What Do We Know About Time Management? A Review of the Literature and a Psychometric Critique of Instruments Assessing Time Management

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1. Introduction

Lack of time is a common complaint in western society. In response, there has been a proliferation of "… books, articles, and seminars on time management, along with their assertions, prescriptions and anecdotes" (Macan, 1994, p. 383). But what exactly *is* time management? Despite the epidemic of time management training programs (Quirk, 1989), there is currently a lack of agreement about the definition of time management and a dearth of literature summarizing time management across disciplines. Furthermore, Hellsten (2005) has argued that there is a lack of a theoretical model of time management. Although self-report instruments purporting to examine time management exist in several disciplines, to date, there has been no published psychometric review or comparison of these instruments for assessing *generic* time management.

2. Purpose

The purpose of this chapter is to examine the existing time management literature. More specifically, the purpose of this chapter is: (a) to describe the current state of time management and the rationale for time management training including the populations for whom recent time management literature is written; (b) to comprehensively review existing published and peer-reviewed literature relating to the concept of time management in order to delineate the skills and behaviors associated with time management identified in the education, industrial, administrative, management, coaching, and sport and exercise psychology domains; and (c) to identify and critically examine commercially available and research-based instruments examining time management.

3. Methodology

Due to the threefold purpose of this chapter, three separate but related review stages were utilized. First, in order to describe the current state of time management, a critical and rigorous review of the current research literature was conducted. The review focused on

the time management skills and behaviors identified in the education, industrial, management, administrative, coaching, and sport and exercise psychology domains. Articles were located using both database searches (e.g., ERIC, ProQuest Education, PSYCHINFO, etc.) and manual reviews of references. Keywords used in the search included time management, time management skills, time management behaviors, time management training programs, planning, scheduling, and organizing. The search located 84 empirical peer reviewed papers as well as generic and popular books and articles on time management. The initial search focused on literature published in the English language prior to December 2005.

Second, in order to ensure the review was current, a second review following the process specified above but restricted to published journal articles since the year 2000, was repeated in September of 2011. Using the keywords *Time Management,* 993 journal articles were identified. Of these articles, 35 abstracts were initially selected for closer review. Of the 35 abstracts identified, 12 articles were deemed relevant. Hand searches of the reference list of these 12 relevant articles identified an additional 4 relevant articles. Thus, the second review added 16 articles to the 84 previously identified in the first review for an overall total of 100 empirical peer reviewed papers and generic and popular books and articles on time management. Of the 16 articles identified in the second review, 2 were classified as popular literature with the remaining 14 articles classified as research articles.

The third review stage involved a literature review of existing instruments assessing time management in the industrial, administrative, management, education, coaching, and sport and exercise psychology domains. Sources of the review included database searches, cross-referencing of journal articles, and hand searches of relevant journals. Similar to the reviews of time management skills and behaviors, the references for each article found during the database search were reviewed for additional articles that by their title, use within the article, or by referencing appeared to be related to time management for exercise. Key words used in the review included time, time management skills and behaviors, time management questionnaires, and time management instruments. Sixteen commercially available instruments were identified that used *time* or *time management* as descriptors and ten additional research studies involved the development of a time related assessment instrument. Each of the identified instruments were then critically reviewed following the work of Hellsten (2005) including assessment of the psychometric characteristics and utility of the instruments to assess time management skills and behaviors.

4. Results

4.1 What is time management?

Time management has been described using many different terms including spontaneity, balance, flexibility, and having control over time (Lakein, 1973). Time management has also been characterized as a habit developed only through determination and practice (Simpson, 1978), as prioritizing and respecting those priorities (Soucie, 1986), and as setting priorities and scheduling tasks (Jordan et al., 1989). Time management can also be considered as the process by which an individual more effectively accomplishes tasks and goals (Schuler, 1979), a process by which an individual obtains control over the timing and the content of

what he/she does (Oncken & Wass, 1985), and as what can be accomplished with time (Mackenzie, 1972, 1975, 1990).

In order to utilize time effectively, individuals must first be able to predict how much time is needed for the activity (Kelly, 2002). An individual will become effective in using their time only when the individual clearly knows what they want to do, what they need to do, and for which specific target date (Soucie, 1986). Individuals need to become more disciplined in their use of time by respecting their established priorities while minimizing distractions from others as well as from situations that have the ability to displace priorities in terms of time and energy (Soucie, 1986).

According to Crutsinger (1994), time management involves determining what one should do by setting goals, deciding which events are the most important and realizing that other activities will have to be scheduled around them (prioritizing), making decisions about how much time to allow for certain tasks (time estimation), adjusting to the unexpected (problem solving), reconsidering goals and priorities on a regular basis (evaluation), and observing patterns and trends in behavior.

There is debate over exactly what skills and behaviors constitute effective time management. For example, Shipman (1983) identified six principles for effective time management. These principles included being aware of self, structuring time appropriately, setting goals and priorities, increasing personal efficiency and effectiveness, scheduling time for activity, and scheduling relaxation time. Time management behaviors have more recently been characterized as making lists, organizing, goal setting, keeping and routinely evaluating one's schedule, and breaking down tasks into simpler parts (Kelly, 2002).

Empirical research investigating the effects of time management behavior has identified three broad clusters of behaviors. These behaviors include setting goals and priorities, engaging in the mechanics of time management, and having a preference for organization (Adams & Jex, 1999; Macan, 1994, 1996; Macan et al., 1990). However, seven time management skills or behaviors can be considered essential to effective time management due to their repetitive prominence in the literature: (a) time analysis, (b) planning, (c) goal setting, (d) prioritizing, (e) scheduling, (f) organizing, and (g) establishing new and improved time habits (Barkas, 1984; Feeny Jonson, 2002; Hellsten & Rogers, 2009; Jorde, 1982; Lakein, 1973; Mackenzie, 1972, 1975, 1990; Morris, 2001; Woolfolk & Woolfolk, 1986). Although, time management documentation activities such as making lists, writing down goals, and utilizing calendars have been identified by many authors as necessary for effective time management, they tend to cross all seven skill areas. Table 1 provides a summary of the characteristics of time management behaviors and skills as identified by empirical research and popular books, articles, and multimedia on time management.

4.2 Who uses time management?

Industry initiated the examination of time management and time management training. However, there is much literature examining time in the education domain, specifically in reference to time and schools (e.g., Knight, 1989), time and school learning (e.g., Anderson, 1984; Bloom, 1965; Carroll, 1963), time management and study skills for students or student athletes (e.g., Carney, 1988; Crutsinger, 1994; Danyluk, 1985; Garcia-Ros et al., 2004; Gibbs,

1993; Ho, 2003, Keim & Strickland, 2004; Mpofu, D'Amico, & Cleghorn, 1996), and time management for educators (e.g., Cemaloglu & Filiz, 2010, Collins, 1987; Feeney Jonson, 2002; Jorde, 1982; Kearns & Gardiner, 2007; Kozoll, 1982; Morris, 2001; Wachter & Carhart, 2003).

