

Innovation, change and paradoxical behaviours in Scientific R & D teams

Recent discussions of organizational change have focused on the influence of different organizational contexts in deepening our understanding of how change plays out in diverse organizational settings (see Conway, Kiefer, Hartley and Briner, 2014; He and Baruch, 2010; Hughes, Mellahi and Guermat, 2010; Loretto, Platt and Popham, 2010). Especially, these studies focus on how change impacts employees and organizational performance. While literature is replete of innovation and change, studies looking at the paradoxical role of team leaders/members and team processes during change are limited. In the present study, we examine change and innovation in the context of Research and Development (R& D) scientific teams to expose the tension, contradictions and paradox that mark the process of change in a major R & D organization in South East Asia.

Organizational change is about organizations' continual renewal of direction, structure and capabilities in order to serve the ever-changing needs of external and internal customers (Moran and Brightman, 2011) while innovation is described as the "implementation of creative ideas that begin with ideation phase of problem identification, idea generation and idea selection for implementation and continues with mobilizing the idea until it successfully gets to the market" (Erez, Jarvenpaa, Lewis, Smith and Tracey, 2013). We note that the process of moving innovation to market is fraught with conflicting demands, contradictory practices and competing views as well as a potential of hindering or enabling innovation and change (Erez *et al.*, 2013). Also, given that paradoxical challenges at the micro people management level have received scant attention (Zhang, Waldman, Han, & Li, 2015), we draw on the paradox theory (Lewis, 2000) to examine the multiple roles and enactments that leaders and team members in R & D teams perform while innovating during change.

Paradoxes are described as “contradictory, yet interrelated elements -elements that seem logical in isolation, but absurd and irrational when appearing simultaneously” (Lewis, 2000 p.760). In this regard, managers and employees need to navigate these tensions and contradictions in the context of innovation. Innovation is known to be vested with the tension between competing demands especially novelty versus usefulness, idea generation, cooperation versus competition and exploration versus exploitation (Erez, *et al.*, 2013). Researchers (e.g. Quinn and Cameron, 1988) call for more research to explore the competing demands for innovation and change.

While there is evidence that senior managers initiate and adjust general plans and policies around change; ultimately, the team leader or middle level managers have a critical role in implementing change (Bamford and Forrester, 2003). Nevertheless, little research documents the enactment of team processes of leaders and members when organizations are pressurized to innovate during change. In the present study, we were interested in answering the following research questions: 1) Given your recent experience of a significant change and restructure in your organisation, what factors do you think promote or inhibit innovation during the change?, 2) What are the critical team leaders and members’ dynamics and behaviours that have significant impact on the process of innovation during transformational change?

To answer our research questions we use CAMPRE as our research setting. CAMPRE is a national scientific research organization located in the South East Asia and focused on Research and Development (R&D). CAMPRE is committed to increased creativity, innovation and employee satisfaction. At the time of data collection, the organization was redirecting investments and resources to maximize impact, building partnerships nationally and internationally to deliver competitive research. Especially, the division we examined for this research was formed about 5 years before data collection and through the integration of three smaller divisions operating across five different geographical sites. The division introduced a

new structure around research themes/streams, aligned changes to fit new organizational directions and changed its funding structure. New stream leaders were charged with responsibilities for project approval, planning and resource coordination.

In terms of data collection, we conducted in-depth interviews from 5 individual (unit and divisional) leaders and 11 focus group interviews from a sample of 178 participants across a wide spectrum of organisational levels and over a period of two years in CAMPRE's R & D teams. Interviews lasted between 45-90 minutes. Additionally, we observed 33 meetings. The observations lasted about 1-2 hours each. Hand written notes during observations were transcribed verbatim. All transcriptions were entered into NVivo. Drawing on a grounded theory approach, our data analyses show that leaders and members at multiple levels engage in six paradoxical behaviours: managing up and down, shifting bureaucracy, conflict and communication, concealing and sharing knowledge, separation and togetherness as well as political diplomacy and maneuvering. Based on our results, we built a conceptual model of the contradictions and paradoxes in team leaders and members' processes and behaviours during organisational change.

