A Glimpse at the Dark Side of Management Control:

The Impact of Management Control Systems on Job-Related Stress

Abstract: Job-related stress is associated with significant health care and societal costs. Yet, while management control systems (MCS) aim at influencing the patterns in organizational activities, little research has explored the link between MCS and job-related stress. Based on an experiment with 132 participants, we study how differences in the comprehensiveness of performance measurement, the way top-management uses performance measurement systems to manage activities, the tightness of standards, and the type of remuneration scheme used affect both pressure- and threat-dimensions of stress in young knowledge workers. Our results suggest that MCS design plays an important role in perceived job-related stress and that relations are more complex than it would seem at first sight. [112 words]

Keywords: management control, job-related stress, stressor, pressure, threat

1. INTRODUCTION

Stress is an often-lamented-about topic when talking with employees and managers. Even many colleagues in academia are increasingly complaining about stress. Not surprisingly, the subject increasingly is attracting public attention. For example, the European Union considers stress at work as one of the biggest health and safety challenges in Europe (OSHA, 2009). In fact, high job-related stress has been found to be linked to coronary heart diseases (Kivimäki et al., 2012; Steptoe & Kivimäki, 2012) and is seen as a cause of many other physiological problems such as impaired immune system functioning, gastrointestinal disorders, dizziness, headaches, trembling, and sleep disturbances (Cooper & Marshall, 1976; George & Jones, 2005; Herbert & Cohen, 1993). Moreover, recent evidence suggests that stress impairs cognitive functioning, implying that individuals who are stressed "are more likely to have an accident in the workplace because of a propensity for cognitive failures" (Day et al., 2012: 532).

Yet, consequences of high job-related stress are not limited to individuals' physical and psychological health. There is mounting evidence that high sickness rates at firms, absenteeism, burnout, emotional exhaustion, loss of productivity, high employee turnover, dysfunctional employee behavior, prolonged strikes, and frequent severe accidents are consequences of high job-related stress for organizations (Baer et al., 2015; Cooper & Marshall, 1976; Day et al., 2012; George & Jones, 2005; Jaworski & Young, 1992). Therefore, societal costs of job-related stress go well beyond the work-related health care costs. In fact, estimates of total societal stress-induced costs – including missed wages due to absenteeism, reduced productivity and health care costs – amount to $200-300 billion annually for the U.S., some $65-66 billion for the U.K., and approximately $232 billion for Japan (Miree, 2007).

As formal, information-based routines, practices, and procedures, management control systems (MCS) aim at maintaining or altering patterns in organizational activities (Simons, 1994). They affect organizational activities through communicating goals, operationalizing top-management's intended strategy to individuals' annual objectives and budgets, measuring progress in achieving these goals, and rewarding performance (e.g., Flamholtz et al., 1985; Simons, 1994). If MCS have the intended impact on the patterns in organizational activities, this is likely to profoundly affect how managers and employees experience their work – and thus very likely the job-related stress they perceive. Thus, it seems important to study how MCS – and in particular, choices in their design – are linked to job-related stress.

Yet, surprisingly little work so far has looked at the role of MCS in job-related stress. In fact, much of the recent research on MCS seems to focus on beneficial consequences of MCS, such as their contribution to enhancing innovation capability (Bisbe & Malagueno de Santana, 2009), creativity (Davila, 2010; Mundy, 2010), learning (Fried, 2010; Hall, 2010), and flexibility (Ahrens & Chapman, 2004; Widener, 2007). Thus, aside from some notable exceptions (e.g., Brownell & Hirst, 1986; Hirst, 1983; Hopwood, 1972; Shields et al., 2000), few publications have attempted to shed light on the MCS and job-related stress relationship. Given the huge societal problems linked to job-related stress and the undisputable impact that MCS have on how activities within organizations take place, more research into this subject seems highly warranted.

Drawing on a vignette experiment with 132 participants, we aim at narrowing this gap in research. We focus on the links between four key MCS design choices with the perceived job-related stress: (1) tightness of standards, (2) the comprehensiveness of performance measurement used to track progress, (3) the way top-management uses performance measurement systems to manage activities, and (4) the type of remuneration scheme used by the firm.

Our paper contributes to existing literature in at least three ways: Firstly, we shed more light on the yet largely unexplored relationship between MCS and job-related stress by looking at four key design choices of MCS, going beyond some prior work that tends to focus only on budgetary and standard tightness. We thus respond to a call by Shields et al. (2000) to shed more light on the MCS - stress-performance relationship. Secondly, while existing research has relied on cross-sectional surveys (e.g., Hopwood, 1972; Shields et al., 2000), we provide experimental evidence that allows for directional claims about the relationships. Hence, we pick up on a call by Burney and Widener (2007) for more experimental investigation into the MCS-stress-performance relations. Thirdly, we follow recent calls within occupational stress research to distinguish multiple dimensions within stress (e.g., Lazarus, 1998; Stanton et al., 2001), that so far have not been implemented in studying the MCS - stress relationship. In line with these calls, we distinguish between pressure-related and threat-related dimensions of stress.

2. THEORETICAL BACKGROUND AND HYPOTHESES

2.1 Job-related Stress: Definitions and Theories

Research on stress has a long and rich tradition that has resulted in numerous attempts to define the construct and to devise theories explaining the emergence and consequences of stress. Therefore, the term "stress" refers to a host of aspects, including the stimuli producing stress reactions, the reactions themselves and the intervening (psychological and cognitive) processes (Lazarus, 1966; Stanton et al., 2001).

Stress as sources. Traditionally, much research focused on factors that give rise to individuals feeling stressed, such as high job demands or time pressure, role ambiguity, insufficient resources, and little control over one's work, to mention just a few (Kahn et al., 1964; Lazarus, 1966, Nixon et al., 2011; Rosen et al., 2010). This line of research has led to long lists of (potential) stressors. In an attempt to bring some structure into these sources of

stress, Cooper and Marshall (1976) suggested a typology that comprises the job's inherent characteristics, the individual's role in the organization, the person's relationships at work, the career development, the life-work interface, and the organizational structure and climate. The research on stressors has equally resulted in guidelines and calls for re-designing work conditions in order to reduce the stressors a person is exposed to. For instance, to reduce strains at work, firms' top managers could emphasize the fit between job demands and individuals' abilities during the hiring process (Van Harrison, 1985), set achievable targets (Merchant & Manzoni, 1989; Shields et al., 2000), or foster a climate of trust between employees and managers (Ross, 1994).

Stress as reactions. Experiencing stress typically leads to attempts to deal with the situation – so-called "coping". Such attempts may imply changes in cognition, behavior, or physiological function. A significant number of these attempts are hard-wired, "stone-age" reactions that prepare the human organism for fight or flight, i.e. for physical activity. Some of these reactions to stress help an individual to be adaptive in the short term, but may threaten health and well-being in the long term if the stress situation persists (Cox, 1993). Emotional exhaustion and burnout are examples of these strains (e.g., Baer et al., 2015). These "strains" have triggered much of the public interest in stress – and the critique of work conditions that lead to stress. Yet, unfortunately, stress is highly personal in the sense that "employees differ in the extent to which they experience the consequences of stress, even when they are exposed to the same sources of stress" (George & Jones, 2005: 279).

