



A review of the time management literature

Time
management
literature

Brigitte J.C. Claessens, Wendelien van Eerde and Christel G. Rutte
Technische Universiteit Eindhoven, Eindhoven, The Netherlands, and

Robert A. Roe
Universiteit Maastricht, Maastricht, The Netherlands

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Abstract

Purpose – The purpose of this article is to provide an overview for those interested in the current state-of-the-art in time management research.

Design/methodology/approach – This review includes 32 empirical studies on time management conducted between 1982 and 2004.

Findings – The review demonstrates that time management behaviours relate positively to perceived control of time, job satisfaction, and health, and negatively to stress. The relationship with work and academic performance is not clear. Time management training seems to enhance time management skills, but this does not automatically transfer to better performance.

Research limitations/implications – The reviewed research displays several limitations. First, time management has been defined and operationalised in a variety of ways. Some instruments were not reliable or valid, which could account for unstable findings. Second, many of the studies were based on cross-sectional surveys and used self-reports only. Third, very little attention was given to job and organizational factors. There is a need for more rigorous research into the mechanisms of time management and the factors that contribute to its effectiveness. The ways in which stable time management behaviours can be established also deserves further investigation.

Practical implications – This review makes clear which effects may be expected of time management, which aspects may be most useful for which individuals, and which work characteristics would enhance or hinder positive effects. Its outcomes may help to develop more effective time management practices.

Originality/value – This review is the first to offer an overview of empirical research on time management. Both practice and scientific research may benefit from the description of previous attempts to measure and test the popular notions of time management.

Keywords Time measurement, Training, Control, Job satisfaction, Performance management

Paper type Literature review

During the last two decades, there has been a growing recognition of the importance of time in the organizational literature. According to Orlikowsky and Yates (2002), the temporal dimension of work has become more important because of expanding global competition and increased demands for immediate availability of products and services. Garhammer (2002) has pointed at the increased pace of life shown in doing things faster (acceleration), contracting time expenditure (e.g. eat faster, sleep less), and compressing actions (making a phone call while having lunch). Other studies have examined the perception of time in organizational contexts (e.g. Palmer and Schoorman, 1999) and the experience of time pressure among employees (e.g. Jackson and Martin, 1996; Major *et al.*, 2002; Teuchmann *et al.*, 1999).



The increasing salience of time is reflected in theoretical as well as practical publications. A number of authors discussed the need for better incorporating time in theoretical models and research designs (e.g. Ancona *et al.*, 2001; George and Jones, 2000; Wright, 2002). Others focused on the ways in which people in organizations manage their time, and on ways in which these efforts can be improved (e.g. Macan, 1994). In this article we will address time from the second perspective, and review the empirical studies on time management. More specifically, we will review definitions of time management, discuss methods for studying time management, summarize empirical findings on time management and the use and effectiveness of time management methods, identify gaps in the current research literature, and give suggestions for future research.

The interest in time management is by no means new. The problem of how to manage time was already discussed in the 1950s and 1960s, and several authors proposed methods on how to handle time issues on the job (e.g. Drucker, 1967; Lakein, 1973; Mackenzie, 1972; McCay, 1959). They suggested simple remedies such as writing work plans down on paper (so-called “to-do lists”) in order to increase job performance. At the same time, some authors (e.g. Drucker, 1967) recognized that planning tasks and activities does not always lead to the completion of planned work, especially when time pressure is high.

McCay (1959) developed a concept for a time-management training program, which is still being used. Critical elements are: giving insight into time-consuming activities, changing time expenditure, and increasing workday efficiency by teaching people how to make a daily planning, how to prioritise tasks, and how to handle unexpected tasks. Many books and articles were written to convey these and similar ideas to managers, promising them a greater effectiveness while using less time (e.g. Blanchard and Johnson, 1982). Over the years the focus of time management publications and training courses has shifted from managers as the major target group to a broad audience of working people. The term “time management” is actually misleading. Strictly speaking, time cannot be managed, because it is an inaccessible factor. Only the way a person deals with time can be influenced. Time management can be viewed as a way of monitoring and controlling time (e.g. Eilam and Aharon, 2003). In this regard, it would be more appropriate to speak about self-management with regard to the performance of multiple tasks within a certain time period. But in the literature, the term self-management has a different meaning. It refers to monitoring and regulating oneself, but without any specific reference to techniques for monitoring time use. Therefore, we will stick to the use of the term time management in the present paper.

In spite of all popular attention to managing time, relatively little research has been conducted on the processes involved in using one’s time effectively (e.g. by using “prime time” to carry out important tasks) and completing work within deadlines. In 1987, a review was published that addressed the increasing popularity of time management (Richards, 1987). It discussed the principles mentioned by authors like McCay (1959) and concluded that, for instance, setting life goals and keeping time logs were important techniques for effectively managing one’s time. Although this article was helpful in understanding the ideas behind the notion of time management, it was not a review of empirical time management studies. In fact, to our knowledge, no reviews of empirical research of time management have been published since the article by Richards (1987). Therefore, the first aim of the present study is to review past

empirical studies on time management and to determine the state-of-the-art in this area of research. We will review the way in which researchers have incorporated time management concepts and methods in their research and critically discuss the research designs they used. Questions to be addressed are: What is time management behaviour? What are its antecedents? What is its impact on outcome variables, such as health and job performance? Our second aim is to determine in which areas more research is needed to extend the present knowledge of time management and the processes involved.