Altogether, we make three major contributions to existing literature in this area. First, we advance the conversation on the context of change by using R & D teams as a backdrop to empirically document the efforts of team leaders and members as they drive innovation during change. Second, we track the emerging paradoxes and tension in the team leaders and members' behaviours and processes while enacting change for innovation. Third and based on our results, we built a conceptual model of the contradictions and paradoxes of the behaviours and processes of leaders and members of R & D teams. The empirical test of our conceptual model should assist academics and practitioners in effective management of change for innovation. The managerial implications of our results for R & D organisations undergoing change are discussed.

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Engaged Employees and Innovative Supervisors: Fostering Innovative Work Behavior and Performance among Public Sector Employees

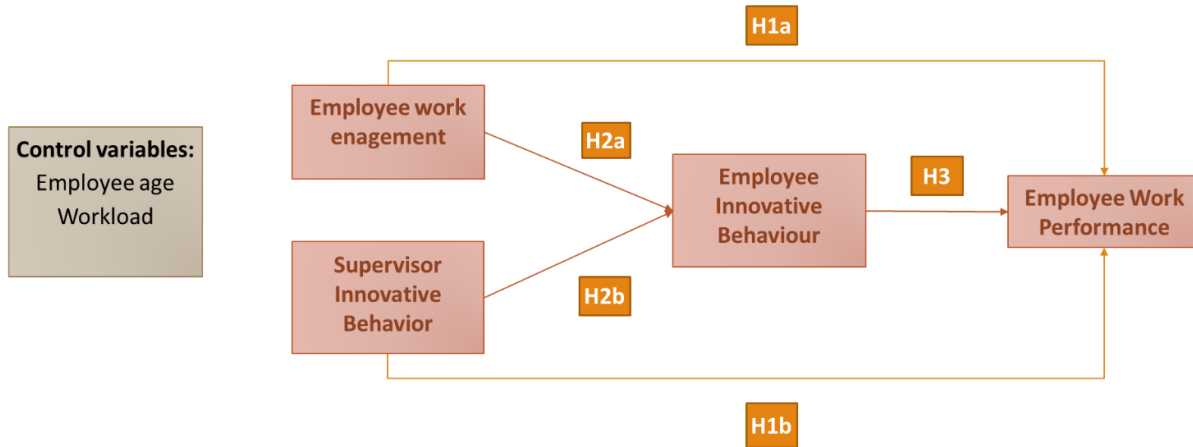
Theoretical background and positioning

The aim of this study is to gain a deeper insight into the mechanism through which employee work engagement affects task performance. More specifically, we investigate whether employee innovative work behavior (IWB) can explain the positive relationship between work engagement, leader IWB and task performance. Work performance refers to the overall degree to which an employee shows outstanding and effective behaviors that enable the fulfillment of work roles and organizational goals (Rich, Lepine, & Crawford, 2010). Work engagement is defined as an affective-motivational, positive work-related state of employees, and consists of three dimensions: vigor, dedication and absorption at the workplace (Schaufeli & Bakker, 2004). It encourages employees in taking initiative at work and pursuing learning goals on a daily basis. Previous research has shown that it contributes to different aspects of work performance (e.g., Halbesleben & Wheeler, 2008; Schaufeli, Taris, Bakker, & Burke, 2006), however, the underlying mechanisms of this relationship remain under examined.

We relate to the micro-innovation literature and propose that employee IWB (a multi-dimensional construct that encompasses employees' behaviors directed towards the development, adoption and implementation of new and useful ideas, processes, products or procedures by employees; de Jong & den Hartog, 2010) acts as a mediator in the relationship between employee engagement and work performance. When employees experience high work engagement, a positive affective and motivational state, they also experience high levels of creativity, broader scope of attention and openness to information, as well as better coping with stress (Tadić, Bakker, & Oerlemans, 2015). Thus, they may be more prone to IWB, which in turn fosters work performance.

In addition, we respond to calls alluding to research on the role of supervisors' creativity and innovativeness in promoting employees' IWB (cf., Anderson, Potočnik, & Zhou, 2014; Škerlavaj, Černe, & Dysvik, 2014). Supervisors-a vital role in designing a healthy work environment, influence employees' innovative behavior both through their deliberate actions aiming to stimulate idea generation and application as well as by their more general, daily behavior (de Jong & den Hartog, 2007). This might be particularly true for the public sector; Damanpour and Schneider (2009), for example, found that having a public manager with a pro-innovation attitude positively influenced the adoption and implementation of innovative efforts. Supervisors act as instigators of innovations, but are

also responsible for creating the environment and conditions in which IWB and thereby work performance can flourish. The research model with hypotheses is presented in the figure below:



Design/Methodology

The data was collected among 125 employees from 20 teams with immediate supervisors within three public-sector organizations in Croatia. The data were multi-source; supervisors assessed their own IWB, their employees' IWB and their work performance, whereas employees assessed their own work engagement.