Author	A	PL	GS	P	S	O	D	GH
Adams & Jex, 1999, 1997		√	√	√		√	√	√
Alay & Koçak, 2002			√	√	√		√	
Anand, 2007								√
Arnold & Pulich, 2004	√		√	√	√	√	√	√
Ashkenas & Schaeffer, 1985	√	√	√	√			√	√
Atkinson, 2001		√				√		√
Barkas, 1984	√	√	√	√	√	√	√	√
Blanchard & Johnson, 1981			√					
Bliss, 1976		√	√	√	√		√	
Bond & Feather, 1988		√						
Britton & Tesser, 1991			√	√	√		√	
Buck, 2003		√			√	√	√	√
Burka & Yuen, 1983			√		√		√	
Burt & Kemp, 1994		√	√	√		√	√	√
Calabresi & Cohen, 1968	√	√			√	√		√
Carney, 1982			√	√			√	√
Cealoglu & Filiz, 2010			√	√	√		√	
Collins, 1987		√	√	√	√		√	√
Claessens et al., 2004		√	√	√				
Corwin et al., 2001		√		√	√	√		
Crutsinger, 1994	√	√	√	√			√	√
Cuismano, 1999			√	√	√	√		
Danyluk, 1985	√	√		√	√	√	√	√
Delahoussaye, 2002				√			√	
DiPipi-Hoy et al., 2009		√		√	√	√		
Drawbaugh, 1984	√	√	√		√		√	√
Feather & Bond, 1983	√	√		√	√	√		
Feeny Jonson, 2002	√	√	√	√	√	√	√	√
Fitzgerald & Waldrip, 2004a	√	√	√	√	√		√	
Fitzgerald & Waldrip, 2004b		√	√	√		√		
Foust, 2000	√	√	√	√	√		√	√
Francis-Smythe & Robertson, 1999		√	√	√		√	√	√
Gafarian et al., 1999	√	√		√	√	√	√	√
Garcia-Ros et al., 2004			√	√	√		√	
Geist, 2003		√	√	√		√		√
Gerdes, 2001						√	√	
Gibbs, 1993		√	√		√		√	√
Hellsten & Rogers, 2009	√	√	√	√	√	√	√	√
Hessing, 1994		√		√	√	√		
Ho, 2003	√	√			√			
Hoch, 2000					√	√	√	√

Author	A	PL	GS	P	S	O	D	GH
Jex & Elacqua, 1999		√	√	√		√	√	√
Jordan et al., 1989		√	√	√	√			√
Jorde, 1982	√	√	√	√	√	√	√	√
Kaehler, 2000		√						√
Kearns & Gardiner, 2007			√	√	√		√	
Kelly, 2002	√							√
Knight, 1989	√	√		√				√
Kotter, 1982		√	√		√		√	
Kozoll, 1982	√	√		√		√		√
Lahmers & Zulauf, 2000		√	√	√		√	√	√
Lakein, 1973	√	√	√	√	√	√	√	√
Landy et al., 1991	√	√			√	√	√	√
Lang et al., 1990					√			
Lay & Schouwenburg, 1993		√	√	√		√	√	√
Lindgren, 2004		√	√					
Macan, 1994; 1996		√	√	√		√	√	√
Macan et al., 1990		√	√	√		√	√	√
Mackenzie, 1972; 1975; 1990	√	√	√	√	√		√	
McGrath & Rotchford, 1983					√		√	
Misra & McKean, 2000		√	√	√		√	√	√
Mpofu et al, 1996		√	√	√		√		
Morris, 2001	√	√	√	√	√	√	√	√
Mudrack, 1997		√	√	√	√	√	√	√
Orpen, 1993		√	√	√		√	√	
Osbourne, 1995								√
Perry, 1997			√	√				
Puffer, 1989		√	√		√		√	√
Quirk, 1989		√		√	√			√
Rice, 1984		√		√	√		√	
Schriber & Gutek, 1987	√			√	√	√	√	
Schuler, 1979	√		√	√				√
Shahani, Weiner, & Streit, 1993		√	√	√		√	√	√
Shipman, 1983	√		√	√	√		√	
Simons & Galotti, 1992		√	√	√	√			
Simpson, 1978	√			√				
Smith, 2002	√	√	√	√	√	√		
Smith, 1999	√	√	√		√			√
Soucie, 1986	√		√	√	√		√	√
Stevens & Pfost, 1984	√	√		√				√
Swart, Lombard, & de Jager, 2010		√		√	√	√	√	√
Taylor & Mackenzie, 1986			√	√	√	√	√	√
Topper, 2003			√		√		√	√
Trockel et al., 2000							√	
Trueman & Hartley, 1995, 1996			√	√	√		√	

Author	A	PL	GS	P	S	O	D	GH
van der Meer et al., 2010		√		√		√		
Wachter & Carhart, 2003		√				√		√
Weber & Vogel, 1977			√	√	√	√		
Wessman, 1973		√			√	√		
White, 2001				√				
Williams et al., 1995			√	√	√		√	
Winter et al., 1993		√		√	√			
Woolfolk & Woolfolk, 1986	√	√	√	√	√	√	√	√
Yoels & Claire, 1994					√	√		
Zampetakis et al., 2010		√	√	√	√	√	√	√
Zinatelli et al., 2002	√		√	√			√	
% of Articles Indicating Each Time Management Characteristic	32.0	63.0	60.0	71.0	60.0	47.0	60.0	54.0

Note. A refers to time analysis, time awareness, and time estimation. PL refers to planning. GS refers to setting goals. P refers to setting priorities. S refers to scheduling. O refers to organization including use of routines. D refers to use of time management documentation. GH refers to the establishment of good time management habits such as avoiding procrastination, delegation, and creating balance. √ indicates the time management characteristic was stated by the author. Bolded authors discussed all eight time management characteristics.

Table 1. Time Management Characteristics Identified by Empirical Research and Popular Literature.

Some of the populations identified as requiring time management training programs include adults performing job searches (Lindgren, 2004), first year university students (Ho, 2003; Swart et al., 2010; van der Meer et al., 2010), at risk university students (Zinatelli et al., 2002), online students (Bocchi et al., 2004), adults and college students with diabetes (Wdowik et al., 2001), adolescents with exceptionalities (DiPipi-Hoy et al., 2009), and student athletes (Keim & Strickland, 2004). Recent time management training programs are also taking advantage of technology for their delivery (e.g., Zinatelli et al., 2002). The focus of time management research has also expanded to include individuals from North America (e.g., Hellsten & Rogers, 2009), Europe (Garcia-Ros et al., 2004; van de Meer et al., 2010; Zampetakis et al., 2010), Africa (Mpofu, et al., 1996), and Australia (Kearns & Gardnier, 2007) and is cross-cultural in nature (e.g., Cemaloglu & Filiz, 2010; Garcia-Ros et al., 2004*)*.