Method

Selection of studies

Empirical studies on time management published between 1954 (when time management was introduced) and 2005 were found through PsycInfo, Sociofile, and references of past studies. Query terms included time management, time use, time allocation, and time structuring. A first criterion for the selection of studies was that time management had been related to academic or work situations. Quite a few studies dealt with topics like rehabilitation after an injury or accident, geriatric afflictions, and other medical conditions (for example, Sakelaris, 1999), which fell outside the scope of our study. The second criterion was that time management behaviour or attitudes had been measured by means of instruments constructed for this purpose. In some studies (e.g. Sweidel, 1996), time management was measured post hoc by combining some items that were more or less related to time management, rather than by means of validated scales to measure time management. Results were therefore questionable and were not included in this review study.

Using these two criteria, 35 empirical studies were selected for inclusion in this review. We will discuss these studies by presenting the theoretical contributions made, the definition of time management used, the measurement scales, the results, gaps in research, and suggestions for future research.

Results

Table I describes the studies included in this review in terms of: author(s) and publication year, the methods used, the samples, the measures of time management, and the variables involved.

As can be seen in Table I, we found no empirical studies published before 1982. Obviously, time management has made its way into the literature without being accompanied by empirical research. The number of respondents in the studies ranged from four to 701, with an average of 90. Three types of research groups were included, i.e:

- (1) employees of different organizations (social service agencies, car dealers);
- (2) students following psychology classes; and
- (3) employees with double workload, that is, working full-time while studying part-time, or working full-time and running a household with children.

The majority of respondents were recruited among students in psychology classes. Research methods included self-report questionnaires, diaries, and experiments.

Table I.
Time management
studies in the review

Author	Method	Sample	Time management measure	Variables included in the study
1. Adams and Jex (1997)	Survey	522 employed adults	TMBS	Test of factor structure of TMBS
2. Adams and Jex (1999)	Survey	522 employed adults	TMBS	Time management behaviours, perceived control of time, W-F conflict, job satisfaction, health
3. Bond and Feather (1988)	Survey	3 samples: 312, 160 and 211 students	TSQ	Time structure, self-esteem, depression, psychological distress, state anxiety, trait anxiety, neuroticism, extraversion, health, physical symptoms, hopelessness, type A behaviour
4. Barling <i>et al.</i> (1996)	Survey	102 car salespersons	Short version TMQ	Short-range planning, long-range planning, achievement striving, sales performance, years of sales experience
5. Britton and Tesser (1991)	Survey	90 freshman and sophomore under-graduates in psychology class	TMQ	Short-range planning, long-range planning, time attitudes, grade point average, scholastic aptitude test
6. Burt and Kemp (1994)	Study 1: experiment Study 2: survey	Study 1: 100 students Study 2: 50 students	Activity planning, TSQ	Study 1: expected, retrospective, and actual task duration
7. Claessens <i>et al.</i> (2004)	Survey, longitudinal	70 R&D engineers	Planning scale	Study 2: time structure, role overload, activity duration, academic performance
8. Davis (2000)	Survey	Women working in 14 different nursing homes	TMBS	Planning, perceived control of time, work strain, job satisfaction, and job performance
9. Eilam and Aharon (2003)	Intervention study, observations, and video recordings	33 students	Yearly and daily planning reports	Time management behaviours, job-induced tension, somatic tension, job satisfaction, experience, performance
10. Francis-Smythe and Robertson (1999a)	Experiment, survey	48 students or employees	TMBS, TSQ	Planning tasks, awareness of discrepancies between suggested versus enacted work (monitoring), and readjusting plans over time Expected task duration, retrospective and prospective tasks, time management behaviours, time structure

(continued)

Author	Method	Sample	Time management measure	Variables included in the study
11. Green and Skinner (2005)	Survey	232 employed adults (134 also follow up measurement)	Key Skills Questionnaire developed for the study several time management skills TMBS	Time management skills, time culture, stress, work home balance
12. Griffiths (2003)	Survey	120 central office employees or teleworkers		Time management behaviours, self-reward, self-punishment, job productivity, job satisfaction, work-family conflict, stress, positive and negative affectivity, conscientiousness
13. Hall and Hirsch (1982)	Diary study	4 members of faculty and staff at a university	An activity log and short survey	Time spent on high-priority tasks, feelings of effectiveness, satisfaction
14. Jex and Elacqua (1999)	Survey	525 employees of a variety of organizations or part-time students	TMBS	Time management behaviours, role conflict, role overload, W-F conflict, strain, feelings of control over time
15. Kaufman-Scarborough and Lindquist (1999)	Survey	112 participants (of which 95 workers)	TSQ	Time structure, polychronicity
16. Kelly (2002)	Survey	130 undergraduate students	TMBS, TSQ	Time management behaviours, perceived control of time, time structure, worry
17. King <i>et al.</i> (1986)	Survey, intervention	56 participants	Time management scale	Knowledge of time management, high-priority tasks, self-monitoring of working on high-priority tasks, self-efficacy, social support, stress, life events, spouse reports
18. Koolhaas <i>et al.</i> (1992)	Survey	469 personnel officers	PTP'90 (Dutch scale)	Optimism, saving, here and now, past, rush, vagueness, timeliness, personal growth
19. Lang (1992)	Survey	96 undergraduate students	Time management coping scale	Time management behaviour, coping, strain, somatic complaints

(continued)

Table I.