Results

The results of a series of hierarchical linear regression analyses followed by bootstrapped mediation analyses provided support for the hypothesized research model: when employees were highly engaged in their work, and when their leader showed highly innovative work behavior, their task performance was higher. Furthermore, the results showed that this relationship could be explained by employees' own (higher) innovative work behavior.

Discussion

Our findings take us one step further into how work engagement enables positive work-related outcomes by revealing the role of employees' innovative work behavior. Engaged employees have high levels of energy, and they enthusiastically apply that energy to improving their work, particularly when supervisors also exhibit innovative work behavior. Employee IWB is one of the ways through which highly engaged employees can show their potentials and substantially contribute to their work performance and organizational goals. These findings support and further expand the broaden and build theory of positive emotions (Fredrickson, 2001), by showing its applications within public sector organizations.

Innovative work behavior is especially needed and understudied within the public sector (Bos-Nehles, Bondarouk, & Nijenhuis, 2017) because these organizations are often ineffective and non-

competitive. It can contribute to the quality of public services and functioning (de Vries, Tummers, & Bekkers, In press). In this context, employees can help to improve public sector performance through their ability to generate ideas, use these as building blocks for new and better products, services, and work processes. However, they need healthy and stimulating work environment, as well as supervisors who are also innovative at their workplace. Hence, our findings add to the literature and have substantial practical implications as they show how employees' work engagement and leader innovativeness can foster employees' innovative work behavior, which is, in turn, beneficial for their task performance.

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**Innovation in safety management:
Management challenges in assimilation of 'in-Vehicle Data
Recorder' (IVDR) to improve driving safety**

Abstract

Road injuries are ranked as the eighth highest cause of death in the world, the financial worldwide cost is 518 billion dollars per year, and 3,287 people fatalities daily caused by road injuries. There is no doubt that the road injuries are a global problem (World Health Organization, 2015; 2013). One innovative way of dealing with and improving road safety, is investment in various technologies, from intelligent transportation systems (ITS), through electronic safety systems (e-safety), to the 'IVDR' system (in-Vehicle Data Recorder) around which this research centers.

Some of these road injuries are work related. The crash risk among corporate car drivers is known to be higher compared to the general driving population; In Australia, organizational vehicles make up approximately 30% of all vehicles (Newman, Watson & Murray, 2004), and in England they take up 50% of all traffic (DFT, 2004). Furthermore, over 30% of the deaths caused by workplace accidents are the direct result of traffic collisions (Clarke et al., 2009; Murray, 2007). The past few years have seen an ever-increasing utilization of the 'IVDR' system in organizational fleet vehicles.

The 'IVDR' system creates a new organizational situation and constitutes fertile ground to innovation in organization's road safety management. The system allows different managerial functions within the organization to "see" the driver's behavior in real-time, to take immediate action, and to develop processes of assimilation and intervention toward correcting and refining flaws, and improving the organization's road safety climate. However, most research on the system's assimilation and effectiveness has been examined among young drivers, and much less of it among organizations with fleet vehicles. Therefore, the

current research's purpose is to identify and define the managerial challenges and common ways of dealing with the assimilation and utilization process of the 'IVDR' system to improve road safety in organization.

According the review literature, Studies point out the different management dimensions that contribute to the assimilation and utilization process of technological systems. four of which are in congruence with the management dimensions that affect the organization's safety management, and will therefore be examined in this research: pro-active management style, leadership style, perceived self-efficacy, and managerial commitment to safety (Salin & Doll, 2013; Kennedy, 2003; Bass & Riggio, 2006; Beus et al., 2010; De Toni et al., 2015; Coeurderoy et al., 2014).