Stress as the psychological and cognitive aspects intervening. Given the problems with both, and defining parsimonious but comprehensive lists of stressors and the highly personal nature of the stress experience, research on job-related stress increasingly shifts its focus of attention toward understanding the psychological and cognitive process mediating between stressors and strains (Cox, 1993; Georges & Jones, 2005). This view resides on the

assumption that individuals evaluate situations (Lazarus, 1966; Lazarus & Folkman, 1984; Magnusson 1982), and that stress is related to "a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984: 19). Since stress can thus be seen as a "tension arising from psychologically stressful circumstances in the job environment" (Kenis, 1979: 712), some scholars shifted to referring to stress as "job-related tension" (e.g., Kenis, 1979) or to using both terms synonymously, while others try to establish subtle distinctions between the two (e.g., Ross, 1994). Part of the divergence might be rooted in whether stress is seen as having a purely negative connotation or whether it is allowed to imply both negatively and positively connoted consequences, for example, increased attention and motivation. Rosen et al. (2010) for instance distinguish these two sides of stress: hindrance versus challenge stressors. Irrespective of the exact term used, research within this stream focuses on shedding light on what causes an individual to perceive a particular situation rather as pressure to excel — a situation that provides for "the spice of life" — while the individual experiences other situations as threatening (Bakker & Demerouti, 2007). Literature generally today agrees that the mediating approach to defining stress, implying that stress is as a state of tension – a feeling or emotion – is the most suitable conception of the three views (Cox, 1993).

As the last view on stress thus increasingly develops into the dominant paradigm in stress research, so do transactional theories aiming at explaining the relationship between stressors and reactions to stress by cognitive evaluation processes (Cox, 1993). Early stress research relied on an *arousal model* derived from the classical Yerkes and Dodson findings of 1908 and proposed that stressors are likely to increase motivational arousal this in turn increases focus and effort and thus performance, resulting in an inverted-U relationship between job-related stress and performance (Weick, 1983). Modern stress research, in

contrast, typically emphasizes the role of a person-environment fit (e.g. Bakker & Demerouti, 2007; Beehr & Bhagat, 1985; Van Harrison, 1985).

Following the *person-environment fit* theories, stress can be described as a psychological state that arises out of a personally significant lack of fit between individuals' perceptions of the demands on them and their ability to cope with those demands (Cox, 1993; Bakker & Demerouti, 2007). The *job-demand-resources model* enlarges this basic model by adding the notion of performance (Beehr & Bhagat, 1985; Van Harrison, 1985) and particularly focuses on the relationships between job demands, coping resources and performance. Both models see stress as a positive function of the difference between the performance demands (goals, constraints) of a task and the individual's performance capability (resources, skills) (e.g., Bakker & Demerouti, 2007; Beehr & Bhagat, 1985; Edwards, 1996; Van Harrison, 1985). A number of competing models have been advanced that aim at further refining these basic ideas about the person-environment fit, for example by spelling out more detailed how the cognitive evaluation takes place, or by considering the potential role the perceived importance of meeting the demand plays. Beehr & Bhagat (1985), for instance, emphasize the importance a person ascribes to meeting a demand in the development of stress and the duration of this situation. The therefore define stress as "a function of the perceived demands on the individual and the perceived resources and coping strength of the individual, multiplied by the perceived importance of meeting the demands and the duration of the situation" (Beehr & Bhagat, 1985:7).

The refined person-environment fit theories, which have received considerable empirical support (e.g., Hakanen et al., 2008) thus allow for much more nuanced predictions about whether certain environmental conditions are likely to lead to psychological problems, e.g. burnout, and physiological issues such as impaired immune system functioning, gastrointestinal disorders, dizziness, headaches, trembling and sleep disturbances. In

particular, they also open up the study of stress as a multi-dimensional phenomenon as "the spice of life", that is, a challenge or pressure that is likely to foster work engagement and performance, and as a threat that spells crisis. The latter is bad news for the individual, the individual's health and the firm the individual works for (e.g., Bakker & Demerouti, 2007). The former case is likely to happen if individuals feel sufficiently in control of the situation and are open to challenges, the latter if they lack a sense of control and aim at avoiding challenges, risk, and uncertainty. Such a perspective seems advantageous since it corresponds to empirical findings pointing to a two-dimensional nature of stress, comprising both a pressure and a threat dimensions (Stanton et al., 2001). It thus allows for overcoming a major weakness of earlier research that focused on one aspect, namely, threat, of stress only. It therefore has attracted criticism lately (e.g., Bakker & Schaufeli, 2008; Luthans, 2003; Wright, 2003). The recent developments in refining the person-environment fit models thus promises to provide a more balanced discussion of job-related stress, leading to refined recommendations that can deal with and re-design potential sources of job-related stress.

2.2 Literature on MCS and Stress

Extant research on management control systems (MCS) has greatly enhanced our understanding of the role of MCS in firms and consequences of differences in MCS design for outcomes such as innovation capability (Bisbe & Malagueno de Santana, 2009), creativity (Davila, 2010; Mundy, 2010), learning (Fried, 2010; Hall, 2010), and flexibility (e.g., Ahrens & Chapman, 2004; Widener, 2007). Since MCS aim to influence the pattern of organizational activities (Simons, 1994) and since the organizational structure, climate at work, and workload are a recurrently found group of stressors in stress research (e.g., Baer et al., 2015; Cooper & Marshall, 1976), the role of MCS and their alternative designs for job-related stress seem a natural research object.

Yet, a computerized search on the Business Source Complete database for such keywords as “stress” or “job-related tension” on some of the field’s prime journals (namely: Accounting, Organizations and Society, Critical Perspectives on Accounting, European Accounting Review, Journal of Management Accounting Research, and Management Accounting Research) for the period between January 1982 and September 2012 yielded virtually no hits relating to the role of MCS on job-related stress. Moreover, most of the papers that initially showed up in our keyword search turned out to deal with other topics, such as the stress experienced in the financial accounting profession, how accountants perceive their jobs, or the general satisfaction at work, without more detailed reference to stress. However, some notable exceptions exist. Moreover, when broadening the review to include also other journals and sources available on the Internet, such as working papers, traces of a very narrow but insightful stream of work on the MCS-stress-performance relation emerge.