Author	Method	Sample	Time management measure	Variables included in the study
20. Lay and Schouwenburg (1993)	Survey	65 psychology students	Short version of TMBS	Trait procrastination, agitation, dejection
21. Macan <i>et al.</i> (1990)	Survey	353 employees of two organizations	TMBS	Time management behaviours, perceived control of time, role ambiguity, role overload, job-induced tension, somatic tension, job satisfaction, Type A-B behaviour, job performance
22. Macan (1994)	Survey	Study 1: 353 employees of 2 organizations Study 2: 341 students	TMBS	Time management behaviours, job satisfaction, job performance
23. Macan (1996)	Survey, intervention study	38 employees from a social service agency	TMBS	Time management behaviours, stress, job satisfaction, job performance
24. Mudrack (1997)	Survey	701 adults for TSQ 207 adults for TMBS	TMBS, TSQ	Test of psychometric qualities of TSQ and TMBS
25. Orpen (1994)	Diary study	96 undergraduate students	Time management scale created for the study	Time management behaviour, experienced overload, anxiety, depression, somatisation, social desirability
26. Peeters and Rutte (2005)	Survey	123 elementary school teachers	Short version of TMBS	Burnout, emotional exhaustion, personal accomplishment
27. Shahani <i>et al.</i> (1993)	Survey	Study 1: 93 undergraduate students Study 2: 106 undergraduate students	1: TMBS, TSQ 2: TMBS	1: Time management behaviours, immediate time pressure, long-term personal direction (goal), time utilization, time anxiety, time submissiveness, time possessiveness, greedy attitude towards time 2: Comprehensibility of life, manageability of life, meaningfulness of life, high/low academic pressure
28. Simons and Galotti (1992)	Survey, intervention study, and diary study	Study 1: 88 undergraduate students	Planning survey	Planning practices, goal setting, prioritising, accomplishment scheduling

(continued)

Author	Method	Sample	Time management measure	Variables included in the study
29. Slaven and Totterdell (1993)	Survey, diary study, interviews, and intervention	Study 2: 39 undergraduate psychology students 34 delegates of two time management training courses	Evaluation of management training, executives time management inventory	Work commitment, internal work motivation, work environment factors
30. Strongman and Burt (2000)	Survey, diary study	Study 1: 101 first year students Study 2: 17 students 293 students	Study 1: TSQ Study 2: diary TMQ	Time structure, procrastination, role overload, self-esteem, breaks
31. Trueman and Hartley (1996)	Survey	37 trainees in time management workshops and 14 participants in control group	Short version of TMBS	Daily planning, confidence in long-term planning, age, academic performance
32. Van Eerde (2003)	Survey	115 students	TSQ	TMB, time management training, emotional stability, worrying, avoidance reactions, training motivation
33. Vodanovich and Seib (1997)	Survey	204 psychology students	TMQ	Time structure, procrastination
34. Williams <i>et al.</i> (1995)	Survey	81 beginning teachers	Evaluation time management training, self-reports about time management skills	Time management, personality types
35. Woolfolk and Woolfolk (1986)	Experiment, survey, and intervention			Tasks that need to be finished (with different deadlines and measurement of meeting deadlines), self-report and external ratings of use of time management

Table I.

Definitions of time management

There is no agreement on the definition of time management in past studies. Although many authors referred to Lakein (1973), who suggested that time management involves the process of determining needs, setting goals to achieve these needs, prioritising and planning tasks required to achieve these goals, several other definitions were suggested. Thus, time management has been referred to as: techniques for managing time (Jex and Elacqua, 1999; Davis, 2000; Macan, 1994, 1996; Macan *et al.*, 1990; Mudrack, 1997); a technique for effective time use, especially having enough time to accomplish the many tasks required (Orpen, 1994; Slaven and Totterdell, 1993; Woolfolk and Woolfolk, 1986); planning and allocating time (Burt and Kemp, 1994; Francis-Smythe and Robertson, 1999a); the degree to which individuals perceive their use of time to be structured and purposive (Bond and Feather, 1988; Strongman and Burt, 2000; Sabelis, 2001; Vodanovich and Seib, 1997); a way of getting insight into time use (Koolhaas *et al.*, 1992); a technique to increase the time available to pursue activities (King *et al.*, 1986); practices intended to maximize intellectual productivity (Britton and Tesser, 1991); an application of self-regulation processes in the temporal domain (Griffiths, 2003); coping behaviour in at-risk populations (King *et al.*, 1986); self-regulation strategies aimed at discussing plans, and their efficiency (Eilam and Aharon, 2003); the use of procedures that are designed to help the individual to achieve his or her desired goals (Hall and Hursch, 1982); ways to assess the relative importance of activities through the development of a prioritisation plan (Kaufman-Scarborough and Lindquist, 1999); clusters of behaviour that are deemed to facilitate productivity and alleviate stress (Lay and Schouwenburg, 1993). Some authors gave no definition at all (Barling *et al.*, 1996; Simons and Galotti, 1992; Trueman and Hartley, 1996).

Besides time management, other terms, such as time structure (Bond and Feather, 1988), were used interchangeably with essentially the same meaning. Because a commonly accepted definition of the concept was lacking, we found it difficult to determine the exact content of time management in past research, to describe the current state of affairs, and to identify which parts are responsible for what results.