This research adopted a mix-method approach. The qualitative database has been constructed based on 48 semi-structured interviews with a variety of interested parties within the organization (managers, vice-managers, safety officers and professional drivers), who make practical use of the system. The quantitative database was built by the 'IVDR' system in two organizational environments samples as case studies. The organizations were selected based on the analysis of the interviews. They presented opposites of perceptions regarding the system's assimilation and utilization process on the one hand, while possessing similar characteristics regarding their scope of activity and task nature on the other. The total number of drivers in both environments is 89.

The qualitative analysis identify and structure four themes. 1) Pro-active management style comprised of three categories: system accessibility, learning processes, and control and supervision processes. 2) The manager's leadership style comprised of two categories: dealing with user perception, and heading the process in practice. 3) Perceived self-efficacy of manager and mid-management's. This theme is comprised of two categories: belief in one's ability to change driving habits, and the subject of changing driving habits via the 'IVDR'. 4)

Managerial commitment to safety comprised of four categories: the question of responsibility; manager appeals and competing goals; how important the issue is to management higher-ups; and measuring the contribution made to safety.

The comparison and examination of the qualitative database's congruence with the quantitative database demonstrated that technology alone does not produce changes in driving habits. It was revealed that in the environment whose managers successfully dealt with the managerial challenges they faced, that is, the environment that **encouraged system assimilation**, changes to driving habits were observed. After one year of system use, a significant reduction in the variables Brakes and Accelerations was observed among the drivers. In contrast, managers who struggled dealing with said managerial challenges, thus characterizing their organizational environment with perceptions and behaviors which **hinder system assimilation** (see appendix A), observed no change in any of the recorded variables.

In addition, perceived self-efficacy and its influence over road safety have been discussed in regards to the drivers. This research innovates and expands, by setting the manager's perceived self-efficacy as a factor which greatly impacts the organization's road safety. The Transformational Leadership style does indeed contribute to and encourages the fulfillment of the 'IVDR' system's assimilation and utilization process. However, the combination of the various themes, and especially the existence of competing goals demonstrate the existence of paradoxical aspects, and complex managerial challenge.

Studies that deal with the process of assimilating technology into organizations discuss management's great importance to the assimilation process, but very few integrate the perspectives of end-users and mid-management into their research. This research overcomes this gap by combining the managerial point of view along with the system's end-users' perceptions.

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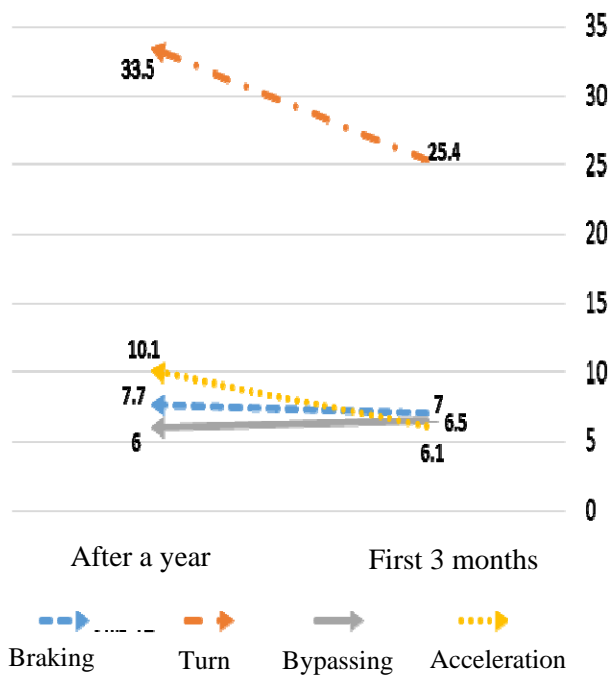
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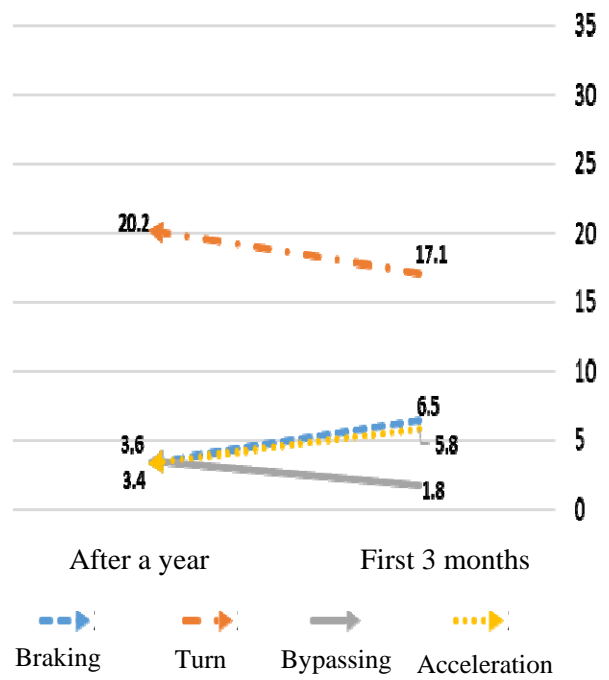
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Appendix A