Hopwood (1972) in his seminal study already pointed out that performance measurement may be mostly focused on financial performance or allow for the use of non-budget, i.e. non-financial measures, as well. His evidence seemed to suggest that the prior approach is associated with higher job-related stress and subordinate dysfunctional behavior rather than a more lenient use of budget-based data or the use of non-budget-based measures as the main basis. A key reason he cites is that accounting data are usually not exhaustive, and might even be biased indicators of managerial performance. Consequently, he suggests that data should be used in a consistent manner: measures of the long-term efficiency of a cost center in light of the whole organization should be preferred to measures of the short-term match of results with a given budget. Hirst (1983) in turn suggested that the relationship between Reliance on Accounting Performance Measures (RAPM) and reported stress depends on task uncertainty. When task uncertainty is low, as RAPM decreases, tension increases;

when task uncertainty is high, as RAPM increases, tension increases. Hirst (1983) shows in his paper that for highly uncertain tasks, a performance measurement system based on accounting data may be considered as an incomplete way of measuring task performance. Extant literature also suggests that trust may moderate the relationship between using accounting information for performance evaluation and job-related stress. For example, Ross (1994) finds that whenever there is a high level of trust, the use of budget-constrained or profit-linked evaluation styles usually results in lower levels of job-related tension than the use of a non-accounting performance evaluation style. Brownell and Hirst (1986) enlarge the study of interactions from two-way to three-way interactions. Their findings show a significant three-way interaction between budget emphasis, budget participation, and task uncertainty in affecting job-related tension, i.e. stress. Reduced job-related stress seems associated with combinations of either low budget emphasis and low budget participation or high budget emphasis and high budget participation.

Burney and Widener (2007) extend the discussion by exploring the link between performance measurement systems that comprise both financial and non-financial indicators linked to strategy and such stressors as role ambiguity and role conflict. While they do not explicitly measure perceived stress, their findings suggest that more comprehensive performance measurement tied to strategy reduces role ambiguity and role conflict – two sources of stress repeatedly highlighted in occupational stress literature. This finding is in line with the evidence provided by Hall (2008), which finds that comprehensive performance measurement is related to lower role ambiguity.

Besides the role of using accounting and other data in performance measurement evaluation and the participation in standard setting, the design of remuneration schemes and the provision of promotion-related incentives for stress have attracted some scholarly attention. Shields et al. (2000) find that standard-based incentives are negatively related to

self-reported levels of job-related stress. While their study – like all others so far conducted on the MCS-stress relationship – does not distinguish among different dimensions of stress, such as pressure and threat, Shields et al. (2000) make an interesting submission: "When individuals expect higher rewards for achieving a goal, they will experience less stress because the expected rewards increase performance capability by arousing and focusing effort" (Shields et al., 2000: 192). While this is in line with the classical arousal model, it seems at odd with the job-demand resources model, since higher rewards should make attaining outcomes more important for individuals (Beehr & Bhagat, 1985). Thus, instead of lowering perceived stress, expected rewards should increase it, following the job-demands-resources model. Yet, the study by Shields et al. (2000) finds a negative relationship. Likewise, Lu et al. (2000) find a negative relationship of promotion-related incentives with job stress.

The existing evidence from management control research seems not to fit the job-demands resources model well, and suggests that further investigation of the effects of rewards on stress remains warranted. Besides questions of reverse-causality in the existing cross-sectional empirical evidence on the reward-stress relationship, one might suspect that part of the explanation for the divergence might lie in whether studies (consciously or unconsciously) capture one of the two dimensions of stress only. That might affect results if the effects differ in direction for the two dimensions. Moreover, existing evidence does not tease out the respective effects of performance measurement comprehensiveness and the provision of rewards as such. The existing evidence might thus potentially confound evidence on the comprehensiveness versus the provision of rewards.

Findings are more in line with theory-based expectations for the extensive literature that investigates the consequences of standard tightness (e.g., goal difficulty, budgetary slack) on stress (e.g., Kenis, 1979; Parasuraman & Alutto, 1981; Shields et al., 2000). Standard

tightness refers to "the amount of resources needed to perform at the level of a standard minus the amount of resources provided to perform" (Shields et al., 2000, p. 190). Kenis (1979) finds that easily attainable goals fail to present a sufficient challenge to participants and hence have little motivational effect; on the other hand, very tight and particularly unattainable goals cause a feeling of failure and have strong demotivation and frustration effects, leading in turn to an increase in job-related tensions and a decrease in job satisfaction. Based on the job-demand-resources model, we can expect that as standard tightness increases, job-related stress increases, due to task demands taxing or exceeding resources and thereby creating uncertainty about goal attainment. Consistent with this, Shields et al. (2000) find that there is a negative relationship between standard tightness and performance, operating through the intervening variable of job-related stress that increases as standards become tighter. Hence, standard tightness can imply more job-related stress.

The study by Shields et al. (2000) is in fact one of the few studies shedding light upon the consequences of perceived stress caused by MCS. They find a negative relationship between job-related stress and individual performance. In contrast to the classical arousal model of stress, higher MCS-induced stress hence seems not to lead to enhanced performance. The evidence provided by Jaworski and Young (1992) in turn suggests that an increased level of stress will increase dysfunctional behavior, i.e. a conscious violation of established rules and procedures. Similarly alarming is that Chabrak et al. (2011) identify changes in the performance-measurement system (PMS) toward a stronger financially-oriented PMS – emphasizing shareholder value and deemphasizing non-financial objectives – to be a root cause of growing absenteeism and suicides at a large European telecommunications firm.

The existing research on the MCS-stress link thus provides both insightful and worrisome findings. They underscore the importance of understanding the MCS-link comprehensively, in order to design MCS in a manner that maximizes their benefits while

keeping negative consequences at bay. However, the existing research still leaves many questions unanswered.

These questions pertain not only to the relation of other, as-yet unstudied MCS and their design alternatives with stress, but also to the generalizability of findings, direction of relations, conceptualization of stress, potential confounding of the role of performance measurement with the provision of performance-based rewards and so on. For example, existing research does not explicitly account for the multi-dimensional nature of stress in the empirical set-ups, thus making it hard to truly evaluate the consequences of alternative MCS or their varying designs. Moreover, extant work either is based on case studies (e.g., Chabrak et al., 2011) or relies on cross-sectional survey evidence (e.g., Burney & Widener, 2007; Shields et al., 2000). Whereas the former group raises questions about how well the findings generalize to other firms, the latter is unable to establish a causal direction. Given the significant societal costs ascribed to job-related stress, the objective of MCS is to affect the patterns of organizational activities (Simons, 1990; 1994), and the still scarce insights into how this impacts the patterns of organizational activities relates to job-related stress, more research on the subject seems warranted. Thus, the call for research shedding light on the MCS-stress relationship by Shields et al. (2000) remains topical today.

2.3 Hypothesis development

We aim to contribute to narrowing this gap in research. We respond to the call by Shields et al. (2000) to further explore the MCS-stress relationship by experimentally investigating the role of four key MCS design choices for perceived job-related stress.

To facilitate cumulative knowledge development regarding the MCS-stress relationship, we emulate Shields et al. (2000), and include standard tightness as one of the design choices studied for explaining stress. Yet, we refine the investigation of this relationship by employing the recently developed two-dimensional perspective of stress (e.g.,

Bakker & Demerouti, 2007; Stanton et al., 2001). That is, we allow for a pressure dimension of stress that should foster work engagement and performance, while at the same time also allowing for a threat dimension of stress that may entail effects such as burnout, fatigue or health and societal problems.

