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On the dark side of work: a longitudinal analysis using self-determination theory

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ABSTRACT

As the nature of work has changed in recent decades, employees are increasingly exposed to psychological demands in the workplace, which have associated consequences for employees, organizations, and society. Using self-determination theory, this study examined the dark side of work, in which frustration of basic psychological needs is associated with higher levels of work-related stress. In this model, work-related stress is associated with higher levels of somatic symptom burden, which in turn is associated with higher levels of emotional exhaustion, turnover intention, and absenteeism. Results of a longitudinal analysis using data from four time points over 15 months supported these predictions. Taken together, this study advances the literature towards an understanding of the (potential) detrimental impact that need-thwarting work contexts can have on employee wellness and work-related outcomes.

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Self-determination theory (SDT); need frustration; work-related stress; somatic symptom burden

On average, working adults spend between 25% and 33% of their waking hours on the job (Harter, Schmidt, & Keyes, 2003). With the ubiquitous nature of technology, though, the boundary between work and non-work has become diffuse. As a result, job tasks can occupy employees not only during work hours but also at home and in their spare time. Indeed, 83% of email users report checking messages at least once per day while on vacation (AOL, 2007). Clearly, work is an important part of life, and how people experience their work may have important consequences for their functioning and wellness – both in general and while on the job.

Roughly 69% of employees report that their work is a significant source of stress, and 41% of employees report feeling tension or stress while at work (American Psychological Association, 2009). Stress while at work has an impact on employee health (Ganster & Rosen, 2013), with consequences both for employees and for organizations. Numerous physiological, psychological, and emotional costs may arise for employees due to stress (Karasek, 1989; Kirjonen & Hänninen, 1986; Parkes, 1982; Wall, Kemp, Jackson, & Clegg, 1986), and poor health and ill-being are associated with less productivity, worse decision-making, and more absenteeism among employees (Boyd, 1997). For organizations, the financial cost associated with these consequences is staggering. In Norway, for instance, the cost of absenteeism for businesses is estimated to be between $1.41 and $1.64 billion per year (Solberg, 2013), and this cost is estimated to be $43.70 billion per year in the United States (Bureau of Labor Statistics, 2014b; Circadian, 2005).

Research from self-determination theory (SDT) has shown that work contexts that are perceived as supportive of basic psychological needs are conducive to optimal motivation, functioning, and wellness among employees, along with benefits for the organization (for a review, see Deci, Olafsen, & Ryan, in press). Yet with psychological demands at work represented by higher performance standards and more complex technology, employees may perceive the workplace as need thwarting rather than need supportive, and as a result may experience stress while at work. However, there is a dearth of research on the association between maladaptive motivational processes (viz., need frustration) and psychological experiences in employees, and the consequences associated with need frustration have received far less empirical attention than the benefits associated with need satisfaction.

Accordingly, the focus of this study is on the dark side of work – that is, how maladaptive motivational processes in the workplace relate to stress, somatic symptom burden, emotional exhaustion, turnover intention, and absenteeism over time. Need frustration refers to "the mechanism that links negative dimensions of the social environment to indices of compromised functioning and well-being" (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011, p. 1460). Recent research has shown that need frustration cannot be considered the polar opposite of need satisfaction, and thus previous research that has focused on need satisfaction does not offer a complete view on the dark side of work (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). In addition, the motivational origins of work stress and somatic symptom burden have not received much empirical attention, as the literature on stress often focuses on job stressors (e.g., job demands) and somatic symptom burden has been addressed in only a few studies in the workplace (González, Swanson, Lynch, & Williams, 2016; Otis & Pelletier, 2005; Trépanier, Fernet, & Austin, 2016; Williams et al., 2014). The next section provides an overview of SDT, which will offer a theoretical and empirical context into which the proposed model for this study (see Figure 1) can be placed.

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Self-determination theory

SDT (Deci & Ryan, 1985, 2000) is an organismic-dialectic approach to human motivation, emotion, and personality in social contexts that has received empirical validation in the workplace (Gagné & Deci, 2005), in health care (Ng et al., 2012), and in other life domains. Central to SDT is the specification of three basic psychological needs for autonomy, competence, and relatedness whose satisfaction is necessary for full functioning and organismic wellness (cf. Niemiec & Ryan, 2013). The need for *autonomy* (de Charms, 1968) refers to the experience of behaviour as choicefull and self-endorsed at a high level of reflection, rather than pressured and coerced. In contrast, frustration of the need for autonomy refers to the experience of not standing behind one's actions and having to act against one's will due to internal or external factors. The need for *competence* (White, 1959) refers to the experience of behaviour as effective and masterful. In contrast, frustration of the need for competence refers to the experience of feeling ineffective and unable to achieve desired outcomes. The need for *relatedness* (Baumeister & Leary, 1995) refers to the experience of mutual connection with and care for important others. In contrast, frustration of the need for relatedness refers to the experience of a lack of communion and close connection with others. According to SDT, need satisfaction is theorized to promote psychological growth and healthy functioning whereas need frustration is theorized to contribute to energy depletion, dysfunction, and illness.