Hinder system assimilation



Encouraged system assimilation



Innovative under Time Pressure: The Pivotal Role of Temporal Leadership and Employees' Human Energy

Employees' innovative behavior is of cardinal importance for organizational performance and long-term survival (e.g., Kanter, 1988; Grant & Ashford, 2008; Nederveen Pieterse et al., 2009), as well as for individual effectiveness (e.g., Janssen & Huang, 2008). Yet, individual innovation poses extra demands on work-related resources available to employees (Zhou & Shalley, 2003; Scott & Bruce, 1994). Therefore, one key question is to understand the underlying mechanisms under which the availability or scarcity of workers' resources influences their innovative behavior.

Engaging in innovation may compete for resources with other work behaviors (Bergeron et al., 2013). Time is an essential resource in many modern organizations, and management scholars have long identified time as an important determinant for individual innovation (Baer & Oldham, 2006; Amabile, 1996). Experiencing high time pressure may hinder individual innovation because employees tend to reduce their exploratory thinking and rely more on familiar algorithms for tackling problems (Andrews & Smith, 1996). In contrast, another stream of literature considers that time pressure could trigger a set of coping strategies and lead to innovative outcomes (Unsworth and Parker, 2003; Zhou & Shalley, 2003; Wu et al., 2014). Given these opposing theoretical arguments, the empirical studies examining the relationship between time pressure and individual innovation behavior have been inconclusive (e.g., Amabile et al., 1996; Madjar & Oldham, 2006). Some scholars find a negative relationship (e.g., Andrews & Smith, 1996; Amabile et al., 2002), others report a nonsignificant association (Amabile & Gyskiewicz, 1989), whereas some studies show some initial evidence of an inverted U-shaped relationship (e.g., Baer & Oldham, 2006; Andrews & Farris, 1972).

What is missing from this body of literature is an empirically grounded understanding of the mechanisms linking time pressure and employees' innovative behavior, and of boundary conditions for such mechanisms to function. The purpose of this study is to unravel this issue first by examining the role of crucial resources in the time pressure-innovation

relationship, as initiated by a few scholars (e.g., Baer & Oldham, 2006). Prior research has established that employees utilize personal and relational resources to meet job demands and engender desired job outcomes (Hobfoll, 1989; Ellis et al., 2015). Drawing on the Job Demands-Resources (JD-R) model (Demerouti et al., 2001), we contend that human energy—as personal resource—is critical for explaining the processes underpinning individual innovation (Quinn et al., 2012; Atwater & Carmeli, 2009; Carmeli & Spreitzer, 2009; Kark & Carmeli, 2009).

Next, we explore how temporal leadership—manifested in leaders' behavior that supports subordinates to cope with temporal challenges (Halbesleben et al., 2003; Mohammed & Nadkarni, 2011)—serves as a vital relational resource moderating the relationship between perceived time pressure and human energy (see Carmeli et al., 2009). We also aim to respond to prior calls for a longitudinal research design to explore the relationship between job demands and innovative behavior (Janssen, 2000). Thus, the contribution of this research lies in longitudinally investigating the effects of personal and relational resources (e.g., human energy and temporal leadership) in the time pressure-individual innovation relation.

Method

Sample and data. To test these relationships, we conducted a longitudinal field study at a global operating professional services firm. We collected data using an online survey administered to knowledge workers providing on-site services to the firm's clients. Knowledge workers in our sample include consultants, auditors, tax experts, and IT specialists. This study is based on the analysis of a two-wave survey (n=169). The first survey (T1) was sent about three months after an organizational transition. The follow-up survey (T2) was sent about six months after the first wave.