Based on the literature, we suggest a definition of time management as “behaviours that aim at achieving an effective use of time while performing certain goal-directed activities”. This definition highlights that the use of time is not an aim in itself and cannot be pursued in isolation. The focus is on some goal-directed activity, such as performing a work task or an academic duty, which is carried out in a way that implies an effective use of time.

These behaviours comprise:

- Time assessment behaviours, which aim at awareness of here and now or past, present, and future (Kaufman *et al.*, 1991) and self-awareness of one’s time use (attitudes, cognitions, e.g. Wratcher and Jones, 1988), which help to accept tasks and responsibilities that fit within the limit of one’s capabilities.
- Planning behaviours, such as setting goals, planning tasks, prioritising, making to-do lists, grouping tasks (e.g. Britton and Tesser, 1991; Macan, 1994, 1996) which aim at an effective use of time.

- Monitoring behaviours, which aim at observing one's use of time while performing activities, generating a feedback loop that allows a limit to the influence of interruptions by others (e.g. Fox and Dwyer, 1996; Zijlstra *et al.*, 1999).

Measurement instruments used

Past studies have mainly used self-report questionnaires. There were only a few diary studies and experiments. In total, ten different types of self-report questionnaires were used to measure time management behaviours, three types of which were used more often. These questionnaires are:

- (1) the time management behaviour scale (TMBS, Macan *et al.*, 1990);
- (2) the time structure questionnaire (TSQ, Bond and Feather, 1988); and
- (3) the time management questionnaire (TMQ, Britton and Tesser, 1991).

The TMBS was constructed by Macan *et al.* (1990), and was based on a list of popularised concepts of time management behaviours examined by factor analysis. The subscales were: setting goals and priorities, mechanics of time management (e.g. making to-do lists), preference for organization (e.g. having a preference for an orderly way of working), and perceived control of time. Reliability levels were moderate and differed greatly among different studies (see, for instance, Davis, 2000). In her study in 1994, Macan argued that perceived control of time was actually an outcome variable of time management behaviours, and should not be considered part of the TMBS.

Adams and Jex (1997) tested the underlying factor structure of the TMBS using confirmatory factor analysis and found additional evidence for a three-factor solution, although they included only 28 of the 33 original items. Shahani *et al.* (1993) investigated the convergent validity of the TMBS by examining the relationships with three other scales (including the TSQ). They found that the TMBS factors were significantly correlated with the other scales and concluded that the TMBS had convergent validity. They stated that the TMBS is the most elaborately validated scale to measure time management behaviours. The studies that included the TMBS did not present all information on the internal consistency of the scales (e.g. Adams and Jex, 1997). Those who did present coefficient alphas found that they ranged from 0.50 to 0.90 (Adams and Jex, 1999; Davis, 2000; Francis-Smythe and Robertson, 1999a; Macan *et al.*, 1990; Macan, 1994; Mudrack, 1997; Shahani *et al.*, 1993). The lowest coefficients alphas were found for the preference for organization-scale (0.50, 0.60, 0.68, 0.70, and 0.83, respectively).

The TSQ was constructed by Bond and Feather (1988) and consists of items referring to the extent to which time is used in a structured and purposeful way. Factor analysis on the items of the TSQ revealed six factors, but only five could be named, i.e. sense of purpose, structured routine, present orientation, effective organization, and persistence. Bond and Feather (1988) claimed that the TSQ meets the usual psychometric criteria for further use as a research instrument, and concluded that the scale had face validity. Although the internal consistency of the total TSQ score in the three samples amounted to 0.88, 0.92, and 0.91 respectively, the internal consistency for the subscales ranged from 0.55 to 0.75. A total of eight other studies included the TSQ and found internal consistencies ranging from 0.66 to 0.75.

Mudrack (1997) compared the TMBS and the TSQ psychometrically and suggested to use shortened versions of both scales. His goal was to establish whether the factor structures of the TSQ en TMBS could be accurately replicated and whether a shorter scale would be acceptable. The coefficient alpha of both the TSQ and TMBS scales equalled or exceeded 0.70, with small differences between the original and shortened form. Based upon these findings, Mudrack (1997) recommended using a 20-item version (versus 26 original items) of the TSQ and a 26-item version (versus 46 original items) of the TMBS.

The TMQ was constructed by Britton and Tesser (1991) and included items on attitudes towards time management (e.g. “do you feel you are in charge of your own time, by and large?”) and planning the allocation of time. The scale consisted of three factors, namely short-range planning, long-range planning, and time attitudes, which together accounted for 36 percent of the variance. Williams *et al.* (1995) included all three scales in a study but did not present internal consistency values or other psychometric information about the TMQ. Barling *et al.* (1996) used shortened forms of two scales, short-range and long-range planning, and conducted a confirmatory factor analysis. They found that a two-factor solution fitted their data reasonably well, producing coefficients alpha of 0.85 and 0.73, respectively. Trueman and Hartley (1996) used 14 items of the original 18-item TMQ and identified two subscales, namely daily planning and confidence in long-term planning, with coefficient alpha 0.85 and 0.71, respectively.

A common feature of the time management measures is that each includes items that refer to planning behaviour. The TMBS subscale “setting goals and priorities”, the TSQ factor “structured routine”, the TMQ subscales “short-range planning” and “long-range planning” all refer to planning tasks and activities. Other time management measures covered by this review also included planning behaviour items relating, for instance, to yearly and daily planning reports (Eilam and Aharon, 2003), using an activity log (Hall and Hursch, 1982), and setting goals, following priorities, scheduling, organizing and planning (Lang, 1992).

