evening business classes)	Self-report questionnaire	Time management correlates with less anxiety ($r = -.22$) but not depression and somatic symptoms
(Jex & Elacqua, 1999)	525 full-time employees / part-time students	Self-report questionnaire	Time management is negatively associated with strain ($r = -.15$ to $-.42$)

(Macan et al., 1990)	165 graduate and undergraduate students	Self-report questionnaire and grade point average	Time management is associated with less role ambiguity ($r = -.47$), somatic tension ($r = -.26$), and with greater job ($r = .26$) and life satisfaction ($r = .23$)
(Claessens et al., 2004)	70 R&D engineers	Self-report questionnaire	Time management is associated with job satisfaction ($r = .30$) and work strain through perceived control of time ($r = -.58$)
(Wanberg et al., 1997)	243 unemployed and employed individuals	Self-report questionnaire (longitudinal)	Time structuring correlates with better mental health among unemployed people ($r = .19$)
(Van Hoye & Lootens, 2013)	231 unemployed people	Self-report questionnaire	Time structuring correlates with psychological well-being during unemployment ($r = -.12$ to $.52$)
(Nonis & Sager, 2003)	201 sales representatives	Self-report questionnaire	Time management correlates negatively with stress ($r = -.19$ to $-.32$)
(Peeters & Rutte, 2005)	123 elementary teachers	Self-report questionnaire	Time management correlates with emotional exhaustion in people who have low autonomy and high work demands ($r = -.17$)
(Nonis et al., 2005)	205 MBA students (U.S. and Sri Lanka)	Self-report questionnaire	Time management correlates positively with job satisfaction ($r = .18$ to $.39$)
(Van Eerde, 2003)	37 trainees	Quasi-experiment	Time management reduces worrying ($\eta^2 = .08$)

Table 1: Summary of selective research on the relation between time management and well-being

Many of these early studies used passive observation designs and, therefore, conclusions about causality were ambiguous (Aguinis & Vandenberg, 2014). Could it be that there is reverse causality and, actually, higher levels of well-being lead to improved time management? (Macan, 1996) was among the pioneers who used experiments to determine whether time management training enhances well-being. She studied workers from a large social service agency who had attended a 2-day training session taught by an in-house instructor and compared them with co-workers who had not undergone time management training. The training session included time management techniques such as learning how to handle interruptions (Lakein, 1973). Her quasi-experimental field study revealed that time management training reduced job-related somatic tensions and increased perceived control of time. A subsequent series of experiments by Häfner and colleagues involving German workers and university students showed that time management training reduced perceived stress (Häfner & Stock, 2010; Häfner et al., 2015; Häfner, Stock, Pinneker, & Ströhle, 2014).

Overall, non-experimental and experimental findings suggest that time management can improve people's quality of life, lower stress, boost job satisfaction, and enhance other facets of well-being (see Table 1). Suggestive though they may be, results are far from conclusive and the existing literature is not sufficiently large to conduct meta-analyses (Aguinis, Pierce, Bosco, Dalton, & Dalton, 2011). For example, if we focus only on studies that link time management measure to job satisfaction, we note quite a few differences in effect sizes. Claessens et al. (2004) reported an effect size of $r = .30$, Macan (1994) ranged from $r = .10$ (non-significant) to $r = .19$ depending on the subscale; and Nonis et al. (2005) failed to find statistically significant effects in their U.S. sample. In other words, while results point to time management being a potential well-being enhancer, results exhibit substantial variability.

In sum, our review suggests that, overall, time management may be useful for well-being enhancement and stress relief. We now turn to the question of whether time management improves performance.

Time Management and Performance

Table 2 includes a summary of studies that have examined the relation between time management and performance. In their pioneering study, Hall and Hursch (1982), for instance, studied the effects of reading a time management manual on four university faculty and staff members. The manual's aim was to help people spend more time on high-priority tasks and less time on meetings and interruptions. The authors also asked participants to record the time they spent on meetings and high- and low-priority activities as well as to report their weekly subjective assessment of effectiveness at work. The main effect of the intervention, the authors found, was a marked increase in time spent on high-priority tasks. With no control group and a sample of only four people, however, results from this study provided preliminary evidence only. Subsequent

research by Claessens et al. (2004) resulted in positive relations between time management and performance (r = .33 and r = .25, respectively) but similarly relied on people's self-reported performance (i.e., employees were asked to assess their own performance compared to that of colleagues along such dimensions as customer relations, communication, and job-related expertise).

Authors	Sample	Research Design and Measures	Conclusions
(Häfner, Oberst, & Stock, 2014)	96 undergraduate students	Experiment (time management intervention)	Time management intervention reduces procrastination (partial η^2 = .21)
(Häfner & Stock, 2010)	71 employees (trading company)	Experiment (time management training)	Time management training has no impact on performance as assessed by supervisors
(Macan, 1996)	44 employees (social service agency)	Quasi-experimental field study (time management training)	Time management training does not lead to more time management behaviors and does not increase job performance
(Macan, 1994)	Study 1: 353 employees Study 2: 341 undergraduate students	Self-report questionnaire	Time management is not associated with job performance
(Macan et al., 1990)	165 graduate and undergraduate students	Self-report questionnaire	Time management is associated with higher self-reported performance as measured both by perceptions (r = .32) and GPA (r = .23)
(Claessens et al., 2004)	70 R&D engineers (semiconductor industry)	Self-report questionnaire	Time management is associated with self-reported job performance (r = .33)
(Barling, Cheung, & Kelloway, 1996)	102 salespeople (car sales)	Self-report questionnaire	Time management alone does not correlate with job performance as measured by objective sales, although time management does interact with achievement striving in predicting sales (r = .32)
(Britton & Tesser, 1991)	90 undergraduate students	Self-report questionnaire (longitudinal)	Time management correlates with academic achievement as measured by GPA (r = -.10 to .39)
(Käser, Fischbacher, & König, 2013)	196 university students	Experiment	Dedicating uninterrupted time to work on some tasks (i.e., quiet time) leads to lower performance
(Hall & Hursch, 1982)	4 participants (university faculty and staff)	Time management intervention without control group	Time management is associated with an increase in time spent on high-priority tasks and self-rated effectiveness
(König, Kleinmann, & Höhmann, 2013)	27 managers (financial sector)	Experimental diary study	Dedicating uninterrupted time to work (i.e., quiet time) leads to higher self-reported job performance (β = .83)
(Nonis et al., 2005)	205 MBA students (U.S. and Sri Lanka)	Self-report questionnaire	Time management is associated with higher self-reported job performance (r = .06 to .26)
(Nonis, Fenner, & Sager, 2011)	201 salespeople (various sectors)	Self-report questionnaire	Time management correlates positively with self-reported job performance (r = .13 to .43)
(Orpen, 1994)	52 supervisors (manufacturing sector)	Experiment (training program)	Time management training increases job performance as assessed by managers' appraisal of participants' activity diaries
(Slaven & Totterdell, 1993)	32 employees (various sectors)	Time management intervention (no control group)	Time management training is not associated with motivation, commitment, and time spent on high-priority tasks
(Woolfolk & Woolfolk, 1986)	81 pre-service teachers (undergraduate seniors)	Experiment (time management training)	Time management training does not increase performance ratings as assessed by cooperating teachers and supervisors

(Trueman & Hartley, 1996)	293 university students	Self-report questionnaire	Time management is associated with overall academic performance ($r = .21$)
(Zampetakis et al., 2010)	186 undergraduate students	Self-report questionnaire	Time management is positively associated with creativity ($r = .48$)
(Rapp, Bachrach, & Rapp, 2013)	212 employees + 41 supervisors (hospitality industry)	Self-report questionnaire	Time management correlates with the influence of helping behavior ($r = .16$) on job performance
(Van Eerde, 2003)	37 trainees	Quasi-experiment	Time management reduces procrastination ($\eta^2 = .10$)

Table 2: Summary of selective research on the relation between time management and performance

Conclusions about the positive effects of time management on performance have not been consistent when studies relied on other types of research designs and measures. For example, Macan (1996) used supervisory ratings (as opposed to self-reports) in her quasi-experimental study and found that time management training failed to boost job performance. More recently, Häfner and Stock's (2010) experimental intervention consisting of a one-day training session featuring exercises and practical cases revealed that time management had no impact on indicators such as timely project completion and overall performance as assessed by supervisors. Barling et al. (1996) used sales as an objective measure of performance in car dealerships and found no direct effect of time management on job performance. Research by Käser et al. (2013) showed that using quiet time, a time management technique in which people dedicate uninterrupted time to work on important tasks (i.e., a form of time protection), actually lowered job performance as measured by the number of errors in a given task.

Clearly, results concerning time management and performance conceptualized as results or outcomes (e.g., sales, project completion) are mixed. However, individual performance can also be conceptualized as behaviors rather than results (Aguinis, O'Boyle, Gonzalez-Mulé, & Joo, 2016; Joo, Aguinis, & Bradley, 2017). For instance, Rapp et al. (2013) study on time management and organizational citizenship behavior concluded that skilled time managers "do a better job of managing their citizenship contributions as well as the reciprocal exchanges that emerge as a consequence of these behaviors." Another study linked time management to higher levels of

creativity (Zampetakis et al., 2010). Lastly, a handful of experiments have shown time management training to reduce procrastination (Häfner, Oberst, et al., 2014; Van Eerde, 2003).

In sum, the existing evidence suggests a complex relation between time management and performance. Time management seems to have more consistent effects on performance defined as behaviors compared to performance defined as results or outcomes. In what follows, we outline novel perspectives on time management that will allow us to discuss and interpret the findings highlighted above.

INTEGRATING INSIGHTS FROM SOCIOLOGY, PSYCHOLOGY AND BEHAVIORAL ECONOMICS

The mixed results described in the previous section mean that we need to better understand the dynamics of time management. To do so, we focus on three research perspectives: time norms and structures, individual time-related differences, and temporal decision-making. Each of these perspectives addresses often-neglected aspects in time management research: time structures and norms consider environmental influences; individual differences describe how time preferences, beliefs, and attitudes affect time management behaviors; and temporal decision-making sheds light on the underlying dynamics of time management itself. By virtue of their focus on different levels of analysis, the perspectives we offer pave the way for bridging micro and macro domains (Aguinis, Boyd, Pierce, & Short, 2011) in future time management research. We elaborate on each of these three perspectives in what follows.

Time structures and time norms

Macan (1994) found relations between job type and time management—the more structured the job (e.g., maintenance staff), the less likely people were to engage in time management ($r = -.20$) or attend time management training seminars ($r = -.25$). Unsurprisingly,

people who occupy highly structured jobs also reported lower levels of perceived control over time. More recently, Claessens et al. (2004) demonstrated that job characteristics such as job autonomy and workload influenced one's perceived control of time and, by extension, job satisfaction, job performance, and stress. A subsequent study by Nonis et al. (2005) adopted a higher level of analysis approach and examined the effects of national culture on time management practices. The authors found that different aspects of time management have different effects on job performance (i.e., self-reported effectiveness in customer relations, sales, and other performance dimensions) and satisfaction depending on whether employees were in the United States or Sri Lanka.

These findings highlight the importance of time structures and time norms, two key concepts in the sociology of time often overlooked in time research in the management and psychology literatures. Time structures are "those external aspects … that can be described more or less reliably by an independent observer" (Barley, 1988, p. 128), such as the timing, frequency, sequence, and duration of events (Flaherty, 2003; Moore, 1963; Zerubavel, 1976). Business hours, project timelines, cleaning schedules, and holidays exemplify time structures; they are explicit and formalized. Time structures affect individual time management by laying out a system around which people can organize their time. For instance, when an employee manages her time, she has to take into account her team's deadlines and the organization's operation hours. Even global entrepreneurs (Markman, Devinney, Pedersen, & Tihanyi, 2016), who seemingly enjoy unfettered autonomy, must operate within the bounds of their international clients' different time zones.

Time norms, in contrast, are intangible and shared patterns of expected temporal activity (Ancona, Goodman, Lawrence, & Tushman, 2001; Bergmann, 1992) that become more salient once they are breached. They constrain time management behavior through social pressures. For

instance, an employee may want to quickly wrap up his sales pitch and leave the office early, but unwritten time rules dictate that a meeting with an important client should not be rushed lest the client might take offense at being given short shrift. What distinguishes time norms from time structures is the moral connotations attached to time norms (Zerubavel, 1979a, 1979b). A team leader's proposal to set a project deadline on May 23rd (i.e., an element of time structure) might arouse disagreement among team members, but they will likely not think of the deadline as a moral issue. In contrast, a supervisor can afford to arrive 15 minutes late at a meeting because lateness signals power and status (i.e., a time norm); a direct report running late, however, signals lack of assiduity and commitment, both of which are typically judged from a moral standpoint.

We contend that time norms influence individual time management in two ways. First, a time norm breach, such as calling one's supervisor at 3 a.m. or leaving work 20 minutes early in a "workaholic" culture, can elicit strong reactions from peers, with substantial consequences for the violator (e.g., loss of reputation, ostracism, and even termination). Thus, time norms act as a deterrent for engaging in temporal behaviors that are frowned upon. Second, even in the absence of prohibitive sanctions, time norms affect time management by making individuals take certain behaviors for granted. Taken-for-grantedness ensures adherence to local customs. Such adherence to time norms is mainly done through early socialization (Ancona, Okhuysen, & Perlow, 2001; Berger & Luckmann, 1966; Schneider, Ehrhart, & Macey, 2011) and, over time, maintained through habit.

Time structures and norms operate at many levels of analysis, and thus afford a conceptual framework to study the dynamics of time management beyond the individual level. In what follows, we offer examples of how time structures and norms influence time management at the team, organizational, and country level. As a preview, Table 3 includes a summary of the

discussion that follows.

Level of analysis	Time structures	Time norms
Team	Teams agree on rules via consensus. Such rules can be time-related (e.g., work starts at 8 a.m. sharp) and influence the time management behaviors of individual members.	Teams develop implicit time-related norms that can constrain individual time management (e.g., time is precious in our team, wasting it will be severely punished).
Organizational	Organizations use time structures (e.g., business hours, project timelines) to standardize and control individual time management practices.	Through socialization and reward systems, organizations instill time norms in employees to channel their individual time management practices toward organizational goals.
Country	Cultures and institutions have different ways of organizing time, hence the differences in time zones, business days, and other time structures across countries and institutions. Individuals such as travel executives and global entrepreneurs must be mindful of those differences in order to seamlessly coordinate their global operations.	Different cultures and institutions have wildly different norms with regard to time. In order to avoid conflict, the frequently traveling employee must be time-culturally savvy.

Table 3: Summary of why time structures and time norms affect time management at different levels of analysis

Team level. Barker (1993) ethnographic study revealed that teams tend to work out rules that, over time, ossify into structures that constrain the behavior of existing members and newcomers. Many such structures are time-based, which shouldn't be surprising because a defining feature of teams is interdependence (Cannon-Bowers & Bowers, 2011), and the best way to ensure seamless interdependence is temporal coordination (Janicik & Bartel, 2003; Okhuysen & Bechky, 2009). This is why teams devise sundry time structures to control team members' time management. As a rather drastic example, a participant in Barker's (1993, p. 428) study reported that "if you are more than five minutes late, you're docked a day's pay." Here, the team had come up with a strict time structure (i.e., work starts at a certain time and you can't be more than five minutes late) that affects individuals' time management choices. By deducting a whole day's pay for a five-minute delay, the team also implicitly establishes a draconian norm of punctuality. The time norm conveys a clear message to existing team members and newcomers: "our time is

extremely precious, so you had better show up at 8 o'clock sharp and not waste a single minute."

In other words, what seems like a simple rule (i.e., if you're more than 5 minutes late you lose

your day's pay) is in reality a manifestation of the team's normative view of time use (i.e., we

expect you to make optimal use of your time) that can dramatically affect a person's time

management choices.

Organization level. Like teams, organizations use time structures to align the efforts of

employees with organizational goals. The primary time structure in organizations is operation

hours (e.g., 9 to 5), and organizations increasingly experiment with different ways to structure

those hours. Intel, for instance, had 300 engineers turn off their communication devices and pin

"do not disturb" signs to their office doors every Tuesday morning for four hours (Stone, 2008).

The purpose of this "quiet time" practice was to determine whether four hours of undisturbed work

(i.e., a time structure) would impact productivity and creativity. (Perlow, 1999) conducted a similar

intervention (also dubbed "quiet time") on software engineers at a Fortune 500 company. The

intervention, she found, had tremendous implications for time management. In her words, "the

engineers discovered that they were not well prepared to work alone and needed help from a

colleague to continue. It often turned out that what they needed could easily have been prepared

ahead of time, but the engineers were not used to planning ahead. By the third phase, they indicated

that they were more accustomed to quiet time and were better able to prepare for non-interactive

periods" (Perlow, 1999, p. 73).

Organizational time norms, too, affect individual time management. But, because time

norms are not typically explicit or formalized, they can be difficult to quantify and study.

Nevertheless, Schriber and Gutek's (1987) study uncovered a set of time norms that made up the

time cultures of the organizations in their sample. Such norms included, among other things,

expectations regarding punctuality, emphasis on scheduling and deadlines, temporal boundaries between work and home, work speed, and autonomy of time use. More recently, Burt, Weststrate, Brown, & Champion (2010) developed a scale to measure the extent to which organizational norms facilitate time management practices. Items include such statements as "Productive use of time is a key value" and "Making time to plan the day's work is encouraged." Such norms have direct implications for individual time management, and the authors found that employees in organizations with less "time management-friendly" norms had higher stress and turnover intentions.

Country level. Global entrepreneurs (Markman et al., 2016), traveling executives (DeFrank, Konopaske, & Ivancevich, 2000), virtual team members (Malhotra, Majchrzak, & Rosen, 2007), and employees on international assignments (Shaffer, Kraimer, Chen, & Bolino, 2012) must all adjust their time management practices to take into account different time zones, business hours, and how other time structures vary around the world. But an even more complex terrain to navigate is that of time norms in foreign cultures (Graham, 1981; Hofstede, 2001; Levine & Norenzayan, 1999). Executives must factor in that being 45 minutes late to an official meeting is considered acceptable in Mexico; when invited over for dinner in Greece, it is rude to ask locals for a specific dinner time, what matters is that one shows up, not when (Hall, 1959). In Brazil, a country characterized by high in-group culture, foreign team leaders are expected to spend enormous amounts of time with team members and cajole people in positions of power in order to be successful (Javidan, Dorfman, De Luque, & House, 2006). International entrepreneurs must similarly keep in mind that different cultural and institutional contexts have different time orientations, "potentially influencing entrepreneurs' tenacity and persistence as well as investment horizons when making investments and resource allocations" (Zahra & Wright, 2011). Such

differences in time orientations can also foster varying levels of perceived urgency, which influence entrepreneurs' priorities and time management choices (Zahra & Wright, 2011).

In summary, the above examples highlight the importance of using time structures and norms as a lens to study time management at the team, organizational, and country level of analysis. Time structures and norms, however, are not immutable. We mentioned earlier that clock time, calendars, weekends, and so on, are social constructions, which means they are changeable. In other words, while higher-level time norms such as organizational culture can affect individual time management (i.e., top-down influence; Bluedorn, 2000), individuals can also change higher-level norms and structures through concerted action (Perlow, Mazmanian, & Hansen, 2016) and make their environment more adapted to their time management style.

Individual Differences

Individual differences in personality, values, and beliefs are known to influence various organizational outcomes such as job satisfaction and performance (Barsade & Gibson, 2007; Sackett, Lievens, Van Iddekinge, & Kuncel, 2017). Similarly, individual differences—specifically, individual differences in *time* attitudes, beliefs, and preferences (Vinton, 1992)—play a critical role in affecting time management outcomes.

Time-related individual differences abound. For instance, perceived control over time (Macan et al., 1990), sometimes called temporal self-efficacy (Britton & Tesser, 1991), refers to people's belief that they are in charge of their time. This belief has been well-researched from a time management perspective, but it is often studied as an outcome of time management (Häfner & Stock, 2010). Other time-related differences might better predict time management outcomes. For instance, some people prefer to do one thing at a time; others prefer to multitask. The latter have a *polychronic time preference*; the former have a *monochronic time preference* (Bluedorn,

Felker Kaufman, & Lane, 1992; Hecht & Allen, 2005). These differences in individual preferences affect time management outcomes: monochronic people are more upset by schedule changes and engage in more planning; polychronic people deal better with schedule changes and can easily integrate different activities together (Kaufman-Scarborough & Lindquist, 1999).

In the work-life balance literature, there is a distinction between "segmenters" and "integrators": the former like to set boundaries between work time and family time while the latter prefer to blend the two (Nippert-Eng, 1996; Rothbard & Ollier-Malaterre, 2016). It is easy to imagine that time management training will have different outcomes depending on whether the trainee is a segmenter or an integrator—the former will benefit from a rigid style that sets boundaries between work and home while the latter will require a flexible time management style that facilitates seamless integration of both domains.

In short, there is a host of time-related individual differences such as time preferences (i.e., polychronic vs. monochronic preference), time boundary styles (i.e., segmenting vs. integrating), and others (e.g., temporal orientation; Shipp, Edwards, & Lambert, 2009; Zimbardo & Boyd, 1999). Researchers need to pay more attention to how individual differences—especially those related to time—can moderate or mediate (Aguinis, Edwards, & Bradley, 2016) the effects of time management on various outcomes. To illustrate, we next discuss the individual difference of temporal awareness in greater detail.

Temporal awareness. Temporal awareness is the belief that time is a real, finite resource that needs to be budgeted. To avoid any conceptual confusion (Suddaby, 2010), we emphasize that temporal awareness is not time perception (Flaherty, 1999), but a belief regarding the nature of time.

Half a century ago, Drucker (1967) observed that high-performing executives think primarily in terms of time, not activities or strategies. Such executives, he noted, have a sense of how much time they have and where their time actually goes. A series of experiments by (Soman, 2001) showed that many people can engage in rational budgeting for money, but not for time, suggesting that people do not readily conceive of time as a finite resource.

Temporal awareness is not mere time tracking or temporal accounting, although these two behaviors are likely outcomes of temporal awareness. Rather, temporal awareness is the understanding that there are only so many hours in a day and that activities come at a temporal cost, hence the need for budgeting—*temporal awareness is a resource-based conception of time*. Granted, most people would agree with the statements "time is finite" and "time should be budgeted like money," but not everyone actually conceives of time that way in their daily life.

Low temporal awareness (i.e., weak or inexistent belief that time is a resource) severely undermines people's ability to manage time effectively, much like an inability to see credit card funds as *credit* leads to poor finance management. People high in temporal awareness think of their available time as a time budget—finite and non-renewable. The currency of their psychological economy is time. How much will this movie cost me in time? Can I reasonably expect to finish this report before attending the meeting? How long will it take you, the reader of our manuscript, to finish it? These are the kind of questions that temporally aware individuals routinely ask themselves. As a result, temporal awareness can influence how and to what extent people manage their time. A person high in temporal awareness, for instance, might have more of a proclivity for time tracking and scheduling than people low in temporal awareness who might use more of an improvisational time management style. High temporal awareness people, by virtue of thinking mainly in terms of time, might also be more naturally drawn to time management as a

way to implement their preference for a time-based organization system.

In short, people high in temporal awareness will likely enjoy better time management outcomes. The chief mechanism, we contend, is a reduction of time-based conflict, defined as the impossibility to fulfill multiple activities because of insufficient time (Greenhaus & Beutell, 1985). Indeed, high temporal awareness helps people make more realistic assessments of what they can and cannot do. When people know how much time they have and treat time as a resource, they are less likely to commit to new activities requiring more time than they actually have. As a result, people high in temporal awareness are likely to experience lower levels of time-based conflict between their different activities. The reduced level of conflict between a person's different roles and activities may, in turn, increase well-being and performance.

Having discussed perspectives and insights regarding time structures and norms, and the influence of individual differences (e.g., temporal self-efficacy, monochronic vs. polychronic time preference, segmenters vs. integrators, temporal awareness), we will now turn to how decision-making, when applied to time decisions, can affect time management.

Temporal Decision-Making

As our definition of time management implies, time management is a form of temporal decision-making. This means, fundamentally, that time management is about making decisions—conscious or otherwise—relating to how we use our time. In this section, we discuss how temporal decision-making—the examination of how people make time-related decisions—enhances our understanding of time management.

The time management literature implicitly adopts a "rational time manager" model, according to which individuals make optimal time decisions. Other fields such as economics and strategic management had also traditionally treated individuals as rational, optimal decision-

makers. However, developments in behavioral economics (Kahneman, 2003) and strategy-as-practice (Vaara & Whittington, 2012) have upturned some of these assumptions. In the same way, insights from the temporal decision-making literature can elucidate how people actually manage their time. Our goal is not to comprehensively survey the field of temporal decision making. Rather, we aim to illustrate how a synthesis of findings in temporal decision-making can inform our understanding of time management by drawing on a few key perspectives and insights.

Temporal escalation of commitment. We already mentioned (Soman, 2001) experiments, which showed that people do not mentally account for time the way they do money. Another result from Soman's (2001) experiments was that the sunk cost effect—a well-established psychological bias that induces people to throw good money after bad (Drummond, 2014)—seems to hold for money but not for time. Interestingly, when experimental manipulations made people more likely to account for time (e.g., by providing a wage rate or lecturing participants about economic approaches to time), the sunk-cost effect appeared. Results of this study draw attention to a potentially counterproductive effect of time management training. Specifically, when people engage in time management, they are more likely to account for time in a systematic way. According to Soman's study, this means that time managers are more likely to fall prey to the temporal sunk cost bias. As a result, this might hamper people's ability to "stop unprofitable routines and activities" (Britton & Tesser, 1991) and lead to a counterproductive escalation of commitment, that is, to throw good time after bad. A key implication that we can draw from Soman's (2001) work is that time management training can have unintended consequences, such as fostering a sunk cost bias that can undermine the very purpose of time management.

Value of time. Another important aspect of temporal decision-making is time valuation. How we value our time bears relevance to how we manage it. Consider independent contractors,

who are often touted as the epitome of professional freedom (Aguinis & Lawal, 2013; Barley & Kunda, 2006). Contractors tend to sell their services by the hour. As a result, they are intensely aware of the economic value of their time and face "an ever-present choice of how to spend every hour… When choosing how to spend their time, contractors could calculate to the penny the opportunity costs of every unbilled or leisure hour" (Evans, Kunda, & Barley, 2004, p. 21). The value people place on their time is thus consequential for time management, because time management may induce people to consciously or unconsciously strive to make the most of their time, to get the most bang for their minute. This may be a potentially detrimental side effect. DeVoe & Pfeffer (2007), for instance, concluded that because hourly payment makes people keenly aware of the value of their time, it makes non-remunerative activities, such as volunteering, much less attractive. Similarly, the higher the perceived economic value of time, the more people feel pressed for time (DeVoe & Pfeffer, 2011), which defeats the very purpose of time management. Counterintuitively, therefore, being overly conscious of time's economic value may not lead to effective time management. If anything, it may make people more harried. In support of this conclusion, research shows that being generous with one's time (e.g., devoting time to help people) actually makes people feel like they have more, not less, time (Mogilner, Chance, & Norton, 2012).

We have barely scratched the surface of how temporal decision-making can inform time management, and a full review of the temporal decision-making literature is beyond the scope of this paper. However, time is a very peculiar resource with unique characteristics, warranting more attention to temporal decision-making. We elaborate on this point in what follows.

The importance of a temporal approach to decision-making. We believe that time deserves its own decision-making literature because it is a resource like no other. Unlike money,

time is possessed in equal amounts by everyone (McGrath & Rotchford, 1983) but is still subject to theft in the workplace by people who tend to non-work related tasks during work hours (Brock, Martin, & Buckley, 2013; Martin, Brock, Buckley, & Ketchen, 2010) and abuse by people who excessively solicit coworkers' time (Perlow, 1999). Unlike energy, time is not renewable, recoverable, or substitutable (Fritz, Lam, & Spreitzer, 2011; Jaques, 1982; Moore, 1963). Furthermore, the value of time is ambiguous. Everybody knows that a dollar is a dollar; but an hour, on the other hand, can mean different things to different people (Okada & Hoch, 2004). Time is also unique by virtue of it being *the* fundamental resource—people need time to acquire other resources. For example, at the individual level of analysis, people are not able to acquire new knowledge, skills, and abilities if they do not have sufficient time (Aguinis & Kraiger, 2009), which impairs their results- and behavior-based performance (Markman, 2012). At the firm level of analysis, organizations are not able to acquire valuable and inimitable resources that gives them a competitive market advantage if they don't have sufficient time to do so (Perlow, 1999). Organizational actions occur in time and unfold in a path-dependent way through time, which has implications even for seemingly disconnected events such as the subsequent ventures of serial entrepreneurs (Wright, Robbie, & Ennew, 1997; Zahra & Wright, 2011). Given time's peculiar nature, then, it shouldn't be surprising that unlike other resources, time is a resource that most people have a hard time processing (Saini & Monga, 2008).

DISCUSSION

Our review of the literature suggests that the link between time management, well-being, and performance is not clear: the relation between time management and well-being exhibits much variability and the link between time management and performance seems to depend on whether performance is measured as results or behaviors. Our review also suggests that insights relevant to

the time management literature are fragmented and dispersed across various disciplines such as sociology, psychology, and behavioral economics. We proposed three novel perspectives that integrate cross-disciplinary and multilevel insights. This integration identifies several critical factors that may enhance or suppress the effects of time management which, as a result, sheds light on the hitherto ambiguous links between time management, well-being, and performance.

To illustrate how our cross-disciplinary and multilevel perspectives can shed light on past research, let's focus on the link between time management and performance (see Table 2). We can start by using a *time structures and norms* lens. In her study on time management in a software engineering company, Perlow (1999, p. 69) observed that "At the end of the calendar year, in a confidential meeting, the managers ranked their software engineers… For all of the top ten engineers, the comments mentioned the long hours that the engineers worked… In contrast, the comments about those at the bottom of the list all referred negatively to the engineer's level of commitment as assessed by hours worked… Clearly, managers noticed the hours that the engineers worked and used these observations as a criterion in ranking them." In other words, organizational time norms in Perlow's organization equate long hours with performance, a norm arguably antithetical to efficient time management. In such conditions, an employee who excels at time management might finish her job in less time than her peers and yet get a negative performance review. In such cases, empirical analyses blind to the importance of time structures and norms might wrongly conclude that time management is not related to performance. Orpen's (1994) experiment corroborated this view. After randomly assigning a group of supervisors to an intensive, customized three-day time management training program, the author asked participants to keep track of how they spent each 30 minutes of every workday in an activity diary. The author then asked three managers familiar with the demands of the job to rate the employees' performance

based on their activity diaries (i.e., a behavior-based performance assessment). Critically, activity diaries were anonymous and did not disclose whether the employee had undergone training or not. In other words, Orpen's (1994) experimental design mitigated the influence of time norms and other confounding variables by shrouding diaries in anonymity. The nature of Orpen's (1994) study might explain why it is among the rare experiments to find a clearly positive link between time management and job performance.

As a second perspective, people's individual differences, especially *time-related individual differences*, likely play a big role in whether time management boosts job performance. Consider, for instance, the fact that in some experiments participants reported engaging in more time management behaviors after training (Häfner & Stock, 2010) while in other experiments many participants did not seem to manage their time at all after they had been trained (Macan, 1996). This could be very well due to participants' individual differences. A handful of researchers have studied the effects of individual time-related differences on time management, such as time discounting (i.e., choosing immediate small rewards over larger but delayed payoffs(Koch & Kleinmann, 2002; König & Kleinmann, 2005). Results from these studies show that people who discount time steeply engage less in time management (König & Kleinmann, 2006) and pay less attention to future deadlines (König & Kleinmann, 2007). Therefore, if these individual differences are not considered explicitly, it is difficult to conclude whether time management does, and to what extent, influence job performance. Buttressing this view, (Barling et al., 1996) found that while time management alone did not predict car sales (a key measure of performance among car dealers), achievement striving (admittedly not a time-related construct, but an individual difference nonetheless) significantly interacted with time management to predict job performance.

Temporal decision-making is the third perspective that helps us make sense of the existing literature. Our discussion of temporal decision-making outlined how time management training itself can undermine performance. Consider Macan's (1994, p. 388) conclusion that the "size of the path coefficients … suggests that time management training may not explain much of the reported variance in the behaviors." Consider, furthermore, Macan's (1994, p. 389) assertion that "respondents in the present study who practiced time management behaviors such as making lists and scheduling activities did not necessarily perceive greater control over their time … When a person does not complete the projects listed, the perception of having little control over how time is spent may result." This relates to how framing effects—a core bias in the decision-making literature—affect our perception of time and work. Researchers have found that thinking in terms of "time spent" and "work left" are often seen as a suggestion to rev up the pace; on the other hand, "work done" and "time left" indicate that there is no need to rush (Teigen & Karevold, 2005). Depending on whether participants in Macan's (1994) study framed their projects in terms of remaining time (e.g., on a schedule) or work left (e.g., on a to-do list), feelings of being in control of one's time can vary tremendously. This is why there is a need to open the "black box" of time management training: barring few exceptions (Häfner & Stock, 2010; Van Eerde, 2003), experimenters typically provide only a vague outline of the contents of time management training programs, mentioning covered topics only in passing (Macan, 1996; Orpen, 1994; Woolfolk & Woolfolk, 1986). Consider another illustration. Käser et al. (2013) concluded that when people engaged in quiet time, their performance actually decreased. But, as the authors themselves acknowledged, the nature of the experiments heavily influenced participants' temporal decision-making processes. As the authors put it, "In search of an explanation, we find that … the [quiet time participant]'s performance decreases significantly when the number of time spans with

interruptions and without interruptions increases ($r = -.42$, $p < .05$). This means that people who have chosen to frequently alternate between interruption time and non-interruption time performed more poorly than people who divided their time into fewer and therefore longer time spans with and without interruptions. The mean number of time spans with or without interruptions … lasted 4.7 minutes. A theoretical explanation for the poorer performance might be that selecting more and therefore shorter time spans without interruptions generated a higher cognitive load because this was harder [for participants] to track" (Käser et al., 2013, p. 301). In other words, it is not quiet time per se that decreases performance; it is the frequent task switching that undermines people's temporal decision-making and, by extension, their performance.