Besides broadening the perspective of stress, we add three other MCS design choices that Shields et al. (2000) did not study: (a) the comprehensiveness of the performance measurement system used, (b) the degree to which top management uses the performance measurement system in an interactive way, and (c) whether the firm employs a flat salary or a pay-for-performance remuneration system. We follow the arguably dominant view on stress as a psychological phenomenon caused by certain stressors and leading to certain strains. Moreover, we will use the terms "job-related stress" and "job-related tension" interchangeably, without implying either a purely positive or a purely negative connotation.

Standard tightness. Following the job-demand-resources model (Bakker & Demerouti, 2007), the stress individuals experience depends on their perceived fit along two dimensions (Van Harrison, 1985): the fit between individuals' motives and supplies, and the fit between demand and abilities. Both are "a function of (1) the perceived uncertainty of obtaining outcomes, (2) the perceived importance of these outcomes, and (3) the perceived duration of the uncertainty" (Van Harrison, 1985, p.37).

Misfit in terms of supplies, i.e. "sustained tension that occurs when the environment threatens not to provide the supplies that the individual seeks" (Van Harrison, 1985, p. 37) – or at least a perception of such a misfit – entails feelings of stress. Tight standards and budgets imply that obtaining valued outcomes is more difficult and success more uncertain than under conditions of slack resources. Since most firms employ annual budgets, tight budgets and the resulting uncertainty for an individual about the success in attaining valued outcomes (or preventing disliked ones) are not a short-term situation. Since the duration of the

misfit plays a role in the stress experienced (e.g., Beer & Bhagat, 1985; Van Harrison, 1985), tight financial budgets should stress individuals. Extant empirical work on standard or budgetary tightness (e.g., Kenis, 1979; Shields et al., 2000) supports these predictions from the job-demand-resources model.

Similarly, misfit in terms of the abilities available to face demands, that is, through objectives exceeding personal skills, knowledge or cognitive and physical abilities, lead to stress. In line with these predictions of the job-demand-resources model, Nixon et al. (2011) find in a recent meta-analysis of 79 studies that high workload demands shows significant positive correlations with physiological strains, such as backache, headache, eye strain, sleep disturbances, etc.

Extant literature does not suggest that misfits relating to supplies or abilities affect the two dimensions of stress discussed in literature differently. Both perceived pressure and perceived threat should increase as standards or budget tightness rise. Therefore, based on the job-demand-resources model and in line with previous research on standard tightness, we arrive at the following first hypothesis:

Hypothesis 1: *Standard tightness increases both dimensions of perceived psychological stress, pertaining to pressure and threat respectively.*

Comprehensiveness of performance measurement. Whereas standard tightness should drive up perceived stress, the comprehensiveness with which performance is measured should lower at least one of the two dimensions of stress. Most outcomes of tasks and jobs today are multi-dimensional in nature (Osterloh & Frey, 2000) – outcomes of a sales rep's activities, for example, typically not only relate to the sales volume and dollar amount achieved, but also to customers' or clients' satisfaction, and so on (Merchant & Van der Stede, 2012). Performance measurement, i.e. the process of quantifying the efficiency and effectiveness of an individual,

a group or an action via a set of measures, therefore can cover just one or many of these different dimensions (Holmström & Milgrom, 1991).

Over the last three decades, performance measurement has evolved from systems with a few measures focused on financial outcomes to more balanced systems comprising both financial and non-financial indicators (Burney & Widener, 2007). Examples of such systems are the balanced scorecard (Kaplan & Norton, 1992), the tableau de bord (Epstein & Manzoni, 1998; Bourguignon al., 2004), marketing dashboards (Pauwels et al., 2009) or corporate social performance scorecards (Chatterji & Levine, 2005).

Hopwood (1972) suggests that a performance measurement that mostly focuses on financial performance implies more job-related tensions and subordinate dysfunctional behaviors, since the PMS can be seen as a biased indicator of managerial performance. Similarly, Weick (1983) claims that simple reporting will only be able to grasp a small portion of an environment's complexity, which should increase the level of stress that individuals experience. Likewise, Burney and Widener (2007) suggest that more comprehensive performance measurement systems reduce role-related stress by lowering role ambiguity.

Such an impact of the comprehensiveness of performance measurement on perceived stress can be derived from the job-demand-resources model. Broadening the assessment of performance to comprise both financial and non-financial aspects is likely to lead to a more complete grasp of an individual's or group's (multi-dimensional) tasks and performance. Since non-financial indicators commonly "lead" to financial ones (Kaplan & Norton, 1992), an assessment of performance based on such leading indicators should reduce the uncertainty individuals perceive about attaining certain outcomes. While the financial indicators used in the performance measurement may still suggest mediocre performance, the non-financial ones may already "forecast" strong performance in the upcoming periods. Provided that an

organization takes comprehensive performance measurement seriously, such a situation should thus entail a more favorable evaluation of an individual's or group's performance than in the case of a performance measurement purely focused on financial measures.

Individuals tend to perceive performance evaluation as a stressful process that threatens their self-esteem (Mallinger & Greiner, 1981). Thus, a performance measurement system that draws a more balanced picture of the performance by including non-financial indicators along with financial ones should lead to less perceived threat than a one-dimensional system concentrated only on financial performance. The comprehensiveness of the performance measurement system might therefore decrease the perceived threat, which is felt when somebody feels endangered since the judgment is made on a rational and exhaustive basis. In addition, if one failed to succeed on one dimension, there still are other dimensions on which one may have attained good outcomes, which is likely to be reassuring for the person whose performance is being judged. Finally, a more comprehensive measurement of performance may also provide more job-relevant information and help clarify the organizations' expectations more clearly. Reduced uncertainty about one's role and the organizations' expectations should lower perceived stress (Burney & Widener, 2007). Therefore, and in line with the job-demand-resources model, more comprehensive performance measurement systems should imply lower levels of perceived threat-related stress.

However, the comprehensiveness of the performance measurement system might also create more pressure on individuals, since being evaluated on multiple dimensions forecloses "taking shortcuts" (e.g., Holmström & Milgrom, 1991). As Burney and Widener (2007: p. 46n) exemplarily point out, such a measurement system "informs the manager that she cannot shirk her responsibilities in either quality or satisfaction to save costs." Building on the job-demand-resources model, increasing the comprehensiveness of a performance measurement

system might increase the perceived demands on individuals, and the misfit between their perceived demands and their perceived resources. Measuring performance in a multi-dimensional manner might make the respective individuals feel that their task is more difficult to accomplish. Hence, individuals may feel more pressured to exert high effort to achieve good performance in multiple dimensions.

Thus, we propose that rising comprehensiveness of the performance measurement system will be positively linked to an increase in the pressure dimension of perceived stress, but negatively to the threat dimension.

