Thriving at Work: A Multi-level and Longitudinal Investigation of Changes in Work Motivation and Employees' Daily Well-being/Ill-being

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ABSTRACT

Thriving at Work: A Multi-level and Longitudinal Investigation of Changes in Work Motivation and Employees' Daily Well-being/Ill-being

Zhe Ni Wang, Ph.D.

Concordia University, 2018

In the workplace, employees often have multiple tasks that they need to complete, and it is likely that their motivation varies with each task (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). It is also likely that employees' motivation fluctuates during the day and/or over the course of a relatively short period of time (e.g., a few months) because of the various kinds of tasks that they perform and/or experience at work, and that these fluctuations in motivation affect their psychological health. Self-determination theory ("SDT"; Deci & Ryan, 1985a; Ryan & Deci, 2000b) offers a multi-dimensional understanding of motivation, one that differentiates not only between levels (quantity) of motivation, but between dimensions (quality) of motivation as well. Drawing on SDT, the hierarchical model of motivation ("H-SDT"; Vallerand, 1997; Vallerand & Ratelle, 2002), and the organismic dialectical approach to forming a multi-dimensional understanding of psychological health, the present study seeks to examine how changes in basic needs satisfaction/frustration lead to changes in motivation and in subjective well-being/ill-being while accounting for characteristics of the work context. The research for this thesis was carried out in the form of two empirical studies. In Study One, I examined the dynamic nature of employees' daily work motivation pertaining to different tasks using the day reconstruction

method (“DRM”; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004), which is a sophisticated structural survey framework that allows participants to systematically reconstruct all of their contextual, relational, as well as perceptual understandings of their workday in a time-sequential manner. I then analyzed the data through multi-level structural equation modelling (“MSEM”). The results of this study showed that the basic three needs-supportive characteristics (“NSCs”) of each work task positively promoted employees’ well-being in the workplace, and that such positive relationships were mediated by autonomous situational motivation. In Study Two, I examined the dynamic process that outlines how changes in basic needs satisfaction/frustration predict changes in employees’ well-being/ill-being through changes in work motivation over time in a dual-path model. To do so, I collected data on three different occasions from field-working employees during a period of four months, and analysed these data using latent growth modelling (“LGM”). The results of this study showed that increases in employees’ basic needs satisfaction directly led to increases in well-being while increases in employees’ needs frustration led to increases in ill-being over time without significant mediation effects from changes in autonomous and controlled work motivation. For both Study One and Study Two, I discuss the theoretical and practical implications of their results, the studies’ limitations, as well as possible directions for future research.

Keywords: *basic psychological needs, dynamics of work motivation, psychological health, multi-level and longitudinal study*

RÉSUMÉ

Fortifiant au travail: une étude à plusieurs niveaux et longitudinale des changements dans la motivation au travail et le bien-être / malaise quotidien des employés

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Les gens ont souvent plusieurs tâches et devoirs dans leur travail et il est probable que leur motivation varie avec ces différentes activités (Fernet, Senécal, Guay, Marsh & Dowson, 2008). Il est également probable que la motivation fluctue pendant la journée et / ou une période relativement courte (par exemple quelques mois) en raison des tâches et des événements que les gens vivent au travail et que ces fluctuations de motivation affectent la santé psychologique des gens. La théorie de l'autodétermination («SDT», Deci et Ryan, 1985, Ryan et Deci, 2000b) offre un concept multidimensionnel de la motivation qui différencie non seulement les niveaux (quantité) mais aussi les dimensions (qualité) de la motivation. Tiré du SDT, le modèle hiérarchique de la motivation (Vallerand, 1997; Vallerand & Ratelle, 2002) et l'approche dialectique organismique pour une conceptualisation multidimensionnelle de la santé psychologique, cette recherche cherche à examiner comment les changements de satisfaction / frustration la motivation et ensuite le bien-être / le mal-être subjectif tout en tenant compte de certaines caractéristiques du contexte de travail. Cela a été fait via deux études empiriques. Dans la première étude, j'ai examiné la nature dynamique de la motivation au travail quotidienne liée à différentes activités liées au travail, en utilisant la méthode de reconstruction de jour («DRM», Kahneman, Krueger, Schkade, Schwarz et Stone, 2004). Cette méthode offre un cadre structurel

sophistiqué permettant aux participants de reconstruire systématiquement leur compréhension contextuelle, relationnelle et perceptive de leur travail de manière séquentielle. J'ai analysé ces données à l'aide d'analyses de modélisation structurelle multi-niveaux («MSEM»). Les résultats de l'étude 1 suggèrent que les caractéristiques de soutien de chaque tâche favorisent le bien-être des employés au travail quotidien, et que ces relations positives sont médiatisées par une motivation situationnelle autonome. Dans la deuxième étude, j'ai examiné le processus dynamique qui sous-tend comment les changements dans la satisfaction / frustration des besoins fondamentaux prédisent des changements dans le bien-être / mal-être des employés par des changements de motivation, dans un modèle è deux voies. Pour ce faire, j'ai collecté des données à trois temps de mesure auprès de travailleurs, pendant une période de quatre mois, et j'ai analysé ces données à l'aide de modèles de croissance latente. Les résultats de la deuxième étude suggèrent que les changements dans la satisfaction des besoins fondamentaux des employés entraînaient directement une amélioration du bien-être tandis que les changements dans la frustration entraînaient une augmentation du mal-être au fil du temps sans effets de médiation significatifs. Je discute des implications théoriques et pratiques de ces études, de leurs limites, et propose des directions de recherche future.

Mots-clés: besoins psychologiques de base, dynamique de la motivation au travail, santé psychologique, étude à plusieurs niveaux et longitudinale

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I dedicate my doctoral degree to my dearest family: my mom, my dad, and my sister, as well as my lovely son, Eric. I could never have gotten this far without your love and support.

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Introduction

Social cognitive theory ("SCT"; Bandura, 1991, 2001) has recently opened the door for researchers to inquire more deeply into how humans learn and how their behavior changes over time. It has done so through constructing a triadic model that links behavior, cognition, and environment. According to SCT, self-regulative mechanisms serve as the psychological processes that enable humans to interact with their environment in such a way as to energize a change in their behavior (Bandura, 1991, 2001). Self-regulative mechanisms serve as motivation for human behavior, but they are not always static or sequential (Gagné & Deci, 2005). Motivation is a psychological process that elicits, controls, and sustains behavior (Pinder, 2008). A prominent theory of motivation, self-determination theory ("SDT"; Deci & Ryan, 1985a; Ryan & Deci, 2000b), has helped scholars advance our understanding of motivation and motivational processes. SDT is a needs-based motivation theory that offers a multi-dimensional concept of motivation that differentiates not only between levels (quantity) but also between dimensions (quality) of motivation. It proposes that the satisfaction of three basic psychological needs – those for autonomy, relatedness, and competence – promotes highly self-determined motivation and results in better performance (Gagné & Deci, 2005) and well-being (Baard, Deci, & Ryan, 2004). In addition, the hierarchical model of self-determined motivation ("H-SDT"; Vallerand, 1997; Vallerand & Ratelle, 2002) suggests that self-determined motivation can act at three reciprocally related levels, namely, the global, the contextual (i.e., motivation for different life domains such as education, leisure, and work; in this research, I focused only on the work domain for this conceptual level, which will hereafter be referred to as "work motivation"), and the situational. This model supplements the majority of previous motivation studies in organizational settings, which have focused on general and work motivation, by looking at the

issue of whether and how situational motivation fluctuates while people engage in different activities at work. Furthermore, the H-SDT model also suggests that determinants and consequences of intrinsic/extrinsic motivation may occur at three levels of generality, that the changes between different levels of motivation are recursive (Vallerand, 1997), and that such changes include both top-down effects from higher to lower levels of motivation and bottom-up effects from lower to higher levels of motivation. According to the SDT framework, a change in motivation can happen in two forms. It can occur due to (1) a change in the quantity of motivation, for example, from weakly motivated to highly motivated, or vice versa; or due to (2) a change in the quality of motivation, for example, people could be more autonomously motivated than controlled motivated through internalization, or they could be more controlled motivated than autonomously motivated through externalization depending on whether their psychological needs are more satisfied (Deci & Ryan, 2008a; Guay, Vallerand, & Blanchard, 2000) or frustrated (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Vansteenkiste & Ryan, 2013).

Employees are often assigned multiple tasks at work, and it is likely that their motivation varies with these different activities (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). It is also likely that employee motivation fluctuates during a relatively short period of time due to the tasks that they perform and the events that they experience. These fluctuations in motivation affect their well-being and ultimately their level of performance. Unfortunately, there are only a handful of studies that examine the empirical question of how situations affect changes in employees' motivation and well-being/ill-being at work over time. In addition, researchers have often focused (and in some cases continue to focus) on assessing work motivation that does not consider situational factors that may interact with employees' general motivational tendencies

(e.g., trait variables). These tendencies are what allows them to behave adaptively across different situations as they perform their jobs. Furthermore, only a small amount of research has focused on examining how changes in both the quality and quantity of motivation impact individuals' well-being/ill-being over time.

Not limited to hedonic feelings (e.g., pleasure, joy, happiness), psychological well-being is a multi-dimensional concept (Ryan & Deci, 2001) which also includes eudaimonic experiences such as vitality (Ryan & Frederick, 1997) and work engagement (Nix, Ryan, Manly, & Deci, 1999). Research has shown that it is the feeling of realizing one's full potential – an aspect of eudaimonic well-being – that protects people from burnout and stress at work (Schaufeli, Bakker, & Salanova, 2006). Moreover, research has also shown that when people are autonomously (highly self-determined) motivated they are more likely to maintain eudaimonic well-being (Ryan & Frederick, 1997). Work engagement (Schaufeli & Bakker, 2004) and vitality (Ryan & Frederick, 1997) are two important ways of operationalizing psychological well-being in the workplace, for they could nurture the calm psychological energy that individuals need to thrive day in and day out on the job (Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005). Furthermore, the organizational and relational contexts at work that generate such psychological energy (e.g., work engagement and vitality) through the performance of tasks or the experience of events, which in turn lead to fluctuations in motivation, need to be carefully studied. In addition, the fluid nature of vitality and work engagement could properly reflect the outcomes of changes in motivation at the situational and context levels, respectively.

Psychological ill-being, which is represented by psychological maladjustment, and which is often referred to as the "dark side of human mental health" (Ryff et al., 2006), could also result

from repeated basic psychological needs frustration and negative social interactional experiences (Deci & Ryan, 2000). Hence, researchers' focus ought to be directed towards understanding the psychological mechanisms behind such a negative aspect of mental health in the workplace, so that many possible negative consequences of psychological ill-being (e.g., absenteeism, turnover, burnout, exhaustion) can be prevented (Ryff, 1995). In this study, I have carried out such research: I examined basic needs frustration, a feeling whose intensity is greater than when basic needs go unsatisfied (Bartholomew et al., 2011), as the parallel mechanism to needs satisfaction, so as to learn how to prevent ill-being at work and to understand the negative consequences of changes in controlled motivation, which is mostly represented by the externalization of self-regulatory processes.

Drawing on SDT, the H-SDT model, and a multi-dimensional conceptualization of psychological health including both employee well-being and ill-being, the present research seeks to examine how changes in basic needs satisfaction/frustration lead to changes in motivation and then in subjective well-being/ill-being while accounting for the characteristics of the work environment. This research was carried out through two empirical studies. Study One focuses on task-specific needs-supportive characteristics ("NSCs"), situational motivation, and well-being according to daily work tasks. Data for this study were collected using the day reconstruction method ("DRM"; Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004), a sophisticated survey framework that allows participants to systematically reconstruct all of their contextual, relational, and perceptual understandings of their work in a time-sequential manner. The study uses multi-level structural equation modelling ("MSEM") to investigate the relationship between within-person situational motivation and well-being. Study Two used latent growth curve modelling ("LGM") to examine a dynamic dual-path model according to which

changes in basic needs satisfaction/frustration predict changes in employees' well-being/ill-being through the mediating effects of the changes in autonomous and controlled motivation. For this study, longitudinal data were collected on three occasions from employees during a period of four to five months. In investigating the psychological mechanisms of daily motivation and well-being/ill-being, researchers should also carefully consider organizational context factors (Johns, 2006). In this research, organizational context was theorized and tested at two different conceptual levels: the situational level (tested at within-person level in Study One), through task-specific NSCs (measured by the perceived autonomy of the work task, timeliness, performance feedback, and interpersonal interactions in Study One), and the work (life-domain) level, through perceived basic needs support/thwart (measured by basic needs satisfaction/frustration, controlled at between-person level in Study One and mainly tested at within-person level in Study Two).