4.3 Empirical studies of time management

Of the 100 located studies or articles involving time management, 38 were empirical studies involving qualitative or quantitative time management research. Five studies examined the time management behaviors and practices of specific populations using qualitative methodologies including the use of time diaries (Hessing, 1994; Ho, 2003; Kotter, 1980; Winter et al., 1993; Yoels & Clair, 1994). Twenty-seven studies examined time management behaviors or practices in relation to other variables such as academic achievement, stress, or creativity (Adams & Jex, 1997, 1999; Alay & Koçak, 2002; Anand, 2007; Britton & Tesser, 1991; Burt & Kemp, 1994; Cemaloglu & Filiz, 2010; Claessens et al., 2004; Francis-Smythe & Robertson, 1999; Garcia-Ros et al., 2004; Hellsten & Rogers, 2009; Jex & Elacqua, 1999;

Kearns & Gardiner, 2007; Lahmers & Zulauf, 2000; Lang et al., 1990; Lay & Schouwenburg, 1993; Macan et al., 1990; Misra & McKean, 2000; Mpofu et al., 1996; Mudrack, 1997; Shahani et al., 1993; Simons & Galotti, 1992; Swart et al., 2010; Trockel et al., 2000; van de Meer, et al., 2010; Williams et al., 1995; Zampetakis et al., 2010). One study (Trueman & Hartley, 1996) compared the effectiveness of time management skills between mature and traditional entry university students. Five studies examined the effectiveness of time management training programs (DiPipi-Hoy et al., 2009; Macan, 1994, 1996; Orpen, 1993; Woolfolk & Woolfolk, 1986). More than half of the studies examined a university or college student sample.

4.3.1 Qualitative time management studies

In reviewing the literature on time management skills and behaviors, five studies were identified which examined the time management behaviors of specific populations using qualitative methodologies. Two studies examined time management techniques in relation to home-based work (Hessing, 1994; Winter et al., 1993). Of these two studies, one study exclusively examined women (Hessing, 1994). Two studies examine university populations including the time management strategies of medical residents (Yoels & Clair, 1994) and the time management of undergraduate English project students (Ho, 2003). The fourth study examined the work habits of successful general managers (Kotter, 1980). There were several common time management techniques identified by these populations including time manipulation, planning ahead, task delegation, prioritization, synchronization and routinization of activities, reallocation of personal time, goal setting, agenda making, and the utilization of a time diary. Many of the strategies that were identified by the more unique samples of dual career women, medical residents, and home based workers parallel each other and the strategies identified by university student samples.

4.3.2 Quantitative time management studies

The literature search identified 27 studies that examined the relationship between time management behaviors and other variables such as academic achievement, stress, and creativity. Most studies were conducted with university or college student populations and most studies utilized some form of questionnaire or self-report measure to assess time management. Alternatives to self-report measures included self-reported time usage questions (e.g., how many hours during a typical weekday, do you…"; Anand, 2007) and observational checklists (DiPipi-Hoy et al., 2009). Results from these studies showed that self-reports of time management behaviors or skills were often related to academic achievement; effective time management lower stress and strain; good time managers preferred planning and organization; older subjects and women engaged more frequently in planning and time management behaviors; individuals who indicated that they set goals and priorities tended toward the Type A behavior pattern; and individuals who had previous time management training engaged more frequently in time management behaviors. In addition, inefficient time use, lack of control over time demands, and inadequate amounts of time appeared to have a negative impact on individuals' psychological resources.

When measured, perceived control of time was consistently identified as the strongest correlate of all the time management behaviors. This finding indicates the importance of

distinguishing between the different time management constructs (Macan et al., 1990). However, the awareness and documentation of time that are associated with time management strategies may lead some people to experience less perceived control over their time. Adams and Jex (1999) suggested that the actions of time management such as making lists and scheduling may lead some people to experience less perceived control over their time. When people are not meeting their time demands, uncompleted tasks and missed appointments on a schedule may lead to lower perceptions of control over time. Claessens et al. (2004) also demonstrated that planning behavior positively affected perceived control of time but stressed the importance of examining planning behavior and job characteristics.

4.3.3 Studies examining the effectiveness of time management

The empirical literature review identified five studies that examined the effectiveness of time management training programs. Three of the studies examined employed adults (i.e., Macan, 1994; 1996; Orpen, 1993) while Woolfolk and Woolfolk (1986) examined pre-service teachers and DiPipi-Hoy and colleagues (2009) examined adolescents with exceptionalities. The DiPippi-Hoy et al. (2009) study is unique in the population of study and the observational checklist method used to assess time management behaviors. Results suggested that participants increased their time management at work and generalized their skills to the community site following intervention (Di-Pippi-Hoy et al., 2009). Results of the two early studies (i.e., Orpen, 1993; Woolfolk & Woolfolk, 1986) which focused on the time management work by Lakein (1973) indicated that time management training has significant immediate and long-term effects on time management attitudes and behaviors and that those who receive time management training rate their time management effectiveness more highly than those who do not. In comparison, two later studies (i.e., Macan, 1994; 1996) which utilized the Time Management Behavior scale developed by Macan et al. (1990) found time management training to be only minimally related to subsequent use of time management behaviors. However, individuals who participated in a time management program did perceive more control over their time after the program. Perceived control over time was related to positive outcomes: Individuals who perceived having more control over their time reported fewer job induced tensions, fewer stresses, and greater job satisfaction than individuals who did not perceive themselves as having control over their time.

Furthermore, the 1994 study by Macan was the first study to empirically examine the relationship between time management behaviors and the Theory of Planned Behavior (TPB) by investigating the relationships between the elements of the TPB and perceived control over time. This model suggested that learning time management skills and consequently engaging in time management behaviors would lead to a greater perception of control over time. Support was found for the process model of time management.

4.4 Review of time management instruments

Sixteen commercially available instruments were identified that used time or time management as descriptors (Blewitt-Dombrowski, 1990; Canfield, 1976; 1981; Cooper et al., 1988; Crosby et al., 1985; Fimian, 1988; Kaplan et al., 1988; Kirkpatrick, 1995; Morreau & Bruininks, 1991; Parry, 1985; People Builders International, Inc.; 1993; Pintrich et al., 1991; Training House Inc., 1995; Weinstein, 1987; Weinstein & Palmer, 1995; Wonderlic Inc. &

Fasiska, 1993). Ten additional research studies involved the development of a time related assessment instrument (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Gafarian et al., 1999; Hellsten & Rogers, 2009; Landy et al., 1991; Macan et al., 1990; Schriber & Gutek, 1987; Weber & Vogel, 1977; Wessman, 1973).

4.4.1 Review of commercially available time management instruments

The literature review identified 16 commercially available instruments through the *Buros Mental Measurements Yearbook*. The Buros Institute of Mental Measurements provides test descriptions and critical test reviews of commercially available tests. Test reviews are written by experts in the field who must hold a Ph.D. and have measurement expertise. These instruments self-identified time management as a potential subscale or scale. The instruments were all published between the years 1976 and 1995.