Hypothesis 2: *Comprehensiveness of performance measurement systems heightens the pressure dimension of perceived psychological stress, but reduces the threat dimension.*

Top management's use of PMS. Simons (1990; 1994) deserves the credit for heightening scholars' and practitioners' awareness of the fact that the way measures are used by superiors might matter just as much as what gets measured. His distinction between a diagnostic use and an interactive use of performance measurement systems suggests that the different uses may not only affect such outcomes as firm innovativeness, but also individual well-being. Early on, Hopwood (1972) argued that the manner in which accounting data is used is crucial, and has an impact on job-related tensions of managers being evaluated. Moreover, a growing body of research in organizational behavior and psychology studies the links between leadership styles and well-being at work. Nielsen and Munir (2009), for example, find a visionary and creative style of leadership that inspires employees and helps to positively influence subordinates' affective well-being. Nyberg et al. (2011) in turn find that an unsupportive management style leads to poor psychological well-being of employees.

Simons' (1990; 1994) concept of interactive use of PMS differs from the uses of accounting data envisioned by Hopwood (1972) and the leadership or the interpersonal

conflicts studied in organizational behavior literature. Nevertheless, these insights have some relevance for the issue of how top management's use of PMS relates to perceived job-related stress. It seems likely that an interactive use of PMS will have similar consequences for job-related stress as do the absence of interpersonal conflicts with supervisors, and a constructive – as opposed to a destructive – managerial leadership. A management control system "can be labeled as *interactive* when top managers use that system to *personally and regularly involve themselves in the decision of subordinates*" (Simons, 1991, p. 49). In the case of performance measurement, this implies that the information generated by the PMS must receive recurring acute attention from the highest levels of management as well as operational managers at all levels of the organization, that the data gets interpreted and discussed in face-to-face meetings, and that "the process relies on the continual challenge and debate of underlying data, assumptions, and action plans" (Simons, 1987: p. 351n).

This permanent involvement of top management in the day-to-day use of performance measures signals the importance they wield on the search for better understanding of the organization's situation. Using a PMS interactively permits not only studying the results of a given individual, group or entity, but also allows for fostering a shared understanding of a more global picture by involving all hierarchical levels in the discussion. This should help align expectations and activities within a firm across the multiple hierarchical levels, thereby reducing the risk of misunderstandings, conflicting action plans, setting of unrealistic goals, or insufficient resource allocation. All of these risks reduce the probability that an individual will achieve the results wished for by top managers, and thus increase the uncertainty that the individual will obtain valued outcomes or avoid unwanted ones.

Therefore, we expect that an interactive use of PMS by top managers that supports individuals in dealing with environmental uncertainty, builds on regular face-to-face

interaction, and is non-intrusive, will lower both the perceived pressure and the threat dimension of stress emanating from PMS systems.

Hypothesis 3: Interactive use of performance measurement systems reduces perceived psychological stress.

Pay-for-performance schemes. Pay-for-performance schemes have seen widespread application in recent years. They imply that a part of an individual's income depends on the performance achieved on one or multiple criteria. Shields et al. (2000) submit that variable compensation systems should lower perceived stress, but the job-demand-resources model predicts differently. Following, for example, Beehr and Bhagat's model (1985), and provided that an individual values monetary rewards, the very existence of a financial incentive linked to the performance of an individual should increase the perceived importance of attaining "good" performance that allows obtaining the expected reward (or desired outcome, more generally). In the job-demand-resources model, however, higher importance results in increased perceived stress (e.g., Beehr & Bhagat, 1985; Van Harrisson, 1985). In the same vein, Locke and Taylor (1991) establish that a job or a career can allow the pursuit of several values (such as material values, achievement-related values, social relationships, and so on); when potential obstacles hamper the achievement of these values, these obstacles are perceived as a threat to one's physical well-being or self-esteem, and stress is experienced as work. For example, obtaining no raise or no promotion or losing one's job are potential causes of stress (George & Jones, 2005), since they prevent one from achieving the material values. Failure at one's job or loss of interesting work also threaten the achievement-related values.

Therefore, as George and Jones (2005) note, providing employees with strong bonuses for achieving high performance can be expected to result in a certain level of stress. However, the stress in this case should be energizing as opposed to threatening – it pushes individuals to

benefit from the opportunity, but it is unlikely to heighten anxiety (*ibid.*). After all, a typical pay-for-performance scheme does not affect the threat dimension of stress, as it implies a gain and not a loss (however, a malus system instead of a bonus system might have the reverse effects). Thus, we expect that the impact of pay-for-performance schemes in rewarding individuals will not exhibit a parallel impact on both the pressure and the threat dimension of perceived stress.

While this distinction does not fully explain why Shields et al. (2000) arrived at a negative relationship of variable compensation and job-related stress, the distinction between the pressure and the threat dimension of stress might at least provide for a first step in better understanding the puzzling result found by Shields et al. (2000). An operationalization that captures only the threat dimension might not find an impact of a variable remuneration scheme; one that captures both dimensions within a single scale might equally arrive at either non-significant or only marginally significant results. In both cases, one may suspect that small changes in the basis used for calculating the reward – e.g., whether this basis consists only of financial performance indicators or of multi-dimensional ones, whether the calculation is formula-based or rather subjective in nature, and so on – might then decisively cause the coefficient "to tip" into negative. For example, if the reward was calculated based on multiple criteria, then a study that does not differentiate between the two dimensions of stress and accidentally focuses on the negative, threat dimension of stress might then quickly confound effects of the comprehensiveness of performance measurement (resulting in a reduction in perceived threat) with those of a link of performance to a bonus (an increase in the pressure dimension).

Therefore, following the job-demand resources model and in line with the submission of George and Jones (2005), we propose the following hypothesis:

Hypothesis 4: *Pay-for-performance bonus schemes heighten the perceived pressure dimension of psychological stress, but not the threat dimension.*

3. METHODS

3.1 Method

Since our hypotheses include directional claims, an empirical method suited to testing such claims is necessary. One such method is vignette experiments. They rely on short experimental case scenarios (i.e. vignettes) containing the independent variables of a study and collect participants' reactions to these scenarios. In our case, these include perceived stress and a set of control variables on scales similar to a conventional survey (Alexander & Becker, 1978; Hartmann & Maas, 2010).

Since vignette experiments are characterized by a controlled and isolated alteration of the selected factors (Alexander & Becker, 1978; Rossi & Anderson, 1982; Starmer, 1999), they provide the same capacity to infer causality as other experimental methods. They thus offer a significant advantage over cross-sectional field studies (cf. Burney & Widener, 2007; Schwenk, 1982). Such cross-sectional evidence does not allow for disregarding that the causal direction in fact runs counter to the one hypothesized, as they merely measure associations between two variables. This might lead to erroneous theory building on the MCS-stress relationship. For example, we cannot ex ante exclude that information asymmetry is the consequence of high job demands and thus lack of time to collect and process information, rather than the antecedent to stress, as hypothesized by some authors (e.g., Jaworski & Young, 1992). Moreover, since the experimenter controls the independent variables, vignette experiments do not suffer from dangers of common-method bias that require particular caution and remedies in field surveys (Podsakoff et al., 2003). Therefore, vignette experiments seem a well-suited method for testing the MCS-stress relationship.