As suggested earlier, need frustration is not isomorphic with need dissatisfaction, and the correlates that arise from these two experiences are not equivalent (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011). More specifically, need dissatisfaction follows from a passive disregard for the basic psychological needs whereas need frustration follows from an active thwarting of the basic psychological needs, and it is logical to conclude that these two processes may yield different outcomes for the individual. In other words, need dissatisfaction may stifle psychological integration and well-being whereas need frustration may produce psychological fragmentation and ill-being. Indeed, some studies have shown a unique association between need frustration and ill-being (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011). As an analogy, consider a living plant. Lack of sun, soil, and water (i.e., need dissatisfaction) will hinder growth and may contribute to eventual death, yet poison and saltwater will kill the plant much more quickly (Vansteenkiste & Ryan, 2013). A similar distinction can be made in the workplace. Lack of connection with co-workers may leave the employee feeling less vital and happy at work, yet ostracism and rejection may leave the employee feeling isolated and depressed. In a similar way, not having a voice in organizational decision-making is phenomenologically different from being forced to comply with a particular decision that the employee cannot stand behind and endorse.

In the work domain, numerous studies have shown that employees who report higher levels of need satisfaction tend to report higher levels of global well-being (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010) and psychological adjustment (Baard, Deci, & Ryan, 2004), and lower levels of burnout (Fernet, Austin, Trépanier, & Dussault, 2013). However, the dark side of work, which emphasizes need frustration, has received much less empirical attention within SDT. Indeed, despite an impressive literature on the benefits of need satisfaction for healthy functioning at work, lack of empirical focus on need frustration has resulted in a literature that speaks very little to the motivational origins of occupational ill health. Nonetheless, it is important to examine the dark side of work because need frustration may yield unique and important associations with ill-being among employees.

To be sure, recent research has begun to fill this gap (Gillet, Fouquereau, Forest, Brunault, & Colombat, 2012; Gillet, Fouquereau, Huyghebaert, & Colombat, 2015; Gillet, Lafrenière, Vallerand, Huart, & Fouquereau, 2014; Schultz, Ryan, Niemiec, Legate, & Williams, 2015; Trépanier, Forest, Fernet, & Austin, 2015; Van den Broeck et al., 2014; Vander Elst, Van den Broeck, De Witte, & De Cuyper, 2012), but few studies have examined occupational ill health as an outcome of maladaptive motivational processes at work. In light of this sparse literature and current challenges posed by an increase in psychological health issues in the workplace (Chartered Institute of Personnel and Development, 2013; Hope, 2013), the importance of quantifying the association between maladaptive motivational processes and occupational ill health is apparent. Using SDT, this study theorized that need frustration in the workplace is associated with higher levels of work-related stress, which in turn is associated with various indicators of occupational ill health.

Stress in the workplace

In recent decades, the nature of work has shifted from industry to knowledge and, as a result, focus has shifted from chemical, biological, and physical hazards in the workplace to psychological demands at work. As such, employees are increasingly prone to stress-related illness. In 2012, for instance, the median number of days that employees in the United States spent away from work due to anxiety, stress, and related disorders was 30 – markedly higher than 8 days away from work for all nonfatal illnesses (Bureau of Labor Statistics, 2014a). Furthermore, recent reports suggest that depression, anxiety, stress, and related issues account for more than 33% of work absences (Hope, 2013), and 40% of organizations have reported an increase in mental health problems and stress-related absences among employees (Chartered Institute of Personnel and Development, 2013).

Ganster and Rosen (2013) defined occupational stress as a "process by which workplace psychological experiences and demands (stressors) produce both short-term (strains) and long-term changes in mental and physical health" (p. 1088). With this in mind, stress can be conceptualized as a contextual factor in the workplace (environmental hazards); as employees' physiological, psychological, and/or behavioural responses to the demands, threats, and/or challenges in the workplace; or as the interaction of these two factors (Ganster & Perrewé, 2011; Kahn & Byosiere, 1992). Ganster and Rosen pointed out that the third conceptualization describes stress

as a process in which environmental events initiate cognitive and physiological reactions that can have implications for well-being. These environmental events are called "stressors," and the reactions are called "strains."

Exposure to high-intensity psychological demands at work can lead to stress, and both theory and research have documented an inverse association between stress at work and both physical and mental health (for a review, see Ganster & Rosen, 2013). As Lazarus (1995) noted, however, research on stress in the workplace up to that time had focused primarily on the organizational arrangements of work. A review of the current literature suggests that this conclusion holds true today, as much of the research on stress at work focuses on contextual stressors and has identified consequences of these factors for employee performance and health (AbuAlRub, 2004; De Gucht, Fischler, & Heiser, 2003). As an illustrative example, the job-demands resources model (JD-R model; Demerouti, Bakker, Nachreiner, & Schaufeli, 2001) has been used extensively to explain how different characteristics of the job and the organization (including stressors) relate to employee wellness.

Having received much less empirical attention than contextual stressors (cf. Lazarus, 1995), it is important to examine stress as a process that leads to occupational ill health in order to develop a more complete understanding of workplace dynamics. Accordingly, this study examined the phenomenological experience of stress (i.e., strain) at work, which is of utmost relevance in the lives of working adults (Ursin & Eriksen, 2004). Of note, SDT may provide a fruitful lens through which to examine these dynamics, especially with a focus on basic psychological needs as essential for optimal functioning and well-being. Indeed, the concept of basic psychological needs has been used to explain some of the processes within the JD-R model that contribute to employee health and functioning (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008). This study theorized that work-related stress among employees is a response to need frustration at work, which in turn is associated with higher levels of somatic symptom burden, emotional exhaustion, turnover intention, and absenteeism.