As for reliability and construct validity, the existing time management measures can clearly be improved. So far, most support was found for the TMBS (Macan, 1994) as a psychometrically reasonable sound measure for studying time management behaviour. However, it is not an ideal measure because of the variability of internal consistency values and inconsistencies in findings with respect to the relations between the subscales and outcomes measures, which will be discussed next.

Time management theory

Not only a definition, but also a theory on time management is lacking. The question “how does time management work and why?” is still unanswered. Only Macan (1994) presented a model of time management that comprised antecedent, mediating, and outcome variables with respect to time management behaviours. Macan (1994) stated that time management training programs lead to three types of time management behaviours:

- (1) setting goals and priorities;
- (2) mechanics of time management; and
- (3) preference for organization.

She hypothesized that these behaviours would result in perceived control of time, or the feeling of having control over one's time. Furthermore, perceived control of time was hypothesized to mediate between the time management behaviours and job-induced and somatic tension, job satisfaction, and job performance. Results showed that time management training was positively related to only one scale of the time management behaviours, goal setting and priorities. Setting goals and priorities and the mechanics of time management were positively related to perceived control of time, whereas preference for organization was not. Job-induced and somatic tension was negatively related, and job satisfaction was positively related to time management behaviour and mediated by perceived control of time. Perceived control of time was not significantly related to job performance. These results imply that by implementing time management techniques, one is able to experience control over what can be done within workday time. This feeling in turn has a positive effect on job satisfaction, and job-induced and somatic tensions.

Three replication studies (Adams and Jex, 1999; Davis, 2000; Jex and Elacqua, 1999) provided only partial support to Macan's (1994) model. Jex and Elacqua (1999) found that perceived control of time partially mediated the relations between goal setting and prioritising, and preference for organization on the one hand, and strain on the other hand. Adams and Jex (1999) found that perceived control of time mediated between setting goals and priorities, mechanics of time management, and preference for organization on the one hand, and health and job satisfaction on the other hand. Setting goals and priorities and preference for organization were positively related to perceived control, whereas mechanics of time management were negatively related to perceived control of time. Davis (2000) found that perceived control of time only acted as a mediator in the relation between preference for organization and the outcome variables job related tension, somatic tension, and job satisfaction. Claessens *et al.* (2004) used a different time management scale to test the mediation model over time. A planning scale was used instead. This study also revealed partial mediation of control of time.

In conclusion, these studies found some support for Macan's (1994) process model that hypothesised perceived control of time to fully mediate between time management behaviours and job- and person-related outcomes.

As for the relationship between particular time management behaviours and outcomes, it was found that planning showed most significant results. Bond and Feather (1988) for instance, found that the TSQ factor "sense of purpose" accounted for most of the variance in the total TSQ score and was therefore identified as the most important factor of the TSQ. Macan (1994) found that the subscale "goal setting and prioritising" was significantly related to outcomes such as perceived control of time and job satisfaction. Britton and Tesser (1991) found a positive relation between short-range planning and grade point average of students, whereas long-range planning was unrelated. They stated that short-range planning was a more effective time management technique than long-range planning because plans could be adjusted to fast changes or unpredictable situations, which allowed for flexibility.

Antecedents of time management

Only a few studies have investigated antecedents of time management behaviour. Yet, it is quite likely that certain personality traits act as antecedents of time management. Also, as is suggested by Macan's (1994) model, time management training is a likely

antecedent of time management behaviour. To our knowledge, six studies focused on possible dispositional antecedents of time management, whereas eight studies investigated the effects of time management training.

Dispositional characteristics. The study of Bond and Feather (1988) included many possible antecedent variables, such as neuroticism and extraversion, related to time structure or time management. Bond and Feather (1988) found that time structure (total TSQ score) was positively related to sense of purpose in life, self-esteem, and type A behaviour, and negatively to neuroticism and anomie (i.e. the individual's generalized sense of self-to-others alienation (Bond and Feather, 1988, p. 323)).

Francis-Smythe and Robertson (1999b) introduced a five-factor scale of time personality (time personality indicator, TPI), four of which are work-related: Punctuality, Planning, Polychronicity, and Impatience. Planning for instance, was operationalised as an attitude towards planning and structuring tasks in advance. This study was conducted to examine the dimensions of time personality, rather than examine the relation between with behaviour and outcomes. However, the authors suggested that people who obtain high scores on punctuality, planning, and polychronicity might have a higher need for controlling the situation and use these attitudes to achieve control.

Lay and Schouwenburg (1993) studied the relation between trait procrastination, i.e. the habitual tendency to avoid the start and completion of tasks, and time management. They found that people high on trait procrastination exhibited a greater likelihood of being behind schedule on their personal projects, studying fewer hours than intended for an examination, and having low scores on feeling in control of time, setting goals and priorities. They also used fewer time management techniques.

Shahani *et al.* (1993) examined the relation between time management behaviours and sense of coherence, a construct that is assumed to reduce vulnerability to stress. They also studied the stability of time management behaviours under varying levels of academic stress. If time management is based on a personality trait, as they asserted, the reported use of time management behaviours should be unchanged under varying levels of stress. Their data provided some support for this idea.