In short, the three perspectives improve our understanding of the relation between time management and well-being and performance and afford a clear framework to make sense of the literature. Next, we turn to their potential for guiding future research.

Suggestions for Future Research

Based on our three perspectives, we offer the following directions for future research. First, future research can focus on time structures and norms. The vast majority of existing studies use quantitative methods, which seems fitting given the ostensibly practical and efficiency-oriented nature of time management. The reality, however, is that people who manage their time are, like all people, embedded in an intricate web of social relationships and constraints. To understand how the complexity of social life influences time management, researchers need to approach time management from a complementary qualitative angle and study thick descriptions of people's experiences. Qualitative designs enable researchers to fully explore the nature, antecedents, and outcomes of time structures and norms—this could not only shed light on the dynamics of time structures and norms, but also unearth facets of time management that are yet unexplored. In

addition, the issue of time structures and norms opens the door to myriad opportunities for cross-cultural time management research. In particular, we contend that, because of cultural differences, the way a person manages time at home in no way guarantees success when transferred to another country. One way to mitigate this issue—and a promising direction for future research—would be to pair expatriates with local hosts who, as cultural mediators, will familiarize expatriates with local time norms and structures (Cooper, Doucet, & Pratt, 2007; DeNisi & Toh, 2005). Studying how expatriates and frequent travelers can better adapt to different time structures and norms can not only enhance organizational performance, but also avert the numerous pitfalls that threaten the well-being of expatriates and their families.

Second, future research could investigate the extent to which time-related individual differences, and particularly temporal awareness, affect time management. A first step in this direction would be to develop a measure of temporal awareness. Such an instrument would allow us to determine whether time management training yields better results in high temporal awareness people. Researchers can also determine if temporal awareness alone (that is, in the absence of typical time management behaviors such as scheduling) contributes to outcomes such as job performance and satisfaction. Most importantly, future research can determine to what extent temporal awareness is dispositional. If temporal awareness is a crucial prerequisite for good time management, then the degree to which temporal awareness can be learned has important implications for time management training. By the same token, research can also examine how much time management itself can be learned. There is modest evidence that time management might be a dispositional aspect of individual personality (Shahani, Weiner, & Streit, 1993), but results are insufficient to draw a firm conclusion. More recently, Malatras et al. (2016) showed that people who grow up in stable families tend to have better time management skills. One way

to conclusively assess the extent to which temporal awareness and time management are dispositional constructs would be to conduct a twin study (Boomsma, Busjahn, & Peltonen, 2002).

Third, as we noted earlier, the field of management in general would benefit from more research on temporal decision-making. For instance, we should not assume that time management training is necessarily beneficial because it can foster decision-making biases—such as the sunk cost effect (Soman, 2001)—that ultimately undermine time management outcomes. Furthermore, existing research on time valuation—a key parameter in temporal decision-making—draws attention to an important methodological implication for time management research. Specifically, do people who take the time to participate in time management studies differ significantly from people who don't? In other words, is there a potential nonresponse bias (Rogelberg & Stanton, 2007) inherent to time management research? We believe there is. Goodman, Cryder, and Cheema (2013) compared MTurk (Amazon's online labor system) participants with people from a middle class urban neighborhood on various measures. They found that the MTurk participants valued their time less than the offline sample, which is not that surprising given that MTurk participants agreed to complete a 15-minute survey for a paltry $0.20. As research on time valuation suggests (DeVoe & Pfeffer, 2007) this means that people who value their time more might be less likely to participate in time management studies which, as a result, creates a nonresponse bias and compromises the validity of results. For instance, in Macan's (1996) quasi-experiment, there were significant pre-existing differences between participants who volunteered to participate in time management training and those who did not. One way to address this would be to devise shorter time management measures—Macan et al.'s (1990) TMB scale comprises 46 items; Britton and Tesser's (1991) TMQ measure contains 35. Shorter scales would likely attract participants who would have otherwise declined to take part in studies deemed too lengthy.

Implications for Practice

Time management is a topic well-suited to bridge the practice-research gap (Bansal, Bertels, Ewart, MacConnachie, & O'Brien, 2012). We offer some practical observations based on the three perspectives advanced in our manuscript.

First, time management training is wildly popular in organizations and is often touted as a silver bullet that will fix sluggishness and other corporate woes. However, this is an ill-advised approach to time management that will likely fail if it ignores organizational time structures and norms (Jacobs & Gerson, 2004; Perlow, 1999). Indeed, the literature we reviewed suggests that many time management interventions fail to translate into job performance. As we have discussed, chief among the reasons for this are the organizational time structures and norms that hinder employees' effective time management. Employees often have to contend with temporal expectations from their managers and coworkers that, in fact, *discourage* good time management practices (e.g., Perlow, 1999). From an employee's perspective, organizational time structures and norms are hard to resist, let alone change, and this can often lead to frustration and dysfunctional turnover. Leaders, on the other hand, can reengineer their organization's time structures and norms in a way that accommodates effective time management practices. As a first step, leaders can use existing measures of time structures and norms (Burt et al., 2010; Schriber & Gutek, 1987) as a diagnostic tool. Judging by the available evidence, regardless of whether people manage their time or not, organizational cultures that are more time management-friendly tend to cause less stress and turnover intentions among employees (Burt et al., 2010), which further highlights the importance of time structures and norms for practitioners.

Second, time-related individual differences may or may not lead to positive time management outcomes. As the literature suggests, time management is not for everyone (Barling

et al., 1996). This does not mean that time-related individual differences cannot be changed. Zimbardo and Boyd (2008), for instance, argued that it is possible for present-oriented people (i.e., people who live in the moment, like to take risks, and loathe thinking about the future) to become more future-oriented (i.e., become more forward-thinking, plan ahead, take more calculated risks, and so on) with proper training. For this reason, time management programs should expand their curriculum to more than just traditional aspects of time management such as to-do lists and scheduling and include modules that target time-related individual differences. For example, training programs may include content for people low in temporal awareness to make them more mindful of the "resource" dimension of time. Another strategy would be to tackle individual differences not by changing them but by screening them out. Different organizations have different time norms which may or may not accommodate certain time-related individual differences. This suggests a need to consider person-environment fit (Edwards, Cable, Williamson, Lambert, & Shipp, 2006) from a temporal perspective (Francis-Smythe & Robertson, 2003; Kaufman, Lane, & Lindquist, 1991). For human resource management practitioners, this means that employee selection can be used to screen out candidates whose time attitudes, beliefs, or preferences do not fit the organization's time norms. Selection, in some cases, might be beneficial because diversity in time-related individual differences can backfire—a recent body of research shows that temporal diversity in teams can hurt performance (Mohammed & Nadkarni, 2011).

Third, developers of time management training programs might want to draw lessons from the temporal decision-making literature. As time management research shows, the "mechanics" of time management (e.g., using to-do lists, schedulers, and calendars) are not always related to time management outcomes, suggesting that time management tools will likely prove ineffective if people make counterproductive time decisions. When people become more mindful of the

potential biases looming over their decision-making, they become less likely to fall prey to them. The possibility of altering people's likelihood to succumb to a temporal decision-making bias has been shown experimentally (e.g., Soman, 2001), which offers hope that time management training can be improved if developers incorporate decision-making elements in their programs.

CONCLUSION

Everybody needs to manage time. Entrepreneurs, executives, expatriates, and academics alike depend on it to organize their professional and personal lives. However, our review of the literature reveals a rather scattered body of knowledge and inconsistent findings regarding the relation between time management and the critical outcomes of well-being and performance. By integrating time management research from different domains, we distilled three perspectives that help us make sense of the mixed findings: Time structures and norms, time-related individual differences, and temporal decision-making. With the advent of the knowledge economy, work becomes ever-more flexible, and the burden of time management is gradually shifting from organizations to employees, making time management an increasingly vital skill. We hope our manuscript will help make time management research accessible to a wide range of scholars and the perspectives offered here will stimulate much-needed research and practices on this important topic.

Say what you will, but a method,
a system, has its virtues.
You know, sometimes I say to myself,
if every single day,
at exactly the same
stroke of the clock,
one were to perform
the same single act,
like a ritual,
unchanging, systematic,
every day at the same time,
the world would be changed.

Opening scene of the movie *The Sacrifice* (1986), by Andrei Tarkovsky

BIG TIME! A TIME MANAGEMENT META-ANALYSIS

Abstract

Does time management work? We conducted a meta-analysis to assess its effectiveness. Results show that time management is moderately related to job performance, academic achievement, and wellbeing. Time management also shows a slightly weaker, negative relationship with illbeing. Interestingly, individual differences and contextual factors play a minor role, with the notable exception of conscientiousness. The extremely weak correlation with gender was unexpected: women seem to manage time better than men, but the advantage is very slight. Using meta-regression, we found that culture at times moderates the link between time management and wellbeing. Furthermore, the link between time management and job performance seems to increase over the years: time management is more likely to get people a good performance review at work today than in the early 1990s. The link between time management and gender, too, is intensifying: women's time management scores have been on the rise for the past few decades. Moderation analyses were otherwise nonsignificant, suggesting that research hasn't paid much attention to moderators or, alternatively, that the effect of time management is relatively universal. We also note that time management seems to enhance wellbeing—in particular, life satisfaction—to a greater extent than it does performance. This challenges the intuitive idea that time management first and foremost enhances work performance and that wellbeing is only a byproduct. It might very well be the other way around.

INTRODUCTION

Stand-up comedian George Carlin (2004, p. 94) once quipped that in the future a "time machine will be built, but no one will have time to use it." Portentously, booksellers now carry five-minute bedtime stories for time-starved parents (Tiger Tales, 2014) and people increasingly speed-watch videos and speed-listen to audio books (Garber, 2015; Mele, 2016; Wilson, Martin, Smilek, & Risko, 2018). These behaviors are symptomatic of an increasingly harried society. Work is intensifying—in a 1965 time-use survey about 50% of workers took breaks; in 2003, less than 2% (Robinson & Martin, 2009). Leisure, too, is intensifying: people scramble to consume music, social media, and other leisure activities ever more efficiently (Boerma & Karabarbounis, 2019; Keinan & Kivetz, 2011; Lorenz-Spreen, Mønsted, Hövel, & Lehmann, 2019; Schneider & Gros, 2019).

In this frantic context, time management is often touted as a panacea for time pressure. Media outlets routinely extol the virtues of time management. Employers, educators, parents, and politicians exhort employees, students, children, and citizens to embrace more efficient ways to use time (Clinton, 2004; Hodge & Lear, 2011; Lorenz & Pinsker, 2019; Malatras et al., 2016; Pausch & Zaslow, 2008). In light of this, it is not surprising that from 1960 to 2008 the frequency of books mentioning time management shot up by more than 2,700% (Google Ngram Viewer, 2016).

But what, exactly, is time management? We define time management as the act of structuring, protecting, stretching, and making sense of one's time[2]. Temporal structuring consists in organizing activities in time (e.g., by using a schedule); temporal protecting consists in restricting one's availability during a certain periods (e.g., by turning off the phone while working); temporal

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[2] See third dissertation article for more details

stretching consists in increasing efficiency (e.g., doing things faster or delegating tasks); temporal sensemaking consists in ascribing meaning, purpose, and direction to temporal behaviors (e.g., by setting goals and dedicating most of one's time to the pursuit of those goals).

A fundamental gap in time management research is the question of whether time management works (Green & Skinner, 2005; Macan, 1994). For instance, studies on the relationship between time management and job performance reveal mixed findings (Macan, 1996; Orpen, 1994). Furthermore, scholars' attempts to synthesize the literature have so far been qualitative, precluding a quantitative answer (Aeon & Aguinis, 2017; Claessens et al., 2007; Richards, 1987). Another obstacle to integration is the fact that time management research tends to be scattered across various disciplines such as psychology, education, nursing, and computer science. We surmise that this fragmentation of the literature stems from the fact that in the 1970s, when the first popular time management manuals were written, several disciplines saw time management as being important for practical (such as helping students get better grades in education research) and theoretical purposes (e.g., understand the cognitive underpinnings of time management in psychology) and, as a result, engaged in research simultaneously but independently.

To tackle these issues and offer a more integrated understanding of time management, we conducted a meta-analysis. In addressing the question of whether time management works, we first clarify the standards for effectiveness. In line with previous reviews, we find that virtually all studies focus on two broad outcomes: performance and wellbeing (Aeon & Aguinis, 2017; Claessens et al., 2007).

Overall, results show that time management enhances job performance, academic achievement, and wellbeing. Interestingly, individual differences (e.g., gender, age) and contextual factors (e.g., job autonomy, workload) were much less related to time management behaviors (e.g., using a to-

do list), with the notable exception of personality and, in particular, conscientiousness. Furthermore, the link between time management and job performance seems to grow stronger over the years, perhaps reflecting the growing need to manage time in an increasingly flexible workplace (Cappelli & Keller, 2013; Golden, 2001; Hamermesh, 1999; Wegman, Hoffman, Carter, Twenge, & Guenole, 2018). National culture also slightly moderates the link between time management and wellbeing. However, in most cases, mean sample age, student status, country, culture, research design, and type of time management measure did not significantly affect time management's impact on performance and wellbeing. The absence of significant moderations may be due to the literature's lack of focus on relevant contextual factors (Aeon & Aguinis, 2017). Alternatively, the lack of significant moderation might reflect the universality of time management's benefits—time management might enhance performance and wellbeing in nearly all contexts.

Overall, our findings provide academics, policymakers, managers, and the general audience with better information to assess the value of time management. This information is all the more useful amid growing doubts about the effectiveness of time management (e.g., Burkeman, 2016). We elaborate on the contributions and implications of our findings in the discussion section.

WHAT DOES IT MEAN TO SAY THAT TIME MANAGEMENT WORKS?

In the din of current debates over productivity, reduced workweeks, and flexible hours, time management comes to the fore as a major talking point. Some opinions take time management's effectiveness for granted, presumably because time management offers a seemingly logical solution to a lifestyle that increasingly requires coordination and prioritization skills (Southerton, 2003, 2009). On the other hand, more and more popular media outlets voice concern over time

management, claiming that it undermines our wellbeing (e.g., Burkeman, 2016). This questioning of time management is becoming more common among academics as well (e.g., Gregg, 2015). As some have noted, the issue is not just whether time management works. Rather, the question is whether the techniques championed by time management gurus might actually be counterproductive or even harmful (Jacobs & Gerson, 2004; Reagle, 2019). Other scholars have raised concerns that time management may foster an individualistic, quantitative, financial view of time that perpetuates social inequalities (Wajcman, 2018). For instance, time management manuals beguile readers with promises of boundless productivity that may not be accessible to women who are usually more hobbled by care work (e.g., tending to young children) and housework than men (Gregg, 2018; Sabelis, 2001). Similarly, bestselling time management books at times offer advice that reinforce global inequities. Some manuals, for instance, recommend delegating trivial tasks to private virtual assistants, who often work out of developing countries for measly wages (Costas & Grey, 2013). Furthermore, time management manuals often ascribe a financial value to time—the most famous time management adage being "time is money." Recent studies show that thinking of time as money leads to a slew of negative outcomes including time pressure, stress, impatience, inability to enjoy the moment, unwillingness to help others, and less concern with the environment (DeVoe & House, 2011; DeVoe & Pfeffer, 2007a, 2007b, 2011; Whillans & Dunn, 2015). What's more, the pressure induced by thinking of time as money may ultimately undermine psychological and physical health (Roxburgh, 2004). Clearly, then, the outcomes of time management are a matter of heated public and scholarly debate.

Concerns over ethics and safety notwithstanding, a more prosaic question researchers have grappled with is whether time management works. Countless general-audience books and training programs have claimed that time management improves people's lives in many ways, such as

boosting performance at work (e.g., Allen, 2001; Lakein, 1973; Sutherland, 2014)—claims that

for a long time remained untested. Initial academic forays into the question challenged those

claims: some studies suggested that time management training didn't improve performance

(Macan, 1994, 1996). These studies used a variety of research designs, running the gamut from

lab experiments, field experiments, longitudinal studies, and cross-sectional surveys to experience

sampling (Claessens, van Eerde, Rutte, & Roe, 2010; Green & Skinner, 2005; Macan, Gibson, &

Cunningham, 2010; Woolfolk & Woolfolk, 1986). Some studies occasionally did find an

association between time management and performance, but only in highly motivated workers

(Barling et al., 1996); studies establishing a more straightforward link with performance were rare

(e.g., Orpen, 1994). Summarizing these insights, reviews of the literature concluded that the link

between time management and job performance is unclear; the link with wellbeing, however,

seemed more compelling although not conclusive (Aeon & Aguinis, 2017; Claessens et al., 2007).

It is interesting to note that scholars typically assess the effectiveness time management by its

ability to influence some aspect of performance or wellbeing. In other words, the question of

whether time management works is equivalent to asking whether time management influences

performance and wellbeing, at least if we are to be consistent with previous research. The link

between time management and performance at work can be traced historically to the Industrial

Revolution and scientific management (e.g., Taylor, 1911). Nevertheless, a feminist reading of

time management history reveals that our modern idea of time management also descends from

female time management thinkers of that same era, such as Lillian Gilbreth, who wrote treatises

on efficient household management (Gregg, 2018; Korhonen, 2017; Rich, 2015). As the link

between efficiency and work output became clearer, industrialists went to great lengths to

encourage workers to use their time more optimally (Landes, 1983; Martineau, 2015; Thompson,

1967). Over time, people have internalized a duty to be productive through optimal time use and now see time management as a personal responsibility at work (Alvesson & Deetz, 2006; Gregg, 2018). The link between time management and academic performance can be traced to schools' historical emphasis on punctuality and timeliness. In more recent decades, however, homework expectations have soared (Gill & Schlossman, 2004) and parents, especially well-educated ones, have been spending more time preparing children for increasingly competitive college admissions (Dotti Sani & Treas, 2016; Ramey & Ramey, 2009). In this context, time management is seen as a vital skill for students to thrive in an increasingly cut-throat academic world. Finally, the link between time management and wellbeing harks back to ancient scholars, who emphasized that organizing one's time was a necessary condition to living a life well-lived (e.g., Aurelius, 1909; Seneca, 2014). More recently, empirical studies in the 1980s examined the effect of time management on depressive symptoms that often plague unemployed people (Bond & Feather, 1988; Feather & Bond, 1983). Subsequent studies surmised that the effective use of time might thwart a host of wellbeing antagonists, such as work-life conflict and job stress (Adams & Jex, 1999; Jex & Elacqua, 1999).

Overall, then, many studies have looked into the effectiveness of time management. By synthesizing these studies' collective findings, this meta-analysis provides a more comprehensive answer to the question of whether time management works. In what follows, we outline our rationales concerning why time management should have a positive influence on various outcomes.

WHY SHOULD TIME MANAGEMENT WORK?

We define time management as the act of structuring, protecting, stretching, and making sense of one's time. In this section, we use this definition as a template to argue that time management leads to beneficial outcomes through these four mechanisms (i.e., structuring, protecting, stretching, and sensemaking). The appeal of these four mechanisms lies in their conceptual, abstract nature—they are not tied to concrete time management strategies, such as using a Pomodoro timer or the Bullet Journal method. As such, these four mechanisms apply equally well to various life domains: professional, academic, and personal.

Performance

The link between time management and performance is not clear (Claessens et al., 2007; Häfner & Stock, 2010; Macan, 1996). This ambiguity, however, might be due to factors other than time management itself (Burt, Weststrate, Brown, & Champion, 2010; Perlow, 1999). Context thus plays a key role. Context notwithstanding, however, time management can influence performance in at least four ways.

Structuring. Structuring is essential to coordinating with other people, which ensures seamless execution of activities (Okhuysen & Bechky, 2009). Furthermore, structuring time helps people concentrate on the task at hand by offloading time-related information. For instance, instead of having to keep a mental schedule of deadlines and tasks to do, people can simply keep that information in calendars and to-do lists (Macan et al., 2010). This process of cognitive offloading (Gilbert et al., 2019; Weis & Wiese, 2019) obviates the need for a cognitively taxing mental schedule and increases focus, reliability and, ultimately, performance. Finally, structuring time to

establish self-imposed deadlines can improve task performance by helping people pace themselves and overcome procrastination (Ariely & Wertenbroch, 2002; Van Eerde, 2015).

Protecting. People often deliberately restrict their availability during certain times. For instance, they may dedicate some interruption-free "quiet time" hours to focus on certain activities. These sheltered pockets of time allow people to focus on high-importance tasks that are more conducive to performance (Perlow, 1999). In so doing, people also mitigate the negative impact of switching between different tasks (e.g., being interrupted by a colleague) on performance (Leroy, 2009).

Stretching. In the face of time pressure, people resort to myriad methods to increase their efficiency. They may, for instance, take advantage of the so-called Parkinson's law, which states that allocating less time to an activity fosters efficiency (Bryan & Locke, 1967). This happens because allocating less time to activities forces people to find ways to be more efficient (Halkjelsvik, Jørgensen, & Teigen, 2011). Indeed, having more time does not necessarily facilitate goal pursuit and, by extension, performance (Zhu, Bagchi, & Hock, 2019). Similarly, people can expand their time (Kirchmeyer, 1992; Marks, 1977) by engaging in activities that might benefit other activities. For instance, one might dedicate leisure time to hobbies that are not only enjoyable but also help develop skills conducive to performance (e.g., improvisational acting might improve public speaking and interpersonal skills).

Sensemaking. People do not manage time for time management's sake. Rather, they manage time to pursue certain goals. Aligning personal time management with one's objectives can help people reach their goals more efficiently. For instance, prioritizing becomes important when the number of tasks exceeds one's bandwidth. In particular, empirical studies show that performance improves as workers prioritize harder tasks compared to easier tasks (KC, Staats, Kouchaki, & Gino, 2017). Furthermore, careful assessment of where to allocate time also leads to greater financial

performance (Cooper, Ramachandran, & Schoorman, 1997; Rapp, Petersen, Hughes, & Ogilvie, 2020).

Wellbeing

Many studies reveal a positive link between time management and wellbeing (e.g., Häfner, Stock, & Oberst, 2015; Jex & Elacqua, 1999; Wanberg, Griffiths, & Gavin, 1997). Nevertheless, recent reviews suggest effect sizes vary wildly, casting doubt on the systematic effectiveness of time management as a wellbeing enhancer (Aeon & Aguinis, 2017). Using our definition of time management, we propose several mechanisms linking time management and various aspects of wellbeing.

Structuring. Temporal structuring offers a frame of reference; a temporal map so to speak (Jaques, 1982; Orlikowski & Yates, 2002). As such, temporal structuring alleviates the distressing effect of situations that offer little or no time structure, like unemployment (Van Hoye & Lootens, 2013). Furthermore, temporal structuring facilitates coordination of social activities (Southerton, 2003), such as when friends make plans to meet up—a key predictor of wellbeing (Kushlev, Heintzelman, Oishi, & Diener, 2018). In the same vein, scheduling activities makes people more likely to actually implement them (Gillholm, Ettema, Selart, & Garling, 1999). This is particularly important for people who need to schedule regular exercise and yearly physicals (Sirois, Melia-Gordon, & Pychyl, 2003; Sniehotta, Scholz, & Schwarzer, 2005), an important aspect of physical and psychological wellbeing. Regular implementation of activities can also lead to a sense of accomplishment and thus enhance self-actualization (Bond & Feather, 1988).

Protecting. Work-life balance plays a major role in wellbeing (Shockley & Singla, 2011). According to role boundary theory, people can establish a healthier work-life balance by setting temporal boundaries between different life domains to avert spillovers (Ashforth, Kreiner, & Fugate, 2000; Kreiner, Hollensbe, & Sheep, 2009; Nippert-Eng, 1996). For instance, people who work from home may decide to stop working at exactly 5 p.m. every day so they can spend time with their family. We can extend this principle to say that temporal protecting enhances wellbeing by warding off time conflicts in general (Greenhaus & Beutell, 1985). For instance, checking emails continuously opens the door to constant interruptions and higher levels of stress; in contrast, checking emails only three times a day at preset times (i.e., setting temporal boundaries) lowers stress by keeping interruptions (and thus, time conflicts) in check (Kushlev & Dunn, 2015).

Stretching. Temporal stretching can enhance wellbeing by enabling people to spend more time on enjoyable activities and less time on unpleasant activities. For instance, paying for services to buy out of unpleasant tasks (e.g., hiring a housemaid) can save people time and make them happier (Whillans, Dunn, Smeets, Bekkers, & Norton, 2017). Another important aspect of temporal stretching is that it can help people deal with time pressure. Specifically, when people feel that they have too much to do in too little time, they can resort to temporal stretching to reclaim a sense of control over time—another predictor of wellbeing (Claessens et al., 2004; Macan, 1994).

Sensemaking. Time management can help people align their time use with their goals, beliefs, and values. In so doing, time management can help people establish a sense of direction and purpose (Bond & Feather, 1988; Mudrack, 1997). By the same token, time management can infuse life with coherence, an important predictor of meaningful living (Heintzelman & King, 2019). Potentially corroborating this view is the fact that the happiest respondents in time-use surveys are those who report being never rushed, and never having excess time on their hands (Robinson,

2013). Indeed, have neither too little time nor too much may reflect intentional time use, that is, using time in accordance in a coherent, purpose-driven way.

Individual and contextual factors

The time management literature has by and large given a wide berth to individual and contextual factors (Aeon & Aguinis, 2017). Thankfully, a meta-analysis allows us to explore these factors both at the participant level and the study level. At the participant level, we can assess the link between time management behaviors and certain variables, such as age and gender. At the study level, we can assess how the link between time management and *participant-level* variables (e.g., life satisfaction) is moderated by *study-level* variables, such as country of investigation and year of publication.

To start with participant-level factors, we expect time management to be associated with age. Time management is a form of self-regulation, and insights from cognitive science suggest that brain areas involving self-regulation do not fully mature until the mid-20s (Berger, Kofman, Livneh, & Henik, 2007; Gogtay et al., 2004). As such, we predict that people will get better at managing their time as they grow older. We also expect time management to be strongly associated with gender. An extensive body of research shows that girls outperform boys in school despite the absence of IQ score differences; some scholars point, instead, to differences in self-discipline, which is closely related to time management (Duckworth & Seligman, 2006). These gender differences, furthermore, seem to emerge very early in life, as evidenced by time management studies on middle-school students (Liu, Rijmen, MacCann, & Roberts, 2009). Furthermore, we anticipate a positive link between time management and a closely related personality trait: conscientiousness. This personality trait often involves meticulousness, organization, dutifulness, and other elements

that overlap with time management. Unsurprisingly, reviews of the literature have noted a frequent association between time management and conscientiousness in empirical studies (Claessens et al., 2007). In addition, we believe that time management behaviors (or, rather, the opportunity to exert time management) will be related to job autonomy: people will have more leeway to manage time in jobs that let them (Macan, 1994). For similar reason, we also expect time management behaviors to significantly relate to internal locus of control: people will manage their time when they believe they can.

In terms of study-level variables, we believe that the link between time management, wellbeing and performance might increase over the years. Socializing is an important predictor of wellbeing (Kushlev et al., 2018), but people have been spending less time socializing over the past decades (Robinson, Tracy, & Lee, 2015). This is perhaps due, in part, to the fact that socializing now requires more complex schedule coordination with other people (Southerton, 2003). For this reason, we expect that over the years, time management skills will play an increasingly important role in maintaining a social life, and thus wellbeing. Concerning the link between time management and job performance, there is a well-documented trend toward more flexibility and autonomy at work (Cappelli & Keller, 2013; Golden, 2001; Hamermesh, 1999; Wegman et al., 2018). Even though people like having freedom over how to use their time (Botti & Hsee, 2010), an often overlooked advantage of having *less* freedom is that "submission to compelling external forces also implies freedom from constantly having to make decisions … from constantly having to consider when to do things, how often, for how long, and in what order" (Zerubavel, 1981, p. 51). In other words, job autonomy incurs a burden that requires better time management skills. As job autonomy increases over the years, people who deftly manage their time will be better equipped

to perform despite less and less structure in their work environment. As a result, we expect that the link between time management and job performance will increase over the years.

We also expect the link between time management, wellbeing, and performance to be moderated by country and culture. Longstanding research has identified cultural differences in how people think about, perceive, and use time (Block, Buggie, & Matsui, 1996; Boroditsky & Gaby, 2010; Hall, 1959; Levine & Norenzayan, 1999; Macchia & Whillans, 2019; Nonis et al., 2005). Further, we expect these differences to stem not only from cultural differences but also from social policies (Haller, Hadler, & Kaup, 2013; Mahmud Rice, Goodin, & Parpo, 2006). Some European countries such as France, for instance, have social policies that cap the workweek to less than 40 hours, subsidized childcare, and leisure facilities, affording citizens with more and better-quality free time that enhances wellbeing (Lahat & Sened, 2019). The link between time management and various outcomes thus hinges not only on individual choices but also on cultural and political differences. Accordingly, we predict that the link between time management, wellbeing, and job performance will be stronger in countries other than West European and Scandinavian. The rationale is that in such countries, there are infrastructures that make time management easier, so to speak, such as subsidized childcare and liberal parental leave. In countries that fail to offer these infrastructures, however, people will have to build stronger time management skills to make up for inadequate social policies. In these contexts, we expect the link between time management and its outcomes to be stronger.

METHOD

Literature Search and Inclusion Criteria

We performed a comprehensive search using the keywords "time management" across the EBSCO databases *Academic Search Complete*, *Business Source Complete, Computers & Applied Sciences*

Complete, Gender Studies Database, MEDLINE, Psychology and Behavioral Sciences Collection,

PsycINFO, SocINDEX, and *Education Source.* The search had no restrictions regarding country

and year of publication and included peer-reviewed articles up to July 2019. To enhance

comprehensiveness, we also ran a forward search[3] on the three main time management measures:

the Time Management Behavior Scale (Macan, Shahani, Dipboye, & Phillips, 1990)[4], the Time

Structure Questionnaire (Bond & Feather, 1988), and the Time Management Questionnaire

(Britton & Tesser, 1991). As shown in `Figure 1: PRISMA chart summarizing the screening`

`process (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009)` Figure 1, the

initial search yielded 10,933 hits, excluding duplicates.

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[3] A forward search tracks all the papers that have cited a particular work. In our case the forward search located all the papers citing the three time management scales available on *Web of Science.*
[4] The authors refined the Time Management Behavior Scale in a subsequent paper (Macan, 1994), which we also used in our forward search.

PRISMA Flow Diagram
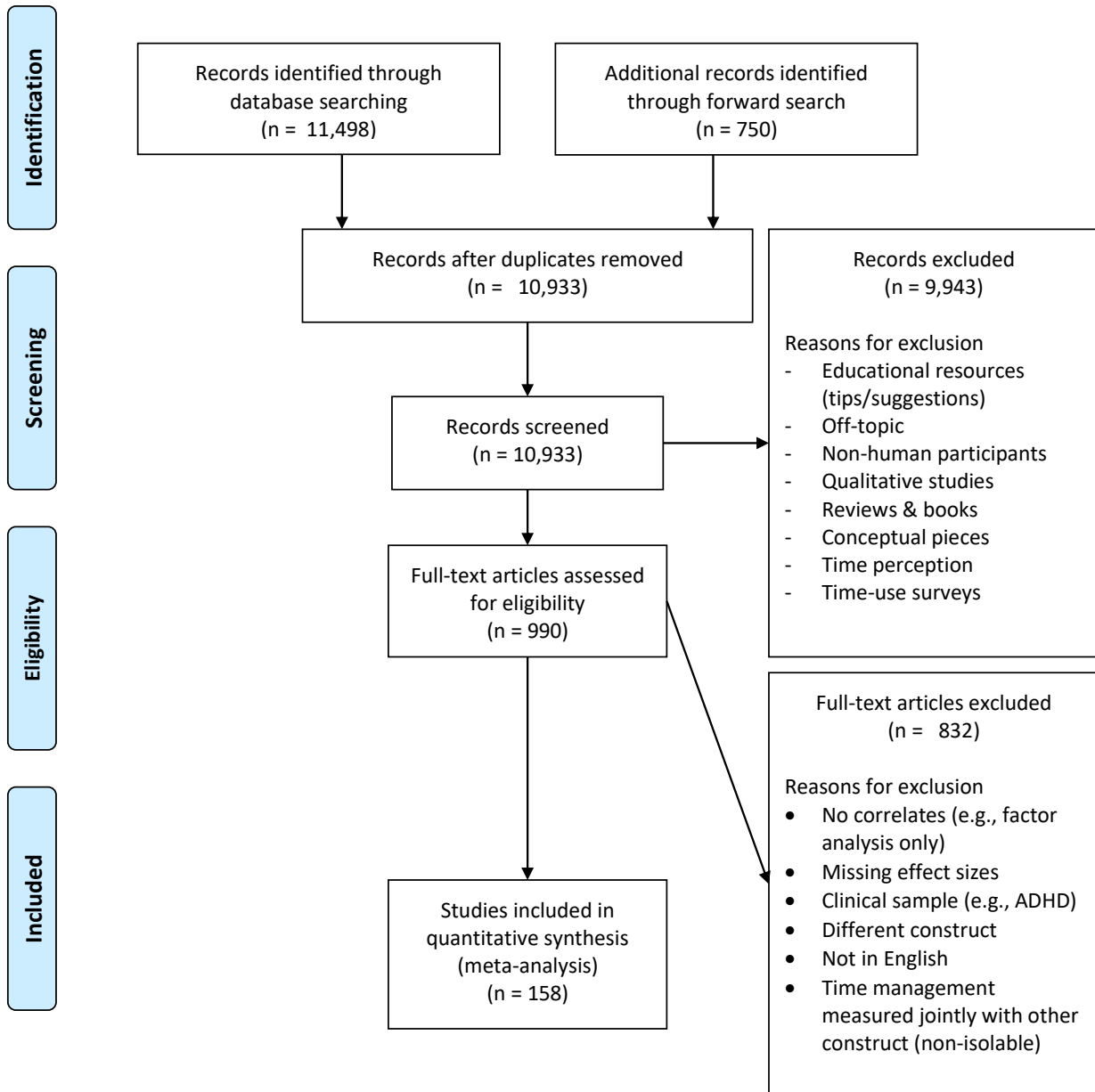
Figure 1: PRISMA chart summarizing the screening process (Moher, Liberati, Tetzlaff, Altman, & PRISMA Group, 2009)

The search included no other terms than "time management" to afford the broadest possible coverage of time management correlates. Nonetheless, as shown in Table 4, we focused exclusively on quantitative, empirical studies of time management in non-clinical samples.