Analysis. We tested our hypotheses with a structural equation model of moderated mediation using Mplus version 7.4 (Muthén & Muthén, 2015). We use a Maximum Likelihood estimator with the Montecarlo integration algorithm for the SEM estimation (Muthén, 2002). We controlled for age, gender and tenure in the organization.

Results

We find that time pressure at T1 is negatively related to employees' energy at T2 ($\beta = -0.247, p = 0.002$). Furthermore, human energy is positively and significantly related to innovative behavior ($\beta = 0.365, p = 0.000$). Our results also show that energy mediates the relationship between time pressure at T1 and individual innovative behavior at T2 ($\beta = -0.098, p = 0.017$). Temporal leadership positively moderates the relationship between time pressure and employees' energy ($\beta = 0.231, p = 0.003$). Figure 1 shows the full theoretical model and Figure 2 exhibits the moderating effect of temporal leadership. Last, the conditional indirect effects confirm that human energy mediates the relationship between time pressure and innovative behavior for low ($\beta = -0.190, p = 0.002$) and medium ($\beta = -0.098, p = 0.016$), but not for high ($\beta = -0.006, p = 0.895$) levels of temporal leadership.

Discussion

The present study makes three key contributions. First, our findings contribute to the literature on the mechanisms underlying the time pressure-individual innovation relationship. Our research provides a better understanding of how it relies on the availability and use of personal and relational resources. Moreover, the longitudinal research design allows us to study the dynamics of the processes underlying innovative outcomes, which have not been extensively explored in prior work (Janssen, 2000). Second, our study makes an important contribution to the human energy literature by extending theory on the effects of human energy conservation and depletion on volitional behaviors (Quinn et al., 2012). Third, we contribute to literature on the role of leadership styles for driving innovation, a question that deserves more scholarly attention (Basu & Green, 1997; Atwater & Carmeli, 2009). In particular, we shed light on the role of temporal leadership (Mohammed & Nadkarni, 2011) in enabling employees to engage in innovative behaviors under time pressure. Employees working under high levels of temporal leadership cope more effectively with time pressure, are less energy depleted, and thus are more likely to behave innovatively.