Kaufman-Scarborough and Lindquist (1999) studied the relation between time management and two styles of dealing with multiple tasks over time, i.e. the polychronic style (preference to perform two or more tasks simultaneously), and the monochronic style (preference to perform tasks sequentially). They found that people with a monochronic style more often engaged in detailed planning than those with a polychronic style. Yet, they found it hard to enact the planning, probably because they wanted to focus on one thing at the time. Polychronics perceived that they reached their planned goals more often than and were better able to manage work interruptions and activity switches than monochronics.

Williams *et al.* (1995) investigated the relationship between the Myers Briggs Type Indicator (MBTI) and time management practices. They found that all TMQ-factors (Britton and Tesser, 1991), i.e. short-range planning, long-range planning, and time attitudes, were significantly related to the J-P (judgment-perception) index of the MBTI. A high score on this scale indicates "... having a preference for a planned, orderly, and controlled way of living" (Williams *et al.*, 1995, p. 37).

In conclusion, some support for a dispositional foundation of time management behaviour was found because TSQ factors (Bond and Feather, 1988), TMQ factors

(Britton and Tesser, 1991), and TMBS factors (Macan *et al.*, 1990) appeared to be related to several personality variables, but this needs further exploration in future research. Within the five factor model of personality, time management appears to be most closely related to Conscientiousness, whereas Neuroticism may be a second relevant factor.

Time management training programs. The effect of time management training programs on time management and on outcomes such as job performance was investigated in eight studies included in this review. The results with respect to the effectiveness of time management training were mixed. Five studies (Green and Skinner, 2005; King *et al.*, 1986; Macan, 1994; Slaven and Totterdell, 1993; Van Eerde, 2003) found support, as participants indicated that they did engage in time management behaviour more frequently after a time management training program; one study (Macan, 1996) did not. A positive relation between time management training and performance (e.g. time spent on working on high-priority tasks) was found in three studies (Hall and Hursch, 1982; King *et al.*, 1986; Orpen, 1994), whereas in two other studies (Macan, 1996; Slaven and Totterdell, 1993) this relation was not found. Orpen (1994), for instance, conducted a field experiment in which a self-developed time management scale was used. The participants of the training group rated their time management skills higher than the control group. A diary study showed that participants made more effective use of their time than the control group did, as rated by managers who examined their activity diaries. Although Macan's (1996) study time management behaviours did not increase after the training program compared to a control group the participants did report more feeling of control of time after they had participated in a time management program. Van Eerde (2003) found that time management training significantly increased participants' time management behaviours and decreased worrying and trait procrastination in relation to a control group. Green and Skinner (2005) did not compare the results to a control group, but obtained post-training scores and follow-up scores after several months. Companies from different sectors were included. Generally, the results were positive over a range of behaviours linked to the coursebook.

In conclusion, past studies have demonstrated that time management training programs generally increased participants self-reported time management skills. Supervisor rating was positive in one study (Orpen, 1994), and some confirmation from supervisors or peers with the self-reports was obtained in three studies (Green and Skinner, 2005; Macan, 1994; Van Eerde, 2003).

Effects of time management

Time management activity has been studied in relation to several other outcome variables. A first group of studies have looked into effects on proximal variables, such as accurately estimated time duration (Burt and Kemp, 1994; Francis-Smythe and Robertson, 1999a); spending time on high-priority tasks (Hall and Hursch, 1982); the ability to readjust plans to improve progress rate (Eilam and Aharon, 2003).

Other studies have examined effects on performance in work and academic settings, such as sales performance (Barling *et al.*, 1996); job performance (Davis, 2000; Macan, 1994); college grades (Britton and Tesser, 1991; Trueman and Hartley, 1996); academic performance (Burt and Kemp, 1994); grade point average (Britton and Tesser, 1991); and total study habits score (Bond and Feather, 1988).

A third group of studies have investigated the effects on attitudinal and stress-related outcomes, such as perceived control of time (Adams and Jex, 1999; Davis, 2000; Jex and Elacqua, 1999; Francis-Smythe and Robertson, 1999a; Macan, 1994); job satisfaction (Davis, 2000; Macan, 1994); role overload (Burt and Kemp, 1994); job-related and somatic tension (Davis, 2000; Macan, 1994); work-family interference (Adams and Jex, 1999); strain (Jex and Elacqua, 1999; Lang, 1992); emotional exhaustion (Peeters and Rutte, 2005); and health (Bond and Feather, 1988).

The proximal outcomes time estimation and spending time on high priority tasks were positively affected. Francis-Smythe and Robertson (1999a) concluded that participants who perceived themselves as practicing time management behaviours estimated the expected time durations more accurately than those who did not, but tended to underestimate time in passing. The authors emphasized the role of motivation, as they found that more motivated respondents had better results in planning.

There appeared to be a difference between the academic and job-related performance outcomes. College grades and total study habits score were positively affected, but the expected relation between time management behaviours and job performance was modest or even non-significant. Macan (1994) failed to find a positive relation with job performance, whereas Barling *et al.* (1996) did find a relation with sales performance, but only for those participants scoring high on achievement motivation.

Results on stress-related outcomes showed that time management was positively related to perceived control of time, job satisfaction, and health, and negatively to job-induced and somatic tension, strain, and psychological distress. Jex and Elacqua (1999) found a moderating effect of time management behaviour on the relation work-family conflict and strain, with a stronger relation between work-family conflict and health for participants who applied time management techniques. This moderation is similar to what Peeters and Rutte (2005) found, time management moderated the relation between high demands and low autonomy on the one hand, and emotional exhaustion on the other.