The major contributions of this research were that both empirical studies (1) allowed the mapping out of the possible variations of motivational determinants (NSCs of specific work tasks in Study One and perceived needs satisfaction/frustration at work in Study Two), the types of motivation at work and their health-related consequences at all three conceptual levels using complex survey infrastructures, and multi-level as well as latent growth modelling as statistical/measurement methodologies; and (2) formed integrations under the theoretical framework of SDT and H-SDT be the pioneer studies to test, describe, and theorize the manifestations (e.g., variances of motivation at work for different conceptual levels, directions, and sequences) of changes in work motivation and their health-related consequences systematically during short time periods (less than twenty-four hours in Study One and four to

five months in Study Two) as a way to enhance our understanding of the dynamics of human motivation.

Theoretical Framework

Dynamic Research Approaches

More and more organizational behavior ("OB") researchers have recently started to focus on using positive, dynamic approaches when conducting research in organizational contexts. Using this approach, many key OB concepts have been rethought and reanalyzed in terms of change over time. Dispositional and static views of concepts can only lay the foundation for identifying and labelling certain organizational phenomena. The constant interaction of individual, contextual, and societal factors requires that these phenomena be examined and understood from a dynamic perspective. Accumulated empirical evidence from longitudinal studies can answer the same research questions in different ways, with one of these ways being the integration and systemization of OB concepts in complex research models with levels, time, and process considerations. Such OB concepts include not only work motivation, but also other attitudes and perceptions like organizational commitment, organizational justice, and job satisfaction.

In a longitudinal study, Hausknecht, Sturman, and Roberson (2011) followed participants over one year in order to study their perceptions of justice, job satisfaction, organizational commitment, and turnover intention. The results of their study showed that the change (trajectories) of perceptions for procedural justice affected commitment, satisfaction, and turnover intention after controlling for the end-state justice level. This study demonstrated that

the change in or accumulative variability of a psychological construct could have a significant impact on one's cognitive and behavioral outcomes in organizations. Like justice and commitment, motivation and work engagement are also dynamic in nature. For instance, past research based on the theoretical framework of self-determined motivation in education (Lavigne & Vallerand, 2010) and sport (Blanchard, Mask, Vallerand, de la Sablonnière, & Provencher, 2007) has found that changes in situational motivation can help individuals to gradually internalize successful needs-supportive interactions with others (e.g., teachers, coaches) as well as various environmental/contextual factors.

Motivation has been theorized from many different perspectives, such as goal-setting theory (Locke, 1991, 1997) and expectancy theory (Vroom, 1964), as well as social psychological theories such as SDT (Deci & Ryan, 1985a; Ryan & Deci, 2000b) and regulatory focus theory (Higgins, 1997, 1998). Especially in OB literatures, motivation (generally referred to as "work motivation") has been found to be related to many positive behavioral outcomes (e.g., work performance and organizational citizenship behavior), emotional outcomes (e.g., affect), as well as attitudinal outcomes (e.g., commitment, engagement, vitality, and satisfaction).

Motivation has been mostly researched as a set of stand-alone psychological processes or as the result of the internalization of or the interaction between external environment and personal orientation (Vancouver, 2008). Under the above theoretical frameworks, motivation has been theorized as a comprehensive dynamic process that includes not only individual differences (e.g., personality, general efficacy, and skill) but also the parameters (e.g., time and context) that affect them. Researchers have to address the role of time properly when they investigate changes in work motivation (Gagné & Deci, 2005). In organizational research, time can be treated as a

focal construct (i.e., time management, temporal focus), or it can be seen as the agent with which to analyze a dynamic process (i.e., motivational change; see Shipp & Cole, 2015). In this research, I intended to treat time as the temporal agent rather than as a focal construct, in order to see how changes in contextual and relational factors vary with motivational changes in the workplace. I decided to treat time in this manner, so that I could investigate motivational change in isolation with these contextual and relational factors by looking at the latter's ability to initiate and sustain human working behavioral changes in organizations.

On the other hand, changes in the quality of motivation through individual internalization processes need more attention (Gagné & Deci, 2005). Researchers and practitioners are also calling for an increased focus on the dynamic nature of changes in motivation, with two important examples being how developmental changes in motivation affect changes in performance (Hayenga & Corpus, 2010) and how cognitive changes in motivational beliefs affect learning outcomes (Pintrich & Schrauben, 1992). Studying the change patterns of motivation and their impact on different outcomes (Vallerand, Pelletier, & Koestner, 2008), as I do here, will provide an understanding of this dynamic process of motivational change over time, which could inspire many interventions in the workplace that would lead to more positive organizational and individual outcomes. This research will add value to our understanding of changes in work motivation – within the context of SDT and the H-SDT model – in two important ways. First, it will capture the various types of situational motivation that pertain to different kinds of tasks, which, in turn, will lay the groundwork for the possibility of understanding how changes in motivation happen during work hours (Study One). Second, it will extend our theoretical understanding of the manifestation of motivational change processes through the temporal relationship of such manifestation with changes in employees' subjective

perceptions of how their basic psychological needs are satisfied/frustrated, and how their own well-being/ill-being is affected (Study Two).

Motivation

General Conceptualization of Motivation

Motivation is a psychological construct that has been extensively researched in the past. When trying to explain just how motivation is generally understood in the scientific community, researchers often emphasize different aspects of the concept under different theoretical frameworks. In the summary published by Kleinginna and Kleinginna (1981), there were 102 definitional statements and nine definitional categories pertaining to the concept of motivation. A comprehensive definition was proposed by Pinder (1998, p. 11), who referred work motivation as "a set of energetic forces that originates both within as well as beyond an individual's being, to initiate work-related behavior, and to determine its form, direction, intensity and duration." This conceptualization of work motivation has several implications: (1) it envisions work motivation as energetic forces that have broad cognitive and behavioral impacts on the psychological health of human beings; (2) the energetic forces can be affected by individual and environmental factors, as well as by the interaction of the former and the latter; and (3) work motivation is a dynamic concept, which explains why people will attempt certain tasks, how hard they will try to complete them, and how long they will keep making attempts to complete them.

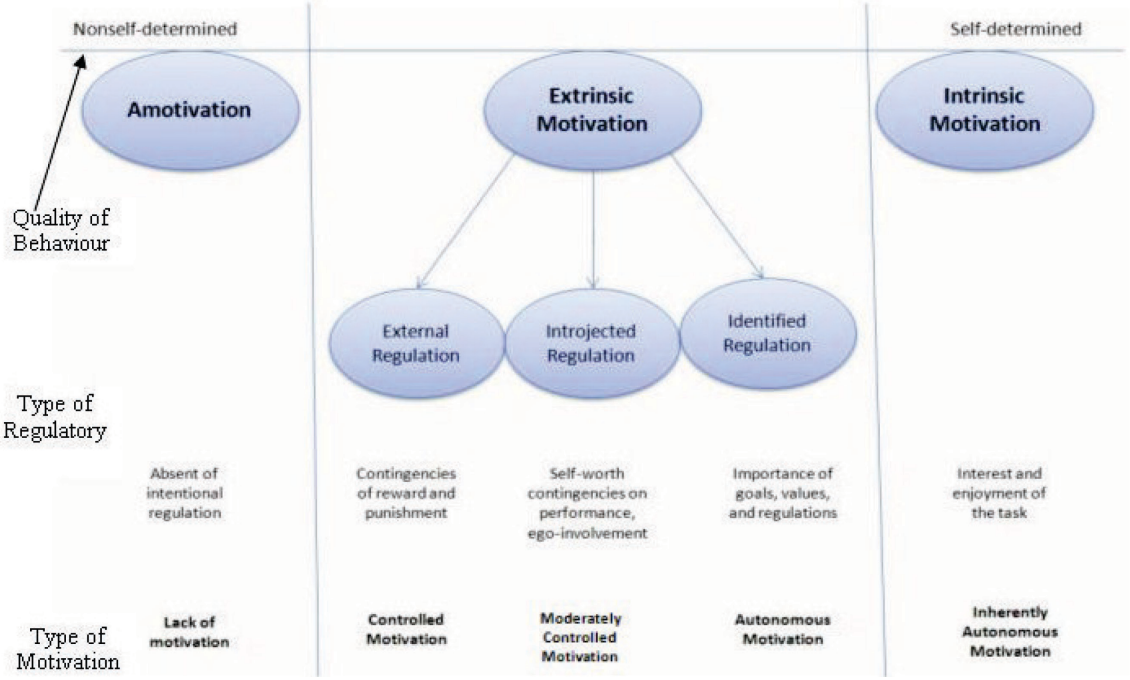
Motivation has a unique relationship with other similar psychological constructs, such as commitment and engagement. While motivation and commitment have similarities (Meyer, Becker, & Vandenberghe, 2004), research has shown that the two constructs have different formational stages in terms of change. For example, in a research study conducted by Gagné and

colleagues (2008), motivation at an early stage ("time one") was related to a change in commitment over time, while commitment at an early stage ("time one"), was not related to a change in motivation over time. Hence, this research supports the idea that motivation precedes commitment, rather than the other way around. Meanwhile, motivation is considered to be strongly related to engagement. Autonomous motivation, for example, often described as autonomous regulation with a high degree of volition and personalized goal orientation (Meyer & Gagné, 2008), has been found to engender absorption, positive affect, passion, and behavioral engagement (e.g., proactive, discretionary performance; see Macey & Schneider, 2008). In a meta-analysis conducted by Christian, Garza, and Slaughter (2011), the positive correlation between work engagement and task performance was theoretically attributed to the close relationship between work engagement and task motivation. Studies of work engagement have also shown that there were substantial variations (Sonnentag, Dormann, & Demerouti, 2010) in work engagement levels during the day. All of these research findings imply the necessity to adopt a dynamic view to better understand changes in employee work motivation.

Motivation at Work

SDT (Deci &Ryan, 1985a, 2000) differentiates not only between levels (i.e., quantity) of motivation, but also between the dimensions (i.e., quality) of motivation (see Figure 1 for an explanation of the dimensional model of motivation). This theory proposes that people do things as the result of different kinds or types of motivation: "intrinsic motivation" refers to when people do "something because it is inherently interesting or enjoyable", and "extrinsic motivation" refers to when people do "something because it leads to a separable outcome" (e.g., money, praise, fame) (Ryan & Deci, 2000a, p. 55).

Figure 1. The **Dimensional Motivation Model** (Adapted from Gagné & Deci, 2005)



The dimensional motivation model proposed by SDT (Deci & Ryan, 1985a, 2000) suggests that people can be motivated both by controlled desires (e.g., to obtain monetary compensation, to avoid punishment, and/or to avoid guilty feelings) as well as autonomous desires (e.g., to have fun performing a given task or to realize one's values or beliefs). Autonomous motivation includes two forms of self-determined motivation, namely, intrinsic motivation and identified regulation, while controlled motivation includes external regulation and introjected regulation (Ryan & Deci, 2000a). Autonomous motivation and controlled motivation are not opposites; they each include different types of motivation that mainly result from different regulatory styles, and each predicts different outcomes (Gagné & Deci, 2005). Although some studies have claimed that different types of motivation did not follow the continuum of autonomy (i.e., Chemolli & Gagné, 2014), most research evidence (e.g., Howard, Gagné, Morin, & Forest, 2016; Litalien et al., 2017) consistently support the theoretical

continuum of autonomy along different types of motivations in SDT. In this sense, when people are autonomously motivated, they show more interest in the task itself and feel less stressed, demonstrating more creativity and flexibility when encountering difficulties (Deci & Ryan, 1987) compared to when they are controlled motivated. Autonomous motivation also increases effort (Sheldon & Elliot, 1998), goal acceptance (Gagné, Koestner, & Zuckerman, 2000), perceived competence (Williams & Deci, 1996), organizational commitment (Gagné, Chemolli, Forest, & Koestner, 2008), and psychological well-being (Baard, Deci, & Ryan, 2004; Black & Deci, 2000). Other researchers have also found that autonomous motivation is associated with less turnover intentions (Richer, Blanchard, & Vallerand, 2002) and fewer reports of physical symptoms such as fatigue, headache, and muscle pain (Otis, Grouzet, & Pelletier, 2005). Autonomous motivation, especially the intrinsic motivation resulting from a high level of self-regulation, ought to be nurtured for the sake of individuals' well-being and performance (Deci & Ryan, 2000).