Somatic symptom burden and work-related outcomes

Somatic symptom burden is the subclinical manifestation of somatization, or "the tendency to experience and communicate somatic distress and symptoms unaccounted for by pathological findings, to attribute them to physical illness, and to seek medical help for them … (which) becomes manifest in response to psychosocial stress" (Lipowski, 1988, p. 1359). In other words, somatic symptom burden is the experience of physical illness (e.g., chest pain, headache, abdominal pain) without a physical cause – the cause of which is stress. Both contextual and psychological factors are thought to play a role in the aetiology of somatic symptom burden. In the work domain, for instance, somatic symptom burden has been linked to job control (De Gucht et al., 2003), workload (Greenglass, Burke, & Fiksenbaum, 2001), work–family conflict (Yun, Kim, Jung, & Borhanian, 2013), work schedule (Geiger-Brown, Muntaner, Lipscomb, & Trinkoff, 2004), and social support (De Gucht et al., 2003). Yet the motivational factors that may contribute to somatic symptom burden are less well understood.

Williams et al. (2014) found that managerial need support relates positively to autonomous motivation at work, which in turn is associated with lower levels of somatic symptom burden. In a similar way, González et al. (2016) found that need satisfaction at work is associated with lower levels of somatic symptom burden among employees in a large company. Otis and Pelletier (2005) found that managerial need support relates positively to autonomous motivation at work, which functions to mitigate the relation of daily hassles to physical symptoms. Thus, basic psychological needs and work-related stress appear to be implicated in the aetiology of somatic symptom burden. With need frustration as a predictor of ill-being, it may be fruitful to consider need frustration in relation to stress and, ultimately, somatic symptom burden.

The importance of understanding the motivational and phenomenological origins of somatic symptom burden is underscored by the adverse impact that somatic symptom burden has on work-related outcomes. For instance, somatic symptom burden is associated with poor functional status, disability days, and lost job productivity (Barsky, Orav, & Bates, 2005; Kroenke, Spitzer, & Williams, 2002). The origin of somatic symptoms may not be physically identifiable, yet the experience of these symptoms for those who suffer from them is anything but trivial. In fact, somatic symptom burden may contribute more to poor physical and mental health and general impairment of physical functioning than many chronic diseases due to the resulting distress, disability, and dysfunction associated with somatic symptoms. As a result, people who suffer with somatic symptom burden spend more days per month in bed than patients with major medical disorders (Smith, Monson, & Ray, 1986) and take more sick leave (Escobar et al., 1987).

Williams et al. (2014) found that somatic symptom burden is associated with higher levels of emotional exhaustion, turnover intention, and absenteeism. Emotional exhaustion may result from the sustained experience of unexplained physical symptoms, and people who perceive their work as stressful and who experience somatic symptoms may be more likely to express intentions to leave their job. In a similar way, people who feel physically ill may be more likely to be absent from work. This study theorized that somatic symptom burden is associated with these work-related outcomes. Such findings would advance the literature by providing a longitudinal (see later) confirmation of Williams et al. and by elucidating the dark side of work.

Statement of hypotheses

An impressive literature developed over several decades underscores the importance of need satisfaction for optimal motivation, functioning, and well-being among employees. From the review presented earlier, however, it is clear that maladaptive motivational processes have received far less empirical attention, particularly with regard to occupational

health. Furthermore, to our knowledge only one study (Trépanier et al., 2016) has used a longitudinal design to examine the correlates of need frustration in the workplace. Accordingly, the aim of this study was to examine how need frustration at work relates to dysfunction and occupational ill health among employees over time. A substantial amount of the workforce experiences their work as stressful (American Psychological Association, 2009), and thus this study examined whether the experience of stress and somatic symptom burden are antecedents of negative work outcomes, including emotional exhaustion, turnover intention, and absenteeism. The following hypotheses were specified based on the literature reviewed earlier, and the proposed model for this study is illustrated in Figure 1.

Hypothesis 1: *Change in basic psychological need frustration will be positively associated with change in stress.*

Hypothesis 2: *Change in stress will be positively associated with change in somatic symptom burden.*

Hypothesis 3: *Change in somatic symptom burden will be positively associated with changes in emotional exhaustion, turnover intention, and absenteeism.*

Hypothesis 4a: *There will be a significant indirect effect of change in basic psychological need frustration at Time 2 on change in somatic symptom burden at Time 4 through change in stress at Time 3.*

Hypothesis 4b: *There will be a significant indirect effect of change in stress at Time 2 on changes in emotional exhaustion, turnover intention, and absenteeism at Time 4 through change in somatic symptom burden at Time 3.*

Method

Participants and procedure

Participants were 267 (205 female, 60 male, 2 unspecified) unit leaders who worked in the Norwegian health care services industry. These employees were of interest in this study because their job requires that attention is given to various requests, obligations, staff issues, and cost limitations while delivering quality health care to patients, which may yield a stressful working environment for the unit leaders. In December 2011, an invitation for study participation was sent electronically to the 428 municipalities in Norway with a request that the invitation be sent to unit leaders in the municipalities' health care services industry. The first questionnaire, to which participants from 131 municipalities in Norway responded, asked for participants' email address to be used for data collection at three additional time points. The second questionnaire (N = 185) was sent in May 2012, the third questionnaire (N = 152) was sent in November 2012, and the fourth questionnaire (N = 115) was sent in February 2013. Table 1 presents participant demographics across the 15-month study period.