In conclusion, research has found positive effects of time management behaviour on proximal outcomes, performance, and stress-related outcomes. However, the results obtained for performance appear to be the weakest within these three categories.

Gaps in research

Surprisingly, little research attention has been given to the question what time management can contribute in combination with organizational or work place factors. In a job in which it is not possible to plan one's workday because managers, or the workflow procedures determine the order and timing of activities, or, in other words, where job autonomy is low, time management might not be an option. Time management assumes that the workplace is suitable for planning one's workday and being able to say "no" to more work, whereas in practice, this is often not the case. Conditions in the workplace and the prerequisites for time management behaviour were not included in past research.

Second, as planning was identified to be an important aspect of time management, time management research on detailed aspects of planning such as prioritising and planning alternative tasks in case the original plan could not be executed (e.g. due to

work interruptions or the unavailability of information) would have seemed logical. Yet, it appears that such research has not yet been done. Also, although some authors have suggested that good planners can be poor at managing time while performing their planned work (Burt and Kemp, 1994; Eilam and Aharon, 2003; Francis-Smythe and Robertson, 1999a), this topic has not been researched thoroughly. People might overestimate the time required to complete a task as a safe estimation strategy. Overestimating time may be a means of controlling time and avoiding stress because they allow enough time for tasks to be completed (Burt and Kemp, 1994).

Third, it appears that research has not studied time management techniques aiming at completing work as planned or persisting in the execution of tasks, such as self-regulation and self-monitoring. Self-regulation refers to the extent to which people are motivated and able to stick to their goal and persist into action towards the goal even when they are confronted with competing motivations (Kuhl and Fuhrmann, 1998). Self-regulation tactics (e.g. effort) have been found to be related to sales performance (Vandewalle *et al.*, 1999) and thus may also be important with respect to time management. A fourth point is that studies have not addressed the social context, such as the work relations among individual workers. Colleagues or co-workers, supervisors, and customers can also be responsible for a disorganized workday and not feeling in control of time (e.g. Perlow, 1999). In definitions and questionnaires of past time management studies, these factors cannot be found. Depending on the type of work, a person can be more or less interdependent of the work or information of others. Time management could include influencing or stimulating others to finish their work in time or to organize their work in a way that it supports one's own work. Also, engaging in time management behaviour can be annoying for others if they do not work in a similar way. For instance, a proposed time management technique is to reserve certain office hours (e.g. between 4 and 5 pm) for questions of co-workers. This technique might be helpful for the individual in the reduction of interruptions at work but, at the same time, it can be inefficient for the work of others. Moreover, avoiding work interruptions, especially being interrupted by phone or e-mail, might be an important aspect in time management research and has not been part of research yet. The relation of "time managers" with others was not addressed in past research, but could be an important factor in time management research.

Fifth, motivational aspects or self-regulation of individuals who are responsible for maintenance and effectiveness of time management techniques have not been included in previous studies, although for instance Francis-Smythe and Robertson (1999a) suggested that motivation may be important. It has been shown that motivational aspects are important drives to energize behaviour. Gollwitzer (1999), for example, stated that an action process consists of two motivational phases. In the pre-decisional phase, preferences are set by deliberating the desirability and feasibility of options. In this phase, the goal to pursue is chosen. The second, pro-actional phase involves an evaluation of the necessity of further goal pursuit. When the outcome of this evaluation is that plans are not reached, people have to motivate themselves in the persistence of goal or task pursuit. Also, Sansone and Harackiewicz (1996) stated that individuals might hold similar goals, but differ in their motivation to reach them. Motivation to reach goals has a direct effect on initial and maintenance behaviour. Maintenance behaviour or persistence is influenced by phenomenal experiences as "feeling like it" and task involvement. Farmer and Seers (2004, p. 280) studied the

motivation entrainment model in relation to how “individuals use time to guide their work and evaluate progress” and “synchronize” their multiple tasks with shifting deadlines. Thus, motivational aspects could be included in future research as they are possibly important determinants of time management behaviours and behavioural change.

While the foregoing gaps relate to issues of content, the final gap we would like to point at is of a methodological nature. Given the very nature of the topic, one would have expected that studies of time management would have looked at how people plan and execute their activities within a given time interval, and that researchers would have investigated plan-action discrepancies as a function of dynamic events, time budgets etc. However, as we have noted, most research studies have used cross-sectional designs and measurement instruments that emphasize stable rather than dynamic aspects of time management behaviour. In our view, future research could profit much from dynamic approaches to theory building and research (Mitchell and James, 2001; Zaheer *et al.*, 1999).

Discussion

This review of time management studies has shown that time management is not a well-defined construct. Also, the quality of measurement instruments was shown to be questionable. The effect of time management on outcomes such as job performance was not clearly established, but the results on proximal and stress-related outcomes were generally positive. Some support was found for a dispositional foundation of time management behaviour, as some of the time management behaviours appeared to be related to personality variables. Time management training was demonstrated to enhance the use of time management behaviours, but there are no conclusive results about the effect of these behaviours on outcome variables.