Successive rounds of screening, first by assessing paper titles and abstracts and then by perusing full-text articles, whittled down the number of eligible studies to 158 (see Figure 1).

Inclusion Criteria	Exclusion Criteria
Studies with a quantitative measure of time management (e.g., scale, survey, questionnaire) and/or feature a time management experiment with at least one control group	Qualitative approaches (e.g., interviews, case studies)
Constructs related to time management, such as time structure, time planning, scheduling, time management behaviors, time management practice, and time management skills	Time-use studies (e.g., national time-use surveys, individual-level time-tracking studies), time perception studies, studies on non-personal time management (e.g., real-time management in supply chains), and time management studies focusing mainly on clinical samples (e.g., with chronic pain or ADHD)
Studies linking time management to other variables (e.g., life satisfaction, stress, academic achievement)	Studies focusing exclusively on time management (e.g., factor analyses)

Table 4: Summary of inclusion and exclusion criteria

Data Extraction and Coding

We extracted eligible effect sizes from the final pool of studies; effect sizes were mostly based on means and correlations. In our initial data extraction, we coded time management correlates using the exact variable names found in each paper. For instance, "work-life imbalance" was initially coded in these exact terms, rather than "work-life conflict." Virtually all time management correlates we extracted fell under the category of performance and/or wellbeing. This pattern tallies with previous reviews of the literature (Aeon & Aguinis, 2017; Claessens et al., 2007). A sizable number of variables also fell under the category of individual differences and contextual factors, such as age, personality, and job autonomy. After careful assessment of the extracted variables, we developed a coding scheme using a nested structure shown in Table 5.

Performance				Wellbeing		Individual Differences			
Professional Setting		Academic Setting		Positive (wellbeing)	Negative (illbeing)	Demographics	Personality	Attributes and Attitudes	Contextual Factors
Results-based	Behavior-based	Results-based	Behavior-based	Job Satisfaction	Emotional Exhaustion	Age	Agreeableness	Internal Locus of Control	Job Autonomy
Job performance	Creativity	GPA	Procrastination (reverse coded)	Life Satisfaction	Stress	Gender	Extraversion	Type A	Role Overload
	Helping Behavior	Standardized Tests	Motivation	Mental Health (positive)	Work-life Conflict	Education	Conscientiousness	Self-esteem	Time Management Training
	Job Involvement	Test Scores		Optimism	Anxiety	Number of Children	Neuroticism	Protestant Work Ethic	
	Procrastination (reverse coded)			Physical health (positive)	Depression	Marital Status	Openness	Multitasking	
	Motivation			Positive affect	Psychological Distress			Cognitive Ability	
	Proactiveness			Self-actualization	Hopelessness			Hours Worked	
				Sense of purpose	Boredom				
				Wellbeing	Negative Affect				
					Worry				
					Physical Distress				

Table 5: Coding scheme for time management correlates

Aeon and Aguinis (2017) suggested that time management influences performance, although the strength of that relationship may depend on how performance is defined. Specifically, they proposed that time management may have a stronger impact on behaviors conducive to performance (e.g., motivation, proactiveness) compared to assessments of performance (e.g., supervisor rankings). For this reason, we distinguish between results- and behavior-based performance in our coding scheme, both in professional and academic settings[5]. Furthermore, wellbeing indicators can be positive (e.g., life satisfaction) or negative (e.g., anxiety). We expect time management to influence these variables in opposite ways; it would thus make little sense to

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[5] Behavior-based performance constructs, such as creativity, were selected using Aeon & Aguinis's (2017) original framework. We added motivation as a behavior-based performance indicator, although the actual scales measuring motivation sometimes combine behavior *and* attitudes. As such, the behavioral and attitudinal dimensions of motivation are hard to disentangle. Literature reviews suggest motivation is a strong predictor of job performance (Sackett et al., 2017); as such, we believe the construct of motivation fits the performance category more than other broad categories in Table 5.

analyze them jointly. Accordingly, we differentiate between wellbeing (positive) and illbeing (negative).

In our second round of coding, we used the scheme shown in Table 5 to cluster together kindred variables. For instance, we grouped "work-life imbalance," "work-life conflict" and "work-family conflict" under an overarching "work-life conflict" category. The authors reviewed each variable code and resolved rare discrepancies to ultimately agree on all coded variables. Note that certain variables, such as self-actualization, covered only one study (i.e., one effect size). While one or two effect sizes is not enough to conduct a meta-analysis, they can nonetheless be grouped with other effect sizes belonging to the same category (e.g., self-actualization and sense of purpose belong the broader category of overall wellbeing). For this reason, we included variables with one or two effect sizes for comprehensiveness.

Anticipating meta-regression analyses (i.e., testing for moderating factors), we also extracted data at the study level, including year of publication, country and culture, student status (i.e., student or professional sample), time management measure used[6], adult status (vs. children), and mean age of the sample. To test for cultural influence, we assigned each country to a cultural cluster (e.g., United States to Anglo, China to Confucian Asian) using Gupta, Hanges, and Dorfman's (2002) classification. We chose the Unites States and Anglo as baselines for country and cultural comparisons.

Meta-analytic procedures

We conducted all meta-analyses following the variables and cluster of variables outlined in Table 5. We opted to run all analyses with a random effects model. The alternative—a fixed effects

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[6] We used codes for each of the three main time management scales (1, 2, & 3), one code for other validated scales (4), and another code for homecooked measures (5).

model—assumes that all studies share a common true effect size (i.e., of time management on a given outcome) which they approximate. This assumption is unrealistic because it implies that the factors influencing the effect size are the same in all studies (Borenstein, 2009). In other words, a fixed effects model assumes that the factors affecting time management are the same in all studies—the fallacy of this assumption was the main theme of Aeon and Aguinis's (2017) review. For each analysis, we also ran meta-regressions to test for the moderating factors outlined above (e.g., year of publication, culture). We used the program Comprehensive Meta-Analysis v.3 (Borenstein, Hedges, Higgins, & Rothstein, 2013), considered highly reliable and valid in various systematic assessments (Bax, Yu, Ikeda, & Moons, 2007; Suurmond, van Rhee, & Hak, 2017) and regularly used in top research outlets, including *Psychological Bulletin* and *The Lancet* (e.g., Chu et al., 2017; Karazsia, Murnen, & Tylka, 2017; Sala, Tatlidil, & Gobet, 2018; Sijbrandij, Kleiboer, Bisson, Barbui, & Cuijpers, 2015; Yon, Mikton, Gassoumis, & Wilber, 2017).

Concerning statistical analyses, meta-analyses do not typically perform calculations on correlations (e.g., Pearson's *r*). Instead, we transformed correlations into Fisher's z scales (Borenstein, 2009). The transformation was done with $z = 0.5 \times \ln\left(\frac{1+r}{1-r}\right)$, where *r* represents the correlation extracted from each individual study. The variance of Fisher's Z was calculated as $V_z = \frac{1}{n-3}$ where *n* corresponds to the study's sample size; the standard error of Fisher's Z was calculated as $SE_z = \sqrt{V_z}$.

In many cases, studies reported how variables correlated with an overall time management score. In some cases, however, studies reported only correlations with discrete time management subscales (e.g., short-range planning, attitudes toward time, use of time management tools), leaving out the overall effect. In such cases, we averaged out the effect sizes of the subscales to compute a summary effect (Borenstein, 2009). This was necessary not only because meta-analyses

admit only one effect size per study, but also because our focus is on time management as a whole rather than on subscales. Similarly, when we analyzed the link between time management and a high-level cluster of variables (e.g., *overall* wellbeing rather than specific variables such as life satisfaction), there were studies with more than one relevant outcome (e.g., a study that captured both life satisfaction and job satisfaction). Again, because meta-analyses allow for only one effect size (i.e., variable) per study, we used the mean of different variables to compute an overall effect sizes in studies that featured more than one outcome (Borenstein, 2009).

RESULTS

Overall description of the literature

We analyzed 158 studies for a total number of 490 effect sizes. 21 studies explored performance in a professional context and 76 in an academic context; 30 studies investigated wellbeing (positive), and 58 illbeing. Interestingly, studies did not systematically report individual differences, as evidenced by the fact that only 21 studies reported correlations with age, and only between 10 and 15 studies measured personality. Studies that measured contextual factors were fewer still—between 3 and 7. These figures fit with Aeon and Aguinis's (2017) observation that the time management literature often overlooks internal and external factors that can influence the way people manage time.

The earliest paper was by Johnson (1938), who aimed to "determine the relative value of definite planning of one's time… as compared with unplanned use of that time, in the achievement of normal school freshmen girls" (p. 45). We found no further papers fitting our inclusion criteria until the mid-1980s. Publication trends also indicate an uptick in time management studies around the turn of the millennium, with an even higher number around the 2010s. This trend is consistent

with the one Shipp and Cole (2015) identified: a surge in time-related papers in organizational behavior around the end of the 1980s.

It is also interesting to know that the first modern time management books of note came out in the early 1970s, including the *The Time Trap* (1972), by Alec MacKenzie and *How to Get Control of your Time and your Life* (1973), by Alan Lakein. These books inspired early modern time management research (e.g., Hall & Hursch, 1982; Macan, Shahani, Dipboye, & Phillips, 1990; Woolfolk & Woolfolk, 1986). It is thus very likely that the impetus for modern time management research came from popular practitioner manuals.

To assess potential bias in our sample of studies, we computed different estimates of publication bias (see Table 6). Overall, publication bias appears relatively low (see also funnel plots on page 168). Publication bias occurs when there is a bias against nonsignificant or even negative results because such results are seen as unsurprising. In this case, however, the fact that time management is generally expected to better our lives offers an incentive to publish nonsignificant or negative results, which would be counterintuitive (e.g., Häfner & Stock, 2010). By the same token, the fact that more and more people feel that time management is ineffective (e.g., Burkeman, 2016) provides an incentive to publish papers that link time management with positive outcomes. In other words, opposed social expectations surrounding time management might reduce publication bias.

	Job performance	Academic achievement	Wellbeing	Illbeing
Classic Fail-Safe *N*	344	2,735	6,496	9,333
Orwin's Fail-Safe *N*[7]	75	309	339	364
Egger's Test of the Intercept	B(0) = 2.76 CI (95%) = (-.77; 6.28) *p* > .05	B(0) = 1.18 CI (95%) = (-.36; 2.72) *p* > .05	B(0) = 0.31 CI (95%) = (-.4.08; 4.69) *p* > .05	B(0) = -1.18 CI (95%) = (-.3.31; 0.94) *p* > .05
Duval & Tweedie's Trim and Fill Method	1 study missing New effect size = .188	0 studies missing	0 studies missing	14 studies missing New effect size = .283
Overall Degree of Publication Bias	Moderate	Low	Low	Moderate

Table 6: Publication bias estimates for each time management outcome

[7] With trivial correlation *r* < 0.08 and mean correlation in missing studies = 0.06

Finally, we note that the link between time management and virtually all outcomes studied is highly heterogeneous (as measured, for instance, by Cochran's Q and Higgin & Thompson's I^2; see tables below)[8]. This could be due to the diversity of research methods and/or samples of participants. This high level of heterogeneity suggests that future research should pay more attention to moderating factors (e.g., individual differences) and the confounding potential of research designs (e.g., consistency of time management interventions), as Aeon and Aguinis (2017) recommend.

Time management and performance in professional settings

Overall, time management has a moderate impact on performance at work, with correlations hovering around $r = .25$. In line with Aeon and Aguinis (2017), we distinguish between results-based and behavior-based performance. The former measures performance as an outcome (e.g., performance appraisals by supervisors)[9] whereas the latter measures performance as behavioral contributions (e.g., motivation, job involvement). Time management seems related to both types of performance. Although the effect size for results-based performance is lower than that of behavior-based performance, moderation analysis reveals the difference is not significant ($p > .05$), challenging Aeon and Aguinis's (2017) conclusions.

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[8] The Q statistic coupled with its degrees of freedom is a classical measure of heterogeneity in meta-analyses. If further analysis shows the Q test to be significant, then heterogeneity is present. The I^2 statistic is a more intuitive measure in that it indicates the percentage of variation across studies due to heterogeneity. The higher the percentage, the higher the heterogeneity in studies' results.

[9] Although performance appraisals may take into account behaviors, it is hard to disentangle behaviors from results in such assessments. They will be considered results-based as per Aeon & Aguinis's (2017) framework.

Variable	k	N	r	95% CI	Q(df)	τ^2	τ^2(SE)	I^2
Performance (overall)	21	3,990	0.259***	0.197 – 0.318	77.32 (20)	0.016	0.007	74.13
Results-based performance (overall)	13	2,532	0.221***	0.144 – 0.295	44.19 (12)	0.015	0.009	72.84
Behavior-based performance (overall)	13	2,474	0.297***	0.225 – 0.365	40.56 (12)	0.013	0.008	70.41
Creativity	1	213	0.460***	0.347 – 0.560	-	-	-	-
Helping behavior	1	254	0.160*	0.038 – 0.278	-	-	-	-
Job involvement	4	617	0.207***	0.129 – 0.282	2.99 (3)	0	0.006	0
Procrastination (reverse coded)	2	198	0.374**	0.166 – 0.550	1.61 (1)	0.012	0.046	37.92
Motivation	4	711	0.352***	0.226 – 0.467	10.12 (3)	0.014	0.016	70.37
Proactiveness	3	813	0.267***	0.121 – 0.401	8.81 (2)	0.014	0.018	77.30

$*p < .05$ $**p < .01$ $***p < .001$

Table 7: Time management and performance in professional settings

Interestingly, the link between time management and performance displays much less heterogeneity (see Q and I^2 statistics in Table 7) than the link between time management and other outcomes (e.g., wellbeing, illbeing, individual differences; see tables 8-11). The studies we summarize in Table 7 include both experimental and non-experimental designs; they also use different time management measures. As such, we can discount, to a certain extent, the effect of methodological diversity. We can perhaps explain the lower heterogeneity by the fact that when people hold a full-time job, they usually are at a relatively stable stage in life. In school, by contrast, a constellation of factors (e.g., financial stability, marital status, to name a few) conspire to affect time management outcomes such as wellbeing and illbeing. Furthermore, work contexts are a typically more closed system than life in general. For this reason, fewer factors stand to disrupt the link between time management and job performance than between time management and, say, life satisfaction. Corroborating this, note how, in Table 9 below, the link between time management and *job* satisfaction is much less heterogeneous ($I^2 = 58.70$) than the one between time management and *life* satisfaction ($I^2 = 95.45$).

Moderation analyses were all nonsignificant, save for two instances. First, compared to the US, Canada ($B = .3539, p < .001$) and Iran ($B = .2427, p < .05$) show a greater correlation between time

management and behavior-based performance ($p < .05$, $Q_{model} = 15.17(6)$, $Q_{residual} = 11.15(6)$, $I^2 = 46.20$, $R^2_{analog} = .57$). Second, the relationship between time management and job performance significantly increases over the years ($B = .0106$, $p < .01$, $Q_{model} = 8.52(1)$, $Q_{residual} = 15.54(9)$, $I^2 = 42.08$, $R^2_{analog} = .75$), as shown in figure 2.
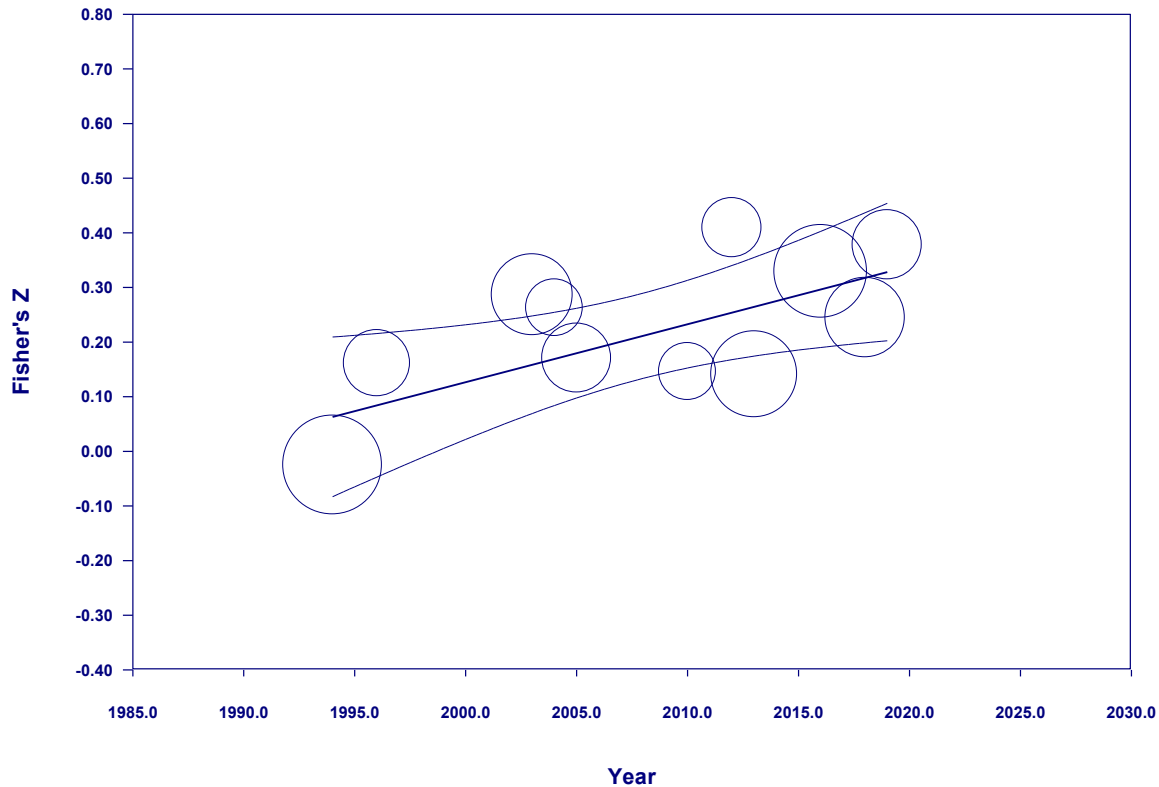
Figure 2: The strength of the relationship between time management and job performance increases over the years

Time management and performance in academic settings

Overall, the effect of time management on performance seems to be similar in academic settings compared to work settings, hovering around $r = .20$ (see Table 8). Here again, we distinguish between results- and behavior-based performance. Time management's impact on behavior-based performance seems much higher than on results-based performance, a much wider difference than the one we observed in professional settings. This suggests than results-based performance

depends less on time management in academic settings than in professional settings. In plain English, this means that time management is more likely to get people a good job review at work than a strong GPA.

Variable	k	N	r	95% CI	Q(df)	τ^2	τ^2(SE)	I^2
Academic Achievement (overall)	76	30,605	0.262***	0.223 – 0.300	916.31 (75)	0.029	0.007	91.81
Results-based performance (overall)	63	27,225	0.196***	0.160 – 0.232	535.28 (62)	0.018	0.005	88.41
GPA	57	24,270	0.213***	0.178 – 0.247	384.48 (56)	0.014	0.004	85.43
Standardized Tests	7	6,270	0.011	-0.053 – 0.094	33.35 (6)	0.007	0.006	82.01
Test Scores	3	603	0.228***	0.151 – 0.303	1.21 (2)	0	0.005	0
Behavior-based performance (overall)	28	8,186	0.430***	0.365 – 0.490	310.83 (27)	0.037	0.013	91.31
Procrastination (reverse coded)	14	3,558	0.490***	0.399 – 0.572	136.62 (13)	0.040	0.020	90.48
Motivation	17	5,805	0.381***	0.302 – 0.454	178.85 (16)	0.031	0.013	91.05

*p < .05   **p < .01   ***p < .001

Table 8: Time management and performance in academic settings

Furthermore, the effect of time management on procrastination in school is strong. Although we cannot establish causation in all studies, we note that some of them featured experimental designs that established a causal effect of time management on reducing procrastination (e.g., Häfner, Oberst, & Stock, 2014).

Interestingly, time management was linked to all types of results-based performance except for standardized tests. This is perhaps due to the fact that standardized tests tap more into fluid intelligence, a measure of intelligence independent of acquired knowledge (Sternberg & Kaufman, 1998). GPA and regular exam scores, in contrast, tap more into crystallized intelligence, which depends mostly on accumulated knowledge. Time management can thus assist students in organizing their time to acquire the knowledge necessary to ace a regular exam; for standardized exams that depend less on knowledge and more on intelligence, however, time management may not be as helpful. Independent empirical evidence bears this out: middle school students' IQ

predicts standardized achievement tests scores better than self-control[10] while self-control predicts report card grades better than IQ (Duckworth, Quinn, & Tsukayama, 2012). Relatedly, we found no significant relationship between time management and cognitive ability in our meta-analysis (see Table 11)

Here again, moderation analyses were all nonsignificant, with the exception of country of investigation: compared to the US, Pakistan ($B = .2657$, $p < .05$) and Turkey ($B = .2644$, $p < .001$) show a stronger correlation between time management and results-based academic performance ($p < .05$, $Q_{model} = 31.21(18)$, $Q_{residual} = 251.37(44)$, $I^2 = 82.5$, $R^2_{analog} = .16$).

Time management and wellbeing

On the whole, time management has a slightly stronger impact on wellbeing than on performance. This is unexpected, considering how the dominant discourse points to time management as a skill for professional growth. Admittedly, the dominant discourse also frames time management as necessary for wellbeing and stress reduction, but to a lesser extent. Our finding that time management has a stronger influence on wellbeing in no way negates the importance of time management as a work skill. Rather, this finding challenges the intuitive notion that time management is more effective for work than for other life domains. As further evidence, notice how in Table 9 the effect of time management on *life* satisfaction is 72% stronger than that on *job* satisfaction.

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[10] For our purposes, we can use self-control as a very rough proxy for time management.

Variable	k	N	r	95% CI	Q(df)	τ^2	τ^2(SE)	I^2
Overall wellbeing	30	9,905	0.313***	0.244 – 0.380	395.83 (29)	0.040	0.014	92.67
Job satisfaction	11	2,856	0.248***	0.189 – 0.305	24.21 (10)	0.006	0.005	58.70
Life satisfaction	9	2,855	0.426***	0.273 – 0.558	175.86 (8)	0.068	0.038	95.45
Mental health (positive)	2	473	0.556***	0.349 – 0.711	7.56 (1)	0.031	0.051	86.77
Optimism	2	330	0.305**	0.108 – 0.479	3.44 (1)	0.016	0.032	70.94
Physical health (positive)	2	567	0.293	-0.002 – 0.542	13.07 (1)	0.045	0.068	92.35
Positive affect	5	2,725	0.280***	0.186 – 0.368	18.73 (4)	0.010	0.010	78.65
Self-actualization	1	336	0.280***	0.178 – 0.376	-	-	-	-
Sense of purpose	1	529	0.351***	0.274 – 0.424	-	-	-	-
Wellbeing	5	1,447	0.219**	0.092 – 0.338	22.86 (4)	0.018	0.016	82.50

*$p < .05$ **$p < .01$ ***$p < .001$

Table 9: Time management and wellbeing

It is interesting to note that here again year of publication, student status, mean sample age, research design, and time management measure used did not moderate the relationship. This might be due to study limitations or, alternatively, to the universality of time management's effect on wellbeing. Nevertheless, compared to Anglo cultures, in Confucian Asian cultures the link between time management and wellbeing was stronger ($B = .4197$, $p < .001$, $Q_{model} = 20.94(2)$, $Q_{residual} = 34.89(6)$, $I^2 = 82.80$, $R^2_{analog} = .77$)
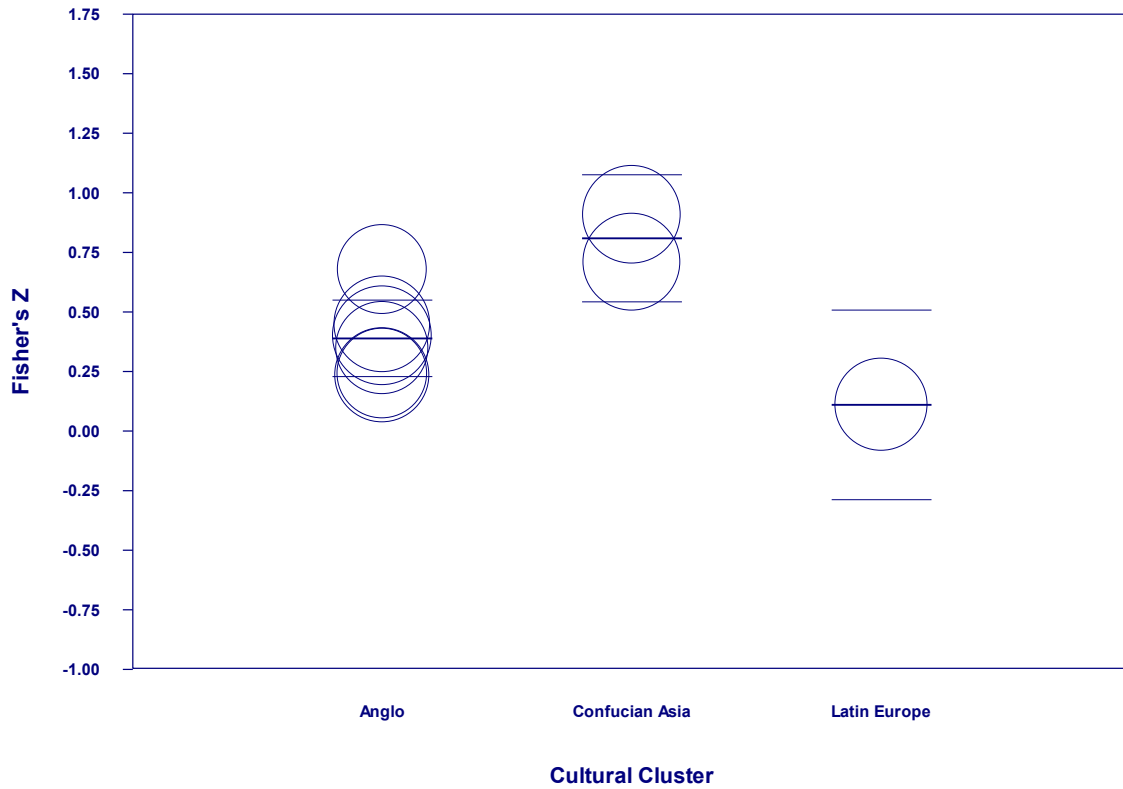
Figure 3: The relationship between time management and life satisfaction is stronger in Confucian Asia

Time management and illbeing

Time management seems to allay various forms of illbeing, although to a lesser extent than it enhances wellbeing. The alleviating effect on psychological distress is particularly strong ($r = -0.358$; see Table 10).

Variable	k	N	r	95% CI	Q(df)	τ^2	τ^2(SE)	I^2
Overall illbeing	58	15,387	-0.222***	-0.273 | -0.170	611.57 (57)	0.038	0.010	90.68
Overall stress	26	5,621	-0.225***	-0.295 | -0.153	184.49 (25)	0.031	0.012	86.44
Emotional exhaustion	3	213	-0.260***	-0.338 | -0.179	1.86 (2)	0	0.006	0
Stress	17	3,367	-0.286***	-0.390 | -0.176	163.84 (16)	0.05	0.024	90.23
Work-life conflict	9	2,812	-0.163**	-0.277 | -0.043	82.11 (8)	0.031	0.018	90.25
Overall psychological illbeing	34	10,100	-0.254***	-0.315 | -0.190	350.58 (33)	0.034	0.012	90.85
Anxiety	16	6,648	-0.181***	-0.255 | -0.105	140.28 (15)	0.021	0.011	89.30
Depression	2	625	-0.226**	-0.375 | -0.065	-	-	-	-
Psychological distress	10	2,196	-0.358***	-0.447 | -0.263	52.98 (9)	0.023	0.014	83.01
Hopelessness	2	565	-0.218***	-0.296 | -0.138	-	-	-	-
Boredom	5	1,248	-0.310**	-0.507 | -0.081	69.68 (4)	0.070	0.055	94.26
Negative affect	4	2,393	-0.232	-0.451 | 0.014	70.74 (3)	0.061	0.061	95.75
Worry	3	291	-0.191*	-0.355 | -0.016	3.98 (2)	0.012	0.025	49.77
Physical distress	7	2,067	-0.204***	-0.264 | -0.142	11.52 (6)	0.003	0.004	47.93

*p < .05   **p < .01   ***p < .001

Table 10: Time management and illbeing

That time management has a weaker effect on illbeing should not be surprising. First, wellbeing and illbeing are not two poles on opposite ends of a spectrum. Although related, wellbeing and illbeing are distinct (Huppert & Whittington, 2003). Thus, there is no reason to expect time management to have a symmetrical effect on wellbeing and illbeing. Second, and relatedly, the factors that influence wellbeing and illbeing are also distinct. Specifically, self-efficacy (i.e., seeing oneself as capable) is a distinct predictor of wellbeing while neuroticism and life events in general are distinct predictors of illbeing (Karademas, 2007). Time management can enhance self-efficacy[11], but can do considerably less in the way of tackling neuroticism and dampening the emotional impact of tragic life events. In other words, the factors that affect wellbeing may be

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[11] One may object that it could be the other way around: people high in self-efficacy may be more likely to engage in time management. However, experimental evidence suggests that time management training does make people feel more in control of their time (Häfner & Stock, 2010). It is thus plausible that time management may have a causal effect on self-efficacy. Relatedly, note how time management ability is strongly related to internal locus of control in Table 11.

much more within the purview of time management than the factors that affect illbeing. For this reason, time management may be less effective in alleviating illbeing than in improving wellbeing. Furthermore, the link between time management and overall stress was moderated by culture. Compared to Anglo cultures, in Confucian Asian cultures the negative link between time management and overall stress was stronger ($N = 26$, $B = .5200$, $p < .001$, $Q_{model} = 17.46(3)$, $Q_{residual} = 81.65(22)$, $I^2 = 73.06$, $R^2_{analog} = .56$). In other words, time management seems to reduce stress to a higher extent in Confucian Asian cultures.
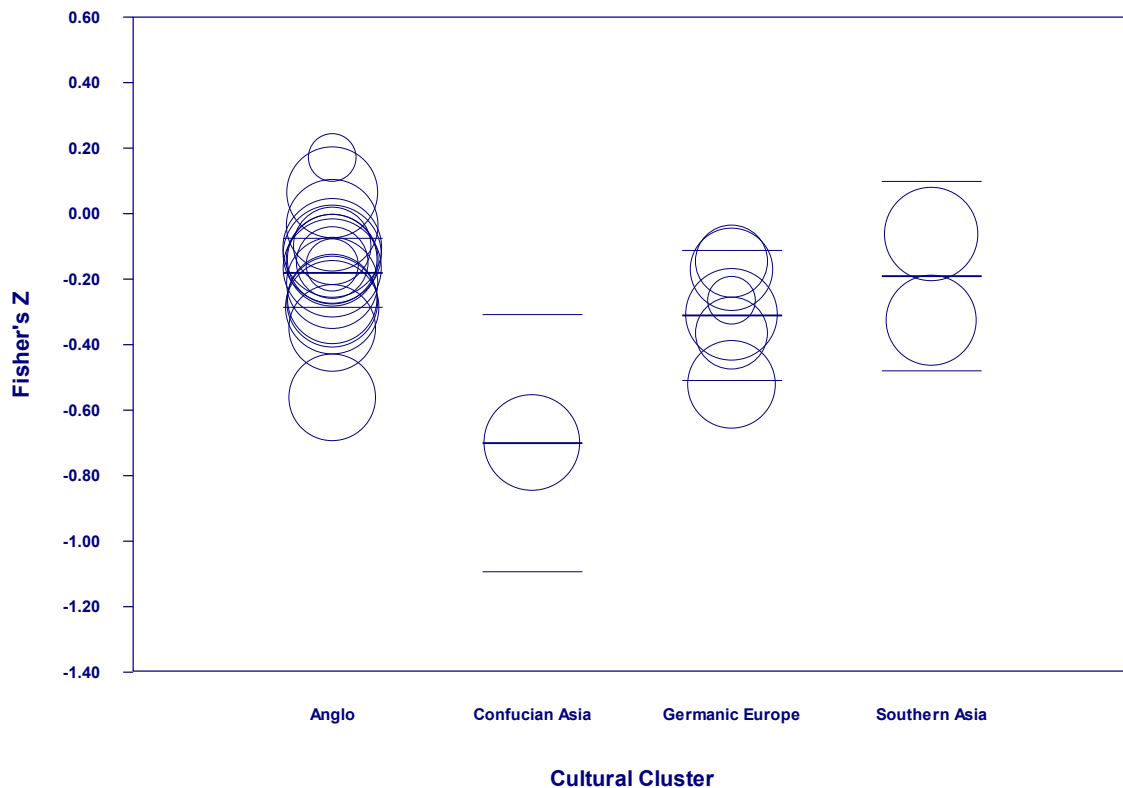
Figure 4: Time management reduces overall stress to a greater extent in Confucian Asia

Time management and individual differences

Time management is, overall, less related to individual differences than to other variables—with the notable exception of personality.