Hierarchical Model of Self-Determined Motivation

The hierarchical model of self-determined motivation ("H-SDT"), first mentioned above, was proposed by an SDT researcher, R. J. Vallerand, in the late 1990s. The H-SDT model proposes that motivation can operate and interact at different levels: the global level (e.g., personality), the contextual level (e.g., referred to specific life domains such as work vs. leisure), and the situational level (Vallerand, 1997; Vallerand & Ratelle, 2002). When studying situational motivation, researchers often focus their empirical investigations on why individuals engage in certain activities at a particular time (Vallerand, 1997), where such situational motivation has been measured using a self-report situational motivation scale ("SIMS"; Guay, Vallerand, &

Blanchard, 2000). The study conducted by Guay, Mageau, and Vallerand (2003) also confirmed the existence of a reciprocal relationship between different levels of motivation using longitudinal and time-lagged models, which suggests that knowing one's situational motivation profile (autonomous vs. controlled) can provide contextual hints for possible interventions to support situational self-determined regulation, which may reinforce one's domain-specific and global motivation at a higher level later on. On the other hand, studying contextual motivation in different life domains (e.g., education, work, leisure) may help people to manage their work-life/study-life balance, to preserve their passion, and to ultimately maintain a high level of well-being (Vallerand, 2012). One challenge faced by the H-SDT model is the interplay between contextual and situational motivation. For example, a computer programmer involved in challenging coding activities who is made to think about organizing a birthday party for his girlfriend may experience motivational conflict across different life domains. His situational motivation at work can be affected by non-work-related motivation in another life domain. A field study conducted by Ratelle, Senécal, Vallerand, and Provencher (2002) examined such negative consequences resulted from motivational conflict between leisure and education activities. More research is needed to investigate the interplay between general, contextual, and situational motivation within the work domain, as well as the affective and behavioral consequences of this interplay at each of the conceptual levels of motivation.

The H-SDT model not only emphasizes the importance of motivation levels (i.e., global vs. life-domain level vs. situational), but it also suggests that different affective, cognitive, as well as behavioral consequences should be reflected at the same generality level (Vallerand, 1997). For example, situational motivation will result in situational consequences (e.g., level of

attention paid to the specific task). In addition, recursive relationships (top-down, bottom-up) among motivations at different conceptual levels also exist (Vallerand, 1997). This means that situational work motivation can shape work motivation related to same-life domain, and that work motivation can also have a learning impact on global-level motivation over time and vice versa. Studies, for example, have shown that in the classroom controlling teachers can promote an extrinsic causality orientation in their students, and that such an orientation can last throughout their school years (Deci, Nezlek, & Sheinman, 1981). Again, with student samples in educational settings, research has also found support for the existence of both top-down and bottom-up effects of global-level motivation affecting contextual-level motivation over a period of five years (Guay, Mageau, & Vallerand, 2003). The present research further investigates the nature of the motivational change mechanism and its effects on well/ill-being according to its three conceptual levels (e.g., at the situational level in Study One); it also looks into the possible cross-level effects among different levels of motivation in the workplace (e.g., from the global to the work-domain level in Study Two) as opposed to in educational or athletic settings.

Past research on situational autonomous motivation has been conducted mainly by using educational (e.g., teachers and students) and athletic (e.g., coaches and athletes) participants. This kind of motivation has rarely been studied in the work domain, and, when it has been, the measurement of situational motivation was very similar to the measurement of contextual and general motivation, with the only difference being in the instructions, which asked subjects to describe their reasons for being motivated or not with regard to particular events/activities that just happened. Finally, situational factors (e.g., various factors reflected in people's social exchanges) have not been taken into account in past research. The time, then, is ripe for research into situational autonomous motivation in the workplace.

Basic Psychological Needs

According to SDT (Deci & Ryan, 1985b, 2000), basic psychological needs act as the gateway to understanding human motivation. Deci and Ryan (2000, p. 229) consider these needs to be "innate psychological nutriments that are essential for ongoing psychological growth, integrity and well-being." Hence, people are naturally inclined to seek out needs-satisfying activities implicitly and/or explicitly in order to grow, master challenges, and integrate new experiences. However, these natural tendencies do not operate automatically but require constant and consistent social "nutriments" and support (Deci & Ryan, 2000; Deci & Ryan, 2008a). SDT researchers have argued for the universality of the need for competence (Csikszentmihalyi, 1988; White, 1959), the need for relatedness (Baumeister & Leary, 1995), and the need for autonomy (Chirkov, Ryan, Kim, & Kaplan, 2003; DeCharms, 1968). All three of these basic psychological needs are essential to human psychological health and, ultimately, to human functioning (Sheldon, Elliot, Kim, & Kasser, 2001).

Need for autonomy. The need for autonomy refers to the need to be the origin or source of one's own behaviors (Ryan & Deci, 2001), and important in this regard is the experiencing of oneself as the locus of causality for one's own behaviors. This need is the most salient one and is necessary for intrinsic motivation and well-internalized extrinsic motivation (together referred to as "autonomous motivation") to emerge (Ryan & Deci, 2006). To act autonomously means to perceive that one's behavior is in accordance with one's core self. A person is constantly influenced by external factors when they are out in the world behaving, but they can still be autonomously regulated as long as they fully endorse their core-self and consciously approve of it (Ryan & Deci, 2006). Just like people need to autonomously learn, grow, and develop, employees need to produce the desired outcomes in the workplace. In order to do this, employees

– like individuals in general – need to have this sense of volition when they perceive they are given opportunities to make job-related choices and to fully endorse external requests to work hard in order to achieve individual, team, and/or organizational goals (Gagné & Deci, 2005).

Need for competence. The need for competence refers to the desire to master optimally challenging tasks, to positively influence the environment, and to attain valued outcomes. People need to feel effective in their interaction with their social environment and to be able to express and demonstrate their capabilities (Ryan & Deci, 2001). People's need for competence explains why they seek challenges and constantly strive to enhance their skills and knowledge to cope with them and to meet them, be this in the domain of education, sports, or work (Ryan & Deci, 2001).

Need for relatedness. Relatedness refers to the desire to feel mutual respect and to feel connected to people in order to get a sense of social support (Baumeister & Leary, 1995). People need to feel connected to others, to care for and be cared for by others, and to have a sense of belongingness to their community (Ryan & Deci, 2001). In the workplace, the satisfaction of the need for relatedness can be very important for employees when it comes to internalizing team and/or organizational values, and acting in the best interest of the team/organization to which they feel they belong (Gagné & Deci, 2005).

SDT researchers have argued that conditions that support people's need for autonomy, competence, and relatedness foster the most volitional and high-quality forms of motivation (e.g., intrinsic motivation, identified regulation) for many human behaviors, and that such forms of motivation also enhance performance and well-being (Baard, Deci, & Ryan, 2004; Gagné, Ryan, & Bargmann, 2003; Vansteenkiste et al., 2007). SDT suggests that all three needs are

important for motivation (Ryan & Deci, 2000b; Gagné & Deci, 2005). In an experiment conducted by Sheldon and Filak (2008), it was not only autonomy support but competence support and relatedness support that had significant effects on participants' self-rated intrinsic motivation and performance outcomes in game-learning settings. These findings therefore support the above contention, stemming from SDT that motivation increases additively with the degree of satisfaction of all three basic psychological needs (Dysvik, Kuvaas, & Gagné, 2013).

Internalization and Externalization as Changes in Motivation

SDT, as a dimensional motivation model, differentiates between types of extrinsic motivation that can be internalized differently (Ryan & Deci, 2006; Gagné & Deci, 2005). Internalization in the literature is referred to as "people taking in values, attitudes, or regulatory structures" (Gagné & Deci, 2005, p. 334). It is especially meaningful at this point to explain that the process of change in work motivation unfolds over time because people often claim that working is not intrinsically motivating, at least not for everyone all the time. Often, people feel obligated (e.g., controlled by reward or paycheque, or desiring to avoid certain negative consequences such as demotion or layoff) to go to work; naturally, it is hard for the management of organizations to create job or work tasks that are intrinsically motivating. But such external regulation of work behavior could gradually require no external contingencies whatsoever. For example, when working becomes an important event in one's life, or when it becomes consistent with one's values, it could be internalized and transformed into an internal regulation and no longer require external reinforcement/reward: an employee could think, for instance, "I will continue to work on the project even though I will not receive any overtime pay, because it is

very important for me to be able to lead and finish the project by myself." Based on such psychological mechanisms of internalization, motivation at work can be changed.

Internalization can be nicely laid out according to its degree of self-regulation over time, for instance from external regulation to identification or from introjection to identification. Controlled regulation can be transformed to more self-regulation but still not be completely accepted by the self; for example, introjected regulation could happen when someone tries to internalize motivation but does not yet fully manage to do so. In that case, the regulation process could still be driven by a desire to avoid ego or self-esteem frustration (Ryan, 1982). Identified regulation is more autonomous, as people feel more volitional when their behavior is congruent with their self-selected goals. People with this type of regulation tend to have an internal perceived locus of causality. SDT suggests that internalization does not have to go through certain stages when it happens under optimal conditions – that is, when it can satisfy people's three basic psychological needs (Gagné & Deci, 2005; Ryan & Deci, 2006). Accumulated empirical evidence also suggests what we have just seen, that improvement in needs satisfaction is essential for the internalization of extrinsic motivation. People's performance and psychological health, then, can be improved through interventions or environmental factors that facilitate the satisfaction of the basic psychological needs for autonomy, relatedness, and competence (Baard, Deci, & Ryan, 2004; Deci, Eghrari, Patrick, & Leone, 1994; Deci & Ryan, 2000; Moller, Deci, & Ryan, 2006; Sheldon & Filak, 2008).

On the other hand, if employees had been repeatedly perceived as being incompetent at work, isolated by co-workers and/or controlled by their supervisor, the original appraisal of work being fun and interesting (e.g., intrinsic motivation) can easily change to perceive working for

more extrinsic reasons (e.g., work for living, to avoid being laid off, stuck due to the fact that one cannot find a similar job right way etc.) as a result of basic needs frustration at work. Such behavioral and attitudinal changes towards work can also be reflected as "externalization" processes over time. However, limited empirical evidence supports this understudied parallel change processes of "externalization" compared to those of "internalization."

To summarize, social contextual factors that maintain a high level of intrinsic motivation are a lot like those that facilitate the internalization and integration of extrinsic motivation (Deci & Ryan, 2008a). These social contextual factors could be, for instance, being offered more choices (Deci et al., 2001), receiving positive feedback (Gagné, Koestner, & Zuckerman, 2000), or benefitting from a stimulating interpersonal ambience (Sheldon & Filak, 2008). Similarly, when the working environment is needs-thwarting, when employees, for example, face a depletion of necessary resources, abusive supervision, or negligent/aggressive co-workers, their basic needs for autonomy, relatedness, and competence are repeatedly frustrated. Their motivation to work could be gradually changed to another orientation, that is, to external regulation, which emphasizes action based on gaining respect and/or monetary compensation, and which could lead to an employee becoming impersonal and/or amotivated (Deci & Ryan, 2008a; Vansteenkiste & Ryan, 2013) in the end. Hence, it is important to take into consideration both employee perceptions of their own needs satisfaction/frustration as well as the needs-supportive characteristics ("NSCs") of their work tasks when looking into how their motivation changes over time (internalization when their motivation becomes more autonomous, and externalization when their motivation becomes more controlled) and how their well-being/ill-being changes over time.

Social Cognitive Theory and Motivation

Social cognitive theory ("SCT"; Bandura, 1991, 2001) examines the human learning experience through a triadic model that looks at behavior, cognition, and environment. It reflects an agency view of human behavior, according to which individuals engage in a motivational process of observation, interaction, and self-reflection mostly through vicarious learning experiences – experiences which they proactively seek out (Schunk & Pajares, 2005). Research evidence which has been accumulated over the past 40 years supports the reciprocal interaction among the three elements of the triadic SCT model (Bandura, 2001; Schunk & Pajares, 2009). In SCT, self-regulatory processes are referred to as "processes that individuals use to personally activate and sustain behaviors, cognition and affects, which are systematically oriented toward the attainment of goals" (Schunk & Usher, 2013, p. 17). Although self-determination theory ("SDT") does not put special emphasis on personal goal-setting, it does, interestingly enough, echo SCT's claim about the psychological nature of self-regulation as an organismic driver of self-initiated behavioral, cognitive, and affective change resulting from observation and social interaction (Deci & Ryan, 2000). In the dimensional motivation model proposed by SDT, transitions between different types of motivation according to different levels of internalization are known as "identified regulation," "introjected regulation," and "external regulation" (see Figure 1). Hence, it is important to study both controlled work motivation and autonomous work motivation, not only for what they can tells us about people's psychology and behavior, but also for the dynamic change ("internalization" vs. "externalization") that can occur when one quality of motivation varies through different contexts. Drawing on both SCT and SDT, the present research views the dynamic change in motivation as the key predictor of changes in human attitudes and behaviors, and its findings in Study One and Study Two can lead to the

advancement of knowledge and to advances in theories of motivation by adding a more dynamic understanding of its antecedents and outcomes.