Appendix

Figure 1: Theoretical Model

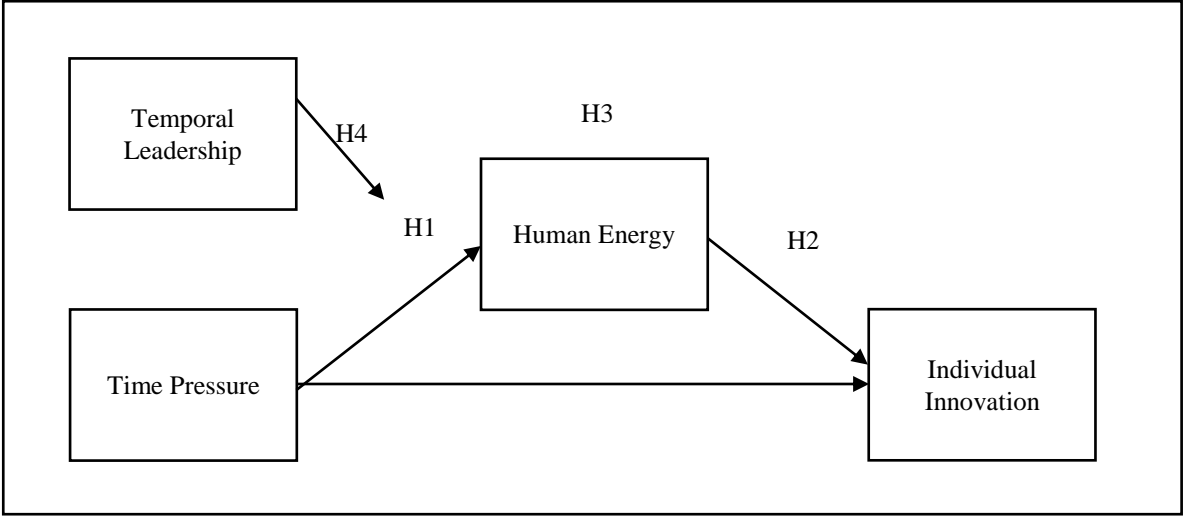
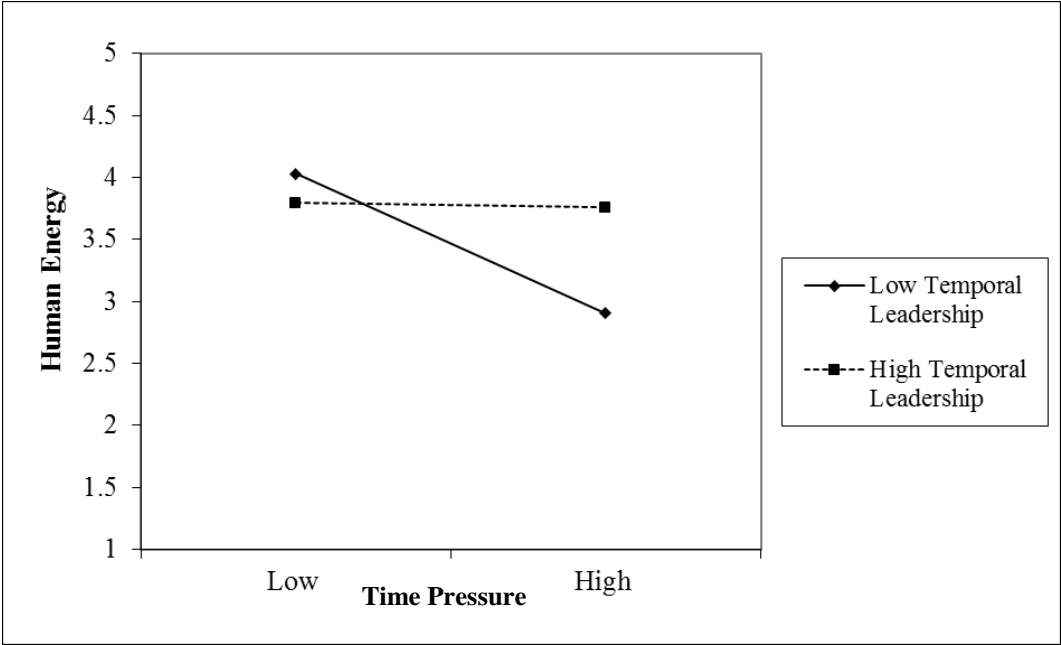


Figure 2: Moderating Effect of Temporal Leadership



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**Dual-career couples:
Talking about one's work during the evening, subsequent positive affect,
and creativity at work**

Working in academia is demanding and requires creativity for solving pressing scientific as well as practical problems. Positive affect is one important predictor of creativity. Experimental as well as daily-survey studies have demonstrated that high positive affect increases creativity, either in a laboratory setting (Isen, Daubmann, & Nowicki, 1987) or in employees' daily working life (Amabile, Barsade, Mueller, & Staw, 2005). Accordingly, morning positive affect should be one important ingredient for being creative throughout the workday. High positive affect in the morning may result from recovery processes happening during the evening (Sonnentag, Binnewies, & Mojza, 2008).

During evenings, however, not only recovery from work takes place. Spouses may talk about their jobs – an activity potentially going along with both favorable and less favorable affective outcomes. Particularly within couples where at least one spouse works in academia, talking about work in the evening might imply to discuss topics research-related problems that require a creative solution.

In our study, we examine how work-related conversations in the evening relate to positive affect in the next morning, and test social support and lack of psychological detachment from work as mediators. In addition, we test if positive affect in the morning relates to creativity during the day at work. We conduct our study in a sample of heterosexual dual-career couples and aim at empirically differentiating between conversations about the work of the female partner and conversations about the work of the male partner.

Communicating with one's spouse about one's own work should increase the likelihood of receiving instrumental or emotional social support. When mentioning work-related issues that are problematic or that need some input from another person, the spouse will be more inclined to provide social support than when the spouse does not hear about the work-related issue. Receiving social support, in turn, should be related to subsequent positive affect. Thus, communicating about one's work should be indirectly related to positive affect via social support. At the same time, however, communicating about one's work may also have a downside. Communicating about one's work implies that one does not psychologically detach from work and thereby recovery processes might be impaired. In turn, subsequent positive affect might decrease.

Hypothesis 1. Communicating about one's work with one's spouse during after-work hours is positively related to received social support.

Hypothesis 2. Communicating about one's work with one's spouse during after-work hours is negatively related to psychological detachment from work.