Variable	k	N	r	95% CI	Q(df)	τ^2	τ^2(SE)	I^2
Demographics								
Age	21	7,579	0.032	-0.013 – 0.076	70.42 (20)	0.007	0.004	71.60
Age (excluding children)	19	6,811	0.048*	0.010 – 0.086	40.71 (18)	0.004	0.002	55.79
Gender [a]	37	16,044	-0.087***	-0.129 | -0.045	232.40 (36)	0.013	0.005	84.51
Education	3	808	0.019	-0.050 – 0.088	0.304 (2)	0	0.005	0
Number of children	3	961	0.027	-0.037 – 0.090	0.247 (2)	0	0.004	0
Marital status [b]	3	980	0.015	-0.048 – 0.078	0.548 (2)	0	0.003	0
Personality								
Agreeableness	10	4,562	0.169***	0.091 – 0.244	57.85 (9)	0.013	0.008	84.43
Extraversion	13	53,45	0.102**	0.039 – 0.164	59.05 (12)	0.010	0.006	79.67
Conscientiousness	15	5,159	0.451***	0.326 – 0.561	367.16 (14)	0.079	0.041	96.18
Neuroticism	14	5,222	-0.151***	-0.229 | -0.072	94.61 (13)	0.018	0.010	86.26
Openness	11	4,793	0.141**	0.037 – 0.243	124.17 (10)	0.028	0.016	91.94
Personal attributes and attitudes								
Internal locus of control	3	579	0.346***	0.269 – 0.419	2.16 (2)	0	0.006	7.39
Type A	7	2,388	0.110*	0.017 – 0.202	31.05 (6)	0.013	0.09	80.67
Self-esteem	3	947	0.346***	0.225 – 0.456	8.19 (2)	0.010	0.014	75.58
Protestant Work Ethic	3	998	0.026	-0.036 – 0.088	0.240 (2)	0	0.003	0
Multitasking	5	932	-0.088*	-0.164 | -0.010	5.53 (4)	0.002	0.006	27.66
Cognitive ability	3	1,484	0.015	-0.064 – 0.094	4.36 (2)	0.003	0.005	54.11
Hours spent studying	6	3,184	0.137**	0.036 – 0.235	30.08 (5)	0.012	0.011	83.37
Hours spent working	8	3,682	-0.042	-0.159 – 0.076	64.87 (7)	0.023	0.019	89.21
Contextual factors								
Job autonomy	4	751	0.101	-0.060 – 0.256	8.38 (3)	0.016	0.022	64.23
Role overload	7	1,187	-0.146*	-0.284 | - 0.003	26.59 (6)	0.025	0.023	77.43
Time management training	3	846	0.173*	0.031 – 0.309	5.92 (2)	0.010	0.016	66.62

*p < .05   **p < .01   ***p < .001
[a] Female = 1; Male = 2
[b] Single = 1; Married = 2

Table 11: Time management and individual differences

Age, for instance, hardly correlates with time management (with a relatively high consistency between studies, I^2 = 55.79, see Table 11 above). Furthermore, the link between time management and age is less pronounced in Confucian Asia compared to other cultures (N = 19, B = -.1414, p < .01, Q_{model} = 9.50(5), $Q_{residual}$ = 23.76(13), I^2 = 45.29, R^2_{analog} = .25).
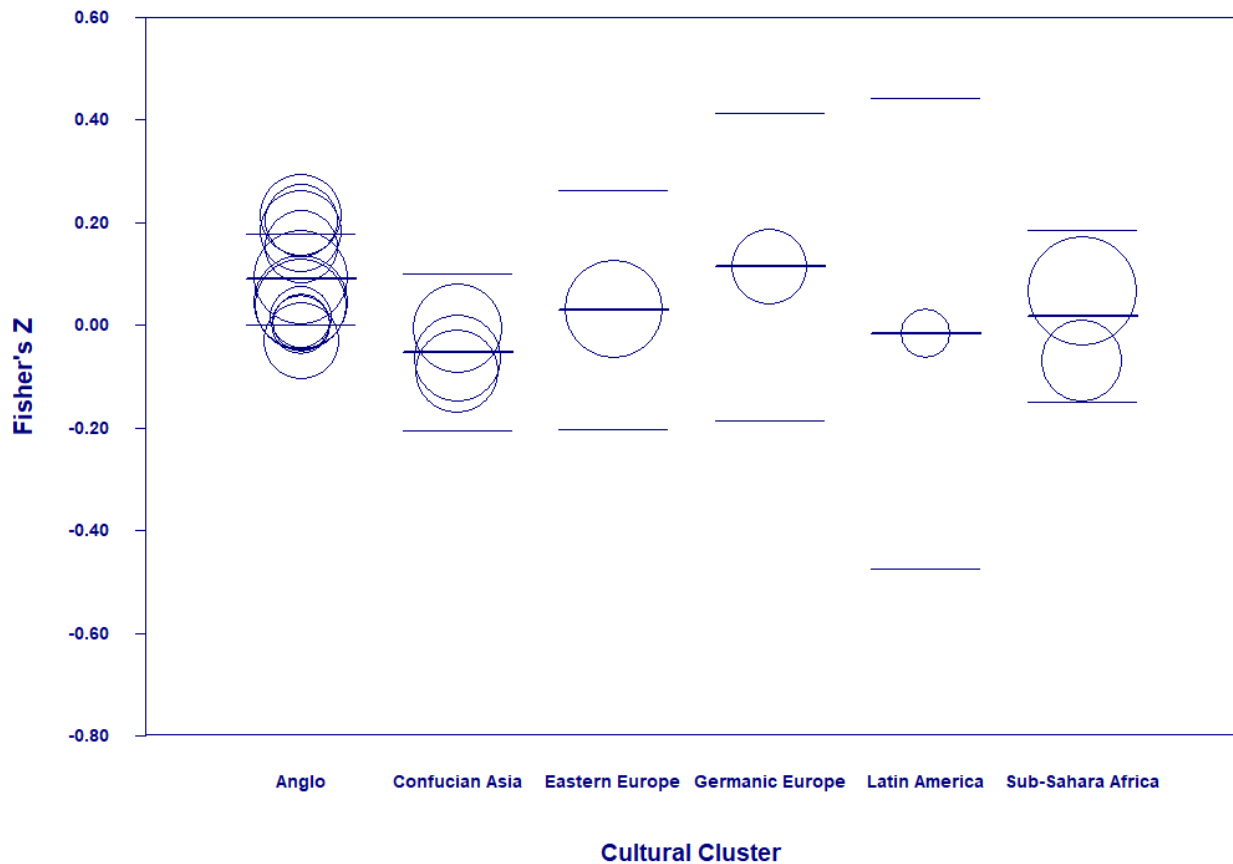
Figure 5: The link between time management and age is weaker in Confucian Asia

Similarly, gender only tenuously correlates with time management, although in the expected direction: women seem to have stronger time management abilities than men. The very weak association with gender ($r = -0.087$) is particularly surprising given women's well-documented superior self-regulation skills (Steel & Ferrari, 2013). That being said, women's time management abilities seem to grow stronger over the years ($N = 37$, $B = -.0049$, $p < .05$, $Q_{model} = 3.89(1)$, $Q_{residual} = 218.42(35)$, $I^2 = 83.98$, $R^2_{analog} = .03$; also see Figure 6 below). More realistically, this increase may not be due to women's time management abilities getting stronger per se but, rather, to the fact that women now have more *freedom* to manage their time (Goodin, Rice, Parpo, & Eriksson, 2008).
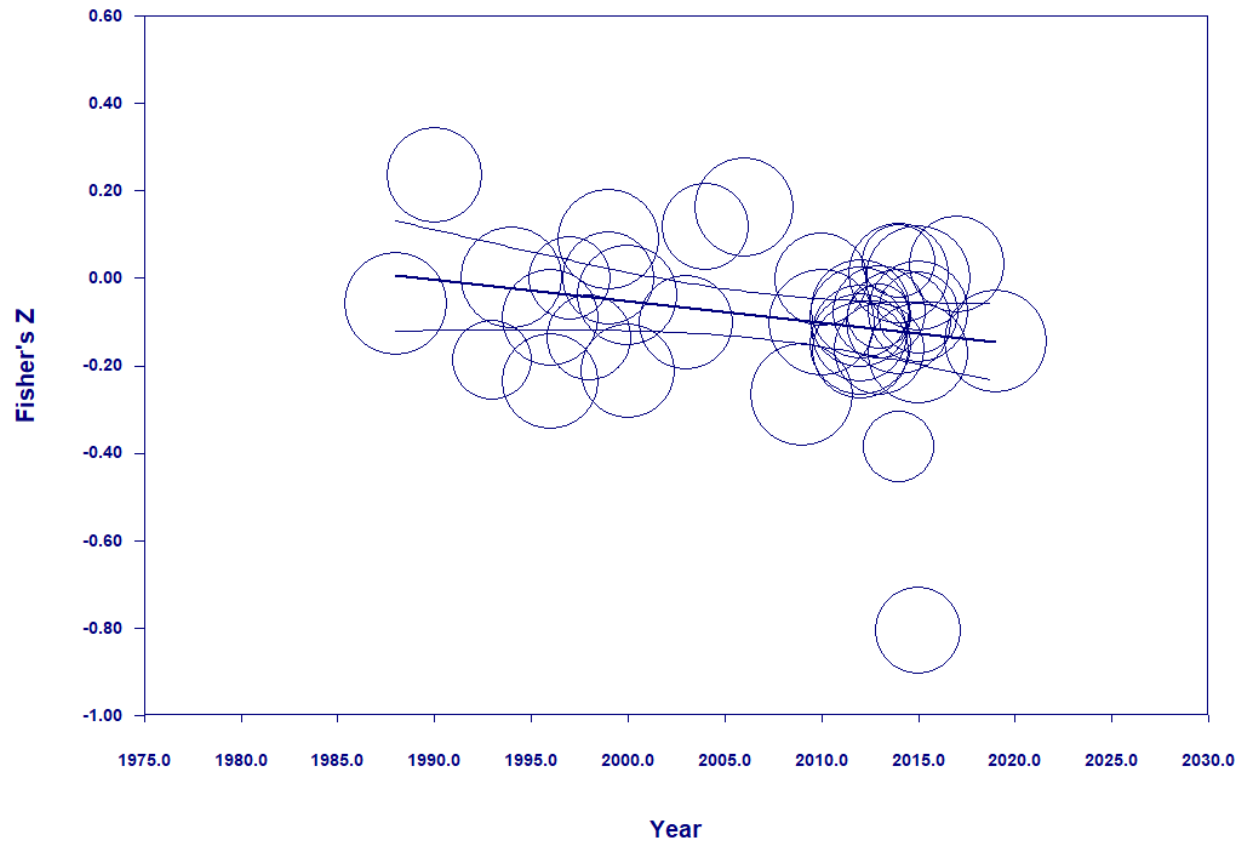
Figure 6: The link between time management behaviors and gender is getting stronger over the years (in favor of women)

Other demographic indicators, such as education and number of children, were nonsignificant. Similarly, the relationships between time management and personal attributes and attitudes were either weak or nonsignificant, save for two notable exceptions. First, the link between time management and internal locus of control (i.e., the extent to which people perceive they're in control of their lives) is quite substantial. This is not surprising, because time management presupposes that people believe they can change their lives. Alternatively, it may be that time management helps people strengthen their internal locus of control, as experimental evidence suggests (e.g., Häfner & Stock, 2010). Second, the link between time management and self-esteem is equally substantial. Here again, one can make the argument either way: people with high self-esteem might be confident enough to manage their time or, conversely, time management boosts

self-esteem. The two options are not mutually exclusive: people with internal loci of control and high self-esteem levels can feel even more in control of their lives and better about themselves through time management.

We also note a very weak but statistically significant *negative* association between time management and multitasking. It has almost become commonsense that multitasking does not lead to performance (e.g., Ophir, Nass, & Wagner, 2009). As a result, people with stronger time management skills might deliberately steer clear of this notoriously ineffective strategy.

In addition, time management was positively (though mildly) related to hours spent studying but not hours spent working[12]. This is consistent with time-use studies revealing that teenagers and young adults spend less time working and more time studying (Twenge & Park, 2019). Students who manage their time likely have well-defined intentions, and trends suggest those intentions will target education over work because, it is hoped, education offers larger payoffs over the long-term (Mullan, 2018).

In terms of contextual factors, time management does not correlate significantly with job autonomy. This is surprising, as we expected autonomy to be a prerequisite for time management (i.e., you can't manage time if you don't have the freedom to). Nevertheless, qualitative studies have shown that even in environments that afford little autonomy (e.g., restaurants) workers can carve out pockets of time freedom to momentarily cut loose (Fine, 1990). Thus, time management behaviors may flourish even in the most stifling settings. In addition, the fact that time management is associated with less role overload and previous attendance of time management training programs makes sense: time management can mitigate the effect of heavy workloads and time management training, it is hoped, improves time management skills.

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[12] These variables cover only student samples (i.e., who also work part- or full-time) and thus do not apply to non-student populations.

Finally, time management is linked to all personality traits. In particular, previous reviews of the literature have commented on the link between time management and conscientiousness (Claessens et al., 2007), and our study reveals the substantial magnitude of that link ($r = 0.451$). The relationship is not surprising: conscientiousness entails orderliness and organization, which overlap significantly with time management. That time management correlates so strongly with personality (and so little with other individual differences) lends credence to the dispositional view of time management (Burrus, 2019; Calabresi & Cohen, 1968; Shahani, Weiner, & Streit, 1993). However, this finding should not be taken to mean that time management is a fixed ability. Having a "you either have it or you don't" view of time management is not only counterproductive (Yeager & Dweck, 2012) but also runs counter to evidence showing that time management training does, in fact, help people manage their time better.

DISCUSSION

Time management is arguably one of the most important skills for organizing our personal and professional lives. It has been the topic of countless books, lectures, and training programs. Since the 1980s, time management research has been growing steadily and has attempted to address the perennial question of whether time management does, in fact, work. Our meta-analysis answers that question by offering a quantitative synthesis of past research. Overall, time management seems to have a moderate influence on job performance, academic achievement, and wellbeing. We note, furthermore, that these three outcomes play an important role in people's lives: doing a good job at work, getting top grades in school, and nurturing psychological wellbeing all contribute to a life well lived.

Contributions

Beyond answering the question of whether time management works, this study contributes to the literature in three major ways. First, we quantify the impact of time management on several outcomes. We thus not only address the question of whether time management works, but also, and importantly, gauge *to what extent* time management works. Indeed, our meta-analysis covers 53,957 participants, which allows for a much more precise, quantified assessment of time management effectiveness compared to qualitative reviews (e.g., Aeon & Aguinis, 2017). We note, however, that there may be variation among different indicators of a given outcome. For instance, the effect size of time management on overall wellbeing is $r = 0.313$ but effect sizes for specific indicators can be lower (positive affect; $r = 0.280$) or higher (life satisfaction; $r = 0.426$). Thus, the overall estimates we present give us a general sense of the impact of time management on broad outcomes; nevertheless, their interpretation should be complemented and refined by taking into account specific indicators. Moreover, we report high levels of heterogeneity between studies most likely due to moderating factors. Interestingly, we found lower levels of heterogeneity across studies conducted in professional (vs. personal or academic) settings. Though by no means conclusive, this suggests that our most reliable findings concern the impact of time management on work performance and satisfaction.

Second, this study encompasses diverse participants over multiple decades, across several countries, and in a variety of settings. This variety allows for a quantitative assessment of moderating factors, such as culture and year of study publication. At the individual level, the scope of our meta-analysis also captures the link between time management behaviors and a host of factors, including age, gender, and prior time management training. (As noted at the beginning of the results section, however, only a modest number of studies reported variables related to

individual differences. As such, moderation analyses did not cover the entirety of the 158 studies and should be interpreted cautiously.) Moderation analyses yielded a few unexpected findings, such as the fact that time management only weakly correlates with gender. Perhaps more interestingly, we found fewer significant moderations than expected. The relatively high heterogeneity between studies suggests that research has yet to uncover additional moderating factors. However, those factors may turn out to be mostly methodological (i.e., studies may be heterogeneous because they use different methods and settings) rather than participant- or context-related. If that's the case, then the relative absence of moderating factors in this meta-analysis may imply that the effects of time management on performance and wellbeing are relatively universal. Third, our findings challenge intuitive ideas concerning what time management is for. Specifically, we found that time management enhances wellbeing—and in particular life satisfaction—to a greater extent than various types of performance. This runs counter to the popular belief that time management primarily helps people perform better and that wellbeing is simply a byproduct of better performance. Of course, it may be that wellbeing gains from time management follow from performance gains, even if wellbeing gains are comparatively higher. But this argument doesn't jibe with experiments showing that even in the absence of performance gains, time management interventions do increase wellbeing (e.g., Häfner & Stock, 2010). This argument also founders in the face of evidence linking time management with wellbeing among the unemployed (Wanberg et al., 1997), unemployment being an environment where performance plays a negligible role, if any. As such, this meta-analysis lends support to definitions of time management that are not work- or performance-centric.

Future research and boundary conditions

As our findings reveal, researchers have assessed the impact of time management on various outcomes, such as emotional exhaustion, life satisfaction, and procrastination. However, our findings differ in terms of weight: some effect sizes are supported by many studies (e.g., GPA with 57 studies) while others are supported by only a handful (e.g., proactiveness with 3 studies). The former effect sizes can be meaningfully interpreted while the latter should be taken with a grain of salt. This means one should cautiously interpret the specific indicators of broad outcome categories. For instance, in the broad category of overall wellbeing, the effect sizes of specific indicators such as job satisfaction (11 studies) and life satisfaction (9 studies) can be interpret more meaningfully than those of optimism (2 studies) and positive affect (5 studies). Future research would benefit from more inquiry into the least studied indicators of performance, wellbeing, and individual differences.

Moreover, this meta-analysis questions whether time management should be seen chiefly as a performance device. Our questioning is neither novel nor subversive: historically people have managed time for other reasons than efficiency, such as spiritual devotion and philosophical contemplation (e.g., Seneca, 2014; Snyder, 2013; Zerubavel, 1980). It is only with relatively recent events, such as the Industrial Revolution and waves of corporate downsizing, that time management has become synonymous with productivity (Gregg, 2018; Thompson, 1967). We hope future research will widen its scope and look more into outcomes other than performance, such as building a sense of meaning in life (Heintzelman & King, 2019). One of the earliest time management studies, for instance, explored how time management relates to having a sense of purpose (Feather & Bond, 1983). However, very few studies have followed suit since. Time

management thus stands to become a richer, more inclusive research area by investigating a wider array of outcomes.

In addition, despite the promising findings of this meta-analysis we must refrain from seeing time management as a panacea. Though time management can make people's lives better, it is not clear how easy it is for people to learn how to manage their time adequately. More importantly, being "good" at time management is often a function of income, education, and various types of privilege (Costas & Grey, 2013; Gregg, 2018; Reagle, 2019; Sharma, 2014). The hackneyed maxim that "you have as many hours in a day as Beyoncé," for instance, blames people for their "poor" time management in saying that successful people have just as much time but still manage to get ahead. Yet the ill-conceived maxim misses the fact that Beyoncé and her ilk do, in a sense, have more hours in a day than average people who can't afford a nanny, chauffeur, in-house chefs, and a bevy of personal assistants. Future research should thus look into ways to make time management more accessible.

Furthermore, this meta-analysis rests on the assumption that time management scales actually measure time management behaviors and that training programs do enhance people's time management skills. This assumption may not be entirely well-founded. Previous reviews have noted the opacity surrounding time management interventions—studies often don't explain what, exactly, is taught in time management training seminars (Aeon & Aguinis, 2017). As a result, comparing the effect of different interventions might come down to comparing apples and oranges. (This might partly account for the high heterogeneity between studies.) Furthermore, research reveals that time management measures aren't entirely uniform (Burrus, 2019; Mudrack, 1997). As such, it is not clear to what extent we can lump these measures together[13]. The extent to which

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[13] Nevertheless, as mentioned earlier we found no instances where time management scale was a significant moderator.

these scales actually capture time management behaviors is not clear either. We hope that our definition of time management will spur future research into crafting more consistent, valid, and generalizable measures. By the same token, we hope to see more standardized time management training interventions in the future that will allow for more meaningful comparisons.

Finally, most time management studies are cross-sectional. Yet it is very likely that the effect of time management compounds over time. If time management can help students get better grades, for instance, those grades can lead to better jobs down the line (Kittelsen Røberg & Helland, 2017). Crucially, learning a skill takes time, and if time management helps people make the time to learn new skills, then time management stands to dramatically enrich people's lives. For this reason, longitudinal studies can track different cohorts to see how time management affects people's lives over time. We expect that developing time management skills early on in life can create a compound effect whereby people acquire a variety of other skills thanks to their ability to make time for self-growth.

CONCLUSION

Overall, this study offers the most comprehensive, precise, and fine-grained assessment of time management to date. We address the longstanding debate over whether time management influences job performance in revealing a positive, albeit moderate effect. Interestingly, we found that time management impacts wellbeing—and in particular life satisfaction—to a greater extent than performance. That means time management may be primarily a wellbeing enhancer, rather than a performance booster. Furthermore, individual and external factors played a minor role in time management, although this does not necessarily mean that time management's effectiveness is universal. Rather, we need more research that focuses on the internal and external variables that

affect time management outcomes. We hope this study will tantalize future research and guide

practitioners in their attempt to make a better use of time.

– Bonjour, dit le petit prince.

– Bonjour, dit le marchand.

C'était un marchand de pilules perfectionnées qui apaisent la soif. On en avale une par semaine et l'on n'éprouve plus le besoin de boire.

– Pourquoi vends-tu ça ? dit le petit prince.

– C'est une grosse économie de temps, dit le marchand. Les experts ont fait des calculs. On épargne cinquante-trois minutes par semaine.

– Et que fait-on de ces cinquante-trois minutes ?
– On en fait ce que l'on veut...

« Moi, se dit le petit prince, si j'avais cinquante-trois minutes à dépenser, je marcherais tout doucement vers une fontaine... »

—Antoine de Saint-Exupéry, Le Petit Prince

WHAT WE TALK ABOUT WHEN WE TALK ABOUT TIME MANAGEMENT: A THEORY

Abstract

We develop a theory of time management. To this end, we draw on the sociology of time and cultural evolution theory. Using the sociology of time, we identify the four core elements of time management: temporal structuring (i.e., mapping activities to time), temporal protecting (i.e., restricting one's availability during certain times), temporal stretching (i.e., doing more activities per unit of time), and temporal sensemaking (i.e., ascribing meaning, purpose, and direction to temporal behaviors). Using cultural evolution theory, we argue that these elements emerge in response to specific cultural problems. Temporal structuring affords a frame of reference, temporal protecting provides a shelter from interferences and intrusions, temporal stretching alleviates perceived time pressure, and temporal sensemaking offers a teleology of time management behaviors. Furthermore, these core elements are subject to cultural selection pressures: some die out, and some prevail depending on their cultural fitness. Building on this premise, we use a configural perspective to predict how different time management strategies fit different cultural environments. In so doing, our approach challenges the idea of a one-best-way to manage time and, instead, reveals how different time management strategies may or may not fit a given environment.

INTRODUCTION

What is time? This question has flummoxed even the most erudite scholars on the topic (Barbour, 2000; Dolev, 2007; Elias, 1992; Hawking, 1988; Rovelli, 2018). What is time management? This question might seem easier to answer. Most people seem to have an intuitive idea of what time management is. Yet scholars still lack an agreed-upon definition (Peeters & Rutte, 2005). In fact, scholars haven't given much attention to time management as a research area (Aeon & Aguinis, 2017). This lack of inquiry is surprising given the astonishing popularity of the topic—time management books often make it to bestseller lists, employers routinely rank it as a top sought-after skill, and educators stress its importance from elementary to graduate school (Green & Skinner, 2005; Hodge & Lear, 2011; Liu et al., 2009). One hurdle that time management research has been facing is lack of theory (Claessens et al., 2007). Bereft of theory, time management research lacks the conceptual grounding necessary to pursue a coherent research agenda (Kuhn, 1962; Sutton & Staw, 1995).

Accordingly, we advance in what follows a theory of time management. As a first step, we build on Aeon and Aguinis (2017) to define time management as the act of structuring, protecting, stretching, and making sense of one's time. Temporal structuring consists in mapping activities to time (e.g., scheduling); temporal protecting helps people restrict their availability during certain times (e.g., turning off the phone); temporal stretching revs up activity efficiency (e.g., speed reading); temporal sensemaking ascribes meaning, purpose, and direction to time management activities (e.g., goal setting). The definition we offer thus addresses the question "What is time management?" by describing its core components (i.e., structuring, protecting, stretching, and sensemaking).

We then adopt a cultural evolution approach (Mesoudi, 2017) to examine how each time management component has emerged in different cultural environments. We assume that time management components have emerged to solve particular problems in a given cultural environment. For instance, temporal protecting emerges in cultural environments with high levels of temporal interference (e.g., people impinging on other people's time). This evolutionary approach thus answers an even more important question—what is time management *for*?

We finally outline how different combinations of time management components (i.e., different time management strategies) survive or perish in different cultural environments. In so doing, this combinatorial approach addresses the question of *when* time management strategies fit a given environment. Our model thus affords contingency: the question is not so much whether time management *works* as when time management *fits*. In other words, we contend that there is no one best way to manage time. Instead, time management strategies must fit a given environment in order to thrive. The further appeal of our approach lies in its applicability to a wide range of settings: combining time management components in different ways leads to a wide variety of time management strategies; combining environmental factors in different ways leads to a wide variety of environments.

Overall, this novel approach offers future researchers a wieldier, more refined, generalizable way to study time management. We elaborate more on this point in the discussion.

A BRIEF HISTORY OF TIME MANAGEMENT

I said that good management consists in properly using things no less than in preserving them, did I not? As for time, then, I try to use it well and strive never to waste any. I employ my time in praiseworthy practices as much as possible. I do not employ it in unworthy matters, nor do I spend more time in doing something than is required for doing it well … And do you know, my children, what I do to prevent one task from interfering with another and finding afterwards that I have started many things but finished none, or perhaps that I have done the worst and neglected the best? When I get up in the morning, before anything else I ask myself what I must do that day. These many things, I list them, I think about them, and assign to them the proper time: this one, this morning; that one, this afternoon; the other, tonight. In this way I do every task in order and almost without effort.

Time management is nothing new, as evidenced by the words of this 15th-century Italian merchant (Alberti, 1971, p. 179). While some may consider time management a fad born in yuppie circles in the 1970s to deal with hectic lifestyles, the concept of time management has been around for millennia (Aurelius, 1949; Bennett, 1910; Franklin, 1964; Penn, 1794; Plutarch, 1920; Seneca, 2014; St. Benedict, 1975). Yet, research has so far largely shunned the topic, empirically and theoretically (Claessens et al., 2007; Häfner, Stock, et al., 2014; Jacobs & Gerson, 2004; Kearns & Gardiner, 2007) Furthermore, there is no well-established definition of time management (Peeters & Rutte, 2005). In order to develop a compelling theory of time management, we first need to clearly define the construct.

We define time management as the act of structuring, protecting, stretching, and making sense of one's time. Temporal structuring consists in organizing activities in time (e.g., by using a schedule); temporal protecting consists in restricting one's availability during certain periods (e.g., by turning off the phone while working); temporal stretching consists in increasing efficiency (e.g., by doing things faster or delegating tasks); temporal sensemaking consists in ascribing meaning, purpose, and direction to time management (e.g., by setting goals)

This definition elaborates on existing ones in several ways. First, it clearly and concisely describes *how* people manage time (i.e., by structuring, protecting, stretching, and making sense of time), rather than describe time management by its consequences (e.g., "using time in an efficient way"; Koch & Kleinmann, 2002, p. 201). Second, this definition comprises four

components (i.e., structuring, protecting, stretching, and sensemaking). This allows for a finer-grained understanding of what time management consists in, rather than treating time management as a monolithic, one-size-fits-all construct. Third, we base our definition not on time management manuals (e.g., Lakein, 1973) or empirical studies (e.g., Barling, Cheung, & Kelloway, 1996) but on insights from the sociology and anthropology of time, allowing for a theory-based definition of a construct too often bereft of theory.

This definition thus offers an abstract yet fine-grained description of what time management is. We note, furthermore, that this definition builds on but slightly departs from that of Aeon and Aguinis (2017, p. 311), which holds that time management is "a form of decision making used by individuals to structure, protect, and adapt their time to changing conditions." Our elaboration, though subtle, reflects profound shifts in how this paper frames time management compared to Aeon and Aguinis (2017). First, time management is no longer seen as being *necessarily* an individual decision-making process. As we'll shortly discuss, the adoption of time management strategies may depend as much on individual decision-making as on sociocultural processes. For the sake of accuracy, then, we dropped the decision-making dimension of time management from the definition. Second, we substitute temporal stretching for temporal adapting. Temporal adaptation implies that people strive for efficiency to adapt to real, external changing conditions. As we argue below, people do not always strive to become efficient to adapt to a real lack of time. Instead, time pressure is in many cases a self-imposed illusion (Goodin, Rice, Bittman, & Saunders, 2005; Hamermesh & Lee, 2007). Temporal stretching is more descriptive of the act (i.e., saving time) and less of the end (i.e., relieve an actual time pressure); as such, it is a better definitional fit. Relatedly, we also jettisoned the clause linking time management to changing conditions. The implicit assumption was that time management in general serves as a

tool to adapt to changing conditions. Though in many ways true, especially in light of the insights that will follow, this statement imposes a *function* to time management that may or may not always hold true. To enhance generalizability, our definition makes no claim as to the general purpose of time management.

Nevertheless, the main claim of this paper is that different aspects of time management emerged precisely because they served a specific purpose. To understand how, we first introduce the basics of cultural evolution theory.

OF MEMES AND MEN

According to biological evolution theory, certain genetic mutations may confer advantages, such as better survival skills or sexual attractiveness. These genes can be passed on to one's offspring and confer the same survival and/or reproductive upper hand to the next generation. Over many generations, the descendants who benefited from a genetic advantage will outnumber "non-mutated" members of the species because of stronger survival skills and/or better reproductive success. Eventually, the genetically advantaged survive and the "non-mutated" may die out through a process of natural selection (Dawkins, 2006; Gould, 1977; Jones, 2001). This, in a nutshell, is how biological evolution works. The phenomenal success of the theory of biological evolution has inspired countless disciplines to adopt evolutionary thinking, including cultural studies. In fact, Charles Darwin himself wondered if changes in human culture might not be due to evolutionary pressures (Mesoudi, 2017). This idea is formalized today in what is known as cultural evolution.

Cultural evolution is "the idea that the information in [the] cultural domain frequently changes according to a similar process by which species change, that is, through the selective retention of

favorable cultural variants, as well as other nonselective processes such as drift" (Mesoudi, Whiten, & Laland, 2004, p. 2). According to this view, fashions, cuisines, and religions, to take a few cultural domains, evolve over time through a process of cultural selection. In cuisine, for instance, tacos have survived in different cultural landscapes for a long time; in contrast, gelatin salads, which were once popular in the 1960s, have almost disappeared. (Tacos "survived" mainly because they are easier to make, more filling, relatively healthier, and benefit from a foreign cuisine status in most non-Hispanic countries. Gelatin salads, however, are not exactly convenient to make and contain sugar, an ingredient that became less cultural acceptable in health-conscious circles.) Although cultural information undoubtedly evolves over time, identifying its boundaries is challenging. What are the boundaries of cultural information pertaining to tacos or gelatin salads? What it is that cultural selection exerts pressure on, exactly? In *natural* selection, the unit of selection is typically the gene. However, finding an equivalent unit of cultural information (a "cultural gene") has proven more challenging. As a first step toward solving this quandary, some have posited the existence of memes[14] (Dawkins, 2016).

Memes, simply put, are instructions for behavior embedded in human brains (Dennett, 1991). Memetic theory asserts that memes have core elements that are common knowledge and peripheral elements that vary from one person to the next. For instance, when people think of wheels, core elements include the fact that wheels are circular and rotate around a central axis; peripheral elements may include whether or not the wheel is red, made of wood, and features spokes (Laland & Brown, 2011). Similarly, the core elements of the "fishing" meme may include baiting and using

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[14] Around the late 2000s, the term "meme" has come to represent humorous images widely circulated online. The circulation of these humorous memes depends on cultural selection pressures (i.e., only the most appealing memes survive cultural selection and become popular). Thus, online memes perfectly illustrate the meme concept. Nevertheless, internet memes constitute but one very specific instance of the general concept of memes and, as such, the two should not be confused.

a fishing rod; peripheral elements may include different baiting (e.g., live bait vs. spinners) and fishing methods (e.g., fly-fishing vs. trolling). The distinction of core vs. peripheral elements thus partially addresses the issue of boundaries: though memes are inherently fuzzy, we can still pinpoint some of their core elements.