Seven of the instruments were developed for the employee/managers or organizational domain (Cooper et al., 1988; Crosby et al., 1985; Kaplan et al., 1988; Kirkpatrick, 1995; Parry, 1985; Training House Inc., 1995; Wonderlic Inc. & Fasiska, 1993). Five instruments were developed for students (Canfield, 1976; People Builders International, Inc.; 1993; Pintrich et al., 1991; Weinstein, 1987; Weinstein & Palmer, 1995). One instrument each was developed for teachers (Fimian, 1988), chronic psychiatric patients (Blewitt-Dombrowski, 1990), individuals with developmental delays (Morreau & Bruininks, 1991), and general adults (Canfield, 1981). Of the 16 instruments, four instruments were specifically written to assess time management (Canfield, 1976; 1981; Kirkpatrick, 1995; Training House Inc., 1995) with the remaining instruments having a time management subscale. However, none of the instruments developed specifically to assess time management were recommended. Of the 12 remaining instruments, only two were unconditionally recommended by reviewers (*Checklist of Adaptive Living Skills:* Morreau & Bruininks, 1991 and *Teacher Stress Inventory:* Fimian, 1988) but assessment of time management was not the primary focus of either instrument.

4.4.2 Review of research based instruments assessing time and time management

The review of the empirical literature identified three studies that utilized a study specific measure of time management (Kearns & Gardiner, 2007; Swart et al., 2010; van der Meer et al., 2010). None of the study specific time management instruments were described in sufficient detail to allow for use by others. The review also identified ten instruments from the administrative, management, health, and education domains that involved the assessment of time in some manner. Five of these instruments were designed to specifically assess time management (Britton & Tesser, 1991; Gafarian et al., 1999; Hellsten & Rogers, 2009; Macan et al., 1990; Weber & Vogel, 1977).

The Time Attitudes Questionnaire (TAQ: Calabresi & Cohen, 1968) is a 46-item self-report questionnaire concerned with time experience and time attitudes. Responses are measured on a 6-point Likert-type scale ranging from strongly disagree to strongly agree. During development, the TAQ was administered to 200 psychiatric patients and 308 college students and the data submitted to a factor analysis. Results of the factor analysis showed a four factor solution: (a) Time Anxiety (discomfort/anxiety about time, the need to control

time), $\hat{\alpha}$ = 0.79; (b) Time Submissiveness (conforming attitude toward time, emphasizing efficient use of time and the use of schedules), $\hat{\alpha}$ =0.56; (c) Time Possessiveness (possessive and greedy attitude towards time) $\hat{\alpha}$ = 0.47; and (d) Time Flexibility (accepting and flexible attitude towards time) $\hat{\alpha}$ = 0.52. Total TAQ scores were not calculated.

The Ricks-Epley-Wessman *Temporal Experience Questionnaire* (*TEQ*) (Wessman, 1973) was developed with the view that, "the characteristic ways of experiencing and utilizing time vary greatly among individuals along dimensions that can be assessed and measured, and that these differences are meaningfully related to personality characteristics" (Wessman, 1973, p.103). The TEQ consists of 80 items with responses measured using a 7-point Likert-type scale ranging from *-3* to *+3*. The scale was originally administered to 110 predominantly male undergraduate students. Factor analysis resulted in four factors: (a) Immediate Time Pressure (lack of control vs. relaxed mastery and flexibility); (b) Long-term Personal Direction (continuity and steady purpose vs. lack of direction); (c) Time Utilization (efficient scheduling vs. procrastination and inefficiency); and (d) Personal Inconsistency (inconsistency vs. consistency and dependability). Total TEQ scores across the four factors ranged from -60 to +60 with a reported internal consistency (Cronbach's alpha) of 0.82.

The *Time Structure Questionnaire* (*TSQ*) is a self-report instrument developed to assess the degree to which individuals perceive their time to be structured and purposive (Bond & Feather, 1988). Originally, a set of 17 items based on Jahoda's (1981, 1982) analysis of the negative effects of unemployment on time structure was developed (Feather & Bond, 1983). Four factors underlie these items: (a) Engagement, (b) Direction, (c) Structure, and (d) Routine. The TSQ is the result of refining and improving this measure of time structure. The TSQ consists of 26 items, of which the majority were measured using a 7-point response scale ranging from *Yes, Always*, to *No, Never.* Three separate samples (ranging in size from 193 to 336 students) of introductory psychology students participated in the development of the TSQ. The responses of the first sample were factor analyzed resulting in 5 identifiable factors accounting for 41.3% of the total variance: (a) Sense of Purpose, (b) Structured Routine, (c) Present Orientation, (d) Effective Organization, and (e) Persistence. Factor analysis of both the second and third samples produced corresponding factor analytic structure. Total TSQ scores were calculated across the five factors and termed *use of time*. Mean scores on the total scale were: Sample 1, 122.6 (*SD* = 20.3); Sample 2, 117.6 (*SD* = 23.6); Sample 3, 124.8 (*SD* = 21.7). The inter-item reliabilities for use of time across the three samples were 0.88, 0.92, and 0.91 and a satisfactory level of stability was found for the total scale after a 15 week interval (test-retest reliability = 0.76).

Schriber and Gutek (1987) developed the *Time-At-Work* questionnaire to measure the temporal dimensions of organizational culture across different organizations. The instrument consists of 56 5-point Likert-type items. Participants consisted of 399 individuals from large organizations and 124 individuals from small organizations. Factor analysis results identified 16 factors accounting for 59.0% of the variance. However, 13 separate temporal dimensions were identifiable and substantively supported: (a) scheduling and deadlines, (b) punctuality, (c) future orientation, (d) quality versus speed, (e) allocation of time, (f) time boundaries between work and non-work, (g) synchronization/coordination of work, (h) awareness of time, (i) work place, (j) sequencing of tasks, (k) intra-organizational time boundaries, (l) autonomy of time use, and (m) variety versus routine. The number of

items associated with each domain ranged from 2 to 9 items and according to the authors, all domains had moderate reliabilities.

The *Time Urgency Scale* (*TUS*) was developed with the intention of assessing time urgency, time awareness, and time use (Landy et al., 1991). Time urgency refers to "accelerated pace" (Burnam et al., 1975) and is the tendency of an individual to consider time as a scarce resource and plan its use carefully (Landy et al., 1991). The TUS is a Likert-type self-report questionnaire consisting of 33 unique items based on the work of Edwards, Baglioni, and Cooper (1990). Initially, the TUS was developed using a sample of 190 undergraduate students. Factor analysis of this data resulted in an interpretable five factor solution: (a) Competitiveness ($\hat{\alpha}$ =0.81), (b) Eating Behavior ($\hat{\alpha}$ =0.89), (c) General Hurry ($\hat{\alpha}$ =0.81), (d) Task-related Hurry ($\hat{\alpha}$ =0.72), and (e) Speech Pattern ($\hat{\alpha}$ = 0.69). This data was supplemented by additional samples of 91, 178, and 213 professionals and samples of 64 and 642 students. Factor analysis of the additional samples resulted in the same five factor solution with similar internal consistency estimates. Furthermore, test-retest reliabilities conducted after four months on the subscale responses of 213 clerical workers were all high ranging from 0.70 to 0.95. Total TUS scores were not calculated.

In a related study, Landy et al. (1991) developed behaviorally anchored rating scales of time urgency. Factor analysis of this scale resulted in nine dimensions, five of which appear to pertain to time management: (a) Awareness of Time (how aware an individual is of the exact time of day), (b) List Making (if a person creates/maintains a to-do list during the day or week), (c) Scheduling (if an individual schedules activities and keeps to that schedule as well as whether an individual proportions time for particular activities), (d) Deadline Control (the extent to which an individual creates or is controlled by external deadlines), and (e) Time Savings (the extent to which a person engages in actions directed towards saving time). The remaining four dimensions assessed urgency behaviors including eating behavior, nervous energy, speech patterns, and tolerance of tardiness.