Psychological Health

Organismic Dialectical Approach to Psychological Health

SDT takes an organismic approach that seeks to integrate humanistic, psychoanalytic, and developmental understandings of human motivation, which include all of its behavioral, cognitive, and emotional manifestations (Ryan & Deci, 2017). It assumes that humans tend toward both autonomy (e.g., inner organization and holistic self-regulation) and homonomy (e.g., integration of oneself with others), with both tendencies serving as fundamental aspects of human life, which cannot be taken for granted (Deci & Ryan, 2002). This dialectical view posits that the interaction between a human being's active and self-regulatory nature and its social context can either nurture or impede their growth. In summary, social environment can either facilitate and enable or disrupt and fragment human developmental processes, with the former leading to human flourishing and the latter leading to much less desirable consequences (Deci & Ryan, 2002). Hence, the psychological health of human beings should be reflected by their being able to achieve growth (i.e., well-being) through needs satisfaction and successful social interactions. It should also be reflected by their being able to avoid the sickness (i.e., ill-being) that results from not being able to integrate with their social environment, which itself is a result of a lifetime of needs frustration and interpersonal thwarting.

The present research follows SDT's organismic dialectic approach, which looks at psychological health from both its positive (e.g., psychological well-being) and negative (e.g., psychological ill-being) sides, by employing a dual-path model to investigate how different

needs-supporting and needs-thwarting contextual interactions affect people's motivational mechanisms (autonomous and controlled).

Psychological Well-being (Hedonic vs. Eudaimonic)

Does affective well-being only include feeling positive every day? Accumulated research evidence points to the fact that "well-being" seems to be multi-dimensional (e.g., Nix, Ryan, Manly, & Deci, 1999; Kahneman, & Deaton, 2010): it is more than just "hedonic happiness." Well-being has historically been studied from two different perspectives: (1) hedonism, according to which humans only seek pleasure; and (2) eudaimonism, according to which realizing one's full potential is one's ultimate goal and pleasure seeking is not sufficient condition for humans to be said to be living a good life (Kopperud & Vittersø, 2008). Both hedonic and eudaimonic well-being are now getting the attention they deserve, as it were, from OB researchers. In fact, individuals' work life has been found to be related to lower levels of positive emotion (e.g., joyful, pleasant, happy) compared to their leisure life and their family life (Kahneman, Krueger, Schkade, Schwarz, & Stone, 2004). Meanwhile, other scholars, using optimal experience, personal growth, and feelings of accomplishment as work-related affective reactions, have found that these feelings were also important sources of well-being and personal development in both work and non-work domains (Csikszentmihalyi, Abuhamdeh, Nakamura, & Flow, 2005; Csikszentmihalyi & Csikszentmihalyi, 1992).

SDT researchers have studied eudaimonic affect in terms of vitality, defined as "the experience of having energy available to one's self" (Ryan & Frederick, 1997, p. 535), and engagement, defined as a "positive, fulfilling work-related state of mind that is characterized by vigour, dedication, and absorption" (Schaufeli, Bakker, & Salanova, 2006, p. 702). In the present

research, I use work engagement and vitality as the key indicators of employee well-being, since both can be used to capture the dynamic nature of daily well-being in the workplace. In so doing, I hope to expand our understanding of well-being in the workplace through an investigation into the daily fluctuations of the motivational mechanisms of vitality and engagement.

Engagement and Vitality as Key to Individuals' Subjective Well-being

In line with the organismic and psychological conceptualizations of subjective well-being, SDT researchers have proposed the construct of vitality, which captures the positive feelings of aliveness and energy, as an important indicator of personal well-being (Ryan & Frederick, 1997). Research has shown that vitality is negatively related to many somatic physical symptoms (e.g., tension, depression, anger, fatigue) (McNair, Lorr, & Droppleman, 1971). Empirical evidence also suggests that vitality could have significant within-person variation, depending on situational factors as well as on the level of needs satisfaction (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000). Vitality has been found to be predicted by autonomous motivation only, while positive emotions have been found to be predicted both by controlled and autonomous motivation (Nix, Ryan, Manly, & Deci, 1999). Furthermore, even when people were autonomously engaged in work tasks, temporary negative emotions (e.g., stress caused by tight deadlines, awkwardness caused by challenging superiors or senior colleagues, uncertainty that comes with being proactive) were sometimes found to have been experienced.

Work engagement (Schaufeli, Salanova, González-Romá, & Bakker, 2002) in its theoretical aspects has a lot in common with vitality (Gagné & Bhave, 2011), but with emphasis on its relatively stable and domain-specific characteristics (for example, it mainly describes people's state of working in organizations). Closely related to autonomous motivation (Meyer &

Gagné, 2008), it has been said to be the positive energy needed to fuel individual performance at work (Bakker, Albrecht, & Leiter, 2011). In addition, work engagement represents the positive energy that one gathers for daily work (Schaufeli, Bakker, & Salanova, 2006). The above empirical evidence summarizes the multi-dimensionality of employees' subjective well-being, which needs to be further investigated for how it can be affected, in an organizational context, by changes in motivational mechanisms associated with the work tasks performed by employees. Deconstructing employees' feelings beyond a simple capturing of positive affect and learning how they energize proactive as well as reactive on-the-job behavior (both in-role and extra-role performance) may help researchers gain a deeper understanding of employees' well-being at the workplace as well as the motivational factors that affect this multi-dimensional well-being construct during daily work activities.

With this new emphasis on positive human psychological mechanisms, researchers have also called for further studies of positive organizational behaviors (Luthans, 2002). Consistent with the purpose of improving well-being and performance in organizations, the present research aims to relate several positive psychological constructs, for example work engagement and vitality, and investigate how they are related to work motivation in different organizational contexts and, in particular, how they are affected by daily fluctuations in motivation caused by the performance and experience of various tasks.

Work engagement is defined in the literature as "a positive fulfilling, work-related state of mind that is characterized by vigor, dedication and absorption" (Schaufeli, Salanova, González-Romá, & Bakker, 2002, p. 74). Meta-analyses of research conducted on work engagement have confirmed its validity as a distinct construct compared to other job attitudes (e.g., satisfaction), and have shown its positive relationship with employee well-being, employee retention, work

performance, and proactive work behavior (Halbesleben, 2010; Christian, Garza, & Slaughter, 2011).

Work engagement has also been conceptualized as a polar result of interventions aimed to prevent burnout, and has therefore been defined as "an energetic state of involvement with personally fulfilling activities that enhance one's sense of professional efficacy" (Maslach & Leiter, 2008, p. 498). In Maslach's model of work engagement, the latter comprises energy, involvement, and professional efficacy (Maslach, Schaufeli, & Leiter, 2001). These dimensions of work engagement are conceptual opposites of the dimensions of burnout, which are emotional exhaustion, cynicism, and reduced efficacy (Maslach & Leiter, 2008). Work engagement and burnout can be measured using the Maslach Burnout Inventory – General Survey ("MBI-GS") (Maslach & Leiter, 2008). However, there is only limited empirical evidence supporting the possible inferences that could be made from the polarized profile of burnout and engagement, and the claim that low burnout goes hand-in-hand with high work engagement (Schaufeli & Bakker, 2004). In the Study Two of present research, I measure and test my conceptual model using work engagement as an independent construct representing a positive consequence of self-determined motivation (Deci & Ryan, 2000).

The feeling associated with having vitality is related to feeling energized, alive, and full of enthusiasm (Ryan & Frederick, 1997). Perceived vitality also results from the energy created from purposeful regulated action (Ryan & Deci, 2008a). These types of energy are related to positive affect, and can be depleted through self-controlling regulation (e.g., suppression impulses). Different theoretical explanations of the mechanisms behind such kinds of energy have been adopted in past health research on the topic. For example, biopsychosocial models focus on the two bipolar dimensions of energy and tiredness, and tenseness and calmness

(Thayer, 1996, 2001). The most positive type is calm energy, and it most easily facilitates psychological and physical health. The ego-deletion model (Baumeister, Bratslavsky, Muraven, & Tice, 1998) emphasizes the energy deletion that results from self-controlling behavior: in short, the effort put into suppressing impulses often results in the loss of both psychological (Wallace & Baumeister, 2002) and physical energy (Gailliot & Baumeister, 2007). These empirical findings emphasize the importance of "calm energy", which could be gained through regular exercise, a healthy diet, and self-control (Ryan & Deci, 2008a).

Needs Satisfaction, Autonomous Motivation, and Well-being

Like other theoretical models, SDT provides a framework for the autonomous self-regulation and nurturing of perceived vitality and work engagement through needs-satisfying environments and relationships (Ryan & Deci, 2008b). Autonomous behavior, which focuses on actions regulated in accord with one's values or interests, is efficient and requires the least amount of inhibition. Such autonomous self-regulation has been found to be related to more vitality and happiness compared to controlled regulation (Nix, Ryan, Manly, & Deci, 1999). In a diary study conducted by Reis and colleagues (2000), autonomy needs satisfaction was found to be a significant predictor of vitality at between-person level, and all three basic psychological needs were found to be important in daily activities at within-person level. Researchers also found that peoples' intrinsic vs. extrinsic orientations were differently associated with vitality, and that these relationships were mediated by the satisfaction of psychological needs (Vansteenkiste et al., 2007).

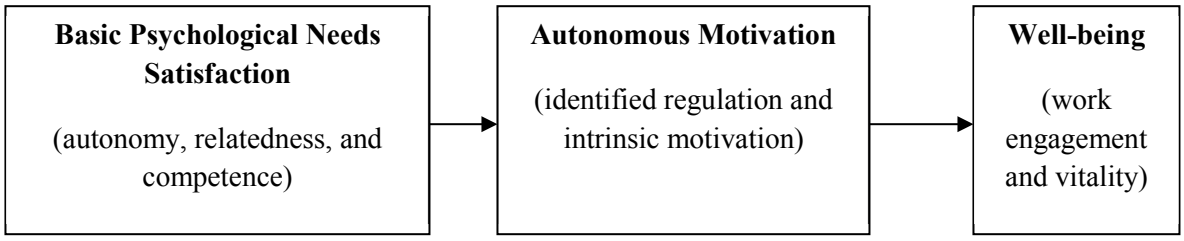
The depletion of human psychological energy has long been a focus of research in psychology. This phenomenon has supported the claim made by Baumeister and Vohs (2007)

that the human mind (and individual will in particular) is a limited resource. Many of their empirical findings, however, have proven to have less external validity outside of the lab, as they have been difficult to apply to real-life management practices. A topic that has been less studied in the literature is calm psychological energy, and how to obtain and nurture such energy in the form of vitality and engagement through needs-supporting interactions and contexts. Researchers have tried to capture such positive work behavior using the concept of "thriving at work" (Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005), a state describing positive self-regulated goal-directed behavior at work. In the theoretical model proposed by Spreitzer and colleagues (2005), thriving is an individual's experience of vitality and learning – a conclusion that differs markedly from those of many researchers who have studied positive working behavior in the form of resilience, flourishing, flow, and self-actualization. Individual agentic work behaviors (Bandura, 2001) such as task focus (Brown & Ryan, 2003), exploration (Kaplan, 1995), and heedful relating (Parker & Sprigg, 1999), positively promote both vitality and learning in the workplace. An organizational context which supports the satisfaction of psychological needs for autonomy, competence, and relatedness can facilitate a change in self-regulation as well as foster individual thriving in the workplace (Deci & Ryan, 2000). Recently, Shippers and Hogenes (2011) have also proposed an "energy management" model in organizations which includes subjects' experience of flow, engagement, and well-being. Through this model, they were able to link energy management to proper leadership interventions that could enhance individual and organizational outcomes.

Hence, it is meaningful to investigate basic needs satisfaction (relatedness, autonomy, and competence) as an antecedent to the relationships between autonomous motivation and well-being in the form of a multi-level longitudinal investigation. Specifically, it would be beneficial

to examine how contextual factors reflecting needs supportiveness could act on autonomous motivation in such a way as to facilitate possible changes from external to internal self-regulation. Moreover, empirical evidence collected on how the satisfaction of basic psychological needs at within-person level affects variations between situational motivation and moment-to-moment vitality could help researchers to further understand the psychological mechanism involved in the interaction between people and contextual factors. Please see Figure 2 below for the path model from needs satisfaction to motivation to well-being.