Hypothesis 3. Receiving social support during after-work hours is positively related to positive affect at bedtime and in the next morning.

Hypothesis 4. Low psychological detachment from work during after-work hours is negatively related to positive affect at bedtime and in the next morning.

Hypothesis 5. Positive affect in the morning is positively related to creativity throughout the workday.

We tested our hypotheses with data collected within a larger project on dual-career couples in academia. Our sample comprised 141 heterosexual dual-career couples in which at least one partner worked in academia. Mean age of the male partner was 35.5 years ($SD = 7.8$), mean age of the female partner was 32.7 years ($SD = 7.0$). Among all couples, 33.3 percent had children living in their households. Among male study participants, 67.4 percent worked in academia and among female study participants 74.5 percent worked in academia.

Study participants completed three daily surveys per day, over the course of one workweek: at bedtime (day d), in the following morning before going to work (day $d+1$), and at the end of the following workday (day $d+1$). The total number of 282 participants (nested within the 141 couples) provided matched bedtime, next-morning, and end-of-work data from both partners on a total of 439 days.

We measured communicating about one's work with two items. More specifically, we asked the participant and the spouse how much time they spent on talking about the participant's work. We used the average of the self-report score and the spouse-report score as variable in our analyses ($r = .60$ for male partner's work, $r = .65$ for female partner's work). We assessed received social support with three items from the social-support measure from Abbey, Abramis, and Caplan (1985). We adjusted the items for day-specific measurement (sample item: "He/She cared about me as a person"): Cronbach's alpha computed separately for the several days of data collection ranged between .79 and .90. We measured psychological detachment from work with four items from the Recovery Experience Questionnaire (Sonnetag & Fritz, 2007), adjusted for day-level assessment (sample item: "Tonight, I did not think about work at all"). Cronbach's alpha ranged from .92 to .94. We assessed positive affect at bedtime and in the morning with six positive-affect items from the PANAS (Watson, Clark, & Tellegen, 1988). Cronbach's alpha ranged between .86 and .90 at bedtime and between .88 and .90 in the next morning. We measured creativity with four items of the creativity measure by Tierney, Farmer, and Graen (1999) which we adapted for day-specific assessment within academia. Participants were instructed to respond to the items with respect to the present day at work (sample item: "I identified opportunities for new scientific insights, new products or processes"). Cronbach's alpha ranged from .86 to .91.

We analyzed our data within an actor-partner interdependence framework (Kenny, Kashy, & Cook, 2006), using a multi-level path analytic approach in which we modeled the hypothesized relationships at the within-person and the between-person level (Preacher, Zyphur, & Zhang, 2010).

Analysis of the overall hypothesized model resulted in a reasonable fit, $\chi^2 = 18.793$, $df = 96$, comparative fit index (CFI) = 0.947, Tucker-Lewis Index (TLI) = 0.929; root mean square error of approximation (RMSEA) = 0.023. However, in this model male partner's positive affect at bedtime was neither predicted by social support or psychological detachment from work nor did it predict positive affect in the morning. Therefore, we tested whether social support or psychological detachment directly predict positive affect in the morning. The model that specified an additional direct path from social support to positive affect in the morning for male partners showed an improved model fit, $\chi^2 = 109.86$, $df = 94$, CFI = 0.963, TLI = 0.948; RMSEA = 0.020, Satorra-Bentler $\Delta\chi^2 = 8.606$, $df = 2$, $p < .05$.

More specifically, at the within-person level, communicating about one's work was positively related to received social support and negatively related to psychological detachment from work (for males and females). For females, both received social

support and psychological detachment from work predicted positive affect at bedtime, and positive affect at bedtime, in turn, predicted positive affect in the next morning. For males, social support received in the evening (but not psychological detachment from work) predicted positive affect in the next morning. Positive affect in the morning predicted creativity at work for males, but not for females.

Overall, our findings show that communicating about one's work matters for subsequent positive affect in the evening or the next morning, respectively. It is interesting that morning positive affect was related to self-reported creativity at work only in males, but not in females. It might be that for females more immediate positive affect (as opposed to morning positive affect) matters more for creativity at work. Thus, it seems that particularly for males, receiving social support while communicating about one's work is related to creativity at work, suggesting that processes at home might matter for creativity within academia.

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