The appeal of memes lies in their likeness to genes. Specifically, memes exhibit variation, heredity, and differential fitness, which are three key mechanisms of evolution (Dawkins, 2016). First, variation means that memes change over time. People introduce new memes to the cultural landscape (e.g., a new dance) and "mutate" existing ones (Rock & Roll music evolved from the Blues). An important distinction is that biological evolution depends on *random* genetic mutations whereas cultural evolution's meme mutations may or may not be random. Indeed, the invention of a new type of cuisine, for instance, can be accidental, but it can also be (and often is) deliberate. Second, heredity means that memes can be transmitted. The basis of meme transmission is replication—creating a personal copy of cultural information in one's own brain (Blackmore, 2016). When you learn a new time management method from a colleague, say the Getting Things Done system (Allen, 2001), you essentially copy the Getting Things Done meme into your own brain. In natural selection, gene transmission is vertical, meaning that genes get passed on from parents to offspring. In cultural selection, transmission is both vertical (i.e., memes learned from parents) and horizontal (i.e., memes learned from other sources than parents; Cavalli-Sforza & Feldman, 1981). Horizontal learning means that people can "inherit" memes from a variety of sources including peers, books, television, proverbs, and a variety of other artefacts (Blackmore, 2000). To inherit various "time management memes," so to speak, people typically learn from parents, peers, schoolteachers and, most commonly, time management books. Importantly, meme replication is rarely perfect. One can rarely replicate with exact accuracy a piece of classical music,

a well-known fairy tale, or even a time management method. Meme replication is thus prone to errors or deliberate changes that underlie the process of variation we described above. In linguistics, for instance, simple grammar mistakes can coin new words that eventually become official (Deutscher, 2005).

Third, memes exhibit differential fitness. This means that some memes survive the pressures of cultural selection while others founder. Natural selection typically favors genes that increase survival skills and/or reproductive success. Cultural selection, on the other hand, can favor memes that promote environmental adaptation, such as warmer clothing in the winter (Creanza, Kolodny, & Feldman, 2017). This is a functional view of cultural evolution—memes survive when they fulfil a function that is useful to human beings[15]. Memes thus typically compete for functional slots in our minds to solve a particular problem (Mesoudi et al., 2004). This is a crucial point. As we will discuss in the following sections, adopting a cultural evolutionary perspective allows us to address a fundamental question: what is time management *for*?

ON THE ORIGIN OF TIME MANAGEMENT BY MEANS OF CULTURAL SELECTION

We defined time management as the act of structuring, protecting, stretching, and making sense of one's time. This definition hints at the fact that time management is made up of four core components, which we will now consider from a memetic standpoint: time management components are memes. To be precise, time management components are meme *categories*. For instance, temporal structuring is a category of memes that includes scheduling, maintaining a to-do list, time-blocking, using Gantt charts and so on. In the interest of conciseness, however, we

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[15] As we argue later on, memes can also thrive for reasons other than being useful to human beings

will hereafter refer to each time management component as a time management meme, rather than as a meme category.

The four time management memes often come together as part of the same time management package. Indeed, most modern time management books will feature some version of temporal structuring (e.g., using a calendar), temporal protecting (e.g., saying no to other people's requests), temporal stretching (e.g., delegating a task), and sensemaking (e.g., taking stock of one's weekly goals)[16]. When memes are part of an overarching group, they form a memeplex (Blackmore, 2000). One may say, for instance, that Lent, belief in the Holy Trinity, and baptisms are memes of the Catholicism memeplex. In the same way, time management is a memeplex comprising four memes: temporal structuring, protecting, stretching, and sensemaking.
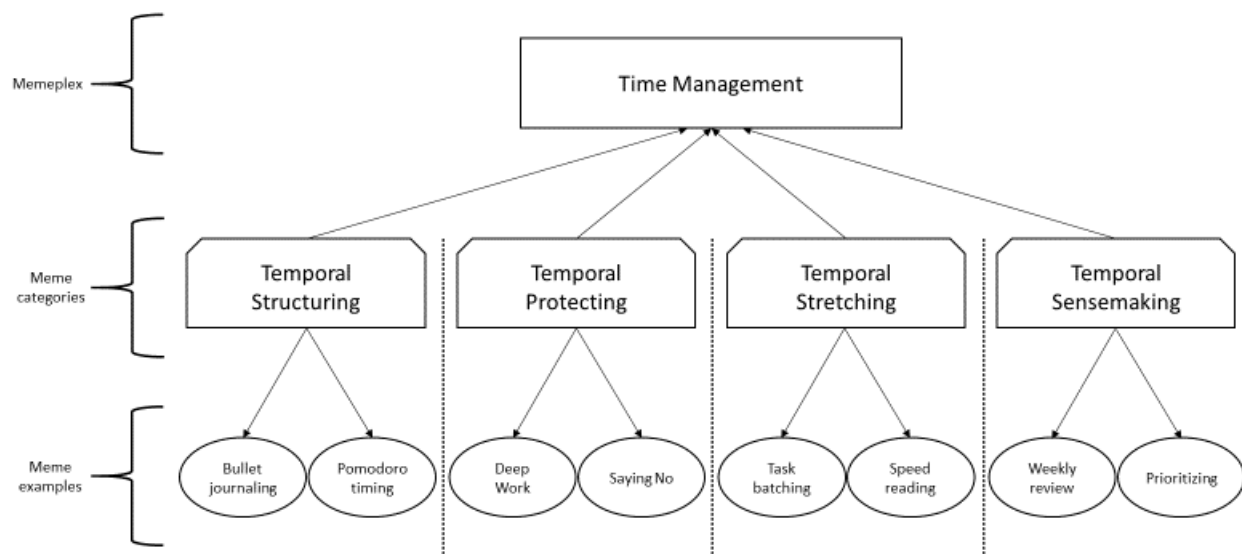
Figure 7: Time management is a memeplex comprising four meme categories

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[16] In fact, scholars have noted that time management books tend to offer more or less the same advice; so much so that one may speak of a time management literary genre (Gregg, 2015)

The broad aim of this section is to trace the origins of the time management memeplex, meme by meme. The importance of this endeavor extends far beyond building a conceptual genealogy of time management. If memes fulfil a useful function for human beings, this means they are useful *in solving a particular problem in a given cultural environment*. Otherwise, they would be selected against and vanish. In other words, people don't manage their time for time management's sake. Rather, people manage time to solve issues that emerge in their cultural landscapes (Bourdieu, 1977; Flaherty, 2003). Therefore, tracing the evolution of time management can shed light on why time management memes thrive or peter out. In more practical terms, this evolutionary approach can reveal what makes certain time management strategies fit or unfit for a given environment. Later on, we will clarify that time management strategies and cultural environments are in fact *combinations* of time management memes and environmental factors, respectively. This combinatorial—or configural (Doty & Glick, 1994; Fiss, 2007, 2011)—approach can organize complex time management phenomena in simple yet insightful configurations (Delbridge & Fiss, 2013). In fact, this approach will allow us to make predictions about how compatible a given time management strategy is with a given environment. In simpler terms, this approach can help us assess whether a given time management strategy will "work" in a given occupation, organization, country, or even historical period. As such, the questions "what is time management for?", "where did time management come from?", and "how do different time management memes adapt to different environments?" are essentially the same question from a cultural evolution perspective. Before we proceed, we must clarify three points. First, to identify the four time management memes, we drew on the sociology and anthropology of time (Adam, 1995; Bear, 2016; Doob, 1971; Flaherty, 2011; Gross, 1984; Zerubavel, 1981). Notwithstanding the synergy between cultural evolution, sociology, and anthropology (Lieberson & Lynn, 2002), these disciplines afford

invaluable insights into the relationship between human beings and time. More crucially, sociology and anthropology provide a *historical* understanding of how people interact with time (Martineau, 2015; Rich, 2015; Sahlins & Graeber, 2017; Zerubavel, 1982). These disciplines thus reveal how people's relationship with time has *evolved* throughout the ages and across different contexts. It is thus judicious to draw on these disciplines to formulate the building blocks of time management.

Second, we have so far talked at length about the concept of cultural environment. This was useful in introducing cultural evolution theory; however, we now need a more precise description of what is meant by cultural environment. To do so, we draw again on the sociology of time to use the pithier concept of timescape. Simply put, a timescape captures the temporal features of an environment, such as speed, rhythm, and timing norms (Adam, 1998). To be more precise, a timescape captures the temporal features of the environment that are *directly relevant* to our level of analysis. Indeed, the appeal of memetics is that memes can be studied at the individual level (i.e., whether or not someone has a copy of a meme in her head), organizational level (i.e., the proportion of workers subscribing to a particular meme), country level (i.e., the prevalence of a given meme in a population) and even beyond. In that sense, a timescape does not comprise an absolute environment but, rather, a "pocket environment" that is directly relevant to our level of analysis of memes. For instance, if we are studying temporal stretching memes in Italy (i.e., country-level of analysis), then the appropriate timescape would be the temporal features of the Italian environment in general (e.g., whether the Italian government imposes strict schedules or not). However, if we are studying temporal stretching memes in a particular Italian organization that is pioneering new work-life balance policies that are drastically different from the rest of country, then the timescape in question would be narrower (i.e., the temporal features of that particular organization's environment) and likely different from the broader Italian timescape

(because of the trailblazing work-life balance policies). For the sake of accuracy and brevity, we will hereafter assume that cultural environments refer exclusively to timescapes. Third, we defined memes as instructions for behavior (Dennett, 1991). This means that memes are not behaviors per se but *instructions* for time management behaviors. Yet it is intuitively clear that time management consists mostly in behaviors (e.g., Macan, Shahani, Dipboye, & Phillips, 1990; Parke et al., 2018). One way to solve this impasse is to liken memes to genotypes (i.e., genetic information, such as a gene coding for hair color) and behaviors to phenotypes (i.e., expressions of genes, such as having red hair). As we discuss below, for example, the temporal structuring meme contains instructions for structuring time which result in actual behaviors, such as time-blocking and day planning. This genotype-phenotype distinction thus sees memes as ideas and behaviors as implementation of those ideas (Gabora, 1997). Implementing time management ideas can be prone to errors, although this is beyond the scope of this paper. In what follows, we focus mostly on how time management *memes*, rather than behaviors, emerge and evolve in timescapes.

Temporal Structuring

We define temporal structuring as the mapping of activities to time. In practice, people structure their time by assigning their activities certain temporal attributes, such as duration, sequence, timing, and frequency (Doob, 1971; Flaherty, 2003; Lauer, 1981). These attributes act as coordinates: they locate activities on a temporal map (e.g., on a weekly schedule or a calendar). For example, an employee may decide to allocate 30 minutes (duration) every Friday (frequency) after the weekly meeting (sequence) at 5 p.m. (timing) to write a brief report. Temporal structuring thus acts as a time map: it helps people orient themselves in the temporal dimension (Jaques, 1982; Orlikowski & Yates, 2002).

Figure 8: Benjamin Franklin's daily schedule, an example of temporal structuring. From *The Autobiography of Benjamin Franklin* (1793)

Temporal structuring memes can vary from person to person. They can range from spontaneous, informal mental schedules (Rajagopal & Rha, 2009) to intricate flowcharts and advanced software (e.g., Allen, 2001). Temporal structuring memes also include those that help people stick to their time structure, such as using timers and reminders (Gilbert et al., 2019; Zerubavel, 1976).

In our treatment of time management, we have steered clear from discussing the ontological nature of time (Carroll, 2010; Smolin, 2013). Nevertheless, we emphasize that time management is not necessarily tied to clock time. Time management can occur in any context where elements in one's

environment change regularly enough to be used as a frame of reference (Bohannan, 1953; Elias, 1992; Nilsson, 1920). For instance, indigenous people in Brazil structure their time by using the movement of the sun across the sky. In coordinating a meeting with another person, they might say something along the lines of "we will meet when the sun will be around here," pointing their finger at where the sun will be at, say, 1 p.m. (Floyd, 2016).

Figure 9: Indigenous speakers of Nheengatú using celestial pointing to structure time (Floyd, 2016, p. 41). Photograph courtesy of Simeon Floyd.

Temporal structuring memes are near-ubiquitous because they address a fundamental cultural issue: the need for a frame of reference. When people face an ambiguous situation, one of their first reflexes is to create a temporal frame of reference (Barley, 1988). Such ambiguous situations occur in timescapes that fail to impose an external structure on people's daily life[17]. An

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[17] As we are writing this, the COVID-19 pandemic is forcing millions of people to work from home. Many people report on social media that they resort to makeshift "COVID-19" schedules. These schedules allow them to adapt to working from home. At a deeper level, these schedules offer people a sense of direction in a context of uncertainty and ambiguity.

increasingly common example is that of digital nomads: people who can afford to work anywhere, any time, on their own terms. Because the environment of digital nomads often fails to impose a time structure, these workers often have to engage in extensive temporal structuring (Cook, 2020). Another familiar example is unemployment. Unemployed people do not enjoy the work-imposed time structure that most employees have and, as a result, can feel disoriented and listless (Wanberg et al., 1997; Waters & Muller, 2003; Young & Lim, 2014). In fact, the earliest well-established time management measure was designed to study time structure among the unemployed and its impact on depression (Bond & Feather, 1988; Feather & Bond, 1983). This doesn't mean employment systematically offers adequate time structures; workers can get bored and create their own time structures on the job. For instance, Roy (1959) documents how factory workers gradually set up daily routines around "coffee breaks," "peach breaks," and "banana breaks" that added regularity to their days. In stark contrast, total institutions (Goffman, 1961), such as prisons and mental hospitals, coercively impose a time structure on nearly all of a person's day. In such contexts, people rarely have to engage in personal time structuring, as their own time is structured by external forces, such as jailers and superintendents. Although modern workplaces don't typically qualify as total institutions, some exhibit high levels of temporal coercion, such as Amazon warehouses where workers are given GPS wristbands that regulate their time rigidly (Ajunwa, 2018; Guendelsberger, 2019).
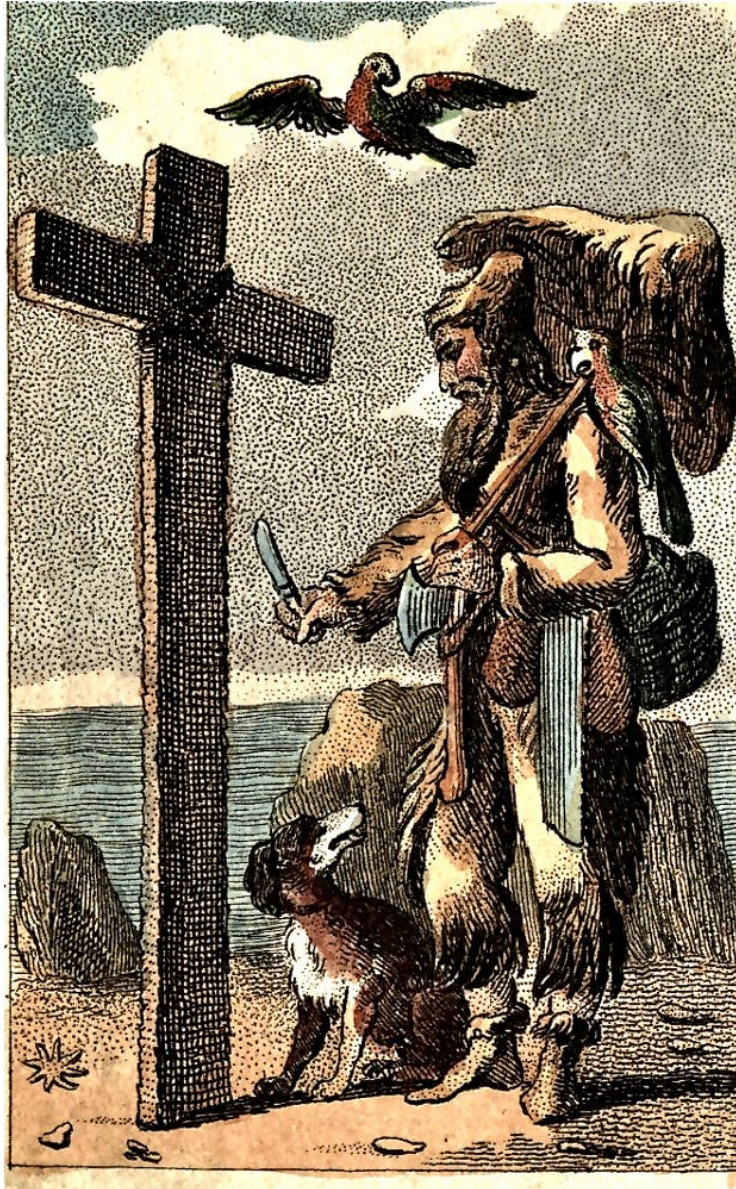
Figure 10: A popular literary and cinematic trope is that of people marooned on a deserted island and whose first actions consist in tracking and structuring time. For instance, one of Robinson Crusoe's first actions (pictured above) was to create a calendar by cutting notches on a wooden post. Temporal coercion provides a frame of reference for human action. In its absence, as is the case on a deserted island, people tend to create their own time structure. Picture: *Robinson Crusoe's Calendar*. Hand-tinted copper engraving, courtesy of The Victorian Web.

We thus propose that timescapes that display high levels of temporal coercion (e.g., fast food restaurants, retail warehouses) will not be fertile grounds for temporal structuring memes[18]. Conversely, timescapes with low levels of temporal coercion (e.g., freelancing) will likely incite

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[18] Though central, this proposition does not exhaust the factors that affect temporal structure. These other factors, such as personality, are beyond the scope of this paper.

people to adopt temporal structuring memes in order to establish a frame of reference. More formally:

Proposition 1: Temporal structuring memes flourish in timescapes with low levels of temporal coercion compared to timescapes with high levels of temporal coercion.

Temporal Protecting

We define temporal protecting as the deliberate restriction of one's availability during certain times. The concept of temporal protecting stems for a spatial—indeed, territorial—understanding of time (Melbin, 1978; Zerubavel, 1979b). According to this view, our time is a personal space into which we occasionally restrict access to other people (a notion captured by such expressions as "me time" and "family time"). Temporal protecting, essentially, segregates our time into different segments in order to reduce schedule conflicts and interferences (Adams & Jex, 1999; Goffman, 1959; Greenhaus & Beutell, 1985; Perlow, 1998).

In practice, people engage in temporal protecting by erecting boundaries to make selected times less permeable to interlopers (Ashforth, Kreiner, & Fugate, 2000; König, Kleinmann, & Höhmann, 2013; Rothbard & Ollier-Malaterre, 2016). One way to tighten one's time boundaries is to make temporal claims (Zerubavel, 1979b), that is, engage in behaviors that intimate lack of availability to others during certain times[19]. For instance, in Kreiner et al.'s (2009) study, a priest noted that "Thursdays are sacred time. Everybody in this church knows it. I am absolutely not available unless you have just been run over by an 18-wheeler ... Everybody knows it. I've never had to be mean about it. I've just been real clear" (p. 717). Another example comes from Evans, Kunda, and

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[19] Certainly, not everyone can protect their time to the same extent. A cook does not get to make time claims the way an academic would. Nevertheless, even in the most temporally intrusive environments, it is still possible to carve out pockets of temporal privacy (see Fine, 1990).

Barley's (2004) study on billable hours where a participant said "You can do a lot of things to me: you can call me names; you can throw rocks at me; you can shoot at me, and I won't care. Waste my time and I'll drive over you in the parking lot" (p. 22). Less extreme examples include putting up "Do Not Disturb" signs on one's door and conspicuously wearing earplugs or headphones.

Note, furthermore, that temporal protecting can involve spatial unavailability (e.g., locking the office door and turning off the phone indefinitely) temporal unavailability (e.g., being physically present in an open-plan office but unavailable during certain times) or both (e.g., a weekend retreat).

Temporal protecting addresses the cultural issue of unwanted temporal interference. In the modern workplace, a constellation of elements conspires to make employees' temporal space more and more accessible. Mobile devices (Mazmanian, 2013; Mazmanian, Orlikowski, & Yates, 2013; Perlow, 2012) and open plan offices (Evans & Johnson, 2000) make it easier for employers, colleagues, and family to intrude upon time that would have otherwise been devoted to other activities. For instance, Perlow (1999) documented how workers at a software engineering company never had time because they were constantly interrupted by colleagues. These temporal intrusions took the engineers' time away from their own work and resulted in their constantly falling behind schedule. To the suggestion of the study's author, the engineers adopted a "quiet time" work method in which certain hours were interruption-free (i.e., a form of temporal protecting). As a result, perception of temporal interference dwindled down, at least for a few months. In a different context, Reid (2015) examined how employees in a demanding consulting firm used creative ways to protect their time. Consultants deliberately targeted local or repeat clients that required less time commitment or favor phone conversations (rather than in-person

meetings) so that they can go skiing with their children on workdays. Here again, temporal interference spurs people into embracing temporal protection.

We thus hypothesize that temporal protecting memes will arise in timescapes characterized by high levels of unwanted temporal interference. We emphasize that temporal interference leads to temporal protecting only when it is *unwanted*. For example, Wajcman and Rose's (2011) study on knowledge workers reveals that digital interruptions (e.g., notifications) are not seen as problematic intrusions but, rather, as a normal aspect of the job—notifications help workers stay up-to-date. Similarly, prior to the industrial revolution, people did not see work and family as different spheres; for this reason, temporal interference across these domains were not seen as problematic (Rice, 2017).

Conversely, we hypothesize that temporal protecting memes will not thrive in timescapes characterized by low levels of unwanted temporal intrusion. One can think, for instance, of relatively isolated occupations, such as farming and working from home (with no dependents)[20]. More formally:

> Proposition 2: Temporal protecting memes flourish in timescapes with high levels of temporal interference compared to timescapes with low levels of temporal interference.

Temporal stretching

We define temporal stretching as the act of increasing the number of activities achieved in a given amount of time. In what follows, we refer to the number of activities one can carry out per any given time unit as time yield (Linder, 1970). People can increase their time yield in a variety of ways, although the underlying mechanism—increasing activity density (Zerubavel, 1981)—

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[20] Note that people may deliberately choose to work from home to escape temporal interference from the office. In this case, working from home is not just a timescape, it's a deliberate time management strategy.

remains the same. One way is to do things faster, such as when people speed-read a book or speed-watch a video (Wilson et al., 2018). People can also simply forgo an activity[21] altogether to save time to tend to other, presumably more important tasks (Zerubavel, 1976). Outsourcing tasks is yet another increasingly common temporal stretching meme: people can delegate tasks to subordinates, relatives, friends, or even private virtual assistants online (Costas & Grey, 2013). A related temporal stretching meme consists in buying time through the use of market services and products (Whillans, Dunn, & Norton, 2018; Whillans et al., 2017). Examples include eating out instead of cooking and taking the plane instead of the train.

Finally, a new class of temporal stretching memes has cropped up over the past few decades: the use of cognitive enhancers (Bloomfield & Dale, 2015; Schelle, Faulmüller, Caviola, & Hewstone, 2014). This form of temporal stretching consists in using pharmacological drugs, such as Modafinil, Adderall, and Ritalin, to better focus and, as a result, increase one's work output per a given unit of time (Le Dévédec, 2019; Leon, Harms, & Gilmer, 2018; Sharma, 2014).

Temporal stretching addresses the issue of perceived time pressure, that is, the perception of having too many activities to do in too little time. We emphasize that the perception of time pressure may not be related to actual shortage of time. Over the past decades, time-use research has shown that the people's leisure time has objectively increased but that, paradoxically, people also report higher levels of felt time pressure (Robinson & Godbey, 1997). Similar research has argued that much of the time pressure people report seems self-imposed (Goodin et al., 2005; Hamermesh & Lee, 2007). Furthermore, citizens in countries with shorter workweeks report higher levels of work-life conflict (Ruppanner & Maume, 2016). Moreover, many people want to maximize their culture consumption (e.g., theaters, museums) in a given amount of time, a

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[21] Although we define temporal stretching as the act of increasing the number of activities *achieved*, for practical purposes forgoing (i.e., not achieving) an activity in a strategic way is equivalent to achieving it.

phenomenon known as cultural voraciousness (Sullivan & Katz-Gerro, 2007). Empirical studies show a strong association between cultural voraciousness and time pressure (Vrotsou, Ellegård, & Cooper, 2009). These empirical observations suggest that reports of time pressure may be due to factors other than actual lack of time.

Accordingly, we hypothesize that temporal stretching memes will surface not necessarily in fast-paced timescapes, but in timescapes that have a quantitative understanding of time (Adam, 2003). It is only when time becomes commodified that people can engage in abstract quantitative time-stretching schemes. The more time can be precisely measured, the stronger the perceived need to budget it and be efficient. In contrast, it would make little sense to "save" time in environments that have a more qualitative conception of time: time is mainly experienced, rather than amenable to quantitative stretching. In such timescapes, time is not measured in units and, as a result, matters of efficiency become less salient. Corroborating our approach is the slew of evidence that thinking of time as money (i.e., a commodified, quantitative understanding of time) makes people more pressed for time (DeVoe, 2019; DeVoe & House, 2011; DeVoe & Pfeffer, 2011). Unsurprisingly, the most time-pressed segment of the U.S. population tends to be highly educated, high-income people (Hamermesh, 2019a, 2019b).

This is not to say that temporal stretching memes did not exist prior to the modern quantification of time (Ogle, 2015; Roenneberg, 2004). It is very likely that in previous eras temporal stretching memes emerged in isolated pockets of educated circles that had a more abstract, commodified understanding of time. For instance, while we usually associate time-and-motion studies with Frederick Taylor and his brand of scientific management, it was Leonardo Da Vinci who conducted one of the very first time-and-motion studies to determine how many man-hours it

would take to efficiently carry out an engineering project aiming to divert the Arno river away from Pisa, Italy (Isaacson, 2017).

The quantitative conception of time has historically spread out from religious, commercial, and intellectual circles to the general population—most people in the modern world now live their lives by the clock (Rifkin, 1987; Snyder, 2013; Zerubavel, 1980). We should expect that as a quantitative conception of time becomes more pervasive, temporal stretching memes will become more common. A familiar example is the growing practice of multitasking over the past decades (Bianchi, Milkie, & Robinson, 2007), which consists in doing several activities simultaneously to increase one's time yield.

Just as a quantitative conception of time was confined to cultural niches (e.g., intellectuals) in the past centuries, so is a qualitative conception of time increasingly confined to small cultural pockets. An increasingly common instance is the Slow Movement, which consists in slowing down the pace of life and embracing a more qualitative appreciation of time (Honoré, 2005). A direct offshoot of this movement are the increasingly popular Slow Food restaurants, which operate according of principles of resistance against the tyranny of the clock (van Bommel & Spicer, 2011). In sum, we propose that temporal stretching memes emerge in timescapces characterized by a quantitative conception of time.

> Proposition 3: Temporal stretching memes flourish in timescapes characterized by a quantitative conception of time.

Temporal Sensemaking

We define temporal sensemaking as the act of ascribing meaning, purpose, and direction to one's temporal actions. Specifically, temporal sensemaking ascribes meaning and teleology to the three

other memes, namely, temporal structuring, protecting, and stretching. Thus, temporal sensemaking regulates how, when, and why people engage in temporal structuring, protecting, and stretching. In other words, temporal sensemaking guides time management behaviors.

Temporal sensemaking addresses the issue of time management's teleology, that is, explaining to what end people manage their time. This issue is conceptually distinct from the need for a frame of reference (i.e., the issue that temporal *structuring* addresses). A frame of reference offers a metric to organize activities; teleology assigns an ultimate purpose to activities. Coercive timescapes, as we've discussed above, obviate the need for a frame of reference: in such timescapes people's time is managed for them. Nevertheless, temporal coercion is not a substitute for teleology. For instance, Amazon warehouse workers' time is rigidly scheduled, but that coercion in no way offers workers an ultimate purpose related to their time management. (In fact, as we'll discuss later, coercive timescapes undermine individual temporal sensemaking.)

Temporal sensemaking becomes important when the responsibility to manage time rests squarely on the individual's shoulders—when society, the state, religion, and other institutions no longer provide guidance as to why time should be managed. While the fact that people are responsible for their own time might sound self-evident today, it is a relatively recent phenomenon. Historically, most timescapes enforced tight time norms, that is, social norms related to how people should think about and use time (Ancona, Goodman, Lawrence, & Tushman, 2001; Bergmann, 1992). In preliterate and ancient societies, for instance, time was the province of deities and other spiritual forces; these forces, according to myriad folklores, would punish people for spending time impiously (Bardon, 2013). People would thus use their time to please gods—the ultimate purpose of time management was salvation. Note that a direct implication is that people did not perceive time as their own. Belief in preordained fate, for example, was exceedingly common.

Because people perceived time to be the property of God[22], the act of making sense of one's own time in that era would have, ironically, made little sense (Gurevich, 1976). Figure 19 illustrates an authoritarian approach to time ownership. Historically, religion and spirituality have been a potent source of time-use teleology. Notice, also, how the homily laments that "most persons live as if their time was their own."

TO EVERY THING THERE IS A SEASON, AND A TIME TO EVERY PURPOSE UNDER THE HEAVEN.

TIME is one of thofe Talents which our great Mafter has in-trufted us with, to improve to his Glory, and our own Happinefs. And we fhould all of us be very careful how we employ our Time; becaufe we muft one Day moft certainly give an Account of it. But how little is this confidered in the World? For do not moft Perfons live as if their Time was their own, and they might do what they would with it? But let none of us deceive ourfelves; for we were not made to live as we lift, but to ferve God, and have received Rules from him to direct us how to ferve him. And we fhould fo order our Lives, as to be always either actually employed in ferving God, or in fitting ourfelves for his Service. This may feem a hard Saying,

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Figure 11: First page of *The Way of Living in a Method, and by Rule; Or, A Regular Way of Employing Our Time: Recommended in a Short, Plain, Practical Discourse to the Charity-Schools, for the Use of the Youth Brought up in Them*. London, UK: Printed for F. and C. Rivington, booksellers to the Society for Promoting Christian Knowledge, No. 62, St. Paul's Church-Yard; by Bye and Law, St. John's Square, Clerkenwell, 1800.

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[22] Relatedly, some have argued the reason why the Catholic Church was against usury is because the time schemes involved in money-lending were seen as playing with the property of God: time (Le Goff, 1960)

Accordingly, we propose that such timescapes have an authoritarian approach to temporal ownership: time is under the dominion of institutions rather than of individuals. Note that we chose the term institutions (rather than religions) because religions haven't been the sole forces to assign teleology to time management. Governments, too, have fulfilled that role on many occasions, such as in socialist Romania (Heintz, 2005).

Over the past few decades and even centuries, however, social norms in general have become laxer (Jackson, Gelfand, De, & Fox, 2019), as have time norms in particular (Assmann, 2013; Southerton, 2009; Vihalemm & Harro-Loit, 2019). Authoritarian institutions have substantially loosened their grip. (Fewer people go to church on Sunday; in North America at least, people no longer have agreed-upon market days and laundry days.) As a result, people today generally believe that their time is their own and that it is up to them to decide what to do with that time (Southerton, 2009). People perceive it to be their duty to make sense of how to use time. This we call a libertarian approach to temporal ownership: people believe they are free—at liberty—to use their time to whatever end they please.

Our emphasis on belief in freedom rather than actual freedom stems from the fact that in neoliberal societies people can be thoroughly controlled and oppressed by invisible systemic forces yet still believe in their autonomy and freedom (Alvesson & Deetz, 2006). Justified or not, belief in one's temporal freedom explains why temporal sensemaking memes emerge. We note, furthermore, that the shift toward a libertarian view of time originates not only from a gradual loosening of time norms but also from technological and logistical advances (e.g., washing machines, microwave ovens, 24/7 grocery stores, human egg cryopreservation) which have given people a historically unprecedented feeling of control over their own time (Foster & Roenneberg, 2008; Gershuny &

Harms, 2016; Norgate, 2006; Shove & Southerton, 2000; Van Der Lippe, Tijdens, & De Ruijter, 2004)

In sum, we posit that in authoritarian timescapes, people manage their time toward a predefined purpose. That purpose is often established by powerful institutions, such as religions or the state. As a result, we don't expect individual temporal sensemaking memes to thrive in such contexts. In contrast, libertarian timescapes enjoin people to reflect on the teleology of their time use. In such settings, people experience a personal duty to choose their objectives and manage their time accordingly. We thus anticipate temporal sensemaking memes to thrive in these timescapes. More formally:

> Proposition 4: Temporal sensemaking memes flourish in timescapes characterized by a libertarian approach to time.
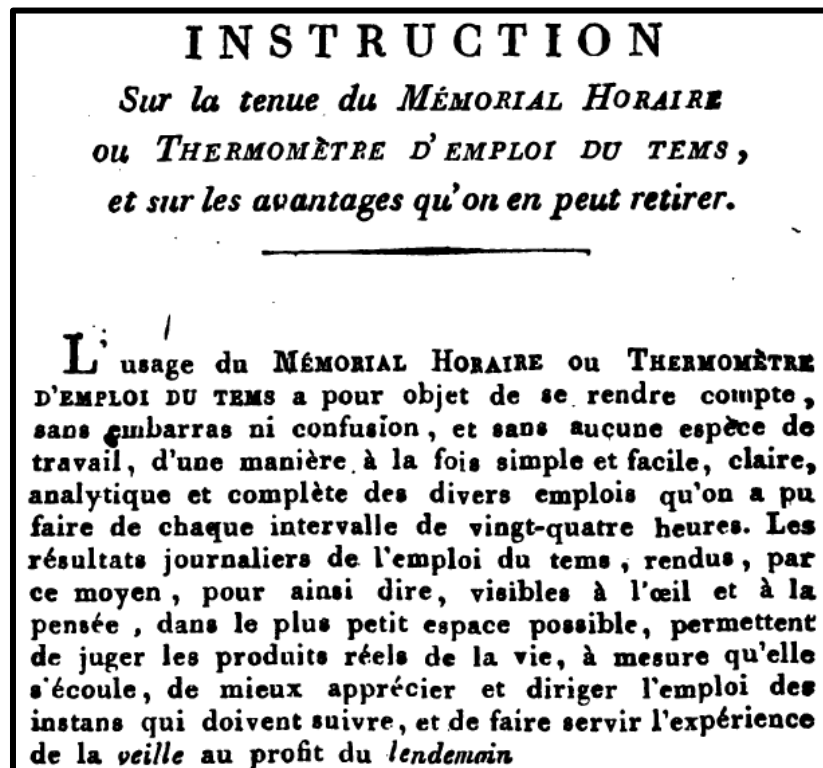
Figure 12: The Schedule Thermometer aimed to help people make sense of their time use so they could be more accountable. It was put forward in the early 19th century by Marc-Antoine Jullien (Jullien, 1813). Tellingly, Jullien gave various names to his time-accountability scheme, such as Biometer and Moral Compass, hinting at the moral dimension of temporal sensemaking (Jullien, 1833).