However, vignette experiments are more artificial than field experiments and do not reveal actual behavioral reactions caused by stress, strains, or health issues. Yet, our interest lies in studying the impact of MCS design choices for stress as such – a variable that cannot be directly observed by a third person, but hinges on the perception and reports of an individual (Cox, 1985). Therefore, vignette experiments allow for precisely capturing the psychological variable of interest in the present study.

3.2 Design

The cues for our four independent variables were provided by means of short descriptions inspired by extant literature on management control systems and practices. For example, the cues for interactive use correspond to the description of interactive management control system use by Bisbe et al. (2007), standard tightness by Nohria and Gulati (1996), and the cues for the remuneration system by Kunz and Linder (2012) and Weibel et al. (2010). Appendix A provides the exact wording of the text cues used.

In order to keep response-burden for participants within acceptable limits and thus avoid effects of fatigue likely linked to lengthy experiments, we employed a mixed design for collecting data on the 2^4 full factorial (Kunz & Linder, 2012). Each participant received three different vignettes out of the 16 combinations possible.

3.3 Participants

Data collection took place at a metropolitan French business school. A total of 145 individuals received the experimental instrument. We subsequently removed observations from individuals with either no prior job experience or who did not provide a response to this question, in order to preserve validity of the study's findings. A number of individuals also failed to provide answers to the items measuring job-related stress. After removing these

cases with such seriously incomplete data, our effective sample size is 132 individuals responding to 373 vignettes.

3.4 Measures

Stress. Measures of job stress relied on a scale recently proposed and validated by Stanton et al. (2001). It is a general measure of job-related stress, captures a domain distinct from dissatisfaction, and "is widely applicable across varied settings and examinees" (Stanton et al., 2001: 869). Its wide applicability results from the fact that it is neither tied to specific stressors (i.e. antecedents) for measuring stress nor to strains (i.e. consequences of psychological stress), as are many other scales. It thus follows the call by Cox (1985) to measure stress as a state based on self-reported measures. A number of scholars have used it since (e.g., Guenole et al., 2008; Takeuchi et al., 2005). In their own examinations, Stanton et al. (2001) found that their scale shows strong relationships with a number of other, more domain-specific self-reported measures of job-related stress (coefficient of correlation *r* between .56 and .70). Yet, in contrast to previous scales, the Stanton et al. (2001) scale is multi-dimensional, capturing perceived pressure as a first dimension of stress (SIG-I) and perceived threat as a second (SIG-II). Apart from being domain and examinee-independent, the scale thus affords the advantage of capturing two dimensions that are consistent with Lazarus' (1998: 185-212) distinction and conceptualization of stress processes. Appendix B provides details on the scale (note: some of the items are reverse-coded (Stanton et al., 2001)).

Cronbach's alpha of the two subscales of Stanton et al. (2001) in our sample were .86 (pressure) and .85 (threat). Not surprisingly, the two subscales correlate with each other. Factor analyses however suggests them being distinct factors. The two subscales correlated significantly with individual's turnover intentions (r =.25, and r =.50 respectively, both at p <.01). This provides some additional indication that the measures are valid, as high stress on a job can be expected to be linked to an increased tendency to leave the respective job (Cooper

& Marshall, 1976; George & Jones, 2005; Stanton et al., 2001). Intention to leave the organization was measured with Fried et al.'s (1996) two-item measure: "If I have my way, I will leave this organization to work in another organization one year from now" and "I am planning to search for a new job during the next 12 months" (alpha =.91).

Controls. Individual's needs for achievement (McClelland et al., 1953) might impact how they respond to demanding situations, e.g., high standard tightness. Individuals with a high need for achievement are likely to perceive less stress since they already innately strive for high efficiency and strong outcomes, irrespective of whether the environment pressures them to do so (as in the case with tight standards). Measurement of respondents' needs for achievement relied on a four-item measure by Yamagouchi (2003), which is a refined version of the classical Steers and Braunstein (1976) measure. Cronbach's alpha of the 4-item scale in our sample was .73.

Self-reported data may be subject to participants' tendency to provide socially desirable responses. To assess the role of such response tendencies, we included a short measurement of social desirability bias, derived from social psychological literature. Strahan and Gerbasi's (1972) "short scale B" is a 10 item version of the classical 33 item scale by Crowne and Marlowe (1960). Cronbach's alpha was .72.

Finally, we collected age, gender and work experience as additional controls, since they might influence how individuals perceive a situation. For example, Cox (1993) submitted that women are a particularly vulnerable group regarding stress. Thus, the female participants in the experiment might experience the MCS as potentially more stressing than male participants. Work experience and age in turn should facilitate putting oneself into the respective situations described in the vignettes, as the repertoire of situations already experienced in life is larger for older and more experienced individuals. Moreover, as George and Jones (2005) note, experience is related to an individual's abilities. It thus might affect

whether a person feels stressed or not, since individuals with more experience (i.e. abilities) may find demanding situations less demanding on their resources than their colleagues with lesser abilities (Burney & Widener, 2007). Not surprisingly, work-experience and age were highly correlated (r =.84, p < .01). To avoid issues of multi-collinearity, we decided to rely on work-experience, as it more closely addresses the issue of how well participants can judge the organizational situation described than age alone. No further controls were included, as the random allocation of the vignettes to participants can be expected to take care of self-selection issues present in normal field surveys. Scholars using such surveys try to (partially) control for such issues by adding control variables about the respondent's personality and organization.

Manipulation checks. Following Pablo (1994), we employed short questions to check whether participants perceived the situations as intended by the experimenters, that is, to check the success of our experimental manipulation of the independent variables. All four independent variables were strongly and significantly correlated with the respective manipulation check (all at p < .001), which suggests that the experiment worked as intended.

4. RESULTS

4.1 Descriptive results

A total of 373 usable responses were obtained from 132 participants. Table 1 provides the descriptive statistics. Roughly, 50 percent of respondents were male, and work experience in paying jobs ranged between half a year and fifteen years with an average of 4.5 years.

Pair-wise correlations – as shown in Table 1 – suggest that the control variables apart from gender are not related to either SIG-I or SIG-II. In contrast, the experimental variables seem to matter. As Table 1 shows, SIG-I is significantly correlated with all four MCS choices, whereas SIG-II is correlated with PMS comprehensiveness, interactive use, and standard

tightness – but not the remuneration scheme. This provides an initial indication that it is beneficial to study the impact of management control practices on stress with a two-dimensional construct of stress, as effects are likely to differ.

Table 1 about here

4.2 Multivariate regression results

Table 2 reports the results of the multivariate analysis to identify the relationship between MCS and perceived psychological stress. Given the data's nested nature (each respondent replying to multiple vignettes), we used clustered regression analysis.