Figure 2. Path Model from Needs Satisfaction to Motivation to Well-being

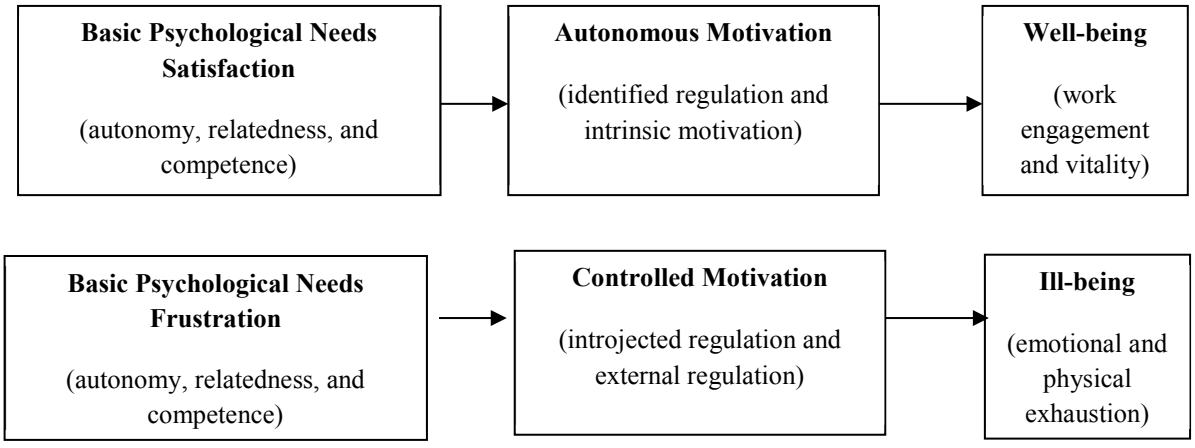


Needs Frustration, Controlled Motivation, and Ill-being

Basic psychological needs function as a gateway to promoting autonomous regulation and positive work outcomes (Gagné & Deci, 2005). SDT researchers have noticed that if the basic psychological needs (autonomy, relatedness, and competence) are thwarted rather than supported, then personal goal setting, behavior, and affect regulation may have even more negative outcomes as compared to the non-satisfaction of these needs (Bartholomew et al., 2011; Ryan & Deci, 2006). Though low levels of needs satisfaction have been found to be related to low levels of well-being (e.g., vitality, positive affect) (Ryan & Deci, 2006), theoretical and empirical evidence also suggests that needs thwarting is uniquely related to ill-being, examples of which are physical and psychological exhaustion, in educational and athletic settings (Bartholomew et al., 2011; Gunnell, Crocker, Wilson, Mack, & Zumbo, 2013; Felton & Jowett,

2013). Hence, it is also necessary to investigate needs frustration, which isn't the equivalent to low levels of needs satisfaction, as a different but parallel path that can lead to the strengthening of controlled regulation (e.g., external regulation, introjected regulation) at work, as employees are likely to adopt different maladaptive behaviors to cope with specific socially-demanding contexts. Research has been conducted to explain this dual-path, which includes both needs frustration and needs satisfaction, which has resulted from contextual needs-thwarting and needs-supporting factors, without treating it as a set of opposing mechanisms. Specifically, changes in perceptual needs satisfaction and needs frustration were seen as two separate but parallel mechanisms that could energize changes (e.g., healing vs. deteriorating) in employees' psychological health at work. This research could serve as the empirical as well as the theoretical basis for the creation of specific and meaningful interventions in the workplace to simultaneously promote employee well-being and prevent employee ill-being.

Figure 3. Dual-Path Model from Needs Satisfaction/Frustration to Motivation to Well-being/Ill-being



In a cross-sectional organizational study conducted by Gillet, Fouquereau, Forest, Brunault, and Colombat (2012), needs satisfaction and needs frustration were examined through two compatible models as mediators of the relationship between perceived organizational and supervisor autonomy supports and employee well-being (operationalized as work satisfaction and happiness for hedonic well-being, and as self-actualization for eudaimonic well-being) using two working samples. The results of a first study showed that perceived organizational support and supervisor autonomy support were positively related to all types of well-being, and that such relationships were significantly mediated by basic needs satisfaction. In a second study by Gillet and colleagues (2012), the results not only replicated the positive path from needs supportiveness (including both perceived organizational support and autonomous supportive interaction with a supervisor) to needs satisfaction and well-being, but they also demonstrated, in an integrated model, that needs thwarting was negatively predicted by perceived organizational support and positively predicted by supervisor-controlled social interactive behavior. In addition, needs thwarting also negatively predicted both hedonic and eudaimonic well-being. This organizational research confirmed the importance of needs satisfaction in terms of organizational context (perceived controlled and autonomy supports) and employee well-being in the workplace, but further research is needed to see how needs satisfaction and needs frustration play separate roles in different motivational regulations (e.g., controlled vs. autonomous motivation) as well as thriving at work. Using the needs-thwarting measurement developed by Bartholomew and colleagues (2011) and further validated by Gunnell and colleagues (2012), this research also investigates the dual-path model to understand more about changes in ill-being and in regulation that come about as a result of needs thwarting in the workplace. This research was conducted in order to find ways of preventing or managing these changes.

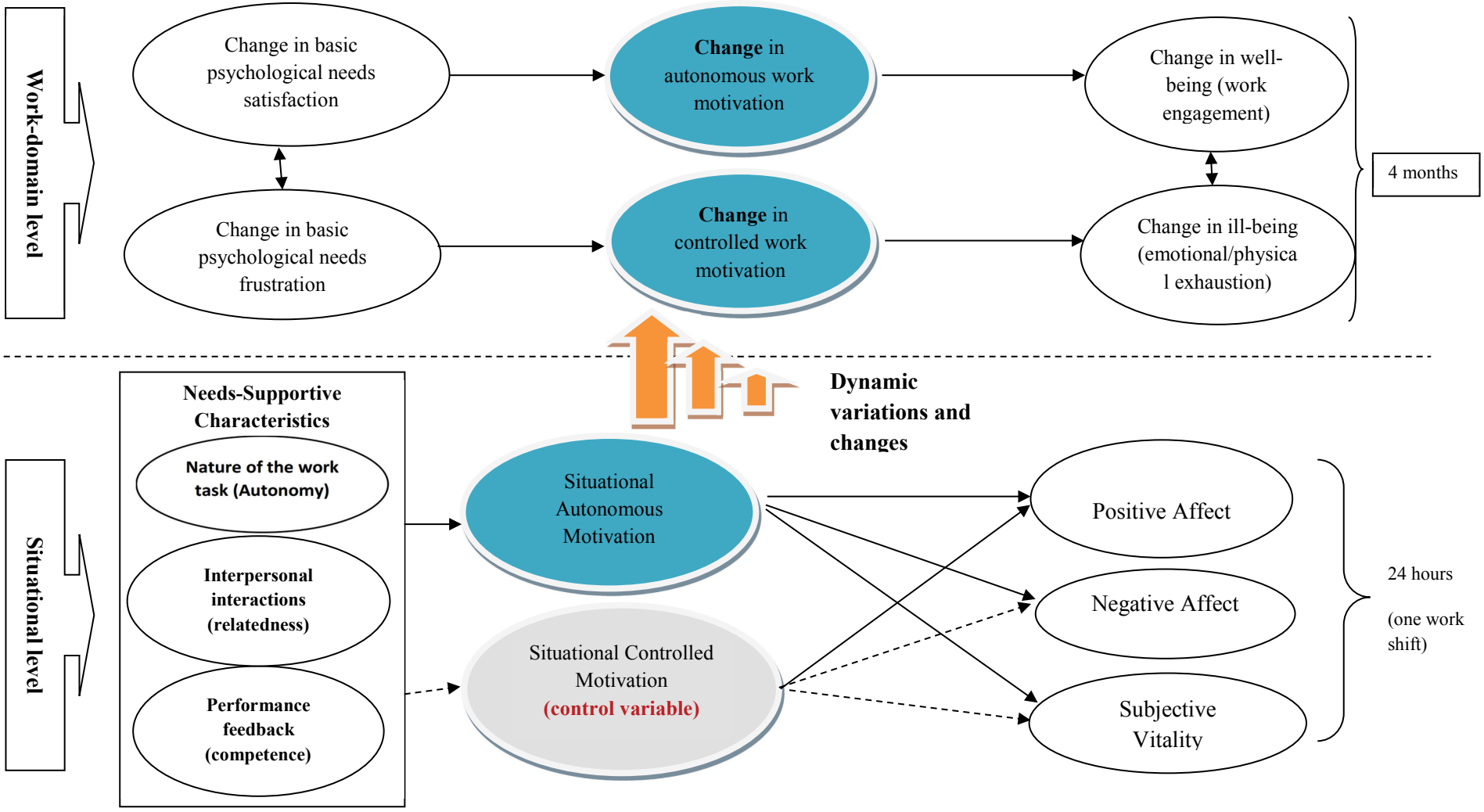
Most research evidence thus far has been focused on how the satisfaction of basic psychological needs promotes autonomous motivation and then predicts other positive outcomes such as well-being and performance (Gagné & Deci, 2005). But little has been done to investigate how situations and interpersonal interactions, here defined as any types of social exchange that one may have in an organizational context, affect changes in employees' work motivation and thriving experience from an explanatory rather than a descriptive perspective (Shipp & Cole, 2015). It is therefore meaningful to investigate the motivational mechanisms of both the variances and changes in psychological energy (e.g., vitality and engagement) in the workplace and to examine empirical evidence in order to help foster this energy for better individual and organizational outcomes. In other words, the sheer amount and variety of interplay between social, contextual, and perceived needs-supporting / needs-thwarting behaviors warrants further investigation, for such investigation could help researchers better understand changes in different persons' situational motivation. In the present research, I specifically use the categories of "needs-supporting" and "needs-thwarting" to characterize the contexts and interactions that either satisfy or frustrate basic human psychological needs. Needs satisfaction/frustration here is understood as employees' perception of how basic psychological needs were supported and/or thwarted in the workplace.

In summary, in the present research two independent empirical studies were conducted in order to test different facets of a proposed research model investigating the fluctuation of perceived needs-supportive characteristics ("NSCs") of tasks performed or events experienced at work, perceived needs satisfaction/frustration, motivation, and psychological well-being/ill-being in the workplace. Study One is a multi-level investigation of the NSCs of work tasks and events and the relationship between within-person situational autonomous motivation and daily well-

being using the day reconstruction method ("DRM") survey infrastructure. Study Two is a longitudinal investigation of how changes in needs satisfaction and frustration affect changes of well-being/ill-being mediated through changes in autonomous and controlled motivation. The general research model is summarized in Figure 4 below. Each study has its own detailed hypotheses, methodology, results, and discussion sections.

Figure 4. Multi-level **Longitudinal** Research Model

General Research Question: How does work context affect employees' self-determined/controlled motivation and well-being/ill-being at work?



Study One

A Multi-level Investigation of Employees' Work Motivation and Daily Well-being

Introduction

At work, employees are often assigned multiple tasks, and it is likely that their motivation to do their jobs varies with each task (Fernet, Senécal, Guay, Marsh, & Dowson, 2008). It is also likely that their motivation fluctuates throughout the day because of the different ways in which they experience their tasks, and that these fluctuations in motivation affect their well-being. Unfortunately, there has been limited research examining how different work activities and situations affect employees' motivation and well-being. In most cases, researchers have focused on domain-level assessments of work motivation that do not consider situational factors that may interact with (and thus affect to some extent) general motivational tendencies and which may allow employees to behave adaptively across different situations at work.

Motivation is a psychological process that elicits, controls and sustains behavior (Pinder, 2008). Self-determination theory ("SDT"; Deci & Ryan, 1985a; Ryan & Deci, 2000b), a needs-based motivation theory, offers a multi-dimensional conceptualization of motivation which differentiates not only between motivational levels (quantity), but between motivational dimensions (quality) as well. According to SDT, people's actions are the result of different types of motivation, and there are two principal or overarching types or dimensions of motivation: autonomous and controlled. Autonomous motivation, which is self-determined, includes intrinsic motivation (i.e., "doing something because it is inherently interesting or enjoyable"; Deci & Ryan, 2000, p. 55) and identified regulation (i.e., "doing something because it is consistent with

one's goals and values"; Deci & Ryan, 2000, p. 55). Controlled motivation, on the other hand, is not self-determined, and it includes introjected regulation (i.e., "doing something to enhance one's self-worth"; Deci & Ryan, 2000, p. 55.) and external regulation (i.e., "doing something to earn rewards or avoid punishment"; Deci & Ryan, 2000, p. 55). SDT suggests that the satisfaction of basic psychological needs (autonomy, relatedness, and competence) promotes highly self-determined types of motivation and results in better performance (Gagné & Deci, 2005) and increased well-being (Baard, Deci, & Ryan, 2004). Furthermore, the hierarchical model of self-determined motivation ("H-SDT"; Vallerand, 1997; Vallerand & Ratelle, 2002) argues that self-determined motivation can act at three reciprocally related levels: the global (i.e., personality), the life-domain level (for example, motivation for work vs. leisure), and the situational (e.g., while performing a specific work task). The H-SDT model supplements the basic tenets of SDT, which focus on general and state motivation, and suggests that situational motivation may fluctuate as people (e.g., employees) engage in different activities.

Not limited to hedonic feelings (e.g., happiness, pleasure, joy), psychological well-being is a multi-dimensional concept (Ryan & Deci, 2001) which includes eudaimonic experiences such as vitality (Ryan & Frederick, 1997) and work engagement (Nix, Ryan, Manly, & Deci, 1999). Research has shown that the feeling associated with realizing one's full potential, an aspect of eudaimonic well-being, is particularly beneficial when it comes to protecting people from burnout and stress at work (Schaufeli, Bakker, & Salanova, 2006). Moreover, research has also shown that when people are autonomously motivated (highly self-determined), they are more likely to maintain their levels of eudaimonic well-being (Ryan & Frederick, 1997). The organizational and relational context at work that generates such psychological energy is thus worthy of investigation.