The four time management memes we've just described are ideal types. This means that even though they are conceptually distinct, in practice they can overlap and even interact in various ways. How do time management memes interact? Temporal sensemaking comes first. Indeed, the very first act of time management is to determine the teleology and meaning of our time use. And temporal sensemaking will orchestrate the other time management memes. Through temporal structuring, for instance, people will schedule their time according to the meaning and purpose they attach to their time. A loving parent will structure his time around his baby's feeding times, naps, and sleep. A hard-driving startup owner will structure her time according to the future she envisions for her companies. In many Islamic countries, some people do not dare structure their time more a week or two into the future, for it would be presumptuous to pretend to know what future times hold; future times and destiny are the under the sovereignty of God (Hall, 1959). Once temporal structuring is established, temporal protecting can be used as a safeguard. This is the reason why politicians and CEOs have secretaries: their temporal structure is too important to be disrupted by outsiders, and the secretary acts as a shield. Temporal protecting's primary aim is thus to preserve temporal structuring. Note that temporal protecting, too, operates at the behest of temporal sensemaking. That's why, for instance, CEO's secretaries will typically block all incoming calls from outsiders except for family emergencies—the meaning and purpose of time dedicated to family is typically seen as vastly more important that time spent on business deals, though not always. Finally, temporal stretching typically comes in to make up for what temporal protecting failed to achieve. For instance, despite your best attempts at turning down your friend's request to help her, she manages to twist your arm and you reluctantly take time off from your busy schedule to assist her. The time you took off, however, means that you're falling behind

schedule, and time is a finite resource. The only resort left, at this point, would be to engage in temporal stretching: hiring someone to do the rest of your work, doing it yourself but faster, or simply forgoing work altogether. In this sense, temporal stretching acts a "spare tire" to preserve temporal structuring. Nevertheless, temporal stretching is also used in cases where temporal structuring was not disturbed. Imagine a young programmer who always manages to finish work on time and stick perfectly to his schedule. One day the programmer realizes that he could do more work in the same schedule by ingesting nootropics (colloquially known as "smart drugs"). This cognitive boost allows the programmer to develop more code per hour, allowing him to work the same schedule yet accomplish much more. In this case, temporal stretching was used to *expand* the possibilities afforded by temporal structuring—the programmer got more out of his schedule. Note that here again, temporal sensemaking can allow or forbid certain temporal stretching activities. For many people, speed-watching movies sounds egregious and does not align with their idea of how watching movies for leisure should be done.

So far, we have argued that time management is not a monolithic entity. Time management comprises four different components, or memes: temporal structuring, temporal protecting, temporal stretching, and temporal sensemaking. These components emerged at some point to deal with specific cultural issues, such as being constantly interrupted by other people or not knowing what to do with one's time.
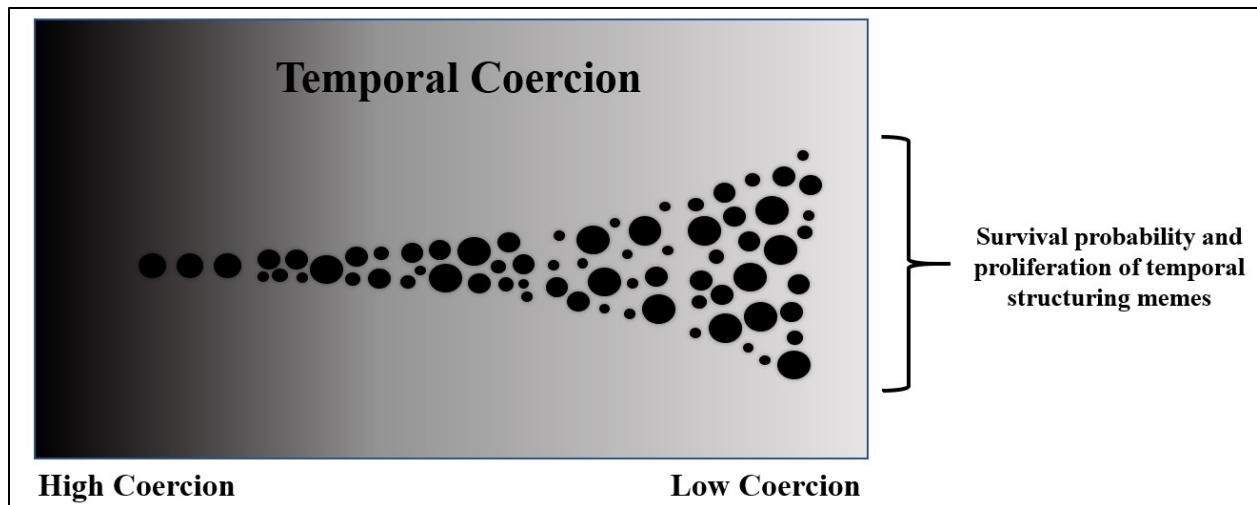
Figure 13: Temporal structuring memes (black circles) thrive and proliferate in low-coercion timescapes. Lighter shades indicate lower levels of temporal coercion

The probability that a given meme will survive and thrive thus depends on environmental conditions (see Figure 13 above for example). In what follows, we expand on this idea to build a fully combinatorial model of time management.

THE VARIETIES OF TEMPORAL EXPERIENCE

What time management strategies survive in a given timescape? To answer this question, we must first enrich our understanding of timescapes. So far the timescapes we've outlined were unidimensional. However, people live in timescapes characterized by several dimensions. For example, one can work in a timescape where time is measured quantitatively and where temporal interference is very high (e.g., nurses in a hospital). The set of timescape dimensions we've outlined (i.e., temporal coercion, temporal interference, temporal orientation, and temporal ownership), can be combined in different ways to represent a wide variety of real-life timescapes (see Figure 14 and Figure 15). Note that because of the high number of possible combinations, the following figures represent only an illustrative sample.

Figure 14:Venn diagram of various timescapes. Each cell exemplifies an environment characterized by one or more timescape dimensions.

Figure 15: Venn diagram of various timescapes. In this case, temporal orientation is qualitative and temporal ownership is authoritarian. As a result, the diagram includes examples that are considered marginal or unusual (e.g., monasteries, Slow Food restaurants), compared to Figure 14. This is due to modern societies being predicated on a mostly quantitative, libertarian conception of time.

We've discussed how different time management memes emerge as solutions to problems found in different timescapes. Extending this idea, we now argue that people use different combinations of time management memes (i.e., time management strategies) to deal with different combinations of timescapes. In other words, time management strategies reflect a particular combination of time management memes, and time management environments reflect a particular combination of timescape dimensions.

Thus, we adopt a configural perspective (i.e., a perspective based on combinations—or configurations—of time management memes and timescape dimensions) to tackle the question of how time management strategies may or may not be suitable to a given timescape. The appeal of a configural perspective is that it allows for contingency rather than rigid linear relationships (Fiss, 2007, 2011). Configurations also lend themselves very well to the notion of fit (Meyer, Tsui, & Hinings, 1993), which allows us to move away from a one-size-fits-all conception of time management. Specifically, we argue that there is no such thing as a one best way to manage time. Rather, we contend that time management strategies will vary depending on their fit with the surrounding timescape (Ancona, Okhuysen, et al., 2001; Francis-Smythe & Robertson, 2003; Kaufman et al., 1991). Unfit time management strategies die out in due course; fit strategies prevail and endure.

The first step toward understanding how time management strategies fit with different timescapes is to explore how discrete time management memes interact with different timescapes. We've already covered how time management memes interact with their "native" timescapes, that is, timescapes that were conducive to the proliferation of a given meme (e.g., temporal stretching memes reduce perceived time pressure in timescapes characterized by a quantitative understanding of time). We now turn to how time management memes interact with "non-native" timescapes (e.g., temporal structuring memes in timescapes with high levels of temporal interference). Crucially, however, it is not always possible to predict how a given meme will fare in certain timescapes. This indeterminacy stems from the fact that time management memes react differently depending on whether other timescape dimensions are present or absent. To illustrate, it is challenging to determine whether temporal structuring memes will thrive in timescapes characterized by low temporal interference. Consider a freelancer working alone from home,

completely sheltered from colleagues' and family's temporal interference. Is that person likely to engage in temporal structuring? We need more information about other timescape dimensions to address this question. Perhaps her work requires her to send emails at specific times, with predefined rest and toilet breaks, in which case her timescape would be characterized not only by low temporal interference but also by high temporal coercion, thus reducing the likelihood that she will engage in temporal structuring. In contrast, consider the scenario where the same worker has complete schedule freedom (i.e., low temporal coercion), in which case she would probably engage in temporal structuring to establish a frame of reference. These two alternative scenarios therefore suggest that, at least in some cases, one timescape dimension (e.g., low temporal interference) may not be enough to determine whether time management memes will survive or go extinct—other timescape dimensions are necessary to resolve this indeterminacy.

We summarize the relationships between time management memes and timescape dimensions in

	Temporal Coercion		Temporal Interference		Temporal Orientation		Temporal Ownership	
	Low	High	Low	High	Qualitative	Quantitative	Authoritarian	Libertarian
Temporal structuring	Proposition 1	Proposition 1	Depends on other factors	Frequent intrusions strongly undermine stability of personal time structures	Depends on other factors	Temporal structuring becomes a time budgeting tool	Depends on other factors	Temporal structuring becomes a self-accountability device
Temporal protecting	Depends on other factors	Temporal protecting carves out "time niches"	Proposition 2	Proposition 2	Depends on other factors	Temporal protecting helps accumulate time	Depends on other factors	Temporal protecting becomes a personal responsibility
Temporal stretching	Depends on other factors	Depends on other factors	Depends on other factors	Temporal stretching helps people regain time lost from temporal intrusions	Proposition 3	Proposition 3	Depends on other factors	Temporal stretching becomes a virtuous duty and competitive advantage
Temporal sensemaking	Depends on other factors	Strong temporal coercion reduces feelings of control	Depends on other factors	Temporal intrusion reduces feelings of control time required for sensemaking	Depends on other factors	Temporal sensemaking becomes a moral compass for the budgeting of time	Proposition 4	Proposition 4

Table 12. For the sake of conciseness, in what follows we elaborate only on determinable interactions that were not previously discussed (i.e., propositions 1 through 4). The four paragraphs that follow expand on Table 12's predicted relationships.

	Temporal Coercion		Temporal Interference		Temporal Orientation		Temporal Ownership	
	Low	High	Low	High	Qualitative	Quantitative	Authoritarian	Libertarian
Temporal structuring	Proposition 1	Proposition 1	Depends on other factors	Frequent intrusions strongly undermine stability of personal time structures	Depends on other factors	Temporal structuring becomes a time budgeting tool	Depends on other factors	Temporal structuring becomes a self-accountability device
Temporal protecting	Depends on other factors	Temporal protecting carves out "time niches"	Proposition 2	Proposition 2	Depends on other factors	Temporal protecting helps accumulate time	Depends on other factors	Temporal protecting becomes a personal responsibility
Temporal stretching	Depends on other factors	Depends on other factors	Depends on other factors	Temporal stretching helps people regain time lost from temporal intrusions	Proposition 3	Proposition 3	Depends on other factors	Temporal stretching becomes a virtuous duty and competitive advantage
Temporal sensemaking	Depends on other factors	Strong temporal coercion reduces feelings of control	Depends on other factors	Temporal intrusion reduces feelings of control time required for sensemaking	Depends on other factors	Temporal sensemaking becomes a moral compass for the budgeting of time	Proposition 4	Proposition 4

Table 12: Interactions between time management memes and timescape dimensions

Temporal structuring. Temporal structuring is challenging to sustain in timescapes with high temporal interference. Interruption and intrusion tend to compromise attempts at structuring one's time. Furthermore, constant temporal interference also means that people would have to continuously update and rebuild their temporal structure to adapt to ever-changing conditions. The burden of constant maintenance will likely discourage temporal structuring over the long term. As a result, temporal structuring memes will likely be less prevalent in high temporal interference timescapes. In environments characterized by a quantitative conception of time, however, temporal structuring memes will likely thrive. Structuring offers people a much-needed temporal budgeting and accounting tool to respond to the needs of a temporally quantitative environment. Indeed,

although temporal structuring can be based on qualitative conceptions of time (e.g., indigenous tribe structuring time around the position of celestial bodies), the hegemony of clock time (Ogle, 2015) means that temporal structuring today is mainly quantitative and responds to the need of living in societies with increasingly quantitative conceptions of time (for an overview and elaboration, see Zerubavel (1982)). In the same vein, in timescapes with a libertarian view of time, temporal structuring becomes a self-accountability device—structuring time makes people accountable for how they use their time. As Wajcman (2018) argues, time structuring tools such as calendars are not neutral; they embody the need to account for every hour of the day. Temporal structuring thus becomes necessary in timescapes where time is not accounted for by external, authoritarian forces such as religion or the state. Accordingly, temporal structuring memes will likely prevail in libertarian timescapes.

Temporal protecting. Temporal protecting can flourish in coercive timescapes, albeit in subtle ways. Due to the coerciveness of the environment, people may strive to carve out "temporal niches" (Fine, 1990) as a form of resistance to and shelter from oppressive structures. Employees in tightly scheduled work environments, for instance, may opt to take slightly longer restroom breaks to have more time for themselves. Furthermore, temporal protecting will likely be more prevalent in environments with a quantitative conception of time. That's because temporal protection allows people to accumulate time by being protective of it, accumulation being an implicit goal in quantitative settings. Lawyers, for instance, typically bill their hours (i.e., an instance of a quantitative conception of time) and, as such, can benefit from accumulating more time to devote to profitable work. As a result, it is not uncommon for lawyers to have secretaries and other assistants to guard against temporal intrusion. Finally, in timescapes characterized by a libertarian view of time, protecting time becomes a personal responsibility (rather than that of

institutions). Indeed, a libertarian conception of time posits that we are all responsible for our own time because it is ours. By extension, the protection of our time is also our responsibility. Philosopher Seneca is a rare instance of an individual holding a libertarian view of time ownership before modern times; to paraphrase, he famously wrote that nothing is ours, except time. Unsurprisingly, Seneca also wrote that "it's the mark of a great man … to allow no part of his time to be skimmed off … such a person's life is extremely long because he's kept available for himself the whole of whatever amount of time he had … none of it was under another's control; for being a most careful guardian of his time, he found nothing worth exchanging for it … but those deprived of much of their life by the public have necessarily had too little" (2014, p. 116). Temporal libertarianism is thus normative: as free individuals, it is our responsibility to defend our time. In such settings, temporal protecting memes will therefore thrive.

Temporal stretching. Temporal stretching will likely be prevalent in timescapes with high temporal interference. For instance, the prevalence (and increasing rise) of temporal stretching memes today (e.g., multitasking, ordering food instead of cooking) is a direct consequence of our being more accessible to other people at all times (Zerubavel, 1979). Environments such as hospitals and open-plan offices are also characterized by high temporal interference. In such contexts, temporal interference often takes time away from the task at hand. People can catch up on time lost to temporal interference by engaging in temporal stretching (e.g., working faster, forgoing the task entirely). As environments become more temporal intrusive, we expect a commensurate rise in temporal stretching memes as a way to recoup time lost. In a libertarian timescape, furthermore, temporal stretching becomes virtuous, as it provides a way for people to do more with their time and be more competitive—two highly sought-after goals. Gregg (2018) likens temporal stretching prowess to a form of athleticism whereby time management aficionados compete to achieve a

spectacular amount of tasks in as little time as possible. Interestingly, it might not be the nature of the tasks achieved per se that matters, but the efficiency with which a vast number of tasks are carried. Temporal stretching might thus be an end in itself in libertarian timescapes; a way to demonstrate one's worth and competence. (This is a parallel to Gershuny's (2005) concept of busyness, where people engage in many activities not out of necessity, but as a badge of honor.) For these reasons, we expect that temporal stretching memes will thrive in libertarian timescapes.

Temporal sensemaking. Coercive timescapes tend to reduce control over time, which can undermine feelings of time ownership—time is not ours if it is coerced by external forces; this is why prisoners and people forced to wait feel that they were robbed of their own time. Barring penance and other philosophical stances, it is rarely possible to ascribe meaning and purpose to time it is coerced by external forces. (As remarked earlier, coercion should not be confused with teleology. A coercive, minutely timed environment such as McDonald's kitchens might coerce cooks' time, but it hardly answers the question of *why* cooks manage their time. In fact, coercion might very well sap the energy and time required to ponder the ultimate purpose of time management.) As a result, temporal sensemaking memes will likely be less frequent in such environments. For the same reasons, high-interference timescapes can also reduce feelings of control and undermine people's capacity for temporal sensemaking. Finally, in quantitative timescapes sensemaking becomes a moral compass for the personal budgeting of time. That is because quantitative timescapes draw attention not only to the countable nature of time but also to its finite aspect. This notion is captured in popular time management adages such as "time flies but you're the pilot," which acknowledges the fleeting nature of time but reaffirms our status as moral arbiter of what to do with our limited time. Temporal sensemaking therefore prospers in timescapes with a quantitative time orientation.

In line with our configural approach, we summarize these insights in Table 13 with a notation system inspired from that of Ragin and Fiss (2008).

	Temporal Coercion		Temporal Interference		Temporal Orientation		Temporal Ownership	
	Low	High	Low	High	Qualitative	Quantitative	Authoritarian	Libertarian
Temporal structuring	●	×	⁂	✕	⁂	●	⁂	●
Temporal protecting	⁂	●	×	●	⁂	●	⁂	●
Temporal stretching	⁂	⁂	⁂	●	×	●	⁂	●
Temporal sensemaking	⁂	×	⁂	×	⁂	●	×	●

Table 13: Meme survival probability by timescape. Black circles indicate likelihood of meme proliferation; crosses of meme extinction. The size of circles and crosses indicates the magnitude of proliferation and extinction. Triangles of asterisks (⁂) denote indeterminacy

Table 13 is merely a reframing of Table 12, although a necessary one to easily visualize the various relationships between time management memes and timescapes. Crucially, Table 13 makes it easier to see how a given time management meme will fare in a combination of timescape dimensions. Adding crosses together augments the likelihood of extinction; adding black circles together augments the likelihood of proliferation; adding asterisk pyramids together augments the likelihood of indeterminacy. Conversely, adding opposite elements (e.g., a circle and a cross) converges toward indeterminacy. Although not strictly linear, this scheme allows for a fuzzy prediction of which time management strategies (i.e., which combinations of time management memes) will fit a given combination of timescape dimensions. Figure 16 illustrates this scheme with a sample of timescapes. Note that the figure does not exhaust the possibilities, but rather serves to illustrate the general idea.

HIGH TEMPORAL INTERFERENCE

Structuring: X
Protecting: ●
Stretching: •
Sensemaking: ×

QUANTITATIVE TIME

Structuring: ●
Protecting: •
Stretching: ●
Sensemaking: •

HIGH TEMPORAL COERCION

Structuring: X
Protecting: ●
Stretching: •
Sensemaking: X

Structuring: ⚛
Protecting: •
Stretching: ●
Sensemaking: •

Structuring: ●
Protecting: •
Stretching: ●
Sensemaking: ●

Structuring: X
Protecting: •
Stretching: ⚛
Sensemaking: x

Structuring: X
Protecting: •
Stretching: •
Sensemaking: x

Structuring: •
Protecting: •
Stretching: ●
Sensemaking: •

LIBERTARIAN TIME

Structuring: ●
Protecting: •
Stretching: ●
Sensemaking: ●

Structuring: •
Protecting: •
Stretching: ●
Sensemaking: •

Structuring: x
Protecting: •
Stretching: ●
Sensemaking: x

Structuring: ⚛
Protecting: •
Stretching: ●
Sensemaking: •

Structuring: ⚛
Protecting: ●
Stretching: ●
Sensemaking: •

Structuring: x
Protecting: •
Stretching: •
Sensemaking: ⚛

Figure 16: Fit between time management memes and various timescapes. Each cell represents the most likely combination of time management memes that are likely to prevail over time in a combination of timescape dimensions.

DISCUSSION

The Oxford Dictionary of English defines time management as "the ability to use one's time effectively or productively, especially at work" (Oxford Dictionaries, 2010). This definition reflects a modern, colloquial, Anglo understanding of time management as a method to be more efficient in professional settings. Though widely shared, this is a reductive conception of time management. Time management is not just about effectiveness or productivity (Snyder, 2013), and it's not necessarily more germane to the workplace than to other life domains (Gregg, 2018; Korhonen, 2017; Rich, 2015). To address this near-sighted conception, we sought to distill the

essence of time management—identify its abstract core. Only in abstracting time management from its contemporary connotations can we offer a definition that generalizes across organizational settings, cultures, and historical periods.

Contributions

With these considerations in mind, our first contribution was to introduce a definition that improves upon existing ones in two ways: by outlining the core elements of time management and defining it as an act. Indeed, unlike the dictionary's definition, we made no allusions to time management being a skill or ability. Rather, we framed time management merely as an act—a practice blending individual agency and social structure (Bourdieu, 1977; Orlikowski & Yates, 2002; Schatzki, 2019). The idea of time management being a skill is relatively recent; historically people managed time because that's what they were supposed to do. A normal act of will in accordance with cultural conventions. In addition, this definition makes a first step toward bringing coherence to time management research, a field marked by its disconnectedness and lack of consistent agenda (Aeon & Aguinis, 2017). Specifically, our definition offers a common vocabulary for future time management researchers; definitional clarity and consensus are essential ingredients to research progress (Kuhn, 1962).

Our second contribution was to identify the four core components of time management, drawing on the sociology and anthropology of time. In so doing, we move beyond the black-box approach to time management adopted by some, but not all, previous studies. The black-box approach treats time management as a monolithic concept whose contents are rarely, if ever, discussed. This confused understanding occurs in casual conversations as well, when people mention time management as a vague allusion to maintaining to-do lists or being punctual. The ambiguity concerning what time management *consists in* perpetuates conceptual befuddlement. In contrast,

our quadripartite model offers a finer-grained understanding of time management, thus enhancing conceptual clarity (Suddaby, 2010). Furthermore, our model is modular in that it rests on four distinct components; this modular understanding of time management affords flexibility and generalizability. To illustrate, consider how the four components we propose, though essential to time management, do not need to be all present to qualify as time management. For example, the combination of temporal structuring, protecting, and sensemaking (but not temporal stretching) constitutes a form of time management. This could be the strategy of someone who, presumably, lives according to a schedule, sets aside liberal amounts of private time, aligns time use with personal goals, but loathes having to rush or resort to time-saving tricks. Critically, the flexibility that our model affords provides a wider conceptual space to integrate various perspectives on time management (e.g., psychology, sociology, history), thus facilitating a coherent, inclusive research agenda.

Our third contribution was to introduce an evolutionary perspective of time management to explain the relative fitness of different time management memes in different timescapes. By definition, an evolutionary perspective is dynamic and thus captures how time management can change over time. This improves on the mostly static conceptions of time management that have been put forth hitherto. As mentioned earlier, for instance, temporal stretching becomes more prevalent in modern times (compared to, say, the Middle Ages) as societies around the world adopt a more quantitative view of time. This evolutionary perspective applies just as well in our lifetimes. For instance, people's time in childhood is tightly regulated by parents and schools (i.e., a coercive timescape), which is one reason why young children do not typically make elaborate to-do lists and schedules. Later in life, as parents and schools loosen their grip, people are confronted with less and less imposed time structure and thus resort to making their own time structures via

scheduling and list-making. This applies to much shorter timescales as well, such as transitioning from consulting work to mindfulness meditation within the same day. Although this was not explicitly addressed earlier, timescapes are not static either: while they can be a relatively stable backdrop, they can at times undergo a sudden, dramatic shift. Shifts in temporal ownership occur, for instance, in unexpected layoffs or midlife crises. In each case, the meaning of time was partially given by organizations and society, respectively. When such institutions no longer adequately fulfil the role of sensegivers (i.e., of owning the meaning of time), it behooves individuals to make sense of their own time and find some purpose for their time management behaviors. Importantly, adopting a cultural evolutionary approach expands our understanding of time management in terms of level of analysis. Cultural evolution theory—in particular memetics—is meme-centric, meaning that the unit of focus is not societies, organizations, individuals, but the meme. This is precisely why cultural evolution theory makes it possible to study time management at higher levels of analyses. To illustrate with parallels, consider how using the gene as unit of analysis allows inquiries at higher levels of analysis, such as population genetics; or how using the firm as a unit of analysis allows the study of organizational population ecology. In the same way, using time management memes as a unit of focus allows us to study time management at an individual level (e.g., how a single person adopts certain time management memes depending on her environmental pressures), organizational level (e.g., how certain time management memes thrive depending on the time norms of the organization), or even historical level (e.g., how temporal stretching memes became more widespread in modern times because our environment has a more quantitative understanding of time). Cultural evolution theory thus offers a very precise unit of focus that, almost paradoxically, allows for a very broad, abstract, and generalizable approach to time management. Last, but not least, cultural evolution theory affords a descriptive framework. Unlike

most time management manuals and some widely used time management scales, the framework we advance does not prescribe a "correct" way to manage time. Rather, our framework *describes* which time management methods will be adopted in practice, depending on environmental conditions.

With these three contributions, this paper addresses three fundamental questions. What is time management? The act of structuring, protecting, stretching, and making sense of one's time. How does time management work? Through various combinations of four fundamental components: temporal structuring, temporal protecting, temporal stretching, and temporal sensemaking. When does time management work? When combinations of time management components fit the surrounding timescape.

Note that the last question made no explicit assumptions as to what criteria should be used to conclude that time management "works." In contrast, empirical studies and general-audience books often measure time management's effectiveness by its impact on performance and wellbeing (Claessens et al., 2007). Though useful, this is a limited understanding of what people aim to do with time management. Some, like monks and nuns, live by a rigid schedule because discipline is a requirement for devotion (Zerubavel, 1980). Others, like worried parents in Mexico and India, deliberately randomize their schedule to avoid kidnapping attempts. (The more predictable people's schedule, the easier they are to kidnap; Clarke, 1993) Still others manage time for identity and resistance purposes, like Inuit communities in Nunavut who leave work at exactly 4:59 p.m. (and not the conventional 5 o'clock) as a form of cultural resistance to Western ideals (van den Scott, 2017)[23]. Our theory of time management thus applies not just to the time management

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[23] Note that our model can explain all of these examples. For instance, kidnapping is an extreme example of temporal interference and can be prevented by random scheduling (i.e., a mix of temporal structuring and temporal protecting). The Inuit's resistance to Western timing can be understood as a shift away from authoritarian time ownership (i.e., the hegemony of Western time) through emancipation. The act of leaving work at 4:59 p.m. (unconventional from a

literature proper, but also paves the way toward a wider, more inclusive multidisciplinary understanding of why, how, and when time management works.

Further considerations, boundary conditions, and future research

A distinctive aspect of our theory is that it takes a meme's-eye view of time management. In other words, this theory does not necessarily focus on how individuals make rational decisions about how to use their time. Instead, our theory describes how time management evolves in different cultural environments—the level of analysis is thus not so much individuals as time management itself. As such, individual rational decision-making plays a smaller role compared to cultural dynamics. The relatively small role of personal agency might seem odd for a theory of time management. Indeed, people often construe time management as the quintessential exertion of temporal agency and individual deliberation (Flaherty, 2011; Larsson & Sanne, 2005).

That we underemphasize individual agency is, in a sense, a limitation of our theory. For instance, we have not discussed how individual differences make people more or less likely to adopt certain time management strategies (Tang, Richter, & Nadkarni, 2019; Vinton, 1992). It is very possible, for instance, that conscientious people are more likely to adopt time management strategies based on temporal structuring (Claessens et al., 2007). Nevertheless, this limitation does not preclude future conceptual extensions. A good place to start would be the observation that people have predispositions that make them more or less likely to adopt a given meme (Laland & Brown, 2011). Future conceptual and empirical research can thus explore how individual tendencies make people take up certain time management strategies (if any) over others.

In another sense, however, our downplay of individual agency strengthens our theory because it opens the door to novel research perspectives. For instance, future research can assess the actual

Western perspective) results from temporal sensemaking: attributing sense, meaning, and purpose to time management in a way that resists cultural oppression.

level of agency that underlies time management—do people manage time intentionally and deliberately? This could involve using rating scales of people's sense of agency as well as neuroimaging (cf. Dewey & Knoblich, 2014; Haggard, 2017). The latter research designs, however, would likely only reveal people's *perception* of having agency in managing time, overlooking the hidden social dynamics that influence seemingly willful decisions (Alvesson & Deetz, 2006). As an alternative, researchers can further qualitative inquiry into the social and cultural dynamics that undergird time management decisions (Sabelis, 2001; Shir-Wise, 2018). This research stream has, and should, continue to investigate the extent to which time management is a well-thought-out act intended for one's benefit, or, alternatively, an unwitting internalization of neoliberal ideals (Gregg, 2018; Leshed & Sengers, 2011; Reagle, 2019).

Relatedly, we have so far assumed that people adopt time management memes because they fulfil a useful function. But scholars have warned that memes are not necessarily popular because they are useful, but simply because they are compelling and catchy (Blackmore, 2000). For instance, world-famous time management guru Tim Ferriss had tested many book titles on different audiences before settling on the very enticing *The 4-Hour Workweek*. Owing to its catchy title, the book sold extremely well and is now a time management classic. Yet it's clear that few people will ever achieve a 4-hour workweek (Costas & Grey, 2013); a popular time management meme is therefore not necessarily useful. Similarly, multitasking is a very popular time management meme, yet its effectiveness is doubtful to say the least (Ophir et al., 2009).

But the issue is not just whether time management is useful but, more worryingly, whether time management is actually safe for us. Memes might have *cultural* fitness, but that in no way guarantees they contribute to *our own biological fitness* (Cavalli-Sforza & Feldman, 1981; Dennett, 1995). For instance, smoking is still a popular meme in some countries, but that meme

works *against* people's biological fitness. Similarly, some time management memes can become popular despite undermining our health and happiness. For instance, polyphasic sleep purportedly enables people to get by with only 2 hours of sleep per day, saving valuable time to spend on other activities (Stampi, 1989). It is doubtful these sleeping schedules contribute to a healthy, balanced life. In the same vein, cognitive enhancers are becoming more popular among students and workers who want to get more done with their time (Bloomfield & Dale, 2015; Leon et al., 2018). Here again, we are not sure to what extent resorting to off-prescription drugs, sometimes sourced from the Dark Web, is healthful. Future research should thus look into what we call the self-destructive aspect or dark side of time management.

Finally, we only superficially dealt with the evolution of time management. Its historical and social contexts are beyond the scope of this paper. Nevertheless, we can learn more about today's time management by examining its past. This can be done using methods tracing the conceptual evolution of a concept (e.g., Bothello & Salles-Djelic, 2018). Charting the evolution of time management can inform current understandings of time management and, by extension, lay out novel, useful perspectives for future research. Our framework has repeatedly emphasized that broad historical forces can influence the proliferation of time management memes, yet we haven't explicitly referred to actual historical events. Future research can, for instance, examine how the transition to neoliberalism has changed the understanding of time in the general population (for instance from qualitative to quantitative) and how that shift has influenced the proliferation of temporal stretching memes. Analyzing the day-to-day time management methods of people who lived in the past may seem impossible at first blush, but recent historical forays into the matter suggest otherwise. For instance, Hailwood (2020) has recently compiled and analyzed hundreds of oral testimonies (i.e., depositions) of witnesses in 17th-century medieval England. Such

depositions contain frequent references to the time of events, timing of events, as well as how rural dwellers conceived of and used time. Though very approximate, this method gives us a glimpse of how people could have managed time in the past. We are confident that more sophisticated analyses of historical artifacts can further illuminate how time management has evolved throughout actual historical events.

CONCLUSION

What is time management? The act of structuring, protecting, stretching, and making sense of one's time. These four dimensions make up the essence of time management. The appeal of this definition lies in its being abstract enough to apply across people, settings, cultures, and historical periods. Yet it is fine-grained enough to be useful and precise: different combinations of time management components yield a wide range of precise time management strategies. Furthermore, this paper departs from the one-best-way view of time management and reveals that different time management strategies fit different contexts. We hardly address matters of individual agency and differences, but at the same time our omission challenges the notion that time management is a perfect example of rational (time-based) decision-making. Rather, we emphasize the importance of cultural pressures that make some time management methods thrive and others vanish. Indeed, we hope this conceptual approach will spur more empirical research on this formidably important concept.

GENERAL CONCLUSION

A running theme in this thesis seems to be that time management is a much larger phenomenon than commonly appreciated. An older, broader, more pervasive phenomenon. The first article suggests that time management is not just about individual behaviors: myriad external factors, such as social norms, intimately intertwine with time management. The second article reveals that, contrary to popular opinion and dictionary definitions, time management influences wellbeing to a greater extent than it does work performance. The third article posits that time management is modular and covers a wide variety of methods that evolve throughout history, culture, and from person to person. The main contribution of this thesis is thus to challenge existing conceptions of time management and offer new perspectives that allow for a better understanding of how, why, and when time management works.