Of the five scales created purposively for assessing time management, the first instrument was developed by Weber and Vogel (1977). As part of a paper in recreation administration, Weber and Vogel (1971) developed a set of 20 self-report items intended to help administrators self-identify time management problems. Each item was measured on a 4-point Likert-type scale ranging from *consistently, always a problem* to *rarely or never a problem*. However, the instrument was not named nor were the psychometric properties assessed.

The *Time Management Behavior* (*TMB*) scale (Macan et al., 1990) was designed to assess the behaviors critical to the construct of time management as defined by the popular literature. Initially, 123 undergraduate students completed the 76-item TMB using a 5-point response scale ranging from 0 *seldom true* to 4 *very often true*. Following item analysis, all redundant and noncontributing items with item-total correlations of less than 0.29 were removed resulting in the 46-item TMB. An additional 165 students completed the 46-item TMB scale and factor analyses were initially conducted on each of the two samples. However, since the results were similar, the two samples were combined. Four factors accounting for 72% of the variance were retained: (a) Goal Setting and Prioritizing (eigenvalue = 7.04; $\hat{\alpha}$ =0.83; 15 items), (b) Time Management Mechanics (eigenvalue = 2.58; $\hat{\alpha}$ =0.62; 13 items), (c) Perceived Control of Time (eigenvalue = 2.08; $\hat{\alpha}$ =0.69; 13 items), and (d) Preference for Disorganization (eigenvalue =

1.26; $\hat{\alpha}$ = 0.60; 5 items). Total TMB scores were calculated and ranged from 0 to 185 with a mean score of 106.4 (*SD* = 22.1) and an internal consistency of 0.83.

The TMB (Macan et al., 1990) scale was used in its entirety in a study examining the relationship between academic stress to student anxiety, time management, and leisure satisfaction in a sample of 249 full-time undergraduate students (Misra & McKean, 2000). The alpha coefficients calculated in this study were higher than the original 1990 study for Mechanics ($\hat{\alpha}$ =.85) and Preference for Organization ($\hat{\alpha}$ =.80), and similar to the original study for Setting Goals and Priorities ($\hat{\alpha}$ =.84) and Perceived Control of Time ($\hat{\alpha}$ =.67).

A modified version of the TMB scale (Macan et al., 1990) was used to examine university students and the relationship between time management, trait procrastination, and academic behavior (Lay & Schouwenburg, 1993). Following factor analysis of the 25-item modified TMB scale, 22 items were retained across three factors (Mechanics of Time Management, *n*=8, $\hat{\alpha}$ =.79; Setting Goals and Priorities, *n*=7, $\hat{\alpha}$ =.83; and Perceived Control of Time, *n*=8, $\hat{\alpha}$ =.74). The three factors identified in this study were very similar to three of the four factors obtained in the original TMB scale study (Macan et al., 1990). The Preference for Disrganization subscale (Macan et al., 1990) was also translated into Greek and confirmatory factor analysis supported the 4-item structure (Zampetakis et al., 2010).

In 1994, Macan modified the TMB scale based on the results of an exploratory factor analysis of 353 employees responses resulting in a 29-item, three subscale version: Goal Setting/Prioritizing (*n*=10, Mechanics of Time Management (*n*=11), and Preference for Organization (*n*=8) (Macan, 1994). The Perceived Control of Time Scale was also included as a separate scale (*n*=5, $\hat{\alpha}$ =.68). Confirmatory factor analysis later conducted to test the underlying structure of the 33-item TMB scale using 522 employed adults (64% women) resulted in a three factor model (Adams & Jex, 1997). The three factor model was then compared to a two factor model and results showed that the three factor model was significantly better than the two factor model (χ^2 =130.29; *p* < .01). These results provide additional support for the underlying factor structure of the TMB (Adams & Jex, 1997). Despite the belief that time management is multidimensional (Macan et al., 1990), no comparisons between a three factor TMB solution and a model with a greater number of factors have been made. This is regrettable because an exploratory examination of the factor structure of the TMB scale with 453 American working adults identified five factors (explaining 59.3% of the variance; Mudrack, 1997).

The *Time Management Questionnaire* (*TMQ*: Britton & Tesser, 1991) is a 35- item instrument based on the time management model developed by Britton and Glynn (1989). This model separates time management into the following seven components: (a) Choosing Goals and Sub-goals, (b) Prioritizing Goals, (c) Generating Tasks and Subtasks, (d) Prioritizing Tasks, (e) Listing Tasks on a To-Do List, (f) Scheduling Tasks, and (g) Carrying out Tasks (Britton & Glynn, 1989). Ninety male and female undergraduate psychology students participated in the development of the TMQ. Each of the 35 items was answered on a 5-point response scale consisting of the responses *always*, *frequently*, *sometimes*, *infrequently*, and *never* with higher values on the scale corresponding to better time management practices. Results of a factor analysis identified 18 items with item-factor loadings of more than 0.40 across 3 factors: (a)

Short Range Planning (accounting for 16% of the total variance), (b) Time Attitudes (accounting for 11% of the total variance), and (c) Long Range Planning (accounting for 9% of the total variance). Total scores on the TMQ were calculated and ranged from 52 to 123 with a mean of 91.0 (*SD* = 14.0).

A modified version of the TMQ scale (Britton & Tesser, 1991) was used to compare the time management behaviors of British mature students to traditional-entry students (Trueman & Hartley, 1995; 1996). Factor analysis did not replicate the original three-factor structure. Instead, factor analysis of the shorter (14 item), modified scale resulted in a 5-item Daily Planning subscale ($\hat{\alpha}$ =.85), a 9-item Confidence in Long-term Planning subscale ($\hat{\alpha}$ =.71) and an overall scale ($\hat{\alpha}$ =.79). Another modified TMQ scale was translated into Greek in order to study the relationship between time management and creativity (Zampetakis et al., 2010). Ten items from the original TMQ scale (Britton & Tesser, 1991) used by Trueman and Hartley (1996) reflecting Daily Planning (5 items; $\hat{\alpha}$ =.82) and Long-term Planning (5 items; $\hat{\alpha}$ =.72) were selected for translation. Confirmatory factor analysis results supported the Daily Planning and Long-term Planning factors (Zampetakis et al., 2010).

The TMQ scale (Britton & Tesser, 1991) was also used in its' entirety in order to examine the Western process models of time management in an African culture (Mpofu et al., 1996). Factor analysis of the TMQ with a sample of 472 Shona speaking (Zimbabwe) teacher candidates replicated the original three factor model demonstrating some evidence of cross-cultural replicability (Mpofu et al., 1996). The original 18-item TMQ was also translated into Spanish and administered to 137 high school students (Garcia-Ros et al., 2004). Factor analysis of the Spanish TMQ scale reproduced the original TMQ scale structure of three subscales: Short-range Planning (7 items; $\hat{\alpha}$ =.81), Time Attitudes (4 items; $\hat{\alpha}$ =.64), and Long-range Planning (4 items; $\hat{\alpha}$ =.60). The Spanish TMQ was also submitted to a confirmatory factor analysis which confirmed the three factor model (Garcia-Ros et al., 2004).