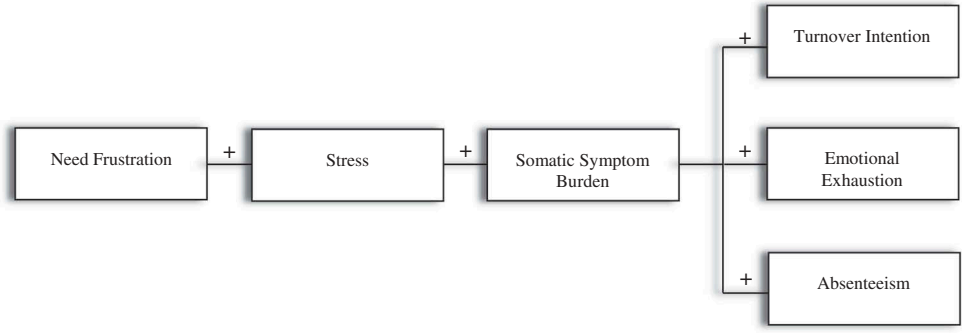

Figure 1. Proposed model for this study.

Table 1. Participant demographics across the 15-month study period.

	Time 1	Time 2	Time 3	Time 4
Number of respondents	267	185	152	115
Gender	Female: 205	Female: 141	Female: 116	Female: 88
	Male: 60	Male: 42	Male: 34	Male: 26
	Unspecified: 2	Unspecified: 2	Unspecified: 2	Unspecified: 1
Age (years)	<29: 2	<29: 2	<29: 2	<29: 2
	30–39: 33	30–39: 19	30–39: 13	30–39: 7
	40–49: 89	40–49: 61	40–49: 49	40–49: 39
	50–59: 109	50–59: 78	50–59: 67	50–59: 52
	60 or older: 33	60 or older: 24	60 or older: 20	60 or older: 14
	Unspecified: 1	Unspecified: 1	Unspecified: 1	Unspecified: 1
Urban vs. rural municipality	Urban:114	Urban:85	Urban:73	Urban:59
	Rural: 151	Rural: 99	Rural: 78	Rural: 55
	Unspecified: 2	Unspecified: 1	Unspecified: 1	Unspecified: 1
Unit	Home-based	Home-based	Home-based	Home-based
	care: 117	care: 84	care: 69	care: 55
	Institution: 96	Institution: 62	Institution: 52	Institution: 38
	Unspecified: 54	Unspecified: 39	Unspecified: 31	Unspecified: 22

Measures

Basic psychological need frustration

The Psychological Needs Thwarting Scale (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) was modified to fit the work context with a stem that referred participants to personal experiences regarding frustration of autonomy (four items; e.g., I feel pressured to behave in certain ways), competence (four items; e.g., there are situations where I am made to feel inadequate), and relatedness (four items; e.g., I feel rejected by those around me) at work. Responses were made on a 5-point scale from 1 (*totally disagree*) to 5 (*totally agree*). The reliability for each subscale was α ≥ .71 at each time point.

Stress

The Tension and Effort Stress Inventory (Svebak, 1993) presented participants with the following statement: "Estimate the degree of pressure, challenge, or demand that causes stress that you have felt exposed to during the last 30 days." Participants rated their experienced stress at work with regard to budget, personnel, and patient care (three items). Responses were made on a 7-point scale from 1 (*no stress*) to 7 (*very much stress*). The reliability for this measure was α ≥ .66 at each time point.

Somatic symptom burden

The Patient Health Questionnaire-15 (Kroenke et al., 2002) assessed somatic symptom burden (15 items; e.g., headaches, dizziness, back pain) during the past 4 weeks. Responses were made on a 3-point scale from 1 (*not bothered*) to 2 (*somewhat bothered*) to 3 (*strongly bothered*). The reliability for this measure was α ≥ .80 at each time point.

Emotional exhaustion

The emotional exhaustion subscale of the Maslach Burnout Inventory (Maslach, Jackson, & Leiter, 1996) assessed emotional exhaustion at work (five items; e.g., I feel burned out from my work). Responses were made on a 7-point scale from 1 (*never*) to 7 (*always*). The reliability for this measure was α ≥ .85 at each time point.

Turnover intention

Separate measures assessed current thinking about turnover (O'Driscoll & Beehr, 1994; three items; e.g., I am thinking of leaving this job) and thinking about turnover over the past year (Luchak & Gellatly, 2007; three items; e.g., during the past year I have regularly had an intention to leave). Responses were made on a 7-point scale from 1 (*never*) to 7 (*always*). The reliability for this measure was α ≥ .94 at each time point.

Absenteeism

At each time point, participants self-reported the number of working days that they were absent due to their own sickness during the previous 3 months.

Results

Preliminary analyses

Screening for outliers

The data were screened for univariate and multivariate outliers. Six multivariate outliers were detected and deleted, which resulted in sample sizes of $N = 261$ at Time 1, $N = 180$ at Time 2, $N = 147$ at Time 3, and $N = 110$ at Time 4.