Each article of this thesis contributes insights that stand to advance time management research. The first article reviews and synthesizes past research and reveals a conflicted literature. To make sense of mixed findings, we drew from various disciplines, such as sociology. In integrating insights from various disciplines, the review puts forward new perspectives to better understand why time management may or may not work. Specifically, the review identifies a wide variety of social norms, individual differences, and time management training flaws that might affect time management outcomes and that are typically overlooked in past research. The review's chief contribution is thus to identify variables (e.g., organizational culture) that may yield better assessments of the impact of time management on such outcomes as work performance and wellbeing.

The second article, a meta-analysis, expands on the first one in a more quantitative fashion. Its main contribution is to quantify the extent to which time management relates to a wide array of

variables, such as age, work performance, and psychological wellbeing. The analyses also allowed to test for a variety of moderators, some of which were mentioned in the first article (e.g., national culture). Though moderators did not seem to play an important role, we emphasize that only a tiny fraction of the studies in the meta-analysis included moderators mentioned in the first article. For instance, no studies in our meta-analysis included time norms or information relevant to time management training. Similarly, the lack of significant differences between results- and behavior-based performance should be taken with caution given our small sample size in either group of performance type. If anything, the lack of consistent moderation suggests that future research needs to include moderating variables more broadly and consistently. Another contribution of our meta-analysis is that it reveals time management to have a much stronger effect on wellbeing than on work performance. This finding not only challenges dominant conceptions of time management but also provide more evidence for the need of a definition of time management that is neither work-centric nor efficiency oriented, such as the one proposed in the first article and further expanded in the third article.

The third article proposes a theory of time management. Its first contribution is to introduce a definition that builds upon the main idea of the two previous articles: time management is a much broader construct than generally assumed. The definition of time management proposed in the third article thus condenses time management to its abstract core elements. It is interesting to note that the first article, the review piece (published in 2017), was cited by entrepreneurship scholars who proposed an updated definition: time management as "the process of systematically accounting for time, and then allocating time more efficiently among a series of prioritized tasks and activities" (Lévesque & Stephan, 2020, p. 166). We believe this definition to be insightful. However, as the third article argues, time management need not be systematic nor efficient. The

focus on systematicity and efficiency reflect a modern, Anglo view of what time management is. In contrast, the definition offered in the third article can be generalized to wider settings without sacrificing precision (i.e., the definition clearly outlines the four core elements that make up time management as a construct). Another important contribution of the third article is its evolutionary perspective on time management. This evolutionary framework posits that time management components (memes) thrive or perish depending on environmental pressures. As such, the third article affords a contingency-based understanding of time management: there is no one best way to manage time; rather, there can be a few optimal ways to manage time in a given environment. This contingency-based understanding addresses the limitations of some studies that took a one-size-fits-all approach to time management.

Since the publication of the first article in 2017, a few notable papers on time management have come to the fore. The first one is an empirical study by Parke et al. (2018). The authors combined the idea of time management to the broader notion of contingency. However, the notion of contingency put forward here is different from the one we mentioned in the previous paragraph. Rather than talking about different components of time management being contingent on the situation, the authors focus on how the planning aspect of time management can be contingent on unexpected events at work, such as interruptions. In essence, the authors propose that contingent planning consists in anticipating disruptive events by planning for them (a blend of temporal structuring and protecting, to use the third article's jargon). We laud Parke et al. (2018) for their focus on contextual factors (e.g., interruptions at work) and introduction of more flexible alternatives to static, rigid time management.

Since 2017, Parke et al. (2018) constitutes one of the only notable advances in time management from a management perspective. However, time management, as emphasized in the first article of

this thesis, is a highly multidisciplinary field. New time management articles have been published in a wide variety of fields. Wajcman (2018), for instance, investigates digital aspects of time management (e.g., intelligent calendars) from a sociological approach. In psychology, Vangsness and Young (2020) examine different time management strategies (i.e., steady work, procrastination, and precrastination) and their impact on task completion. In behavioral sciences, a formidable research endeavor dubbed the Human Screenome Project now aims to collect vast amounts of data to study how people use their time on various devices (Reeves et al., 2020). New research in transportation now explores what self-driving cars would entail for time management and productivity (e.g., by installing compact desks in car to allow people to work while commuting; Singleton, 2018). Clearly, time management research advances rapidly in a wide variety of fields, further warranting the need for a multidisciplinary approach.

Overall, the thesis contributes to the literature by addressing three fundamental questions: What do we know about time management? Does time management work? And what is time management? Each article has addressed, respectively, each of these three questions. The first two articles—the review and the meta-analysis—look backward and take stock of all the literature up until now. The third article looks forward by building the foundation for a more expansive and inclusive understanding of time management. It is hoped that the findings, insights, and perspectives outlined in this thesis will prove useful to future researchers who wish to advance the science of how people manage time.

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APPENDIX: FUNNEL PLOTS
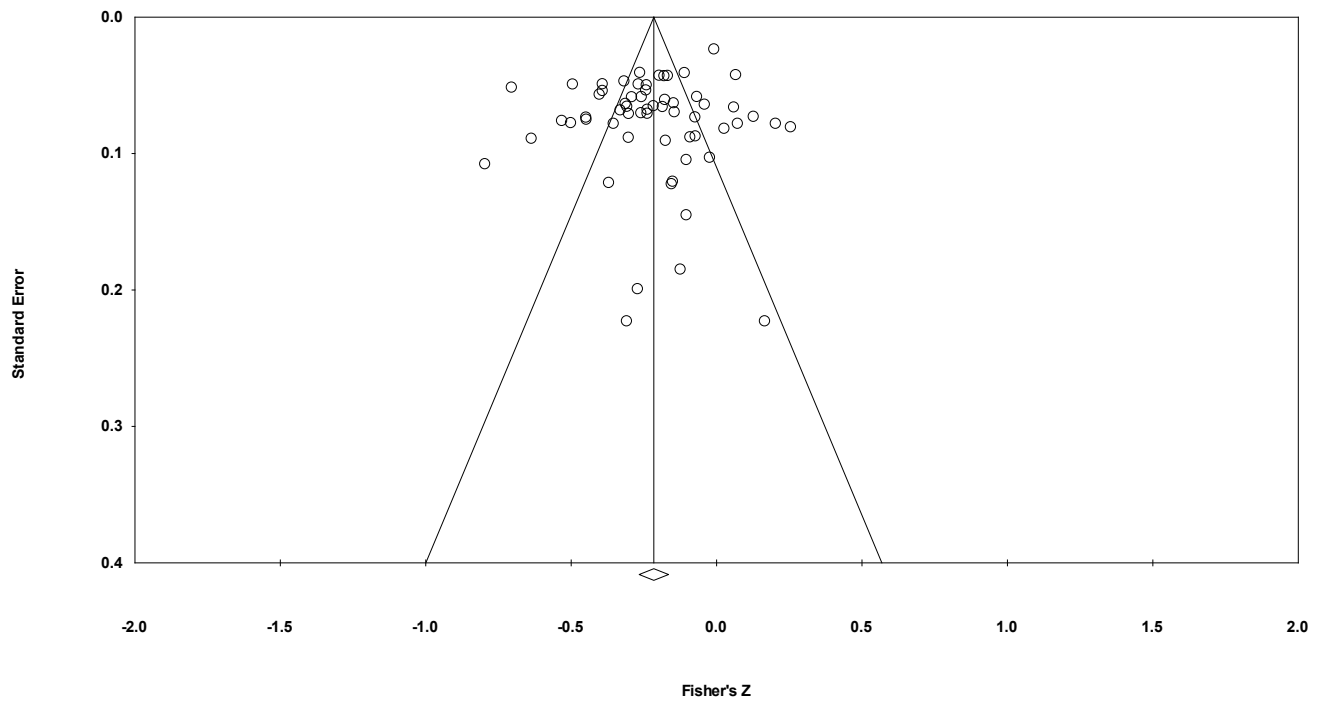
Figure 17: Funnel plot for time management distress
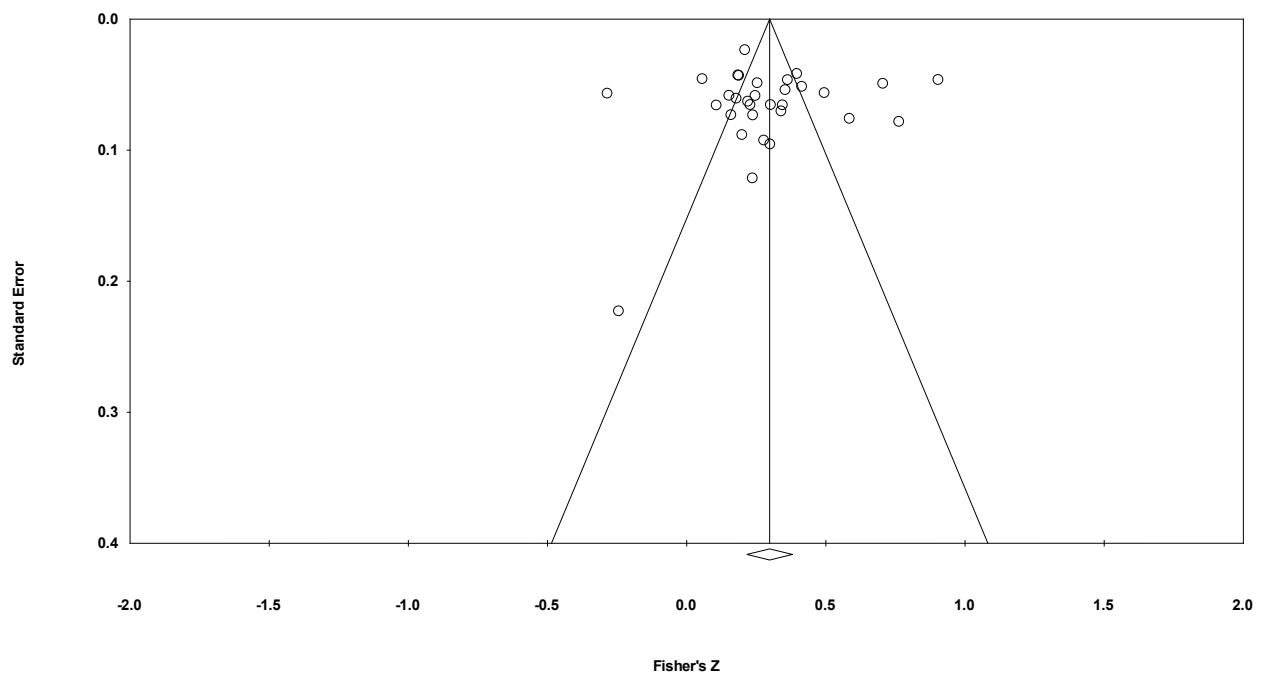
Figure 18: Funnel plot for time management and wellbeing
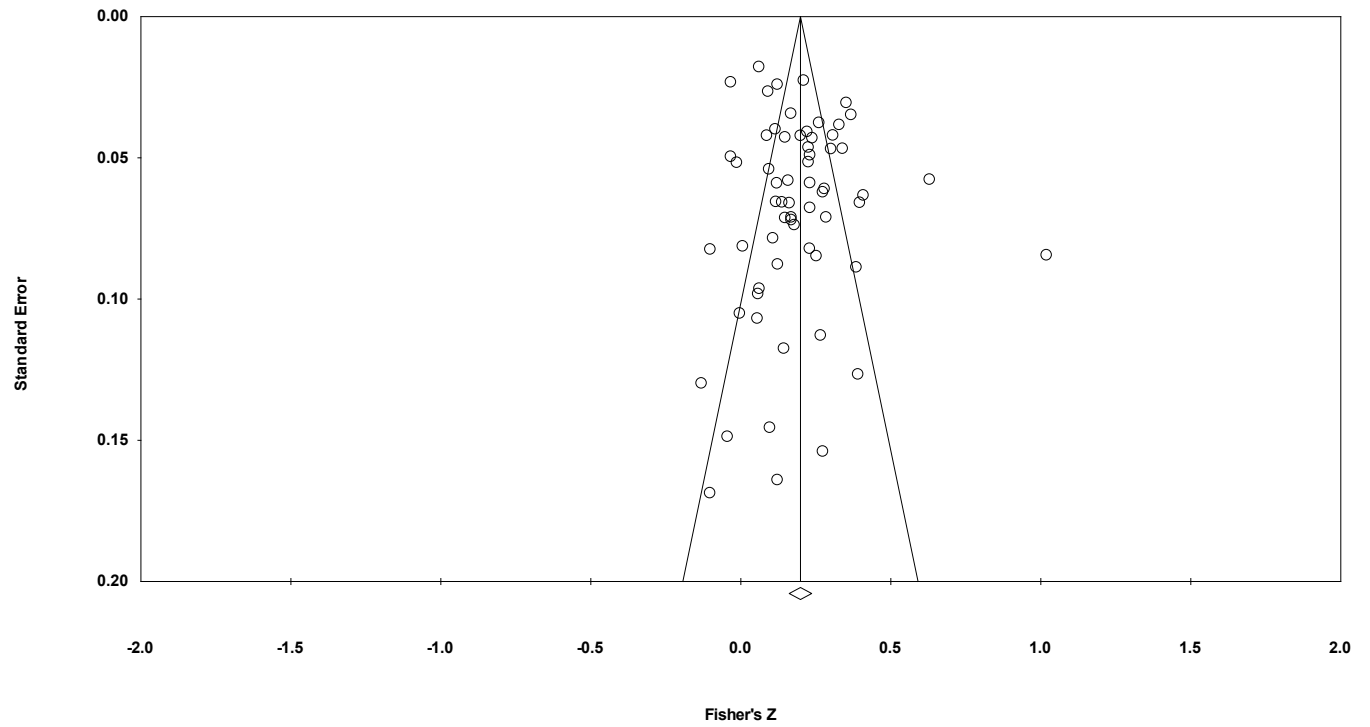
Figure 19: Funnel plot for time management and academic achievement
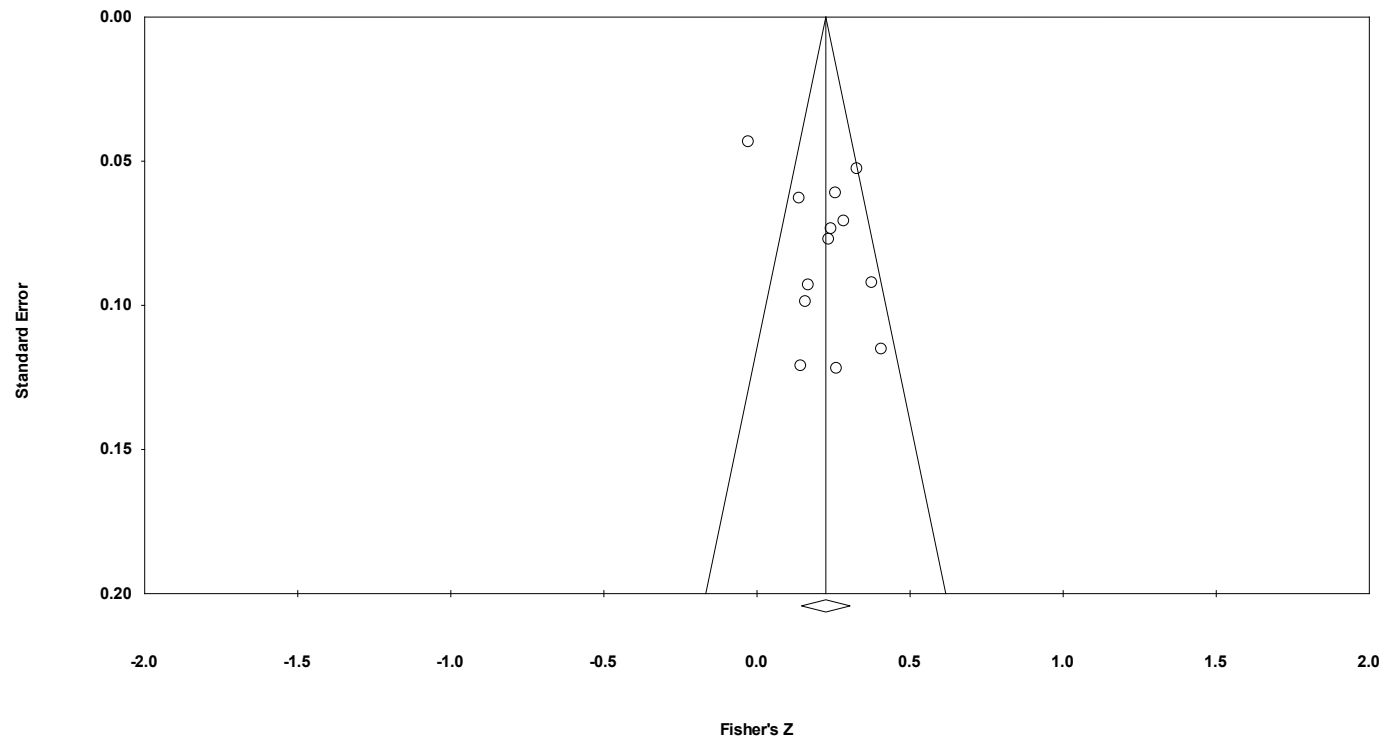
Figure 20: Funnel plot for time management and job performance

Time management and performance in professional settings

Time management and job performance

Outcome	Study name	Statistics for each study					Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	
job performance	White, James, Burke, & Allen, 2012	0.388	0.181	0.562	3.546	0.000	
job performance	Rapp, Bachrach, & Rapp, 2013	0.140	0.017	0.259	2.233	0.026	
job performance	Norris, Teng, & Ford, 2005	0.169	-0.012	0.339	1.830	0.067	
job performance	Norris & Sager, 2003	0.279	0.146	0.402	4.033	0.000	
job performance	Macan, 1994	-0.025	-0.110	0.060	-0.573	0.566	
job performance	Kearns & Gardiner, 2007	0.254	0.139	0.363	4.235	0.000	
job performance	Hafner & Stock, 2010	0.145	-0.091	0.366	1.204	0.229	
job performance	Guoqing & Yongxin, 2000	0.233	0.085	0.371	3.067	0.002	
job performance	Claessens, Van Eerde, Rutte & Roe, 2004	0.257	0.023	0.464	2.152	0.031	
job performance	Barling, Cheung, & Kelloway, 1996	0.160	-0.033	0.341	1.630	0.103	
job performance	Khan, Farooqi, Khalil, & Faisal, 2016	0.318	0.222	0.408	6.224	0.000	
job performance	Parke et al., 2018	0.240	0.100	0.371	3.320	0.001	
job performance	Sutharshini, Thevanes, & Arulrajah, 2019	0.361	0.194	0.507	4.089	0.000	
		0.221	0.144	0.295	5.542	0.000	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 21: Time management and job performance forest plot

Time management and job involvement

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
job involvement	van der Heijden, Schepers, & Nijssen, 2012	0.220	0.070	0.360	2.855	0.004	166	
job involvement	Ritz, Burris, & Brashears, 2013	0.418	0.007	0.708	1.991	0.046	23	
job involvement	Baltes et al., 2003	0.136	0.010	0.258	2.111	0.035	241	
job involvement	Parke et al., 2018	0.260	0.121	0.389	3.610	0.000	187	
		0.207	0.129	0.282	5.159	0.000	617	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 22: Time management and job involvement forest plot

Time management and motivation

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
motivation	Noris & Sager, 2003	0.363	0.236	0.477	5.352	0.000	201	
motivation	Barling, Cheung, & Kelloway, 1996	0.541	0.390	0.664	6.116	0.000	105	
motivation	Alexandris, Kouthouris, & Girgolas, 2007	0.232	0.103	0.353	3.481	0.000	220	
motivation	Mudrack, 1999	0.290	0.152	0.417	4.028	0.000	185	
		0.352	0.226	0.467	5.212	0.000	711	

Figure 23: Time management and motivation forest plot

Time management and performance in academic settings

Time management and standardized tests

Outcome	Study name	Statistics for each study					Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	
standardized test	Xu, Yuan, Xu, & Xu, 2014	-0.030	-0.076	0.016	-1.272	0.203	
standardized test	West & Sadoski, 2011	0.131	-0.061	0.314	1.337	0.181	
standardized test	Suraya et al, 2007	0.001	-0.035	0.037	0.055	0.956	
standardized test	Britton & Tesser, 1991	-0.072	-0.275	0.137	-0.673	0.501	
standardized test	Hofer et al., 2012	0.200	0.128	0.270	5.341	0.000	
standardized test	Janzen et al., 2015	-0.030	-0.127	0.068	-0.601	0.548	
standardized test	Burrus et al, 2017	-0.098	-0.255	0.064	-1.188	0.235	
		0.021	-0.053	0.094	0.551	0.582	

Figure 24: Time management and standardized tests forest plot

Time management and test scores

Studyname		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
test score	Van Nuland, Dusseldorp, Martens, & Boekaerts, 2010	0.270	0.153	0.379	4.430	0.000	259	
test score	Kicket et al., 2019	0.229	0.071	0.375	2.827	0.005	150	
test score	Won & Yu, 2018	0.170	0.030	0.304	2.372	0.018	194	
		0.228	0.151	0.303	5.660	0.000	603	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 25: Time management and test scores forest plot

Time management and procrastination (reverse scored)

Outcome	Studyname	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
lack of procrastination	Vodanovich & Seib, 1997	0.640	0.518	0.737	8.024	0.000	115	
lack of procrastination	Hafner, Oberst, & Stock, 2014	0.500	0.333	0.637	5.297	0.000	96	
lack of procrastination	Chu & Choi, 2005	0.315	0.194	0.427	4.913	0.000	230	
lack of procrastination	Choi & Moran, 2009	0.318	0.182	0.442	4.444	0.000	185	
lack of procrastination	Bond & Feather, 1988	0.385	0.290	0.473	7.407	0.000	336	
lack of procrastination	Hofer et al., 2012	0.630	0.583	0.673	19.532	0.000	697	
lack of procrastination	Ja'hafari et al., 2017	0.773	0.572	0.886	5.340	0.000	30	
lack of procrastination	Lay, 1992	0.455	0.196	0.655	3.294	0.001	48	
lack of procrastination	Lay et al., 1993	0.499	0.290	0.662	4.315	0.000	65	
lack of procrastination	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.480	0.378	0.570	8.219	0.000	250	
lack of procrastination	Won & Yu, 2018	0.242	0.105	0.370	3.412	0.001	194	
lack of procrastination	Atalayin, Balkis, Tezel, & Kayrak, 2017	0.695	0.644	0.740	18.171	0.000	452	
lack of procrastination	Hensley et al., 2018	0.360	0.273	0.441	7.641	0.000	414	
lack of procrastination	Wolters et al., 2017	0.477	0.402	0.546	10.926	0.000	446	
		0.490	0.399	0.572	9.252	0.000	3558	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 26: Time management and procrastination (reverse coded) in academic

Time management and motivation

Study name		Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
motivation	Zampetakis, Bourata, & Moustakis, 2010	0.450	0.327	0.558	6.557	0.000	186	
motivation	Van Nuland, Dusseldorp, Martens, & Boekaerts, 2010	0.270	0.153	0.379	4.430	0.000	259	
motivation	Valle, Pan, Regueiro, Suarez, Tuero, & Nunez, 2015	0.389	0.315	0.459	9.471	0.000	535	
motivation	Stegers-Jager, Cohen-Schotanus, & Themmen, 2012	0.340	0.271	0.405	9.159	0.000	672	
motivation	Poyraz, 2013	0.713	0.604	0.796	9.066	0.000	106	
motivation	Liu, Liu, & Yang, 2014	0.461	0.386	0.530	10.740	0.000	467	
motivation	Kearns & Gardiner, 2007	0.218	0.101	0.329	3.613	0.000	269	
motivation	Xu, 2006	0.430	0.349	0.504	9.459	0.000	426	
motivation	Conte, Mathieu, & Landy, 1998	0.286	0.121	0.436	3.342	0.001	132	
motivation	Chu & Choi, 2005	0.140	0.011	0.265	2.123	0.034	230	
motivation	Basila, 2014	0.434	0.142	0.657	2.827	0.005	40	
motivation	Hofer et al., 2012	0.520	0.464	0.572	15.183	0.000	697	
motivation	Janzen et al., 2015	0.635	0.573	0.690	15.014	0.000	404	
motivation	Kicket et al., 2019	0.156	-0.004	0.309	1.907	0.057	150	
motivation	Ning et al., 2011	0.160	0.077	0.241	3.743	0.000	541	
motivation	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.410	0.301	0.508	6.846	0.000	250	
motivation	Ghiasvand et al., 2017	0.279	0.191	0.363	5.998	0.000	441	
		0.381	0.302	0.454	8.800	0.000	5805	

Favours A   Favours B

Figure 27: Time management and motivation in academic settings

Time management and cognitive ability

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
cognitive intelligence	MacCann, Fogarty, & Roberts, 2012	0.050	-0.033	0.133	1.177	0.239	556	
cognitive intelligence	George et al., 2008	-0.100	-0.226	0.029	-1.515	0.130	231	
cognitive ability	Hofer et al., 2012	0.050	-0.024	0.124	1.318	0.187	697	
		0.015	-0.064	0.094	0.377	0.706	1484	
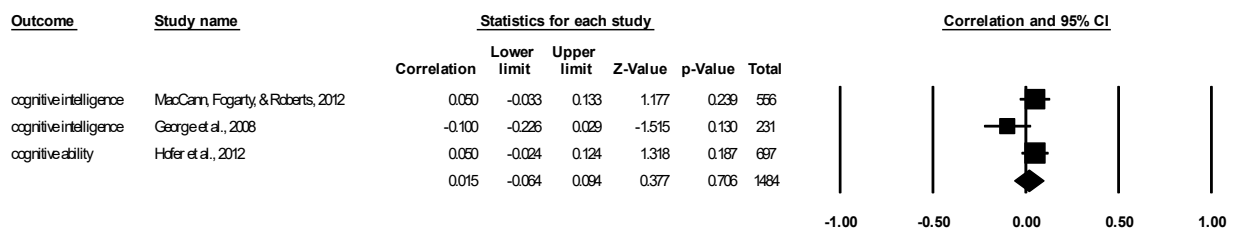
Figure 28: Time management and cognitive ability forest plot

Time management and hours spent studying

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
hours studied	Valle, Pan, Regueiro, Suarez, Tuero, & Nunez, 2015	-0.019	-0.104	0.066	-0.438	0.661	535	
hours studied	Nunez, Suarez, Rosario, Vallejo, Cerezo, & Valle, 2015	0.045	-0.047	0.136	0.956	0.339	454	
hours studied	Nunez et al, 2015	0.098	0.050	0.145	4.030	0.000	1683	
hours studied	Meeuwisse et al., 2013	0.408	0.140	0.620	2.906	0.004	48	
hours studied	Barling et al., 1995	0.350	0.232	0.458	5.542	0.000	233	
hours studied	George et al., 2008	0.110	-0.019	0.236	1.668	0.095	231	
		0.137	0.036	0.235	2.657	0.008	3184	

Figure 29: Time management and hours spent studying forest plot

Time management and hours worked

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
hours worked	Xu, Yuan, Xu, & Xu, 2014	0.040	-0.006	0.086	1.696	0.090	1799	
hours worked	Shahani, Weiner, & Streit, 1993	-0.075	-0.275	0.131	-0.713	0.476	93	
hours worked	Meeuwisse et al., 2013	-0.264	-0.510	0.022	-1.814	0.070	48	
hours worked	Huie, Winsler, & Kitsantas, 2014	-0.212	-0.276	-0.146	-6.205	0.000	834	
hours worked	Barling et al., 1995	0.210	0.084	0.330	3.233	0.001	233	
hours worked	Lay et al., 1993	0.123	-0.125	0.356	0.973	0.330	65	
		-0.023	-0.174	0.128	-0.298	0.766	3072	

Figure 30: Time management and hours worked forest plot

Time management and job satisfaction

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
								Statistics for each study
job satisfaction	Ritz, Burris, & Brashears, 2013	-0.236	-0.591	0.195	-1.076	0.282	23	
job satisfaction	Noris, Teng, & Ford, 2005	0.274	0.098	0.433	3.015	0.003	118	
job satisfaction	Noris & Sager, 2003	0.266	0.132	0.390	3.835	0.000	201	
job satisfaction	Macan, Shahani, Dipboye, & Phillips, 1990	0.260	0.149	0.365	4.492	0.000	288	
job satisfaction	Macan, 1994	0.186	0.102	0.267	4.316	0.000	529	
job satisfaction	Claessens, Van Eerde, Rutte & Roe, 2004	0.236	0.001	0.446	1.969	0.049	70	
job satisfaction	Chang & Nguyen, 2011	0.294	0.114	0.455	3.148	0.002	111	
job satisfaction	Adams & Jex, 1999	0.189	0.105	0.270	4.358	0.000	522	
job satisfaction	Azar et al., 2018	0.155	0.040	0.266	2.643	0.008	289	
job satisfaction	George, 1991	0.320	0.221	0.413	6.052	0.000	336	
job satisfaction	Hsu et al., 2019	0.395	0.305	0.478	7.991	0.000	369	
		0.248	0.189	0.305	8.020	0.000	2856	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 31: Time management and job satisfaction forest plot

Time management and life satisfaction

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
								Statistics for each study
life satisfaction	Wang, Wu, & Wu, 2014	0.720	0.673	0.762	19.275	0.000	454	
life satisfaction	Wang, Kao, Huan, & Wu, 2011	0.610	0.545	0.668	14.178	0.000	403	
life satisfaction	Martella & Maass, 2000	0.110	-0.020	0.236	1.660	0.097	229	
life satisfaction	Macan, Shahani, Dipboye, & Phillips, 1990	0.230	0.118	0.337	3.954	0.000	288	
life satisfaction	Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013	0.380	0.307	0.449	9.416	0.000	557	
life satisfaction	Chu & Choi, 2005	0.335	0.215	0.445	5.250	0.000	230	
life satisfaction	Choi & Moran, 2009	0.237	0.096	0.369	3.259	0.001	185	
life satisfaction	Boniwell, 2005	0.590	0.483	0.679	8.836	0.000	173	
life satisfaction	George, 1991	0.420	0.328	0.504	8.170	0.000	336	
		0.426	0.273	0.558	5.091	0.000	2855	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 32: Time management and life satisfaction forest plot

Time management and positive affect

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
								Statistics for each study
positive affect	Luo, Paris, Hogan, & Luo, 2011	0.210	0.164	0.255	8.774	0.000	1697	
positive affect	Boniwell, 2005	0.462	0.336	0.572	6.517	0.000	173	
positive affect	Etcheverry et al., 2001	0.180	0.062	0.293	2.968	0.003	269	
positive affect	George, 1991	0.350	0.252	0.440	6.669	0.000	336	
positive affect	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.220	0.099	0.335	3.515	0.000	250	
		0.280	0.186	0.368	5.702	0.000	2725	

Favours A   Favours B

Figure 33: Time management and positive affect

Time management and wellbeing

Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
							Statistics for each study
well-being	Chang & Nguyen, 2011	0.295	0.115	0.456	3.160	0.002	111	
well-being	Disch et al, 2000	0.060	-0.031	0.150	1.294	0.196	467	
well-being	Eldeleklioglu et al., 2010	0.162	0.019	0.299	2.211	0.027	186	
well-being	Van Hoye & Lootens, 2013	0.228	0.102	0.347	3.504	0.000	231	
well-being	Atalayin, Balkis, Tezel, & Kayrak, 2017	0.351	0.267	0.429	7.768	0.000	452	
		0.219	0.092	0.338	3.352	0.001	1447	

Favours A   Favours B

Figure 34: Time management and wellbeing forest plot

Time management and emotional exhaustion

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.170	emotional exhaustion	-0.337	0.007	Peeters & Rutte, 2005	-1.881	0.060	123	
-0.253	emotional exhaustion	-0.378	-0.119	Noris & Sager, 2003	-3.639	0.000	201	
-0.316	burnout	-0.432	-0.190	Mahmoodi-Shahrebabaki, 2015	-4.742	0.000	213	
-0.260		-0.338	-0.179		-6.115	0.000	537	

Favours A   Favours B

Figure 35: Time management and emotional exhaustion forest plot

Time management and stress

Correlation		Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.106	stress	-0.186	-0.025	Tanner, Schnittjer, & Atkins, 1991	-2.556	0.011	580	
-0.100	stress	-0.298	0.106	Shahani, Weiner, & Streit, 1993	-0.952	0.341	93	
0.168	stress	-0.262	0.543	Ritz, Burris, & Brashears, 2013	0.759	0.448	23	
-0.510	stress	-0.615	-0.387	Noris, Hudson, Logan, & Ford, 1998	-7.140	0.000	164	
-0.337	stress	-0.466	-0.194	Noris, 1997	-4.450	0.000	164	
-0.143	stress	-0.263	-0.019	Misra & McKean, 2000	-2.258	0.024	249	
-0.150	stress	-0.373	0.090	McLaughlin, Cormier, & Cormier, 1988	-1.228	0.219	69	
-0.157	stress	-0.501	0.230	Lambert, Torres, & Tummons, 2012	-0.792	0.429	28	
-0.263	stress	-0.341	-0.182	Jex & Elacqua, 1999	-6.153	0.000	525	
-0.300	stress	-0.410	-0.181	Jansen & Suhre, 2010	-4.815	0.000	245	
-0.480	stress	-0.586	-0.358	Hafner, Stock, Pinneker, & Strohle, 2014	-6.899	0.000	177	
-0.260	stress	-0.607	0.170	Hafner, Stock, & Oberst, 2015	-1.190	0.234	23	
-0.146	stress	-0.367	0.090	Hafner & Stock, 2010	-1.213	0.225	71	
-0.280	stress	-0.383	-0.170	Grissom, Loeb, & Mitani, 2015	-4.848	0.000	287	
-0.351	stress	-0.541	-0.126	Claessens, Van Eerde, Rutte & Roe, 2004	-3.001	0.003	70	
-0.264	stress	-0.380	-0.139	Chu & Choi, 2005	-4.074	0.000	230	
-0.683	job stress	-0.734	-0.624	Hsu et al., 2019	-15.969	0.000	369	
-0.286		-0.390	-0.176		-4.935	0.000	3367	