Table 2 about here

As Models 1a and 1b in Table 2 show, the control variables seem not to be important in explaining the level of perceived job stress. Both models in total do not attain common thresholds for statistical significance, as indicated by the minuscule F-values of .35 and 1.57. In contrast, Models 2a and 2b, which include the management control practices along with the control variables, are statistically significant. As indicated by the adjusted R^2, they explain about 16 to 17 percent of the variance in the SIG-I (pressure) and SIG-II (threat) components of perceived stress.

Of the control variables, only gender and need for achievement (nAch) exhibit a significant relationship with the level of perceived job stress. Both affect the level of perceived threat. Male participants reported lower perceived threat than did their female counterparts. This corresponds to findings of other studies that men and women react differently to stressors and that women may be among the vulnerable groups (e.g., Cox,

1993), and thus lends some reassurance to our findings. Individuals high in nAch, in turn, perceive less threat than their counterparts low in nAch.

Work-experience, in contrast, seems not related to either the pressure or the threat dimension. The fact that the measure of socially desirable response tendency shows no significant relation with the reported level of perceived stress enhances our confidence regarding the suitability of the sample for studying the MCS-stress relationships.

Models 2a and 2b show interesting relationships of the management control practices to the two dimensions of stress. PMS comprehensiveness seems to lower both dimensions of stress. Our data thus suggests rejecting Hypothesis 2. Reliance on an interactive use of PMS and tight standards, in contrast, show statistically significant relationships with both the pressure and the threat dimension of job-related stress in the expected directions. Standard tightness drives – as per hypothesis 1 – both the pressure and the threat dimensions of perceived stress. Using PMS in an interactive manner in turn lowers perceived stress on both dimensions; Hypothesis 3 thus cannot be rejected. The choice of a flat versus pay-for-performance remuneration system influences only to the pressure dimension of job-related stress, which is consistent with hypothesis 4.

The results of the multivariate analysis thus lend support to hypotheses 1, 3 and 4, but suggest rejecting hypothesis 2.

5. CONCLUDING DISCUSSION

Stress at work is increasingly attracting public attention. Research in psychology has greatly enhanced our understanding of the stress phenomenon, and scholars have found a number of person-related and job-related factors to be antecedents to stress experienced by employees and managers. However, research in management control – apart from some notable exceptions (e.g., Shields et al., 2000) – has not shown much interest in the subject.

Our findings demonstrate that more research into the MCS-stress relationship is warranted. The four alternative design-choices of MCS that we tested exhibit significant relationships with the pressure dimension of perceived stress, the threat dimension, or both.

Standard tightness increases – as expected – both dimensions of perceived stress. This finding is in line with earlier findings (Shields et al., 2000), yet these studies did not separate the two dimensions of stress empirically, as we did. Whereas standard tightness furthers job-related stress, using MCS in a rather interactive manner seems to reduce both dimensions of stress. Both effects are in line with the predictions derived from person-environment fit theories. Moreover, both are of significant relevance for practice. Especially during periods of economic downturns, many firms tighten up budgets. Whereas this may enhance performance via higher effort due to increased pressure, it comes at the price of an increase in the threat dimension of job-related stress. Besides the claimed positive effects for innovation and adaptation, interactive use of performance measures seems beneficial in order to reduce job-related stress. Yet, since the interactive use seems to reduce both types of stress, firms wishing to maintain a certain level of pressure may want to switch from a flat salary system to a pay-for-performance scheme. Introducing such a pay-for-performance remuneration scheme, in contrast to standard tightness, affects only the pressure dimension of stress.

Considering non-financial performance measures along with financial ones reduces stress in comparison to a situation with a pure focus on financial performance measures only. This finding suggests that the recent emphasis on complementing financial measures with non-financial indicators (Kaplan and Norton, 1992) is also likely to reduce the negative side effects of performance measurement systems on employee well-being via a reduction in the stress that employees perceive. Whereas this effect was not the prime rationale for the development of the Balanced Scorecard and similar balanced performance measurement systems, our findings lend an additional reason for firms to complement their financial PMS

with non-financial indicators. A number of limitations however call for caution in generalizing our findings and for further research into the MCS-stress relations.

Whereas we devoted great care to designing the vignette experiment and ran several robustness checks, it is important to stress that we relied on a sample drawn from course participants at a metropolitan French business school. It is likely that our participants are thus more representative of so called "knowledge workers" (Zuboff 1988) rather than employees in general. Perceived stress is largely influenced by situational factors. Yet, it also depends on how individuals cognitively treat the environmental stimuli. To account for this fact, we included a number of variables to control for individuals' work experience, gender, and need for achievement. Yet, while these variables capture some of the most important person-related factors in dealing with stressors, two additional factors should be considered in future studies: individuals' self-efficacy beliefs and their personality traits. Extant research suggests that these two factors work as moderating factors of stressors at work (George & Jones, 2005). Accounting for them in future studies on the MCS-stress relationship is thus likely to help increase explained variance in the dependent variable.

The method of data collection chosen, while offering a number of advantages for studying the MCS-stress relationship, also exhibits some limitations. In particular, vignette experiments – like other experiments – impose tight limits on the number of factors and the different levels for each factor that can be studied, in order to avoid effects of fatigue due to lengthy experimental set-ups. Therefore, we in order to keep the number of vignettes (and thus the response burden) to an acceptable level, we focused on only four MCS practices out of a huge number of possibly relevant MC practices. It is highly likely that other MC practices will influence the level of perceived stress at work. Therefore, future research should broaden the scope and include additional MC practices. Moreover, even within the four practices studies, we had to focus on only two alternatives (i.e. binary independent variables).

However, MC practices in reality are certainly not black-and-white; they have many nuances and shades. Thus, for example, we did not test different reward systems in terms of the size of the promised bonus or the effects of a bonus-and-malus system.

Although these limitations call for caution in using the results for practical recommendations before corroboration through more research, we contribute to existing literature in at least three ways.

Firstly, we shed more light on the largely unexplored relationship between MC practices and job stress by studying the as-yet unexplored role of pay-for-performance measurement systems and the way MCS are used. We heeded the call by Shields et al. (2000) for more research into the MCS-stress-performance relationship.

Secondly, while existing research has relied on cross-sectional surveys (e.g., Hopwood, 1972; Shields et al., 2000), we provide experimental evidence that allows for causal inferences regarding how some key design choices of MCS affect perceived work stress. We thereby follow the call by Burney and Widener (2007) for using experimental evidence to shed more light on the MCS-stress-performance link.

Thirdly, we answered recent calls within stress research to distinguish multiple dimensions within stress (Bakker & Schaufeli, 2008; Luthans, 2003; Wright, 2003), that so far have not been implemented in studying the MCS-stress relationship. In line with these calls, we distinguish between pressure-related and threat-related dimensions of stress.