Most of the past studies were field studies and used questionnaires. Our main criticism on these instruments is that they were based on different definitions of time management and thus represent non-equivalent operationalisations of the time management construct. The internal consistency of the scales differed somewhat over studies and was in some cases below the generally accepted level of 0.70. Planning was part of all three mostly used time management questionnaires (TMBS, TSQ, TMQ), suggesting that planning is an important time management component.

A large number of past studies used student samples. It can be questioned whether the results for students also hold for employees, because students deal with different kinds of tasks than employees, and it has not been demonstrated that the processes involved are comparable. One of the differences is that students are able to postpone activities by deciding not to study for an exam, while employees have less possibility to do so and may face more negative outcomes of not doing certain things in time.

In conclusion, this review of time management literature demonstrates that there is still a lot of work to be done on the subject of time management. Past studies have covered only parts of the conceptual spectrum and did not always demonstrate which considerations led to their point of view on time management behaviours and to the selection of outcome variables.

In future research, time management behaviour should be studied in more detail. We believe that it is necessary to explore how people plan and prioritise their work activities, whether and how they perform their planned actions, and how they

implement time management techniques. To be able to do this, we firstly suggested a definition of time management behaviours that incorporates all relevant aspects. Next, a time management measure that operationalises this definition should be constructed and a model of time management should be developed that covers antecedents as well as outcomes of time management behaviours. Based on this research, time management training programs might be developed and evaluated. All this stands in stark contrast to the current situation where research has taken popular notions of time management and topics included in time management training programs as points of departure.

Future research could also focus on the characteristics of the work situation, including the lack of autonomy in work, a heavy workload, the influence of others, or a planning system to organize one's time at work in relation to time management behaviours. Characteristics of non-work life conditions should be considered as well, as they can also influence the use of time management techniques. People with double workload, e.g. work and study, or work and a family with children, have a bigger likelihood of experiencing priority conflicts because they have to balance between the two situations constantly. Furthermore, personality type, personal characteristics (for instance a preference for a structured work style or work strategy), and openness for learning new strategies could influence the success of time management behaviours. Individuals differ widely from one another in the degree to which they handle the passage of time and the pursuit of goals. Some individuals are constantly drawing up schedules and lists, and setting deadlines for themselves, while others pay less attention to short-term concerns (Conte *et al.*, 1998).

With respect to the outcomes of time management behaviours, future research should be directed at the effects on perceived control of time and effectiveness in terms of task completion within the available time (deadlines). Factors determining whether the timely completion of tasks results in higher job performance (e.g. Kelly, 2002), more leisure time, or working less overtime (e.g. Rau and Triemer, 2004), could be included in future research.

Besides quantitative studies on time management, qualitative research studies could be conducted to obtain detailed information about the application of time management behaviours in practice. For instance, by means of a diary study on how people plan and prioritise their tasks from day to day, how they actually spend their workday and what considerations are important here, what unexpected events come up, and how they handle this. The advantage of a diary study is that information on how people use their time is obtained as it occurs (Conway and Briner, 2002; Pentland *et al.*, 1999; Reis and Wheeler, 1991; Symon, 1999).

Another suggestion is to focus future research on specific target groups. As most studies have dealt with student samples, further research on time management at work could focus on employees in their work situations, preferably from different organizations in order to ensure sufficient variation in contextual factors. To be able to show the differences in decision-making and strategy between individuals, research groups could be divided into persons that are good or average time managers. Sonnentag and Schmidt-Braße (1998) have shown how this can be done. They asked supervisors to name employees that they thought had the quality to either be good or not as good at performing a certain task.

A shortcoming of the present study is that only 32 studies on time management were included in the study, which can account for a biased view of past research, although they were the only studies available within the selected criteria. Also, as there were few time management studies available and time management measures were quite different, it was not possible to do a meta-analysis on the results of previous studies.

Conclusion

This review of time management studies gives an impression of how useful time management may be. Although some appear to be sceptical about the results of implementation of time management in practice, scientific studies have demonstrated that the popularity of time management is justified in as far as it has some favourable effects on people's perceptions and feelings. Results of past studies were consistent in showing evidence of positive effects of time management on perceived control of time, job satisfaction, and negative effects on job-induced and somatic tensions. Additionally, perceived control of time was found to be associated with higher job satisfaction, and to mediate the relation between time management and several other outcome variables. As for the effects of time management on job performance, results were inconclusive.

In this article, we have introduced a new definition of time management and suggested directions for future research. We feel that time management deserves further research, using more rigorous methods of analysis. Such research may clarify both the processes involved and the effects on perceptions, feelings and performance. From a practical perspective, this time management review has identified aspects of time management, including time assessment, setting goals, planning, prioritising and monitoring, that seem to affect outcomes positively. Several of these aspects were already covered in the original work by McCay (1959). Incorporating all these aspects in a systematic manner may help to improve current time management training programs and to develop new time management interventions.

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About the authors

Brigitte J.C. Claessens is a Researcher, Wendelien van Eerde is Assistant Professor and Christel G. Rutte is Full Professor. All are based in the sub-department of Human Performance Management of the Technische Universiteit Eindhoven. Brigitte J.C. Claessens is also a Consultant at Beteor B.V. She is the corresponding author and can be contacted at: b.j.c.claessens@tm.tue.nl

Robert A. Roe is Full Professor of organizational theory and organizational behaviour at the Universiteit Maastricht. He has worked on a wide range of topics in personnel and organizations. Currently, his focus is on management and organizational behaviour from a temporal perspective, with as emphasis on motivation, competence and performance.