Completers versus dropouts

One hundred and ten of the 261 enrolled participants completed the study. Thus, differences on the demographic and study variables between groups (completers = 0; dropouts = 1) at Time 1 were assessed. Logistic regression analyses revealed that completion status was not associated with need frustration ($OR = .96$, $SE = .29$), stress ($OR = 1.05$, $SE = .13$), somatic symptom burden ($OR = 1.33$, $SE = .78$), emotional exhaustion ($OR = 1.11$, $SE = .25$), turnover intention ($OR = 1.28$, $SE = .15$), absenteeism ($OR = .97$, $SE = .18$), age ($OR = .82$, $SE = .17$), or gender ($OR = .72$, $SE = .37$) (all p's > .10).

Handling of missing data

Table 2 presents information on item non-response and wave non-response, as recommended by Burton and Altman (2004). Missing value analysis on each study variable (or dimensions of a study variable) indicated that the data were missing completely at random [$\chi^2(df = 1652) = 1724.94$, *ns*].

Construct validity

A confirmatory factor analysis was performed on the study variables at each wave. (Somatic symptom burden was not included in these analyses because it is a formative construct). The results of these analyses revealed acceptable fit at each time point [Time 1: $\chi^2(df = 356) = 677.25$, $p < .001$; comparative fit index (CFI) = .92; root mean square error of approximation (RMSEA) = .059 (90% CI: .052, .066). Time 2: $\chi^2(df = 215) = 361.86$, $p < .001$; CFI = .91; RMSEA = .051 (90% CI: .042, .060). Time 3: $\chi^2(df = 356) = 652.39$, $p < .001$; CFI = .88; RMSEA = .057 (90% CI: .050, .063). Time 4: $\chi^2(df = 356) = 647.65$, $p < .001$; CFI = .86; RMSEA = .056 (90% CI: .049, .063)].

Table 2. Item non-response and wave non-response across the 15-month study period.

	Item non-response (of the composite variable)				Wave non-response			
Variable	Time 1	Time 2	Time 3	Time 4	Time 1	Time 2	Time 3	Time 4
Need frustration (%)	5.7	6.1	6.8	0.0	0.0	31.0	43.7	57.9
Stress (%)	1.1	3.3	2.7	0.0	0.0	31.0	43.7	57.9
Somatic symptom burden (%)	11.1	12.2	6.8	0.1	0.0	31.0	43.7	57.9
Emotional exhaustion (%)	3.8	3.3	2.7	0.0	0.0	31.0	43.7	57.9
Turnover intention (%)	1.5	–	1.4	0.0	0.0	31.0	43.7	57.9
Absenteeism (%)	1.1	3.3	1.4	1.8	0.0	31.0	43.7	57.9

Primary analyses

Structural equation modelling in AMOS 22 was used to test the hypothesized model illustrated in Figure 1. A good model fit is indicated by a chi-square likelihood ratio (χ^2/df) that is less than 3:1 (Gefen, Straub, & Boudreau, 2000) and a RMSEA value that is close to or lower than .08, accompanied by a CFI value that is close to or higher than .95 (Hu & Bentler, 1999). Due to the large number of variables relative to sample size, the model was tested using path analysis with observed variables. The analysis was conducted with Full Information Maximum Likelihood (FIML) to impute missing data, as recommended by Allison (2003).

The estimated model included all hypothesized paths and correlations among error variances at each time point. All autoregressive and cross-lagged paths were set to be equal with the assumption that these paths do not differ across the time points (i.e., a stationary process; Cole & Maxwell, 2003). Other than being roughly the same distance apart in time, the waves of assessment came at arbitrary points in participants' lives, with no underlying conceptual or theoretical differences to distinguish them. Thus, we assumed that the interplay of variables being examined had reached a state of stationarity, suggesting that the predictive paths between pairs of waves would be conceptually equivalent and could be collapsed to create a more parsimonious model. Correlations among the study variables were not consistent with a pure simplex pattern (see Table 3). Therefore, autoregressive paths were added between Time 1 and Time 3, Time 1 and Time 4, and Time 2 and Time 4, as recommended by Little (2013). Gender, age, and smoking status were used as auxiliary variables, which were correlated with the study variables at Time 1 and with the error variances at Time 2, Time 3, and Time 4, as recommended by Enders (2006).

The fit of the model to the data was acceptable, χ^2 (df = 165) = 271.00, p < .001; χ^2/df = 1.64; CFI = .95; RMSEA = .050 (90% CI: .039, .060). Results for the model are shown in Figure 2. Hypothesis 1 posited that change in basic psychological need frustration will be positively associated with change in stress. This prediction was supported, as basic psychological need frustration at Times 1, 2, and 3, respectively, related positively to stress at Time 2 (β = .09, p = .032), Time 3 (β = .07, p = .032), and Time 4 (β = .09, p = .032). Hypothesis 2 posited that change in stress will be positively associated with change in somatic symptom burden. This prediction was supported, as stress at Times 1, 2, and 3, respectively, related positively to somatic symptom burden at Time 2 (β = .09, p = .008), Time 3 (β = .08, p = .008), and Time 4 (β = .08, p = .008). Hypothesis 3 posited that change in somatic symptom burden will be positively associated with changes in emotional exhaustion, turnover intention, and absenteeism. This prediction was supported, as somatic symptom burden at Times 1, 2, and 3, respectively, related positively to emotional exhaustion at Time 2 (β = .17, p = .001), Time 3 (β = .14, p = .001), and Time 4 (β = .14, p = .001); related positively to turnover intention at Time 3 (β = .15, p = .001) and Time 4 (β = .15, p = .001) (turnover intention was not assessed at Time 2); and related positively to absenteeism at Time 2 (β = .21, p = .001), Time 3 (β = .26, p = .001), and Time 4 (β = .21, p = .001). The reverse cross-lagged paths were not significant with the exception of the paths from somatic symptom burden at Times 1, 2, and 3, respectively, to stress at Time 2 (β = .10, p = .014), Time 3 (β = .09, p = .014), and Time 4 (β = .10, p = .014).