The purpose of this study, then, is to examine the ways in which needs-supportive characteristics ("NSCs") of specific work tasks that occur throughout the day affect situational motivation and hedonic as well as eudaimonic well-being. To this end, this study has two main objectives, namely, to determine the patterns of different types of situational motivation (autonomous vs. controlled), which are affected by needs-supportive characteristics of work tasks, and to investigate the relationships between different types of needs-supportive characteristics, situational motivation, vitality, and affect in order to uncover the motivational mechanisms which energize and/or sustain the fluctuation of daily well-being in the workplace. In accordance with SDT and the H-SDT model, the expectation here is to find that fluctuations in the NSCs of work tasks will impact different dimensions of well-being via fluctuations in situational motivation. The study research model is depicted below in Figure 5.

With regard to methodology, this study employs the day reconstruction method ("DRM"), a method initially proposed by Kahneman and colleagues (2004) that has been used by social scientists during the last decade for the study of daily experience and momentary satisfaction. The DRM survey methodology allows researchers to collect a great deal of experience-related data. According to the review of the validity and reliability of the DRM by Diener and Tay (2014), this method is just as effective (e.g., moderate to high correlation between two measurements) as the experience sampling method, which is another approach that is typically employed in surveys (Scollon, Prieto, & Diener, 2003). For this study, the DRM is used because it allows for the configuration of daily work tasks into different "episodes," which is an advantageous means of measuring both contextual and interpersonal variables within a well-organized multi-level longitudinal framework. It also allows for the use of reliable situational psychometric measurements to capture the dynamic nature of the focal constructs of

this research and to overcome the lack of sensitivity that comes with the limitation of having to rely on a single item to measure satisfaction (Diener, Inglehart, & Tay, 2013). Finally, if one were to take a completely temporal view (Shipp & Cole, 2015) of the dynamic nature of human motivation, the DRM could be used as an advanced framework with which to study both subjective and objective time (Shipp & Cole, 2015) simultaneously with an event-contingent sampling methodology (Beal & Weiss, 2003).

Theory and Hypotheses

Task-specific Antecedents to Situational Autonomous Motivation

SDT suggests that social contexts that promote the satisfaction of basic psychological needs facilitate the internalization of extrinsic motivation, resulting in more autonomous self-regulation (Gagné & Deci, 2005). This implies that employees' autonomous motivation will increase when the social context supports their basic psychological needs for autonomy, relatedness, and competence. Spreitzer and colleagues (2005) have suggested relational resources, organizational climate, and trust (i.e., social context) as possible antecedents for individual thriving behaviors in the workplace. Hence, it is meaningful to see how task-specific elements, such as NSCs of work tasks and interpersonal interactions, impact employees' situational motivation and well-being throughout the workday.

In SDT, the needs supportiveness of autonomy, relatedness, and competence are important both to nurturing intrinsic motivation and to facilitating the internalization of autonomous extrinsic motivation (Deci & Ryan, 2008a; Gagné & Deci, 2005). Different aspects of the job, for example job characteristics (Gagné, Senécal, & Koestner, 2002), positive feedback (Ryan, 1982), and acknowledgment (Deci et al., 1999), enhance intrinsic motivation and

facilitate internalization. Research evidence from a volunteer community sample has demonstrated that job characteristics such as autonomy (included perceived work scheduling autonomy, decision-making autonomy, and work methods autonomy) and feedback positively predicted autonomous motivation (Millette & Gagné, 2008). In a field study conducted by Deci, Connell, and Ryan (1989), a manager's autonomy support, mostly perceived by employees as being provided with choice and voice during their supervision, was found to be significantly related to the latter's satisfaction and other work-related attitudes. In addition, the longitudinal follow-up of this field study, which took place over a period of 13 months, showed that special training provided to managers to improve their ability to understand others' perspectives and to provide informative feedback resulted (through a quasi-experiment design using controlled groups) in higher employee attitudinal assessments (e.g., job satisfaction, organizational commitment, and trust in senior management). Again, in the experiment study conducted by Sheldon and Filak (2008), manipulations of relatedness (e.g., being acknowledged by and connected to others) as well as competence (as expressed by efficacy beliefs and feedback) needs satisfaction significantly predicted self-reported intrinsic motivation in comparison to other controlled conditions.

The results of a study conducted by Reis and colleagues (2000) confirmed the conclusion that social activities contributed to relatedness needs satisfaction, which, characterized as meaningful talk with as well as feeling understood and appreciated by interaction partners (i.e., being interpersonally connected), in turn positively predicted daily well-being. Furthermore, the results of a study conducted by Vallerand and Reid (1984) showed that perceived competence (described by the authors as being perceived to be responsible for one's own learning outcomes) was found to mediate the relationship between feedback received by undergraduate students and

their intrinsic motivation in school. In fact, Gagné and Deci (2005) have called for further research into the impact that the above-mentioned job contents (job-related choice, meaningful feedback, the feeling of being connected) may have on autonomous motivation in the workplace.

Based on the robust empirical findings of studies that have used SDT and the H-SDT model as their theoretical bases, the above-mentioned motivational mechanisms discovered at between-person level (i.e., work motivation) should also theoretically be present at within-person level (i.e., situational motivation). While most prior research has related to between-person level and while it has focused mainly on a single needs-supportive characteristic, the present research aims to operationalize all three needs-supportive characteristics. The goal is to apply them to work tasks – to be reconstructed through the DRM survey infrastructure – that are experienced and performed by employees during a typical day at the office, in order to see how they can impact their situational autonomous motivation. Thus, I propose the following hypotheses:

Hypothesis 1a: Autonomy-supportive characteristics of work tasks (e.g., the existence of volitional choice) positively predict the situational autonomous motivation at within-person level.

Hypothesis 1b: Relatedness-supportive characteristics of work tasks (e.g., interpersonal interactions, perception of feeling connected to others in the workplace) positively predict situational autonomous motivation at within-person level.

Hypothesis 1c: Competence-supportive characteristics of work tasks (e.g., timeliness and performance feedback rating) positively predict situational autonomous motivation at within-person level.

Needs-supportive Characteristics and Well-being

The satisfaction of basic psychological needs has been connected to many positive outcomes, such as organizational satisfaction (Gillet, Fouquereau, Forest, Brunault, & Colombat, 2012), life satisfaction (Gagné, Ryan, & Bargmann, 2003), positive affect (Nix, Ryan, Manly, & Deci, 1999), and positive performance (Baard, Deci & Ryan, 2004). Empirical research carried out under an SDT framework has also supported the positive relationship between intrinsic motivation and vitality (Nix et al., 1999). Another study, which focused on college students and used the experience sampling method, showed that the needs satisfaction of autonomy, relatedness, and competence were associated with greater levels of vitality and positive affect, and lower levels of negative affect and exhaustion (Reis, Sheldon, Gabel, Roscoe, & Ryan, 2000). The vitality-raising effects that result from the three main forms of needs support (i.e., autonomy, relatedness and competence) were confirmed by a longitudinal study with elite female gymnasts (Gagné, Ryan, & Bargmann, 2003). Further research into this topic in an organizational context has also confirmed this positive phenomenon of NSCs enhancing subjective vitality (Ryan, Bernstain, & Brown, 2010).

All three basic forms of needs satisfaction can lead to increased positive affect and decreased negative affect (Ryan & Deci, 2000b). Autonomy needs support has been found to reduce the feeling of burnout (Fernet, Austin, Trépanier, & Dussault, 2013). At the same time, competence needs support has been shown to increase cognitive engagement on novel and useful tasks (Vinarski-Peretz, Binyamin, & Carmeli, 2011). Feeling connected (e.g., relatedness need supportiveness) was not only shown to increase positive affect (Carlson, Charlin, & Miller, 1988), but also to be related to feeling a greater sense of enthusiasm for one's work. Hence, contexts and situations that support these three basic psychological needs, namely, the needs for

autonomy, for relatedness, and for competence should have a positive impact on such daily well-being variables as employees' vitality and affect at within-person level. In line with these findings, I thus propose the following hypotheses:

Hypothesis 2a: Autonomy-supportive characteristics (e.g., existence of volitional choice) of work tasks positively predict vitality and positive affect at within-person level, and autonomy-supportive characteristics (e.g., existence of volitional choice) of work tasks negatively predict negative affect at within-person level.

Hypothesis 2b: Relatedness-supportive characteristics of work tasks (e.g., perceived connection during interpersonal interaction) positively predict vitality and positive affect at within-person level, and relatedness-supportive characteristics of work tasks (e.g., perceived connection during interpersonal interaction) negatively predict negative affect at within-person level.

Hypothesis 2c: Competence-supportive characteristics of work tasks (e.g., performance feedback) positively predict vitality and positive affect at within-person level, and competence-supportive characteristics of work tasks (e.g., performance feedback) negatively predict negative affect at within-person level.

Situational Autonomous Motivation and Well-being

Since autonomous motivation has been found to positively predict vitality (Kasser & Ryan, 1996; Baard, Deci, & Ryan, 2004) at between-person level (both in the education and in work domains), it is reasonable to expect that situational autonomous motivation is positively associated with the within-people variation of vitality level during the workday across different

specific work tasks. The construct of vitality used in this study focuses on the calm nature of psychological energy (Ryan & Frederick, 1997) without capturing the emotional and physical exhaustion mostly associated with job burnout (Maslach, Schaufeli, & Leiter, 2001). From the perspective of energy consumption, the more exhausted one feels the less likely they are able to be vital, concentrated and focused. In addition, in a study conducted by Vansteenkiste and colleagues (2007), intrinsic motivation was found to positively predict vitality as a special indicator of human well-being. I thus propose the following hypothesis:

Hypothesis 3a: During the workday, situational autonomous motivation positively predicts vitality at within-person level.

SDT research has accumulated an extensive amount of evidence on the positive relationship between autonomous motivation and positive affect in sports (Kowal & Fortier, 1991; Gagné et al., 2001) and education (Lavigne & Vallerand, 2010) studies. Controlled motivation has been found to predict positive emotion (Nix et al., 1999) and satisfaction when the task is algorithmic (i.e., repetitive or routine in nature; Gagné & Deci, 2005). However, research on the negative consequences of external regulation (e.g., different types of extrinsic motivation) has shown that they were positively related to negative affect (Gagné et al., 2003) among athletes when they perceived their coaches to be controlling rather than autonomy-supportive. Based on the empirical evidence gained from non-working participants at within-person level, similar hypothetical relationships at within-person level between situational autonomous motivation and affect in the workplace can be can be posited.

Hypothesis 3b: During the workday, situational autonomous motivation positively predicts positive affect at within-person level.

Hypothesis 3c: During the workday, situational autonomous motivation negatively predicts negative affect at within-person level.

Situational Motivation as Mediator of Needs-supportive Characteristics and Well-being

Under the SDT framework, a basic needs-supportive context should have a significant positive impact on employees' autonomous motivation (Gagné, Ryan, & Bargmann, 2003; Gagné & Deci, 2005) and facilitate the internalization of extrinsic self-regulation (Gagné & Deci, 2005). Furthermore, SDT research has shown that when options and choices were given, if autonomously motivated, peoples' energy was depleted at a slower rate than when activities were imposed on them (Ryan & Deci, 2008b). Meanwhile, the results of a meta-analysis conducted by Ng and his colleagues (2012) over 184 data sets suggest not only that perceptions of all three need supports positively promote both psychological and physical health, but also that the satisfaction of the three basic needs enhances autonomous regulation (e.g., autonomous motivation) as a positive predictor of well-being. Hence, it is reasonable to expect that situational autonomous motivation, acting as an important cognitive evaluation step, can mediate the relationship between NSCs (e.g., contextual supportiveness) and daily well-being (e.g., vitality and affect) pertained to specific work tasks in the workplace. I thus propose the following hypotheses:

Hypothesis 4a: Situational autonomous motivation mediates the relationships between autonomy, as a NSC of work tasks, and vitality, as well as positive and negative affect during the workday.