The TMQ scale (Britton & Tesser, 1991) was also translated into Turkish (Allay & Koçak, 2002). Following factor analysis, the Turkish TMQ appeared to consist of three subscales: Time Planning (16 items, $\hat{\alpha}$ =.88), Time Attitude (7 items, $\hat{\alpha}$ =.66), and Time Consumers (4 items, $\hat{\alpha}$ =.47) (Allay & Koçak, 2002). The Turkish TMQ was then retranslated and modified (Cemaloglu & Filiz, 2010). Administration of the modified Turkish TMQ to 65 participants resulted in slightly higher internal consistency values: Time Planning (16 items, $\hat{\alpha}$ =.89), Time Attitude (7 items, $\hat{\alpha}$ =.67), and Time Consumers (4 items, $\hat{\alpha}$ =.56). The modified Turkish TMQ was then used to examine the relationship between academic achievement of university students and time management (Cemaloglu & Filiz, 2010).

The *Diabetes Time Management Questionnaire* (*DTMQ:* Gafarian et al., 1999) is a 49-item questionnaire designed to assess general time management skills and time management skills specifically relevant to compliance to a diabetes healthcare regimen. The 49 items were derived based on a review of the time management and diabetes education and compliance literature. Time management was believed to involve a set of complex skills including behavioral outcomes such as accomplishing tasks, making and following a schedule, using a daily planner, feeling in control of one's time, prioritizing tasks, problem solving, making lists,

delegating, breaking down tasks into small components, assertiveness, being organized, monitoring one's use of time, and engaging in self-reinforcement for task completion. Thus, each facet of time management was assessed with only a few items. Each item was assessed by the research team for content validity, redundancy, and clarity and only items with 100% agreement were retained. Each item was assessed using a 5-point Likert-type scale ranging from 1 O*ften* to 5 *Never*. Sixty individuals with diabetes ranging in age from 19 to 82 years (*SD* = 16.2) completed the scale. Mean scores on the DTMQ ranged from 49 to 245 with a mean score of 120.6 (*SD* = 21.2). Internal consistency of the DTMQ yielded a coefficient alpha of 0.82 and two-week test-retest reliability computed on 49 responses was high (r_{xx} = 0.81). Factor analysis of the DTMQ was not conducted (Gafarian et al., 1999, p. 590).

The *Time Management for Exercise Scale (TiMES:* Hellsten, 2005; Hellsten & Rogers, 2009) is a 32-item scale designed to assess time management skills specifically for exercise. The TiMES was developed using the TPB and based on the TMB scale (Macan, 1994). An iterative methodology incorporating both content related evidence of validity (i.e., expert judgments as to relevance and representativeness of items) and structural validity (i.e., factor analysis) was used to construct the TiMES (Hellsten & Rogers, 2009). The TiMES consists of 4 subscales: Exercise Importance (8 items; $\hat{\alpha}$ =.91), Exercise Documentation (8 items; $\hat{\alpha}$ =.91), Ability to Manage Time for Exercise (8 items; $\hat{\alpha}$ =.73), and Setting Exercise Goals (8 items; $\hat{\alpha}$ =.85). Each item was rated on a 5-point Likert type scale ranging from 0 *does not describe me at all* to 4 *describes me very well*. A total of 704 university students completed the TiMES and mean scores on the subscales ranged from 6.2 (*SD*=7.40) to 21.30 (*SD*=5.60) (Hellsten & Rogers, 2009). No stability reliability information was provided.

4.5 Critique of research based instruments assessing time and time management

The purpose of this critique is to critically examine and evaluate the ten time-related instruments in terms of validity and reliability. Each of the instruments was evaluated according to the minimum requirements of test development. These requirements include the instruments' theoretical framework, definition of the construct, and information on the psychometric properties of the instrument including validity, reliability, and item statistics (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999).

4.5.1 Validity

Validity is an overall evaluative judgment of the degree to which empirical evidence and theoretical rationales support the adequacy and appropriateness of interpretations based on all assessments including questionnaires (Messick, 1989, 1995). This comprehensive view of validity integrates considerations of content, criteria, and consequences into a construct framework (Messick, 1995). Validation of an instrument calls for the integration of different sources and types of evidence (Cronbach, 1971). Therefore, for the purposes of this critique, validity will be differentiated into distinct aspects in order to critically examine the existing time management instruments. As validation is a continuing process (Messick 1995), none of the instruments reviewed are expected to be *fully* valid, but each instrument should possess some evidence of validity.

Theoretical framework. The construction of an instrument should begin with a theory about the behavior, which is derived from prior research (Cronbach, 1971). Thus, each of the instruments reviewed should be grounded in a theory of time or time management. Of the ten instruments identified, seven did not describe a theoretical framework for the instrument (i.e., Bond & Feather, 1988; Calabresi & Cohen, 1968; Gafarian et al., 1999, Macan et al., 1990; Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973). The remaining three instruments were based on different theoretical frameworks (i.e, Britton & Tesser, 1991; Landy et al., 1991). For example, the TUS was based on personality theory, specifically, the Type A behavior pattern (Landy et al., 1991), while the TMQ was based on research involving computer operating systems (Britton & Tesser, 1991). Latter research involving the TMB (Macan et al., 1990) did incorporate the TPB (Macan, 1994). The TiMES (Hellsten, 2005; Hellsten & Rogers, 2009) was developed based on the TMB scale (Macan, 1994; Macan et al., 1990) and thus also incorporated the TPB.

Content validity evidence. The content aspect of construct validity includes evidence of content relevance, representativeness, and technical quality (Lennon, 1956; Messick, 1989) including specifications of the domain boundaries and expert panel judgments (Messick, 1995). In order to construct the initial pool of items, the boundaries of the construct domain to be assessed need to be formed, especially if the instrument is not grounded in a theoretical framework. Thus, the knowledge, skills, and other attributes that are representative of the domain need to be specified (Messick, 1989).

Although the majority of the instruments (i.e., Bond & Feather, 1988; Britton & Tesser, 1991; Hellsten & Rogers, 2009; Landy et al., 1991; Macan et al., 1990, Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) specified domain boundaries, the boundaries differed. For example, the TMB was designed to assess "the behaviors critical to the construct of time management as defined in the popular literature" (Macan et al., 1990, p.761). These behaviors included setting goals and priorities, learning to say "no", making a to-do list, organizing, planning, delegating, and procrastinating (Macan et al., 1990). In contrast, the TAQ (Calabresi & Cohen, 1968) was designed to measure time attitudes and orientation to time but provides few boundary details. Similarly, although the DTMQ (Gafarian et al., 1999) is based on several elements of time management, the boundaries of time management were not set for this instrument. Gafarian et al. (1999) freely state that, "…the definition of time management has not been explicated." Lack of construct boundaries may pose a threat to the validity of the instrument through construct under-representation and irrelevance (Messick, 1989).