Favours A   Favours B

Figure 36: Time management and stress forest plot

Time management and work-life conflict

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.260	work-life conflict	-0.385	-0.126	Nonis & Sager, 2003	-3.744	0.000	201	
-0.116	Combined	-0.200	-0.031	Jex & Elacqua, 1999	-2.662	0.008	525	
0.063	work-life conflict	-0.068	0.192	Fenner & Renn, 2010	0.944	0.345	227	
-0.125	Combined	-0.209	-0.040	Adams & Jex, 1999	-2.863	0.004	522	
-0.064	work-life conflict	-0.178	0.052	Azar et al., 2018	-1.084	0.278	289	
-0.038	Combined	-0.163	0.089	Baltes et al., 2003	-0.579	0.563	241	
-0.210	work-life conflict	-0.330	-0.084	Barling et al., 1995	-3.233	0.001	233	
-0.513	work-life conflict	-0.584	-0.434	Hsu et al., 2019	-10.843	0.000	369	
-0.140	Combined	-0.272	-0.003	Lapierre et al., 2012	-2.004	0.045	205	
-0.163		-0.277	-0.043		-2.663	0.008	2812	

Favours A   Favours B

Figure 37: Time management and work-life conflict forest plot

Time management and anxiety

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.230	anxiety	-0.358	-0.094	Talib & Sansgiry, 2012	-3.279	0.001	199	
-0.290	anxiety	-0.413	-0.157	Sansgiry, Bhosle, & Sail, 2006	-4.169	0.000	198	
-0.070	anxiety	-0.175	0.036	Ranellucci, Hall, & Goetz, 2015	-1.289	0.197	341	
-0.230	anxiety	-0.353	-0.100	Munt & Merydith, 2012	-3.418	0.001	216	
-0.120	anxiety	-0.232	-0.004	Macan, Shahani, Dipboye, & Phillips, 1990	-2.036	0.042	288	
-0.212	anxiety	-0.292	-0.129	Macan, 1994	-4.937	0.000	529	
0.010	anxiety	-0.038	0.058	Luo, Paris, Hogan, & Luo, 2011	0.412	0.681	1697	
-0.081	anxiety	-0.277	0.121	Lang, 1992	-0.783	0.434	96	
-0.260	anxiety	-0.414	-0.091	Kleijn, Ploeg, & Topman, 1994	-2.987	0.003	129	
-0.254	anxiety	-0.328	-0.177	Kaya, Kaya, et al., 2012	-6.259	0.000	584	
-0.310	anxiety	-0.385	-0.231	Bond & Feather, 1988	-7.352	0.000	529	
-0.259	anxiety	-0.348	-0.166	Janzen et al., 2015	-5.307	0.000	404	
0.030	anxiety	-0.131	0.189	Kicket et al., 2019	0.364	0.716	150	
0.070	anxiety	-0.014	0.153	Ning et al., 2011	1.626	0.104	541	
-0.341	anxiety	-0.436	-0.238	Waters & Muller, 2003	-6.183	0.000	306	
-0.304	anxiety	-0.386	-0.217	Ghiasvand et al., 2017	-6.570	0.000	441	
-0.181		-0.255	-0.105		-4.629	0.000	6648	

Favours A   Favours B

Figure 38: Time management and anxiety forest plot

Time management and psychological distress

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.238	psychological distress	-0.364	-0.103	Nonis & Sager, 2003	-3.414	0.001	201	
-0.430	psychological distress	-0.547	-0.296	Nonis, Hudson, Logan, & Ford, 1998	-5.835	0.000	164	
-0.150	psychological distress	-0.373	0.090	McLaughlin, Cormier, & Cormier, 1988	-1.228	0.219	69	
-0.172	distress	-0.286	-0.054	Kearns & Gardiner, 2007	-2.833	0.005	269	
-0.560	psychological distress	-0.669	-0.427	Jackson, 1999	-7.047	0.000	127	
-0.326	psychological distress	-0.437	-0.205	Chu & Choi, 2005	-5.098	0.000	230	
-0.192	psychological distress	-0.293	-0.087	Bond & Feather, 1988	-3.548	0.000	336	
-0.370	psychological distress	-0.451	-0.283	Goodman et al., 2017	-7.798	0.000	406	
-0.660	psychological distress	-0.764	-0.523	Jackson et al., 1997	-7.309	0.000	88	
-0.416	psychological distress	-0.505	-0.319	Waters & Muller, 2003	-7.709	0.000	306	
-0.358		-0.447	-0.263		-6.959	0.000	2196	

Favours A   Favours B

Figure 39: Time management and psychological distress forest plot

Time management and boredom

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.455	boredom	-0.529	-0.374	Wang, Wu, Wu, & Huan, 2012	-9.820	0.000	403	
0.253	boredom	0.099	0.395	Vodanovich & Watt, 1999	3.178	0.001	154	
-0.418	boredom	-0.531	-0.291	Vodanovich & Watt, 1999b	-5.990	0.000	184	
-0.460	boredom	-0.572	-0.331	van der Heijden, Schepers, & Nijssen, 2012	-6.349	0.000	166	
-0.387	boredom	-0.474	-0.293	Ranellucci, Hall, & Goetz, 2015	-7.506	0.000	341	
-0.310		-0.507	-0.081		-2.626	0.009	1248	

Favours A   Favours B

Figure 40: Time management and boredom forest plot

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Time management and negative affect

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.020	negative affect	-0.068	0.028	Luo, Paris, Hogan, & Luo, 2011	-0.823	0.410	1697	
-0.484	negative affect	-0.591	-0.361	Boniwell, 2005	-6.887	0.000	173	
-0.370	negative affect	-0.459	-0.274	George, 1991	-7.088	0.000	336	
-0.020	negative affect	-0.163	0.124	Parke et al., 2018	-0.271	0.786	187	
-0.232		-0.451	0.014		-1.849	0.064	2393	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 41: Time management and negative affect forest plot

Time management and worry

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.120	worry	-0.450	0.239	Van Eerde, 2003	-0.649	0.516	32	
-0.320	worry	-0.467	-0.156	Kleijn, Ploeg, & Topman, 1994	-3.723	0.000	129	
-0.087	worry	-0.255	0.086	Kelly, 2003	-0.983	0.326	130	
-0.191		-0.355	-0.016		-2.140	0.032	291	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 42: Time management and worry forest plot

Time management and physical distress

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.320	physical distress	-0.451	-0.175	Nonis, Hudson, Logan, & Ford, 1998	-4.208	0.000	164	
-0.260	physical distress	-0.365	-0.149	Macan, Shahani, Dipboye, & Phillips, 1990	-4.492	0.000	288	
-0.170	physical distress	-0.252	-0.086	Macan, 1994	-3.937	0.000	529	
-0.146	physical distress	-0.337	0.056	Lang, 1992	-1.418	0.156	96	
-0.069	physical distress	-0.237	0.103	Conte, Mathieu, & Landy, 1998	-0.785	0.432	132	
-0.129	health issues	-0.233	-0.022	Bond & Feather, 1988	-2.367	0.018	336	
-0.271	physical distress	-0.349	-0.190	Adams & Jex, 1999	-6.332	0.000	522	
-0.204		-0.264	-0.142		-6.372	0.000	2067	

Favours A   Favours B

Figure 43: Time management and physical distress forest plot

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Time management and age

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Correlation and 95% CI
age	Xu, Du, & Fan, 2013	0.200	0.064	0.328	2.874	0.004	
age	Vodanovich & Seib, 1997	0.000	-0.183	0.183	0.000	1.000	
age	Valle, Pan, Regueiro, Suarez, Tuero, & Nunez, 2015	-0.192	-0.272	-0.109	-4.484	0.000	
age	Ubaka, Sansgiry, & Ukwe, 2015	0.066	0.013	0.118	2.458	0.014	
age	Trueman & Hartley, 1996	0.210	0.098	0.316	3.649	0.000	
age	Mpofu, D'Amico, & Cleghorn, 1996	-0.070	-0.184	0.046	-1.182	0.237	
age	Macan, Shahani, Dipboye, & Phillips, 1990	0.180	0.066	0.290	3.072	0.002	
age	Macan, 1994	0.093	0.008	0.177	2.139	0.032	
age	Huang & Lin, 2014	-0.007	-0.103	0.089	-0.142	0.887	
age	Gevers et al., 2015	0.005	-0.182	0.192	0.052	0.959	
age	Fenner & Renn, 2010	-0.031	-0.161	0.100	-0.464	0.643	
age	Conte, Mathieu, & Landy, 1998	0.015	-0.156	0.185	0.170	0.865	
age	Adams & Jex, 1999	0.045	-0.041	0.130	1.026	0.305	
age	Adams & Blair, 2019	-0.016	-0.242	0.212	-0.136	0.892	
age	Bajec, 2019	0.030	-0.047	0.107	0.760	0.447	
age	Barling et al., 1995	-0.010	-0.138	0.119	-0.152	0.879	
age	Disch et al., 2000	0.040	-0.051	0.130	0.862	0.389	
age	Hsu et al., 2019	-0.064	-0.165	0.038	-1.226	0.220	
age	Lapierre et al., 2012	0.150	0.013	0.281	2.148	0.032	
age	Xu, Du, & Fan, 2017	-0.090	-0.200	0.022	-1.573	0.116	
age	Van Hoye & Lootens, 2013	0.113	-0.016	0.239	1.714	0.087	
		0.032	-0.013	0.076	1.378	0.168	

Figure 44: Time management and age forest plot

Time management and age (18+)

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
age	Xu, Du, & Fan, 2013	0.200	0.064	0.328	2.874	0.004	204	
age	Vodanovich & Seib, 1997	0.000	-0.183	0.183	0.000	1.000	115	
age	Ubaka, Sansgiry, & Ukwe, 2015	0.066	0.013	0.118	2.458	0.014	1386	
age	Trueman & Hartley, 1996	0.210	0.098	0.316	3.649	0.000	296	
age	Mpofu, D'Amico, & Cleghorn, 1996	-0.070	-0.184	0.046	-1.182	0.237	287	
age	Macan, Shahani, Dipboye, & Phillips, 1990	0.180	0.066	0.290	3.072	0.002	288	
age	Macan, 1994	0.093	0.008	0.177	2.139	0.032	529	
age	Huang & Lin, 2014	-0.007	-0.103	0.089	-0.142	0.887	416	
age	Gevers et al., 2015	0.005	-0.182	0.192	0.052	0.959	110	
age	Fenner & Renn, 2010	-0.031	-0.161	0.100	-0.464	0.643	227	
age	Conte, Mathieu, & Landy, 1998	0.015	-0.156	0.185	0.170	0.865	132	
age	Adams & Jex, 1999	0.045	-0.041	0.130	1.026	0.305	522	
age	Adams & Blair, 2019	-0.016	-0.242	0.212	-0.136	0.892	75	
age	Bajec, 2019	0.030	-0.047	0.107	0.760	0.447	645	
age	Disch et al., 2000	0.040	-0.051	0.130	0.862	0.389	467	
age	Hsu et al., 2019	-0.064	-0.165	0.038	-1.226	0.220	369	
age	Lapierre et al., 2012	0.150	0.013	0.281	2.148	0.032	205	
age	Xu, Du, & Fan, 2017	-0.090	-0.200	0.022	-1.573	0.116	307	
age	Van Hoye & Lootens, 2013	0.113	-0.016	0.239	1.714	0.087	231	
		0.048	0.010	0.086	2.464	0.014	6811	

Figure 45: Time management and age (excluding children) forest plot

Time management and gender

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value
-0.100	gender	-0.146	-0.054	Xu, Yuan, Xu, & Xu, 2014	-4.252	0.000
-0.160	gender	-0.291	-0.023	Xu, Du, & Fan, 2013	-2.288	0.022
-0.100	gender	-0.144	-0.055	Xu, 2010	-4.364	0.000
-0.071	gender	-0.168	0.027	Wang, Wu, Wu, & Huan, 2012	-1.422	0.155
0.000	gender	-0.183	0.183	Vodanovich & Seib, 1997	0.000	1.000
-0.368	gender	-0.564	-0.132	Vences, 2014	-2.991	0.003
-0.077	gender	-0.161	0.008	Valle, Pan, Regueiro, Suarez, Tuero, & Nunez, 2015	-1.780	0.075
0.000	gender	-0.053	0.053	Ubaka, Sansgiry, & Ukwe, 2015	0.000	1.000
-0.232	gender	-0.337	-0.121	Trueman & Hartley, 1996	-4.045	0.000
0.039	gender	-0.194	0.268	Sun, Wang, & Sharma, 2014	0.324	0.746
-0.185	gender	-0.375	0.019	Shahani, Weiner, & Streit, 1993	-1.776	0.076
-0.091	gender	-0.205	0.025	Mpofu, D'Amico, & Cleghorn, 1996	-1.538	0.124
-0.210	gender	-0.326	-0.088	Misra & McKean, 2000	-3.343	0.001
-0.087	gender	-0.362	0.202	Meeuwisse et al., 2013	-0.585	0.558
-0.164	gender	-0.271	-0.053	Mans & Sigler, 2012	-2.895	0.004
0.230	gender	0.118	0.337	Macan, Shahani, Dipboye, & Phillips, 1990	3.954	0.000
0.000	gender	-0.085	0.085	Macan, 1994	0.000	1.000
-0.260	gender	-0.323	-0.195	Liu, Rijmen, MacCann, & Roberts, 2009	-7.578	0.000
0.117	gender	-0.049	0.277	Kelly, 2004	1.381	0.167
-0.150	gender	-0.228	-0.070	Kaya, Kaya, et al , 2012	-3.643	0.000
0.160	gender	0.066	0.251	Xu, 2006	3.319	0.001
0.011	gender	-0.085	0.107	Huang & Lin, 2014	0.224	0.823
-0.080	gender	-0.263	0.109	Gevers et al., 2015	-0.829	0.407
-0.088	gender	-0.178	0.003	García-Ros & Pérez-González, 2012	-1.890	0.059
-0.003	gender	-0.133	0.127	Fenner & Renn, 2010	-0.045	0.964
-0.126	gender	-0.236	-0.013	Fazal et al., 2012	-2.183	0.029
-0.135	gender	-0.299	0.037	Conte, Mathieu, & Landy, 1998	-1.543	0.123
-0.059	gender	-0.133	0.016	Bond & Feather, 1988	-1.550	0.121
0.088	gender	0.002	0.173	Adams & Jex, 1999	2.010	0.044
-0.144	gender	-0.219	-0.068	Bajec, 2019	-3.674	0.000
-0.101	gender	-0.225	0.026	Baltes et al., 2003	-1.563	0.118
-0.040	gender	-0.130	0.051	Disch et al, 2000	-0.862	0.389
-0.171	gender	-0.264	-0.075	Janzen et al., 2015	-3.458	0.001
-0.667	gender	-0.749	-0.564	Karakose, 2015	-9.495	0.000
0.000	gender	-0.135	0.135	Mudrack, 1999	0.000	1.000
0.030	gender	-0.082	0.141	Xu, Du, & Fan, 2017	0.523	0.601
-0.078	gender	-0.205	0.052	Van Hoye & Lootens, 2013	-1.180	0.238
-0.087		-0.129	-0.045		-4.071	0.000

Figure 46: Time management and gender forest plot

Time management and education

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total
education	Meeuwisse et al., 2013	-0.037	-0.318	0.250	-0.248	0.804	48
education	Macan, 1994	0.032	-0.053	0.117	0.734	0.463	529
education	Van Hoye & Lootens, 2013	0.001	-0.128	0.130	0.015	0.988	231
		0.019	-0.050	0.088	0.545	0.586	808

Figure 47: Time management and education forest plot

Time management and number of children

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
children	Macan, 1994	0.040	-0.045	0.125	0.918	0.359	529	
children	Fenner & Renn, 2010	0.020	-0.110	0.150	0.299	0.765	227	
children	Lapierre et al., 2012	0.000	-0.137	0.137	0.000	1.000	205	
		0.027	-0.037	0.090	0.827	0.408	961	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 48: Time management and number of children forest plot

Time management and marital status

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
married	Fenner & Renn, 2010	0.057	-0.074	0.186	0.854	0.393	227	
married	Adams & Jex, 1999	-0.002	-0.088	0.084	-0.046	0.964	522	
married	Van Hoye & Lootens, 2013	0.012	-0.117	0.141	0.181	0.856	231	
		0.015	-0.048	0.078	0.465	0.642	980	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 49: Time management and marital status forest plot

Time management and agreeableness

Outcome	Studyname	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total
agreeableness	MacCann, Fogarty, & Roberts, 2012	0.240	0.160	0.317	5.756	0.000	556
agreeableness	Liu, Rijmen, MacCann, & Roberts, 2009	0.360	0.299	0.418	10.733	0.000	814
agreeableness	Kleitman & Kosta, 2014	0.150	0.011	0.283	2.116	0.034	199
agreeableness	Kelly, 2005	0.190	-0.002	0.368	1.943	0.052	105
agreeableness	Douglas, Bore, & Munroe, 2016	0.151	0.042	0.256	2.718	0.007	322
agreeableness	Choi & Moran, 2009	-0.023	-0.167	0.122	-0.310	0.756	185
agreeableness	Bajec, 2019	0.085	0.008	0.161	2.159	0.031	645
agreeableness	Bidjerano et al., 2007	0.180	0.049	0.305	2.675	0.007	219
agreeableness	Bisson et al., 2015	0.091	0.036	0.145	3.244	0.001	1267
agreeableness	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.220	0.099	0.335	3.515	0.000	250
		0.169	0.091	0.244	4.234	0.000	4562

Figure 50: Time management and agreeableness forest plot

Time management and extraversion

Outcome	Studyname	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total
extraversion	Munt & Merydith, 2012	0.110	-0.024	0.240	1.612	0.107	216
extraversion	MacCann, Fogarty, & Roberts, 2012	0.030	-0.053	0.113	0.706	0.480	556
extraversion	Liu, Rijmen, MacCann, & Roberts, 2009	-0.040	-0.108	0.029	-1.140	0.254	814
extraversion	Kleitman & Kosta, 2014	0.490	0.377	0.589	7.505	0.000	199
extraversion	Kelly, 2005	0.050	-0.143	0.239	0.505	0.613	105
extraversion	Douglas, Bore, & Munroe, 2016	0.126	0.017	0.232	2.262	0.024	322
extraversion	Choi & Moran, 2009	0.157	0.013	0.295	2.136	0.033	185
extraversion	Bond & Feather, 1988	0.023	-0.084	0.130	0.420	0.675	336
extraversion	Bajec, 2019	0.110	0.033	0.186	2.798	0.005	645
extraversion	Bidjerano et al., 2007	0.010	-0.123	0.142	0.147	0.883	219
extraversion	Bisson et al., 2015	0.079	0.024	0.133	2.815	0.005	1267
extraversion	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.100	-0.024	0.221	1.577	0.115	250
extraversion	Van Hoye & Lootens, 2013	0.115	-0.014	0.241	1.744	0.081	231
		0.102	0.039	0.164	3.173	0.002	5345

Figure 51: Time management and extraversion forest plot

Time management and conscientiousness

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
conscientiousness	White, James, Burke, & Allen, 2012	0.750	0.633	0.833	8.426	0.000	78	
conscientiousness	MacCann, Fogarty, & Roberts, 2012	0.760	0.723	0.793	23.427	0.000	556	
conscientiousness	Liu, Rijmen, MacCann, & Roberts, 2009	0.650	0.608	0.688	22.079	0.000	814	
conscientiousness	Kleitman & Kosta, 2014	0.270	0.136	0.394	3.876	0.000	199	
conscientiousness	Kelly, 2005	0.700	0.587	0.786	8.759	0.000	105	
conscientiousness	Gevers et al., 2015	0.498	0.343	0.627	5.655	0.000	110	
conscientiousness	Douglas, Bore, & Munroe, 2016	0.471	0.381	0.552	9.133	0.000	322	
conscientiousness	Claessens, Van Eerde, Rutte, & Roe, 2010	0.000	-0.367	0.367	0.000	1.000	29	
conscientiousness	Choi & Moran, 2009	0.284	0.146	0.411	3.940	0.000	185	
conscientiousness	Bajec, 2019	0.347	0.277	0.413	9.173	0.000	645	
conscientiousness	Bidjerano et al., 2007	0.360	0.239	0.470	5.539	0.000	219	
conscientiousness	Bisson et al., 2015	0.261	0.209	0.312	9.499	0.000	1267	
conscientiousness	Burrus et al, 2017	0.057	-0.105	0.216	0.689	0.491	149	
conscientiousness	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.450	0.345	0.544	7.618	0.000	250	
conscientiousness	Van Hoye & Lootens, 2013	0.387	0.271	0.492	6.165	0.000	231	
		0.451	0.326	0.561	6.428	0.000	5159	

Favours A   Favours B

Figure 52: Time management and conscientiousness forest plot

Time management and neuroticism

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
neuroticism	Van Eerde, 2003	-0.290	-0.580	0.065	-1.608	0.108	32	
neuroticism	MacCann, Fogarty, & Roberts, 2012	-0.230	-0.307	-0.150	-5.507	0.000	556	
neuroticism	Liu, Rijmen, MacCann, & Roberts, 2009	-0.220	-0.284	-0.154	-6.369	0.000	814	
neuroticism	Kelly, 2005	-0.150	-0.332	0.043	-1.526	0.127	105	
neuroticism	Douglas, Bore, & Munroe, 2016	-0.138	-0.244	-0.029	-2.481	0.013	322	
neuroticism	Claessens, Van Eerde, Rutte, & Roe, 2010	0.110	-0.267	0.458	0.563	0.573	29	
neuroticism	Choi & Moran, 2009	0.105	-0.040	0.246	1.422	0.155	185	
neuroticism	Bond & Feather, 1988	-0.338	-0.429	-0.240	-6.420	0.000	336	
neuroticism	Bajec, 2019	-0.122	-0.197	-0.045	-3.107	0.002	645	
neuroticism	Bidjerano et al., 2007	-0.080	-0.210	0.053	-1.178	0.239	219	
neuroticism	Bisson et al., 2015	0.035	-0.020	0.090	1.245	0.213	1267	
neuroticism	George et al., 2008	-0.360	-0.467	-0.242	-5.691	0.000	231	
neuroticism	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	-0.080	-0.202	0.045	-1.260	0.208	250	
neuroticism	Van Hoye & Lootens, 2013	-0.243	-0.361	-0.118	-3.744	0.000	231	
		-0.151	-0.229	-0.072	-3.719	0.000	5222	

Favours A   Favours B

Figure 53: Time management and neuroticism forest plot

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Time management and openness

Study name		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total
openness	MacCann, Fogarty, & Roberts, 2012	0.110	0.027	0.191	2.597	0.009	556
openness	Liu, Rijmen, MacCann, & Roberts, 2009	0.350	0.288	0.409	10.407	0.000	814
openness	Kleitman & Kosta, 2014	0.420	0.298	0.528	6.268	0.000	199
openness	Kelly, 2005	0.150	-0.043	0.332	1.526	0.127	105
openness	Douglas, Bore, & Munroe, 2016	0.035	-0.075	0.144	0.625	0.532	322
openness	Choi & Moran, 2009	0.124	-0.021	0.264	1.682	0.093	185
openness	Bajec, 2019	0.178	0.102	0.252	4.559	0.000	645
openness	Bidjerano et al., 2007	0.190	0.059	0.315	2.827	0.005	219
openness	Bisson et al., 2015	-0.065	-0.120	-0.010	-2.314	0.021	1267
openness	Zivcic-Becirevic, Smojver-Azic, & Dorcic, 2017	0.000	-0.124	0.124	0.000	1.000	250
openness	Van Hoye & Lootens, 2013	0.038	-0.092	0.166	0.574	0.566	231
		0.141	0.037	0.243	2.649	0.008	4793

Figure 54: Time management and openness forest plot

Time management and locus of control

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total
locus of control	Nonis & Sager, 2003	0.281	0.148	0.404	4.063	0.000	201
locus of control	Boniwell, 2005	0.343	0.204	0.468	4.661	0.000	173
locus of control	Lapierre et al., 2012	0.410	0.289	0.518	6.191	0.000	205
		0.346	0.269	0.419	8.297	0.000	579

Figure 55: Time management and internal locus of control forest plot

Time management and Type A

Outcome		Study name	Correlation and 95% CI			
Correlation	Lower limit	Upper limit		Z-Value	p-Value	Total
0.140 typeA	0.025	0.252	Macan, Shahani, Dipboye, & Phillips, 1990	2.379	0.017	288
0.103 typeA	0.018	0.187	Macan, 1994	2.371	0.018	529
0.090 typeA	-0.005	0.184	Macan, Gibson, & Cunningham, 2010	1.854	0.064	425
0.063 typeA	-0.073	0.197	Conte, Rizzuto, & Steiner, 1999	0.905	0.365	209
0.236 typeA	0.068	0.391	Conte, Mathieu, & Landy, 1998	2.732	0.006	132
0.262 typeA	0.169	0.350	Bond & Feather, 1988	5.412	0.000	410
-0.103 typeA	-0.200	-0.004	Mudrack, 1999	-2.047	0.041	395
0.110	0.017	0.202		2.309	0.021	2388

Figure 56: Time management and Type A personality forest plot

Time management and self-esteem

Outcome		Study name	Correlation and 95% CI			
Correlation	Lower limit	Upper limit		Z-Value	p-Value	Total
0.317 self-esteem	0.227	0.402	Bond & Feather, 1988	6.623	0.000	410
0.250 self-esteem	0.125	0.367	George et al., 2008	3.857	0.000	231
0.456 self-esteem	0.362	0.540	Waters & Muller, 2003	8.569	0.000	306
0.346	0.225	0.456		5.372	0.000	947
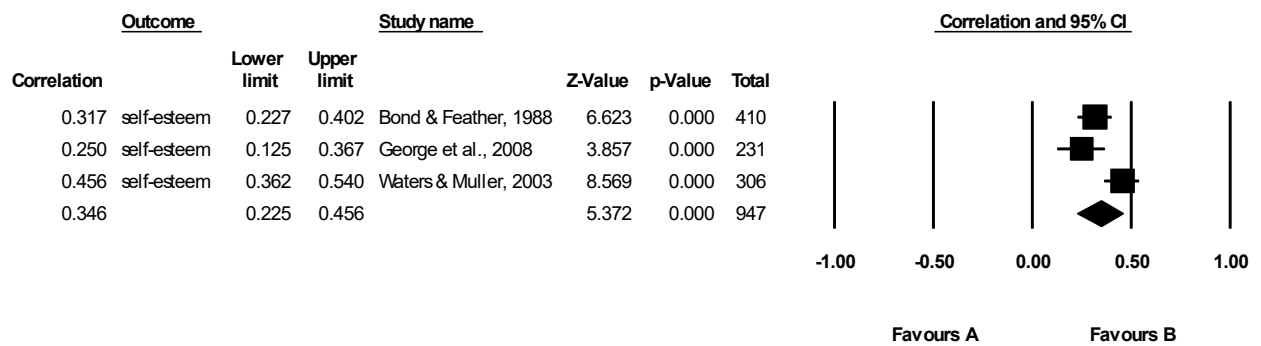
Figure 57: Time management and self-esteem forest plot

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Time management and Protestant Work Ethic

Outcome		Study name	Statistics for each study					Correlation and 95% CI
Correlation			Lower limit	Upper limit	Z-Value	p-Value	Total	
0.049	protestant work ethic	Mudrack, 1997	-0.071	0.168	0.797	0.426	267	
0.026	protestant work ethic	Bond & Feather, 1988	-0.081	0.133	0.475	0.635	336	
0.010	protestant work ethic	Mudrack, 1999	-0.089	0.109	0.198	0.843	395	
0.026			-0.036	0.088	0.812	0.417	998	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B
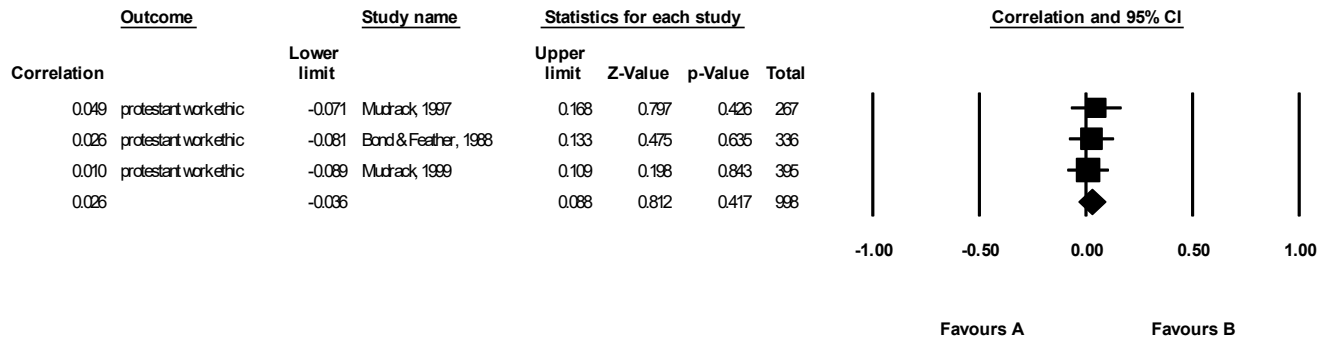
Figure 58: Time management and Protestant Work Ethic forest plot

Time management and multitasking

Outcome	Study name	Statistics for each study						Correlation and 95% CI
		Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	
multitasking	Yang & Zhu, 2015	-0.180	-0.286	-0.070	-3.189	0.001	310	
multitasking	Nonis, Teng, & Ford, 2005	-0.075	-0.252	0.107	-0.806	0.420	118	
multitasking	Gevers et al., 2015	-0.056	-0.241	0.133	-0.580	0.562	110	
multitasking	Conte, Rizzuto, & Steiner, 1999	-0.104	-0.236	0.032	-1.498	0.134	209	
multitasking	Choi & Moran, 2009	0.033	-0.112	0.176	0.445	0.656	185	
		-0.088	-0.164	-0.010	-2.215	0.027	932	

-1.00   -0.50   0.00   0.50   1.00

Favours A   Favours B

Figure 59: Time management and multitasking forest plot

Time management and job autonomy

Outcome	Study name	Correlation	Lower limit	Upper limit	Z-Value	p-Value	Total	Correlation and 95% CI
jobautonomy	Peeters & Rutte, 2005	0.050	-0.128	0.225	0.548	0.584	123	
jobautonomy	Macan, 1994	-0.035	-0.120	0.050	-0.803	0.422	529	
jobautonomy	Claessens, Van Eerde, Rutte, & Roe, 2010	0.335	-0.036	0.625	1.777	0.076	29	
jobautonomy	Claessens, Van Eerde, Rutte & Roe, 2004	0.255	0.021	0.462	2.134	0.033	70	
		0.101	-0.060	0.256	1.229	0.219	751	

Favours A   Favours B

Figure 60: Time management and job autonomy forest plot

Time management and role overload

Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
-0.120	role overload	-0.232	-0.004	Macan, Shahani, Dipboye, & Phillips, 1990	-2.036	0.042	288	
0.260	role overload	0.063	0.438	Lang, 1992	2.566	0.010	96	
-0.360	role overload	-0.646	0.015	Lambert, Torres, & Tummons, 2012	-1.884	0.060	28	
-0.154	role overload	-0.236	-0.069	Jex & Elacqua, 1999	-3.547	0.000	525	
-0.350	role overload	-0.473	-0.214	Hafner, Stock, Pinneker, & Strohle, 2014	-4.821	0.000	177	
-0.331	role overload	-0.654	0.094	Hafner, Stock, & Oberst, 2015	-1.538	0.124	23	
-0.100	role overload	-0.368	0.183	Burt & Kemp, 1994	-0.688	0.492	50	
-0.146		-0.284	-0.003		-1.997	0.046	1187	

Favours A   Favours B

Figure 61: Time management and job overload forest plot

Time management and time management training

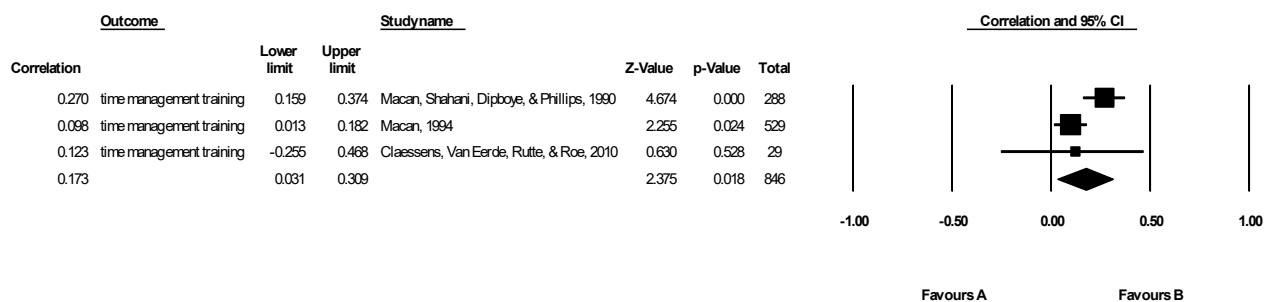| Correlation	Outcome	Lower limit	Upper limit	Study name	Z-Value	p-Value	Total	Correlation and 95% CI
0.270	time management training	0.159	0.374	Macan, Shahani, Dipboye, & Phillips, 1990	4.674	0.000	288	
0.098	time management training	0.013	0.182	Macan, 1994	2.255	0.024	529	
0.123	time management training	-0.255	0.468	Claessens, Van Eerde, Rutte, & Roe, 2010	0.630	0.528	29	
0.173		0.031	0.309		2.375	0.018	846	

Favours A   Favours B

Figure 62: Time management and time management training forest plot