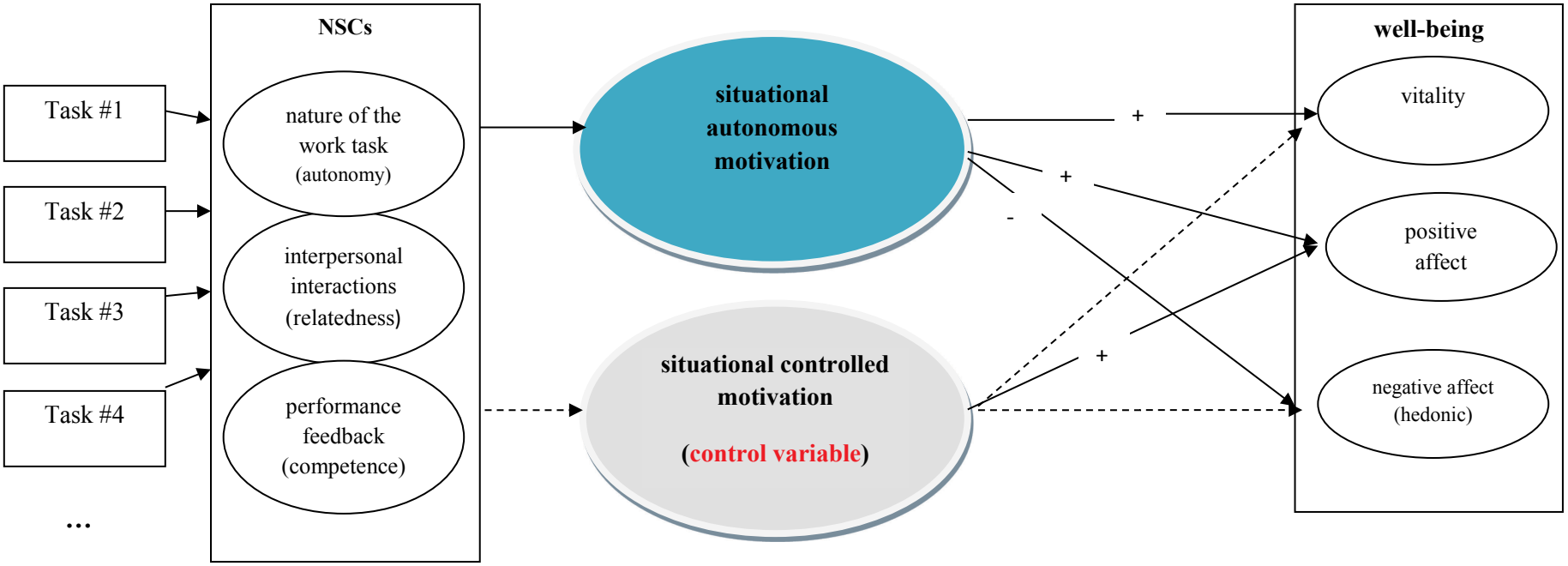
Hypothesis 4b: Situational autonomous motivation mediates the relationships between relatedness, as a NSC of work tasks, and vitality, as well as positive and negative affect during the workday.

Hypothesis 4c: Situational autonomous motivation mediates the relationships between competence, as a NSC of work tasks, and vitality, as well as positive and negative affect during the workday.

There is no direct theoretical link between NSCs (e.g., needs support in social contexts and interactions) of work tasks and controlled motivation (Deci & Ryan, 1985a, 2000; Gagné & Deci, 2005). Research evidence has shown that although the performance of specific work tasks can be controlled-motivated, positive affect (e.g., joy, happiness, feeling good) was identified when such events were accomplished by the participants (Nix et al., 1999). Additionally, controlled motivation has been found to be highly correlated with low levels of well-being, which can be indicated by emotional exhaustion, fatigue, and other symptoms of burnout (Cresswell & Eklund, 2005). At the same time, people's controlled self-regulation tends to show the same negative pattern with regard to decreased well-being (Gagné & Deci, 2005). Therefore, the hypothesized research model employed in this study (see Figure 5), as mentioned above, is both multi-dimensional and multi-level, for it includes situational controlled motivation as a within-person control variable and tests it, together with the between-people (work motivation) variables, in order to capture the unique variation of situational autonomous motivation and well-being across different work tasks throughout a particular workday.

Figure 5. **Hypothesized Research Model** for Multi-Level Investigation of Study One

Task-Level (Within-people/Situational) Variables



Task-level (within-people) control variable: Situational controlled motivation

Individual level (between-people) control variables:

- Basic psychological needs satisfaction (autonomy, relatedness, and competence)
- Autonomous work motivation; controlled work motivation

Notes: --------► *Represents non-hypothesized relationships; NSC = Needs-Supportive Characteristics;*

Methods

Procedures

The online survey (which included a specific description of the inclusion criterion for participation) was advertised on a website that also included all the credit-earning studies that were available to students who were registered for this particular course at the JMSB. Participants were told the purpose of the survey and were briefed about the right to withdraw from it at any time. They were also informed that the data would be stored on a server located at Concordia University. A confirmation page appeared once the participant finished and submitted the survey. Students who registered for the survey but who had not finished within the first two weeks were sent reminder emails to urge them to fill out the survey before the last day of the semester to secure the extra class credits.

The survey data was downloaded from the Concordia server into Excel files, and then transferred into SPSS 18.0 files. The data was then examined to ensure that it was complete (i.e., no missing surveys, no missing questions). If the missing data points were random, then the list-wise deletion method was used, since there should be no significant impact on potential statistical analyses. No data recomputation ended up having to be performed due to the fact that no significant missing data were detected (Tabachnick & Fidell, 2007).

Sample

Data were collected from Canadian part-time working employees (N = 158, with average 7 work tasks per participant; average age = 23.09 yrs, SD = 2.73 yrs; percentage of male participants in total sample: 48%). Participants were undergraduate students studying at

Concordia University's John Molson School of Business ("JMSB"), as I used a subject pool to recruit participants. Students were enrolled in an introductory course on organizational behavior during the fall semester of 2015 and winter semester of 2016. The inclusion criterion was that the students worked part-time, at least 18 hours but no more than 25 hours per week. Two class credits were given to qualified students for participating in the study.

The smallest unit of analysis in this study was the singular work event ("work episode" described in the DRM survey; examples of episodes are "answered customer service problems"; "opened all the machines and prepared the paperwork"; "confirmed with supervisor and prepared the ingredients of drinks for the rest of the night"). The final data consisted of a total 1,097 work events identified by a total of 158 participants.

Measurements

Following the DRM methodology, participants completed diary entries (see Appendix I) of a specific workday (their last work shift, a day before they filled out the survey), where they described each work task they experienced during that workday (e.g., events, activities, social interactions), which were described as "episodes" in the survey terminology. They were then asked to provide information pertaining to the study variables for each work task, as described below.

Needs-supportiveness characteristics (within-person variable). Needs supportiveness characteristics ("NSCs"; i.e., autonomy, competence, and relatedness) of work tasks and interpersonal interactions was the new factor being investigated in this study. I asked specific questions about each work task in the DRM diary survey packets.

Autonomous NSCs were measured by three questions. The first one asked the participants to what extent they had the choice to perform the work task. The second question asked them to what extent they had the choice to perform the work task at that specific time. The third question asked them to what extent they had the choice to perform the work task in the way they wanted to perform it. Participants were also asked to use a scale from 1 ("1" being "not my choice at all") to 5 ("5" being "entirely my choice") to rate their answers to all three autonomous NSC questions.

Relatedness NSCs of the work task were captured by asking who the participants interacted with by providing a list of possible interactants (e.g., co-workers, clients, subordinates, bosses, and other people) with "with no one, I was by myself" being of the possible responses. Then participants were asked to assess how connected they felt during such interaction with these people using a scale from 1 to 5 ("1" being "not connected at all"; 5 being "very much connected") if they had not chosen the response stating that they were by themselves at work.

Competence NSCs of the work task were captured by asking the participants whether they received performance feedback right after the work task and, if they did, what level of performance ("1" being very negative and "5" being very positive) they received. If they responded "no" to this first question, participants were then asked whether they would be receiving the performance feedback in the near future. As for the competence NSCs of the work task, receiving no performance feedback either on the spot or at some point in the future was coded as "1"; receiving performance feedback at some point in the future was coded as "2"; and receiving performance feedback (either positive or negative) on the spot was coded as "3." Hence, a variable describing the level of timeliness for competence feedback was coded

according to how timely the participants received feedback. The valence of the feedback was also measured to reflect the performance rating received with the feedback.

In SDT, both the timeliness and valence of performance feedback are important factors when it comes to peoples' ability to perceive themselves as competent to carry out actions and to master their surroundings as a means to functioning well in their environment (Deci & Ryan, 2000). Empirical evidence also supports the fact that, when people repeatedly experience their basic psychological need for competence being satisfied in a positive manner, their self-determined regulation increases (Vallerand, Pelletier, & Koestner, 2008). In this study, I used different analytical strategies to address the nature of this variable. Please see the results section for testing details.

Situational motivation (within-person variable). The situational motivation scale (Guay, Vallerand, & Blanchard, 2000; *Cronbach's α* = .78 for a total of 16 items) was used to capture the motivation of the participant for each work task. In the situational motivation scale, participants were then asked to answer the question "Why were you engaged in this work activity?" using a scale of 1 to 7 (1 corresponding to "not at all" and 7 corresponding to "exactly"). The scale has 16 items in total: 4 items capturing intrinsic motivation (i.e., "because I think that this activity is interesting"; *Cronbach's α* = .91), 4 items capturing identified regulation (i.e., "because I am doing it for my own good"; *Cronbach's α* = .87), 4 items measuring external regulation (i.e., "because I am supposed to do it"; *Cronbach's α* = .83), and 4 items measuring amotivation (i.e., "there may be good reasons to do this activity, but personally I don't see any"; *Cronbach's α* = .82). Confirmatory factory analysis ("CFA") was conducted for both situational autonomous motivation (tested as a second-order factor over two first-order factors composed of four items for both intrinsic and identified regulation; CFI = .97; TLI = .95;

RMSEA = .10; SRMR = .04) and situational controlled motivation (single factor structure with four items measuring external regulation; CFI = .99; TLI = .98; RMSEA = .07; SRMR = .02).

Vitality (within-person variable). The subjective vitality scale (Ryan & Frederick, 1997; *Cronbach's α* = .94) was used to measure vitality for each work task described by participants in the packet. Participants were asked to use a scale of 1 to 7 (1 being "not at all" and seven being "very true") to answer the question "How did you feel during the work episode? There were a total six items (e.g., "I felt so alive I just wanted to burst during that episode") in this measurement. CFA confirmed a good fit for the single factor structure of the measurement (CFI = .96; TLI = .94; RMSEA = .15; SRMR = .03).

Affect (within-person variable). Positive affect (PA) and negative affect (NA) were measured using a list of twelve positive and negative adjectives (Kahneman et al., 2004; *Cronbach's α* = .89 for 8 items of negative affect; *Cronbach's α* = .80 for 4 items of positive affect). Participants were asked to use a scale of 1 to 6 (1 being "not at all" and 6 being "very much") to describe how they felt during each task. Examples of positive affect were "happy," "enjoying myself," etc.; and examples of negative affect were "frustrated," "depressed," etc. CFA confirmed a good fit for the single factor structure of both positive affect (CFI = .97; TLI = .95; RMSEA = .08; SRMR = .04) and negative affect (CFI = .98; TLI = .93; RMSEA = .13; SRMR = .03).

Motivation at work scale (between-person variable). State-level motivation at work was measured using the revised motivation at work scale (Gagné, et al., 2015; *Cronbach's α* = .82 for a total of 19 items). In this measurement, participants were asked to use a scale of 1 to 7 (1 being "not at all for this reason" and 7 being "exactly for this reason") to answer the question "Why do you put effort in your job?" There are total of 19 items, 3 items measuring intrinsic motivation

(e.g., “because I have fun doing my job”; *Cronbach’s α* = .95), 3 items measuring identified regulation (e.g., “Because putting effort into this job aligns with my personal values”; *Cronbach’s α* = .72), 4 items capturing introjected regulation (e.g., “because otherwise I feel ashamed of myself; *Cronbach’s α* = .78), and 6 items to assess external regulation (e.g., “because I risk losing my job if I don’t put effort into it”; *Cronbach’s α* = .65). CFA results confirmed a relative good fit for both autonomous motivation (CFI = .97; TLI = .96; RMSEA = .10; SRMR = .04) and controlled motivation (CFI = .96; TLI = .94; RMSEA = .10; SRMR = .06).

Basic needs satisfaction (between-person variable). The satisfaction of basic needs was measured by the satisfaction of basic psychological needs scale for work (Van den Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010; *Cronbach’s α* = .76 for a total of 16 items). Participants were asked to use a scale of 1 to 5 (1 being “strongly disagree” and 5 being “strongly agree”) to evaluate how they felt about their jobs. This scale comprises16 items to measure the satisfaction of the basic psychological needs of autonomy (6 items; e.g., “I feel I can be myself at my job”; *Cronbach’s α* = .75), relatedness (6 items; e.g., “at work, I feel a part of a group”; *Cronbach’s α* = .83), and competence (7 items; e.g., “I have the feeling that I can even accomplish the most difficult tasks at work”; *Cronbach’s α* = .75). CFA results confirmed a good fit for the single factor structure for all three basic psychological needs for autonomy (CFI = .99; TLI = .97; RMSEA = .03; SRMR = .03), relatedness (CFI = .98; TLI = .95; RMSEA = .07; SRMR = .04), and competence (CFI = .97; TLI = .91; RMSEA = .15; SRMR = .03).