Analyses of indirect effects were performed using RMediation (Tofighi & MacKinnon, 2011). Hypothesis 4a posited that there will be a significant indirect effect of change in basic psychological need frustration at Time 2 on change in somatic symptom burden at Time 4 through change in stress at Time 3. This prediction was not supported, as the indirect effect was not significant (B = .003; 95% CI: .000, .008). Hypothesis 4b posited that there will be a significant indirect effect of change in stress at Time 2 on changes in emotional exhaustion, turnover intention, and absenteeism at Time 4 through change in somatic symptom burden at Time 3. This prediction was supported, as the indirect effect was significant for emotional exhaustion (B = .009; 95% CI: .002, .018), turnover intention (B = .014; 95% CI: .003, .028), and absenteeism (B = .021; 95% CI: .005, .040).

Discussion

Using SDT, this study examined the dark side of work, in which frustration of the basic psychological needs for autonomy, competence, and relatedness is associated with higher levels of work-related stress. In this model, work-related stress is associated with higher levels of somatic symptom burden, which in turn is associated with higher levels of emotional exhaustion, turnover intention, and absenteeism. In line with hypotheses, the results of a longitudinal analysis using data from four time points over 15 months supported this model of the dark side of work, thereby underscoring the importance of motivational factors for the physical and psychological wellness of employees. Understanding the motivational factors that may contribute to work-related stress and somatic symptom burden is important not only for individual employees but also for the organizations to which they belong, as the costs associated with turnover intention and absenteeism can be enormous. Theoretical and practical implications are discussed in the following sections.

Theoretical implications

These findings contribute to an understanding of maladaptive motivational processes through the lens of SDT. The so-called dark side of motivational processes has received only a small amount of empirical attention, both in general and in the work domain. That said, a consideration of maladaptive motivational processes is important because emerging research suggests that need frustration may explain unique variance in ill health and dysfunction. This study did not contrast need frustration and need satisfaction, but previous research (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011) has revealed differential associations with relevant outcomes.

Table 3. Descriptive statistics and intercorrelations for the study variables.

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1. Need frustration$_{T1}$	2.03	0.60	–																						
2. Need frustration$_{T2}$	2.01	0.56	.68***	–																					
3. Need frustration$_{T3}$	1.98	0.63	.68***	.62***	–																				
4. Need frustration$_{T4}$	1.99	0.73	.63***	.63***	.59***	–																			
5. Stress$_{T1}$	4.50	1.40	.48***	.33***	.37**	.39***	–																		
6. Stress$_{T2}$	4.37	1.34	.38***	.41***	.32***	.37***	.54***	–																	
7. Stress$_{T3}$	4.48	1.44	.46***	.40***	.40***	.41***	.63***	.61***	–																
8. Stress$_{T4}$	4.10	1.36	.46***	.29**	.42***	.38***	.62***	.57***	.62***	–															
9. Somatic symptom burden$_{T1}$	1.31	0.27	.43***	.33***	.37***	.32**	.41***	.21**	.34***	.40***	–														
10. Somatic symptom burden$_{T2}$	1.30	0.26	.33***	.32***	.33***	.26**	.31***	.25**	.26**	.35***	.77***	–													
11. Somatic symptom burden$_{T3}$	1.31	0.28	.29**	.31***	.38***	.31**	.29**	.18*	.40***	.43***	.77***	.69***	–												
12. Somatic symptom burden$_{T4}$	1.29	0.26	.27**	.24*	.33**	.44***	.23*	.23*	.30**	.45***	.80***	.78***	.80***	–											
13. Emotional exhaustion$_{T1}$	2.45	0.99	.51***	.31***	.36***	.32**	.53***	.25**	.37***	.40***	.71***	.54***	.48***	.45***	–										
14. Emotional exhaustion$_{T2}$	2.29	0.87	.40***	.51***	.39***	.40***	.36***	.42***	.33***	.28**	.59***	.59***	.41***	.45***	.66***	–									
15. Emotional exhaustion$_{T3}$	2.35	0.91	.37***	.41***	.47***	.50***	.33***	.33***	.49***	.46***	.63***	.52***	.63***	.59***	.59***	.70***	–								
16. Emotional exhaustion$_{T4}$	2.31	1.05	.34***	.35***	.36***	.55***	.31**	.36***	.37***	.48***	.59***	.56***	.58***	.69***	.60***	.64***	.80***	–							
17. Turnover intention$_{T1}$	2.31	1.25	.41***	.26**	.37***	.21*	.34***	.28***	.25**	.29**	.41***	.33***	.29**	.29**	.51***	.34***	.33***	.34***	–						
18. Turnover intention$_{T3}$	2.42	1.28	.40***	.39***	.43***	.31**	.36***	.22**	.28**	.36***	.44***	.42***	.44***	.38***	.47***	.46***	.51***	.49***	.71***	–					
19. Turnover intention$_{T4}$	2.45	1.41	.24*	.35***	.33**	.41***	.25*	.22*	.33**	.36***	.37***	.40***	.48***	.52***	.39***	.46***	.54***	.62***	.62***	.75***	–				
20. Absenteeism$_{T1}$	0.31	0.89	.09	.03	.18*	-.03	-.01	-.12	-.14	.03	.19**	.19*	.22*	.16	.16*	.04	.05	.03	.12	-.00	.01	–			
21. Absenteeism$_{T2}$	0.61	1.75	.14	.12	.11	.06	-.01	-.06	-.16	.06	.36***	.20*	.21*	.29**	.24**	.19*	.12	.09	.02	.04	-.01	.46***	–		
22. Absenteeism$_{T3}$	0.34	1.15	.07	-.04	.04	.05	-.05	.05	-.01	.09	.27**	.32***	.30**	.34***	.21*	.15	.22**	.24*	.04	-.06	-.00	.43***	.44***	–	
23. Absenteeism$_{T4}$	0.79	1.76	-.01	.10	.19	.17	.06	.21*	.07	.19	.37***	.39***	.33**	.44***	.20*	.29**	.32**	.29**	.14	.06	.17	.24*	.24*	.41***	–