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APPENDICES

APPENDIX A: Vignette Cues used for the Independent Variables*

PMS comprehensiveness cues

High: It has a comprehensive system for measuring both financial (e.g., Return on Assets, EBIT, costs) and non-financial performance (such as the development of sales and production volumes, employee satisfaction, employee turnover, and the firm's performance on environmental or social matters) on the level of the firm, individual business units and departments.

Low: Performance measurement at the firm focuses exclusively on financial (e.g., Return on Assets, EBIT, costs) performance on the level of the firm, individual business units and departments.

Cues for diagnostic vs. interactive use

Interactive: The performance measures are used intensively by both top managers and front-line managers. They are used for face-to-face challenging and intensive debate with a focus on strategic uncertainties. The underlying idea is a non-invasive, facilitating and inspirational involvement of top managers in key areas of strategic uncertainty to which front-line managers and employees are exposed.

Diagnostic: The performance measures are used off and on by top managers and operational managers. Their primary purpose is to highlight areas where performance falls short of expectations. This "ringing of the alarm bell" triggers top managers and their staff to dig into the performance measurement system in order to disaggregate the respective measure into its individual parts and the responsible organizational units. The front-line managers responsible for the unit(s) that fell short of targets, are summoned to explain the deviations and to report on the implemented corrective actions. The underlying philosophy is that top managers want to be able to check on front-line managers' performance and to trigger or take corrective actions themselves if they deem them necessary.

Standard tightness cues

Low: The financial resources (i.e. the budget) as well as non-financial resources (e.g., allotted working time, etc.) available to you to carry out your job leave some room for other activities on the side that are not necessary for performing the job.

High: Both, the financial resources (i.e. the budget) as well as non-financial resources (e.g., allotted working time etc.) available to you to carry out your job are extremely limited. They virtually leave no room for activities that are not truly necessary for performing the job.

Cues regarding remuneration and reward practices

Fix: Your remuneration is a simple fixed monthly salary. Changes in sales or profits do not affect the amount of money you receive.

Variable: Besides your monthly fixed salary, the company operates a bonus scheme: Success in increasing the department's sales and profit performance leads to a yearly bonus payment of 0-40 percent (depending on the increase achieved) on top of your annual salary. Last year you received a 20 percent bonus.

* Cues were provided without any separating headings or subheadings.

APPENDIX B: Items used to measure Psychological Stress

Given the organizational situation that you just read, how will you behave?

Please indicate how often you will engage in the activities stated in the sentences by circling the respective number**.**	Strongly disagree — Strongly agree
I think the job is demanding	1 – 2 – 3 – 4 – 5 – 6 – 7
I feel pressured	1 – 2 – 3 – 4 – 5 – 6 – 7
I think this work situation is nerve wracking	1 – 2 – 3 – 4 – 5 – 6 – 7
In this work situation, I would stay absolutely calm	1 – 2 – 3 – 4 – 5 – 6 – 7
In this situation, I would feel relaxed	1 – 2 – 3 – 4 – 5 – 6 – 7
Work at the firm seems hectic	1 – 2 – 3 – 4 – 5 – 6 – 7
Many things at the firm seem stressful	1 – 2 – 3 – 4 – 5 – 6 – 7
I feel very much pushed by the firm	1 – 2 – 3 – 4 – 5 – 6 – 7
I find the work situation highly irritating	1 – 2 – 3 – 4 – 5 – 6 – 7
In the situation described, I would feel I have everything under control	1 – 2 – 3 – 4 – 5 – 6 – 7
I would feel hassled by the conditions at the firm	1 – 2 – 3 – 4 – 5 – 6 – 7
The work at the organization is more stressful than what I'd like	1 – 2 – 3 – 4 – 5 – 6 – 7
The work at the firm seems comfortable	1 – 2 – 3 – 4 – 5 – 6 – 7
Things seem to be smoothly running for me at this firm.	1 – 2 – 3 – 4 – 5 – 6 – 7
The work at the firm is overwhelming	1 – 2 – 3 – 4 – 5 – 6 – 7

TABLE 1: Descriptive statistics

	Mean	SD	Min	Max	1	2	3	4	5	6	7	8	9
1 SIG-I *Pressure*	0,00	0,94	-2,52	2,30									
2 SIG-II *Threat*	0,00	0,94	-2,01	2,63	**0,80** ***								
3 PMS Compehensiveness	0,50	0,50	0,00	1,00	**-0,13** **	**-0,19** ***							
4 Interactive use of PMS	0,57	0,50	0,00	1,00	**-0,24** ***	**-0,28** ***	0,04						
5 Standard tightness	0,48	0,50	0,00	1,00	**0,29** ***	**0,24** ***	-0,06	0,03					
6 Pay-for-Performance scheme	0,54	0,50	0,00	1,00	**0,12** **	-0,03	0,00	0,03	0,01				
7 Gender	1,50	0,50	1,00	2,00	-0,05	**-0,11** **	0,01	**-0,13** **	**-0,10** **	0,04			
8 Work experience	4,51	3,93	0,50	15,00	-0,02	0,02	-0,01	-0,01	0,58	0,03	**-0,21** ***		
9 nAch	0,00	1,00	-6,57	0,97	0,01	-0,06	0,01	-0,06	0,00	0,01	-0,04	**0,21** ***	
10 Desirable response tendency	1,04	2,27	-5,00	5,00	-0,02	0,00	0,08	-0,03	**0,13** **	0,00	**0,13** **	-0,02	-0,03

n = 373

TABLE 2: Regressions for Psychological Stress

	SIG-I *Pressure*				SIG-II *Threat*			
	Model 1a		Model 2a		Model 1b		Model 2b	
	coef	se	coef	se	coef	se	coef	se
Gender	-0.100	0.105	-0.105	0.105	**-0.216****	0.106	**-0.231****	0.102
Work experience	-0.007	0.012	-0.007	0.012	0.003	0.013	0.004	0.013
nAch	0.011	0.043	-0.005	0.042	-0.066	0.046	**-0.084***	0.050
Desirable response tendency	-0.004	0.022	-0.019	0.023	0.005	0.025	-0.005	0.026
PMS Compehensiveness			**-0.182****	0.080			**-0.294*****	0.079
Interactive use of PMS			**-0.481*****	0.107			**-0.573*****	0.102
Standard tightness			**0.539*****	0.101			**0.438*****	0.095
Pay-for-Performance scheme			**0.247*****	0.089			-0.043	0.088
F	0.35		9.87		1.57		12.30	
prob > F	0.841		0.000		0.186		0.000	
Root MSE	0.941		0.861		0.936		0.854	
R2	0.00		0.18		0.02		0.19	
Adjusted R2	-0.01		0.16		0.01		0.17	
Mean VIF	1.05		1.05		1.05		1.05	
Maximum VIF	1.09		1.10		1.09		1.10	
Number of clusters (= participants)	132		132		132		132	
Number of observations	373		373		373		373	

Note: *** p<0.01, ** p<0.05, * p<0.1