Item and scale content relevance. Following the definition of the construct of interest, a set of items is developed. The relevance, and thus the construct validity, of five of the scales for time management (i.e., Bond & Feather, 1988; Calabresi & Cohen, 1968; Landy et al., 1991; Schriber & Gutek, 1987; Wessman, 1973) may be threatened. Although these scales assess time in some manner, they were created for different purposes (i.e., measure time structure not time management), and therefore, not all of the content corresponds to the skills and behaviors that define time management.

Despite being developed for different purposes, there are similarities among these scales. For example, with the exception of the items comprising the time flexibility factor of the TAQ, the structured routine, effective organization, sense of purpose, and the persistence

items of the TSQ (Bond & Feather, 1988), the time utilization and long term personal direction items of the TEQ (Wessman, 1973), and the time submissiveness and time possessiveness items of the TAQ are similar. There are also similarities among subscales of instruments developed to measure other aspects of time and instruments developed explicitly for time management. The TMB has been shown to have concurrent validity through significant correlations with the TSQ (r =.69, p < .001) and the TEQ (r = .54, p < .001) (Shahani et al., 1993). Furthermore, the Setting Goals and Priorities subscale of the TMB (Macan et al., 1990) is significantly related to the structured routine, effective organization, sense of purpose, and the persistence factors of the TSQ, the time utilization and long term personal direction factors of the TEQ, and the time submissiveness, time possessiveness, and time flexibility factors of the TAQ (Shahani et al., 1993).

Expert judgment. Content relevance and representativenes of the items are traditionally appraised by expert professional judgment (Messick, 1995). The scale items need to meet the scrutiny and criticism of the experts (Cronbach, 1971) and consequently, the soundness of the instrument is no better than the writers and reviewers of the items (Cronbach, 1971). In five of the studies (Britton & Tesser, 1991; Calabresi & Cohen, 1968; Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) the identity of the item writers were not revealed; in the remaining four studies (Bond & Feather, 1988; Gafarian et al., 1999; Landy et al., 1991; Macan et al., 1990) the research team was responsible for writing and modifying the items.

Furthermore, for the majority of the instruments (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Macan et al., 1990, Schriber & Gutek, 1987; Weber & Vogel, 1979; Wessman, 1973) there was no reference to any type of expert review of the items. For both the behaviorally anchored TUS and the DTMQ, an expert review of items was conducted, but the reviewers were either the research team or undergraduate students (Gafarian et al., 1999; Landy et al., 1991). For example, in the adaptation of the TUS to a behaviorally anchored rating scale, undergraduate students were used as expert judges of relevant time urgency dimensions, response anchors, scaling, and content validity (Landy et al., 1991). It is questionable whether undergraduate students are subject matter experts in time urgency and thus the use of undergraduate students as expert judges may weaken the validity of the scale. The TiMES (Hellsten, 2005; Hellsten & Rogers, 2009) was the only scale to incorporate an extended expert review and analysis of judgments.

The DTMQ and the TiMES were the only instruments to explicitly address the technical quality and clarity of the items, "The research team reviewed each item for content validity, comprehensiveness, redundancy, and clarity. Those items meeting 100% agreement were retained" (Gafarian et al., 1999, p. 588). However, the use of the research team to judge the quality and clarity of the items developed may also be inappropriate as the judgments made may be biased. The TiMES (Hellsten, 2005; Hellsten & Rogers, 2009) included a technical review as part of the expert review of the items.

Structural validity. It is not enough that expert judgments are made to test whether the content is relevant to the proposed instrument use. There is also a need to examine the structural validity, or the underlying dimensional structure, of the instrument (Messick, 1995). Factor analysis is often used as a tool for gathering construct validity evidence (Messick, 1995). Validity evidence is gathered through a match between hypothesized and statistical factor loadings. Items that by hypothesis are indicators of a certain construct are

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expected to show substantial loadings on the same factor. When an item loads on another factor, this shows that the indicator is impure (Cronbach, 1971). Of the ten instruments reviewed, eight were factor analyzed (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Hellsten & Rogers, 2009; Landy et al., 1991; Macan et al., 1990; Schriber & Gutek, 1987; Wessman, 1973). However, the original factor analysis results of the TEQ and the TMQ instruments (Britton & Tesser, 1991; Wessman, 1973) may be unstable due to the number of items analyzed and sample size. In each case, a large number of items (k = 35 and k = 80) were analyzed using a small number of participants (n = 90 and n = 110) (Britton & Tesser, 1991; Wessman, 1973).

Time management appears to be a multidimensional construct (Macan et al., 1990), and thus any instrument assessing time management should include several subscales and subscale scores should be calculated (Mudrack, 1997). When a total score is used to represent time management, differential relationships among subscales and between subscales and other variables will be impossible to detect due to the aggregation of the subscales (Cronbach, 1971). Of the eight instruments that were factor analyzed, five calculated subscale and total time management scores (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Macan et al., 1990; Wessman, 1973) while three instruments, the Time-At-Work questionnaire (Schriber & Gutek, 1987), the TUS (Landy et al., 1991), and the TiMES (Hellsten, 2005; Hellsten & Rogers, 2009) only provided subscale scores.

There have also been problems with the use of the subscale scores for some of the instruments. Specifically, in terms of the TMB scale, the composition of the subscales has not been consistent across researchers or studies raising concerns about the comparability of research findings (Mudrack, 1997). For example, Macan (1994) modified the TMB scale resulting in a 33-item, three subscale version. Similarly, in response to the fact that the original TMB scale (Macan et al., 1990) had relatively weak factor structure coefficients of less than or equal to 0.40, Lay and Schouwenburg (1993) used truncated 7-item versions of three of the TMB scales in their research.

In order to support a construct validity argument, confirmatory factor analysis should also be used to assess the model and the instrument. The TMB, TMQ, and the TiMES were the only scales to be factor analyzed using a confirmatory perspective. Furthermore, the time management literature has consistently suggested that time management is composed of at least three factors. For the eight instruments that were factor analyzed (Bond & Feather, 1988; Britton & Tesser, 1991; Calabresi & Cohen, 1968; Hellsten & Rogers, 2009; Landy et al., 1991; Macan et al., 1990; Schriber & Gutek; Wessman, 1973), all but one (Britton & Tesser, 1991) resulted in interpretable solutions of four or more factors. Although the concept of parsimony is integral to factor analysis, parsimony can also be dangerous and threaten construct validity.

Of the five scales that propose to assess time management explicitly (Britton & Tesser, 1991; Gafarian et al., 1999; Hellsten & Rogers, 2009; Macan et al., 1990; Weber & Vogel, 1979), not all of the scales include items that are representative of the whole domain of time management. According to popular research, time management behaviors and skills include awareness of time and self, planning, setting goals, prioritizing, scheduling, organizing, documentation, and establishing good time management habits (Barkas, 1984; Feeny Jonson, 2002; Jorde, 1982; Lakein, 1973; Mackenzie, 1972, 1975, 1990; Morris, 2001). Four of the scales

appear to assess the majority of these behaviors (DTMQ, Gafarian et al., 1999; TiMES, Hellsten & Rogers, 2009; TMB, Macan et al., 1990; and TMQ, Britton & Tesser, 1991) but each of the time management behaviors is only assessed using a few items. For example, the TMQ (Britton & Tesser, 1991) consists of three factors (short-range planning, time attitudes, and long-range planning) but assesses both setting goals and time management documentation with only two items. The use of only a few items to assess each time management skill and behavior may lead to an under-representation of the whole domain of time management. This source of instrument invalidity has serious adverse consequences and may negatively impact an individual's scores. Inaccurate scores, and inaccurate interpretations, should not occur because something relevant to the focal construct is missing (Messick, 1995).