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

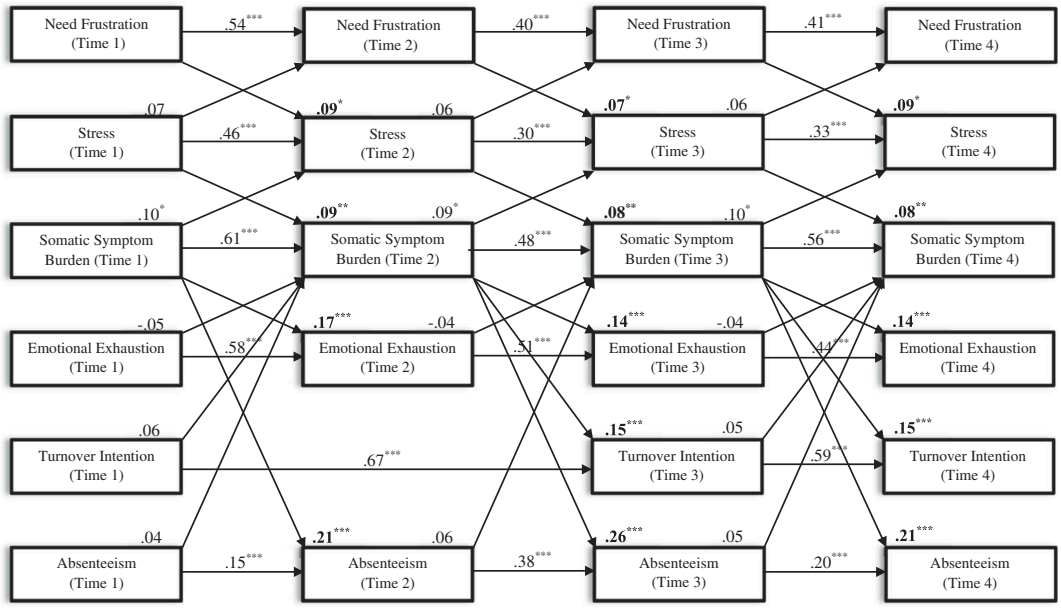

Figure 2. Structural equation model, with standardized parameter estimates, examining the longitudinal associations among need frustration, stress, somatic symptom burden, emotional exhaustion, turnover intention, and absenteeism. Some autoregressive paths and covariances among error terms were omitted for clarity. * $p < .05$, ** $p < .01$, *** $p < .001$.

At both theoretical and empirical levels, the results of this study contribute to an understanding of the motivational origins of work-related stress, somatic symptom burden, and occupational ill health. Stress may be an initial manifestation of maladaptive motivational processes in the workplace, which subsequently can manifest as somatic symptoms. These unexplained physical symptoms may leave employees feeling drained (emotional exhaustion), desiring to leave the organization (turnover intention), and too sick to work (absenteeism). This study examined need frustration rather than need thwarting, yet there is reason to believe that the social context of the workplace is relevant to the dark side of work (Trépanier et al., 2015).

Interestingly, analyses revealed a bidirectional association between stress and somatic symptom burden. The significant relation of somatic symptom burden to stress may be explained by the association between somatic symptom burden and functional impairment. With an experience of somatic symptoms, employees may experience their work tasks as more difficult and, thus, stressful. This bidirectional association may offer an account for the lack of indirect effect of need frustration on somatic symptom burden through stress. Future research is needed to explore this association in more detail.

Another important contribution of this study is its longitudinal design. It is of particular importance to consider several data points when examining occupational health and related outcomes, which are likely the result of prolonged motivational experiences in the workplace. Indeed, Ursin and Eriksen (2004) noted that only sustained high arousal related to stress constitutes a potential health risk. This study followed participants over 15 months, and thus sustained stress during that time may pose risks for somatic symptom burden and emotional exhaustion.