4.5.2 Reliability

Evidence of reliability consistent with the construct's meaning is simultaneously evidence of construct validity (Mesick, 2000). One measure of reliability is internal consistency, which is an index of both item homogeneity and item quality (Crocker & Algina, 1986). When examinees perform consistently across items within an instrument, the instrument is said to have item homogeneity (Crocker & Algina, 1986). However, the amount, type, and quality of reliability evidence presented with each of the ten instruments were variable. For example, Weber and Vogel (1979), and Britton and Tesser (1991) did not did not present reliability evidence. Conversely, Wessman (1973), Bond and Feather (1988), and Gafarian et al. (1999) presented reliability evidence (in the form of Cronbach's alpha) for the total score but no evidence of subscale reliability. Conversely, Calabresi and Cohen (1968) and Schriber and Gutek (1987) presented only subscale reliability evidence in the form of Cronbach's alpha. Landy et al. (1991) (using coefficient alpha) and Macan et al. (1990) (using inter-item reliability) presented evidence of both subscale and total scale reliability. Hellsten and Rogers (2009) presented evidence of subscale reliability only.

Internal consistency coefficients should also be at least 0.70 in magnitude (Nunnally, 1978). The TAQ (Calabresi & Cohen, 1968), TMB (Macan et al., 1990), TUS (Landy et al., 1991), and Time-At-Work questionnaire all presented subscales with internal consistency coefficients less than 0.70. For both the TAQ and the TMB, three of the four subscales had moderate internal consistency estimates ranging from 0.47 to 0.69, while one subscale of the TUS had an internal consistency estimate of 0.69 (Calabresi & Cohen, 1968; Landy et al., 1991; Macan et al., 1990). The Time-At Work questionnaire reported internal consistency estimates ranging from the low 0.50's to 0.80. In addition, despite the higher internal consistency estimate of 0.82 presented with the 49 item DTMQ (Gafarian et al., 1999), the stability of the estimate is questionable due to a very small sample size (n = 47).

The stability of the test scores (test-retest reliability) may also be relevant to construct validation depending upon the theory defining the construct (Cronbach & Meehl, 1955). Test-retest reliabilities are important because the users of a time management scale will most likely be interested in tracking changes over time. If respondents do not respond consistently to the items or have different ideas about what independent performance is, it may be difficult to interpret what score changes mean (Haneghan, 1995). Three studies provided evidence of test-retest reliability (Bond & Feather, 1988; Gafarian et al., 1999; Landy et al., 1991). The estimates ranged in value from 0.76 to 0.95 with test-retest lengths of

4 months, 2 weeks, and 15 weeks, respectively. However, none of these studies provided a rationale for the test-retest time period chosen. As different test-retest estimates of reliability can occur with different use of time periods (Crocker & Algina, 1986), these results may be questionable.

4.5.3 Summary

Of the four instruments developed specifically to assess time management and which presented information regarding the scale construction process - TMQ, DTMQ, TiMES, and TMB - the TMB (Macan et al., 1990) and TMQ (Britton & Tesser, 1991) appear to possess the strongest evidence of reliability and validity for a general measure of time management. In comparison the TiMES (Hellsten & Rogers, 2009) appears to possess evidence of validity for the self-report of exercise related time management and the DTMQ (Gafarian et al., 1999) appears to possess content validity for time management for diabetes.

The TMB was created to assess the time management skills and behaviors referred to by the popular literature (Macan et al., 1990) and as such it appears to represent the majority of the domain of time management. The TMB also appears to possess adequate construct validity evidence for academic time management with undergraduate students. Despite the low subscale reliability estimates calculated from the original sample, latter studies employing the TMB have consistently shown higher subscale reliability estimates ranging from 0.77 to 0.94 (e.g., Lahmers & Zulauf, 2000; Macan, 1994; Misra & McKean, 2000; Shahani et al., 1993).While the TMQ (Britton & Tesser, 1991) possesses content validity for time management, the construct validity of this scale is threatened by construct under-representation and a lack of reliability evidence. However, the TMQ does appear to demonstrate evidence of cross-cultural replicability. Of the instruments identified by the literature review, only the TMB (Macan et al., 1990) and the TMQ (Britton & Tesser, 1991) appear suitable for direct import into a time management program or intervention study.

5. Conclusion

Despite the widespread use of the term time management, there is currently no universally accepted definition of time management and no agreement regarding the skills and behaviors that constitute time management. In order to address these limitations, this chapter provides the first comprehensive, cross-disciplinary review, summary, and psychometric critique of existing programs and instruments purporting to assess time management behaviors. According to the review, time management is most commonly defined by: (a) time analysis, (b) planning, (c) goal setting, (d) prioritizing, (e) scheduling, (f) organizing, and (g) establishing new and improved time habits.

The results of the review of time management show that the effective use of time has long been recognized as a crucial factor for success in many different fields and many practical techniques have been devised for improving time management (Puffer, 1989). Given the widespread use and acceptance of the value of time management behaviors (Jex & Elacqua, 1999), it is unfortunate that only a modest amount of empirical research has been conducted. Furthermore, research prior to 1990 tended to focus on measuring the effectiveness of time management training as a unidimensional construct. In general, results from empirical studies have shown that the use of time management behaviors leads to more effective

performance and that perceived control over time is a very important aspect to time management. Self-reports of time management have been shown to be related to academic achievement, age, and gender (Britton & Tesser, 1991; Lahmers & Zulauf, 2000; Simons & Galotti, 1992). Good time managers appear to prefer planning and organization (Williams et al., 1995). Individuals who have previous time management training also appear to engage more frequently in time management behaviors (Britton & Tesser, 1991; Hellsten & Rogers, 2009; Macan, 1994; 1996; Macan et al., 1990; Orpen, 1993; Simons & Galotti, 1992; Williams et al., 1995; Woolfolk & Woolfolk, 1986).

The critique of time management instruments suggests that although more research is needed, the TMB (Macan et al., 1990) and the TMQ scales (Britton & Tesser, 1991) appear to possess the strongest evidence of validity and reliability in measuring general time management skills and behaviors. Future independent research is needed to confirm the psychometric characteristics of the TMB and TMQ scales with a variety of populations and in a cross-cultural manner. Additional research is also required to further develop the theoretical model of time management as many time management programs and instruments have developed atheoretically. Future research should also begin to examine the literature of self-regulation and how this literature may apply to time management.

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Time Management

Edited by Prof. Todor Stoilov

The time management is worthy goal of many human activities. It concerns variety problems related to goals definition, assessment of available resources, control of management policies, scheduling of decisions. This book is an attempt to illustrate the decision making process in time management for different success stories, which can be used as reference models by the interested audience.

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