In sum, the results of this study contribute to the literature on the association between motivational processes at work and employee functioning by (1) elucidating the dark side of work through analysis of need frustration in the workplace, which was not assessed in previous research on the topic, and (2) providing longitudinal support for the model examined in Williams et al. (2014). Taken together, these findings reveal the potential harm of need frustration for employees and organizations alike, and thus advance the literature towards an understanding of the (potential) detrimental impact that need-thwarting work contexts can have on employee wellness and work-related outcomes. To the extent that need frustration arises in unsupportive work environments, these findings offer insight into how social contexts may adversely affect employees and the organizations to which they belong. More research is needed to examine how specific features of the work context (general ambiance, managerial behaviours) either support or thwart satisfaction of the basic psychological needs for autonomy, competence, and relatedness. For now, it is noteworthy that need frustration in the workplace can yield adverse consequences for employees, organizations, and society.

Practical implications

These findings have clear implications for organizations. Due to work-related stress, 52% of employees have considered or made a decision about their career such as to look for a new job, decline a promotion, or leave a job (American Psychological Association, 2007). In addition, 51% of employees said that they are less productive at work due to work-related stress (American Psychological Association, 2009). Research has linked employee health to job performance (Wright, Cropanzano, & Bonett, 2007), competitive advantage (Grawitch, Gottschalk, & Munz, 2006), turnover (Wright & Bonett, 2007), and absenteeism (Aldana, 2001). The results of this study suggest that work-related stress and somatic

symptom burden – resulting from need frustration in the workplace – could leave organizations with a heavy cost due to lost human capital. For instance, the cost to replace an employee following turnover is 20% of that employee's annual salary (Boushey & Glynn, 2012), and in Norway the cost associated with one day of absenteeism in 2010 was NOK 2,600. In this study, 1222 days of absenteeism were reported across four time points in 267 participants, which translates to a cost of NOK 3,177,200 (USD 365,414) for this small sample of unit leaders. The results of this study suggested that somatic symptom burden represents 22% of the absenteeism reported by the participants, which translates to a cost of NOK 698,984 (USD 81,938).

With these estimates in mind, organizations would be well served by not creating conditions that are conducive to need frustration. Managers can work to limit workplace bullying (Trépanier et al., 2016), which is associated with need frustration. In addition, characteristics of the job such as job insecurity (Van den Broeck et al., 2014) and job demands (Trépanier et al., 2015) are associated with need frustration and, therefore, are to be limited as much as possible. Other research has shown that trait mindfulness (Schultz et al., 2015) and financial motives (Landry et al., 2016) have implications for need frustration in the workplace. Need-supportive work contexts may help to optimize employees' personal resources, motives, and goals. To be sure, need-supportive work contexts have been shown to predict higher levels of need satisfaction, autonomous motivation, and well-being (for a review, see Gagné & Deci, 2005), and lower levels of need frustration (Schultz et al., 2015). Briefly, need-supportive managers elicit and acknowledge employees' perspectives, provide opportunities for skills building and problem solving, and create a warm interpersonal environment (for illustrations, see Niemiec & Coulson, in press; Niemiec, Soenens, & Vansteenkiste, 2014; Williams et al., 2011). Studies in the work domain have shown that in such contexts, employees tend to experience optimal (autonomous) types of motivation, full functioning, and organismic wellness.

Limitations and future research directions

Several limitations deserve mention. First, the sample was one of convenience and specific to the Norwegian health care industry, which may preclude generalization of the results to the working population as a whole. In this study, participants represented 133 of 428 municipalities – both small and large – and worked in both home-care services and institutions, which suggests that the sample was representative of the population of unit leaders. Nonetheless, it is important for future research to replicate this study in other occupational settings and countries. Second, a substantial number of participants dropped out of the study, which is common in longitudinal research. That being said, missing values were accounted for using appropriate and recommended analytic procedures, which strengthens the results of this study. Third, the study relied solely on self-report data, and thus we did not obtain physician validation of somatic symptoms, information on medical utilization, or objective data on absenteeism. Therefore, we cannot confirm that the somatic symptoms were in fact unexplained, although Kroenke et al. (2002) argued that the presence of three or more symptoms is not likely to have a medical cause. With regard to absenteeism, Spector (1987) noted a high association between self-reported and actual absenteeism. That being said, it is important for future research to obtain objective data on unexplained physical symptoms, medical utilization, absenteeism, and actual turnover. Fourth, the proposed model was tested using observed variables due to a small sample size relative to the complexity of the model. Analyses using observed variables have more precision due to lower standard errors in the estimates (Ledgerwood & Shrout, 2011), yet the benefit of accounting for bias due to measurement error through the use of latent variables was foregone.

Conclusion

This longitudinal study demonstrated that frustration of the basic psychological needs for autonomy, competence, and relatedness is associated with higher levels of work-related stress and somatic symptom burden, which in turn is associated with higher levels of emotional exhaustion, turnover intention, and absenteeism over time. Changes in these variables were consistent with a directional process, but findings from this study are not sufficient to warrant a causal conclusion. Nonetheless, it is important that organizations create need-supportive social contexts to promote full functioning and organismic wellness among their employees, which is of benefit not only for employees but also for organizations and society.

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