Demographic variables (between-person variable). Information regarding educational level, gender, age, and years of attendance at Concordia were also collected in the survey.

Work motivation (Gagné et al., 2015) and *basic needs satisfaction at work* (Van den Broeck, et al., 2010) were also measured and controlled for as between-person level variables in

multi-level structural equation modelling ("MSEM") testing, as research suggests employees with higher autonomous work motivation are readier to adapt to situational factors that support basic psychological needs, which results in more autonomous regulation (Gagné & Deci, 2005). However, this proposition needs to be mirrored and supported at the task level with situational motivation, affect, and vitality during workdays (Gagné & Deci, 2005).

Statistical Analyses

Kurtosis and skewness were verified to ensure the univariate normality of the data distribution using the cut-off from -1.5 to +1.5 (Tabachnick & Fidell, 2007). Descriptive statistical analyses were then conducted, including means, standard deviation, variance, frequencies, and zero-order correlations, before confirmatory analyses were conducted for each multi-dimensional psychometric measurement. Then MSEM using Mplus 7.0 (Muthén & Asparouhov, 2011; Muthén & Muthén, 2012) was used for the hypotheses testing. In the analyses, I followed the suggested acceptable fit index for structural modelling (i.e., CFI $\geq$ .95; NNFI/TLI $\geq$ .93; RMSEA $\leq$.05; SRMR $\leq$ .08) summarized and proposed recently by Hooper, Coughlan, & Mullen (2008).

Results

Descriptive Statistics

Please see Table 1 and Table 2 for descriptive statistics for the study variables at both the within-person and between-person levels.

Table 1. Descriptive Statistics for the Study Variables at within-person level

		Min.	Max.	Mean	SD	Variance	Skewness		Kurtosis	
							Stat	Std. Err.	Stat	Std. Err.
NSC	Autonomy	1	5	3.07	1.36	1.86	-.05	.074	-1.21	.148
	Competence	1	3	1.89	.88	.78	.22	.074	-1.68	.148
	Relatedness	1	7	2.86	1.48	2.20	-.05	.074	-1.42	.148
Situational motivation	Autonomous motivation	1	7	3.75	1.61	2.59	-.07	.074	-.86	.148
	Controlled motivation	1	7	4.91	1.58	2.50	-.60	.074	-.33	.148
Well-being	Vitality	1	7	3.29	1.55	2.39	.28	.074	-.66	.148
	Positive affect	1	7	4.34	1.45	2.11	-.35	.074	-.39	.148
	Negative affect	1	7	2.33	1.16	1.34	1.04	.074	.47	.148

Note: NSC = Needs-supportive characteristics of the work tasks; N = 1,092 (list-wise deletion)

Table 2. Descriptive Statistics for the Study Variables at between-person level

		Min.	Max.	Mean	SD	Variance	Skewness		Kurtosis	
							Stat.	Std. Err.	Stat.	Std. Err.
Basic needs satisfaction	Autonomy	1	5	3.26	.74	.54	-.10	.20	-.31	.39
	Competence	1	5	3.99	.68	.47	-.32	.20	-.19	.40
	Relatedness	1	5	3.53	.78	.62	-.50	.20	.23	.40
Motivation at work	**Autonomous motivation**	1	7	4.43	1.24	1.54	-.27	.20	-.29	.40
	Controlled motivation	1	7	4.17	1.06	1.13	-.15	.20	-.00	.40
	Intrinsic motivation	1	7	4.20	1.63	2.65	-.27	.20	-.72	.40
	Identified regulation	1	7	4.64	1.14	1.30	-.53	.20	.21	.40
	Introjection regulation	1	7	4.28	1.29	1.66	-.16	.20	-.21	.40
	External regulation	1	7	4.07	1.14	1.29	-.19	.20	-.31	.40
	Amotivation	1	7	2.11	1.41	2.00	1.19	.20	.43	.40

Note: N = 158 (list-wise deletion)

Zero-Order Correlations

Please see Table 3 and Table 4 for simple correlations among study variables at both within-person and between-person levels.

Table 3. Simple Correlations among Study Variables at within-person level

Scale			1	2	3	4	5	6	7	8
1	**NSC**	Autonomy	-							
2		Competence	-.14**	-						
3		Relatedness	.06	.29**	-					
4	**Situational motivation**	Autonomous motivation	.52**	.06	.33**	-				
5		Controlled motivation	-.39**	.10*	-.03	-.18**	-			
6	**Well-being**	Vitality	.36**	.14**	.35**	.66**	-.11**	-		
7		Positive affect	.32**	.14**	.39**	.66**	.02	.67**	-	
8		Negative affect	-.21**	.10**	-.11**	-.16**	.12**	-.15**	-.27**	-

Note: NSC = Needs-supportive characteristics of the work tasks; N = 1,092 (list-wise deletion); ** p <.001 *(two-tailed)*; * p <.05 *(two-tailed)*

Table 4. Simple Correlations among Study Variables at between-person level

	Scale		1	2	3	4	5	6	7	8	9	10
1	**Basic needs satisfaction**	Autonomy	-									
2		Competence	.31**	-								
3		Relatedness	.47**	.25**	-							
4	**Motivation at work**	**Autonomous motivation**	.65**	.34**	.45**	-						
5		**Controlled motivation**	-.00	.18**	.08	.48**	-					
6		Intrinsic motivation	.73**	.31**	.48**	.93**	.30**	-				
7		Identified regulation	.37**	.30**	.28**	.85**	.63**	.58**	-			
8		Introjection regulation	.14	.19**	.08	.58**	.89**	.41**	.68**	-		
9		External regulation	-.16	.12	.03	.24**	.86**	.10	.40**	.53**	-	
10		Amotivation	-.47**	-.25**	-.35**	-.38**	.03	-.39**	-.26**	-.06	.13	-

Note: N = 158 (list-wise deletion); ** p <.001 *(two-tailed)*; * p <.05 *(two-tailed)*

Confirmatory Factor Analyses

Separate CFA models were tested for major psychometric measurements used at both the between-person (N' = 158) and the within-person (N = 1,092) levels. Please see CFA results reported separately in the measurements subsection of the methods section of this study.

Two-level CFA was conducted on all eight latent variables (e.g., dependent variables, mediating variables, and independent variables, as well as the control variable in my research model at both the within-person and between-person levels) included in the measurement model. The two-level CFA results confirmed the good fit of this measurement model with the eight factors at within-person level (χ^2 = 422.66; *df* = 134; CFI = .96; TLI = .94; RMSEA = .04; within SRMR = .07; between SRMR = .00).

Two-level CFA was also conducted on competing models: (1) seven within-level factors (PA and NA as combined factor; χ^2 = 1,052.10; *df* = 137; CFI = .86; TLI = .80; RMSEA = .08; within SRMR = .16; between SRMR = .00); and (2) five within-level factors (NSCs as one combined factor, Positive affect (PA) and negative affect (NA) as another combined factor; χ^2 = 1,171.24; *df* = 145; CFI = .84; TLI = .79; RMSEA = .08; within SRMR = .17; between SRMR = .00). Observing the fit indexes and Chi-square difference test results showed that the more restricted model with eight within-level factors best represented the data set.

Multi-level Structural Equation Modelling ("MSEM")

To test the proposed hypotheses, MSEMs were conducted separately to test the direct effect of autonomy, relatedness, and competence NSCs of the work tasks as well as the

mediating mechanisms of autonomous situational motivation. Please see the figures and tables below for the final results.

I. Testing the AUTONOMY NSC

MSEM testing the direct effect (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .08 within / .00 between) and mediation (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .08 within / .00 between) were conducted. The results (Figure 6 and Figure 7) confirmed that the autonomy-supportive characteristic of the work tasks positively predicted situational autonomous motivation (β = .56, p < .001), vitality (β = .36, p < .001), and positive affect (β = .45, p < .001); at the same time, it negatively predicted situational controlled motivation (β = -.36, p < .001) and negative affect (β = -.15, p < .05). Moreover, situational autonomous motivation significantly mediated the relationship between the autonomy-supportive characteristic and vitality (*total indirect coefficient* = .31, p < .001), as well as that between the latter and positive affect (*total indirect coefficient* = .36, p < .001).

When controlling for the perceived basic psychological needs satisfaction of autonomy, autonomous and controlled motivation at between-person level and the between-level significant coefficient between perceived autonomy needs satisfaction and autonomous work motivation (β = .64, p < .001) also confirmed the past understanding of needs satisfaction as an important antecedent for autonomous work motivation. Interestingly, situational autonomous motivation was not correlated with situational controlled motivation (r = .04, *n.s.*) at within-person level in the direct model, while autonomous work motivation was positively correlated with controlled work motivation (r = .64, p < .001) at between-person level.

Figure 6. MSEM Results for the **Direct Effect** of the Autonomy NSC

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation

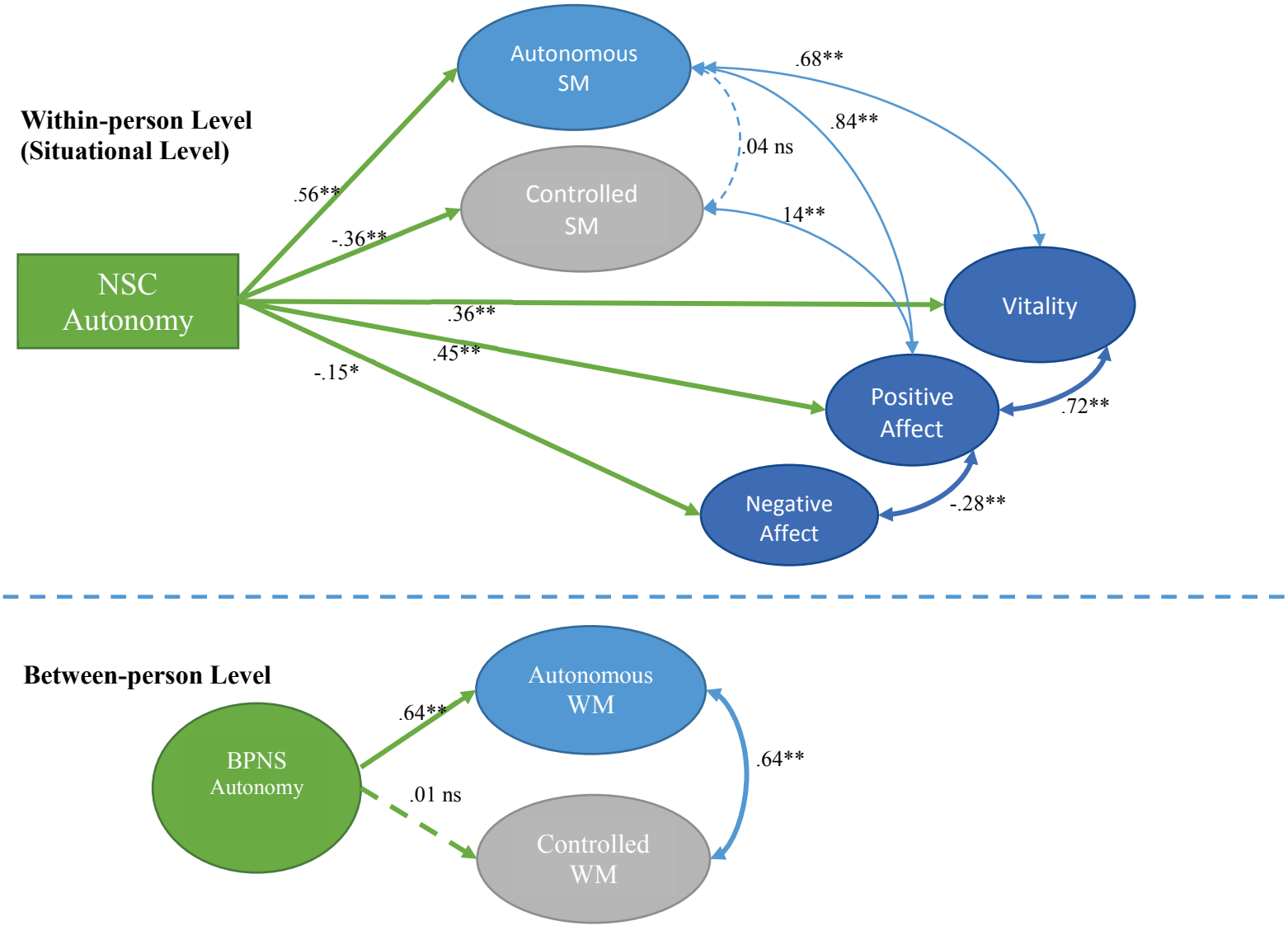
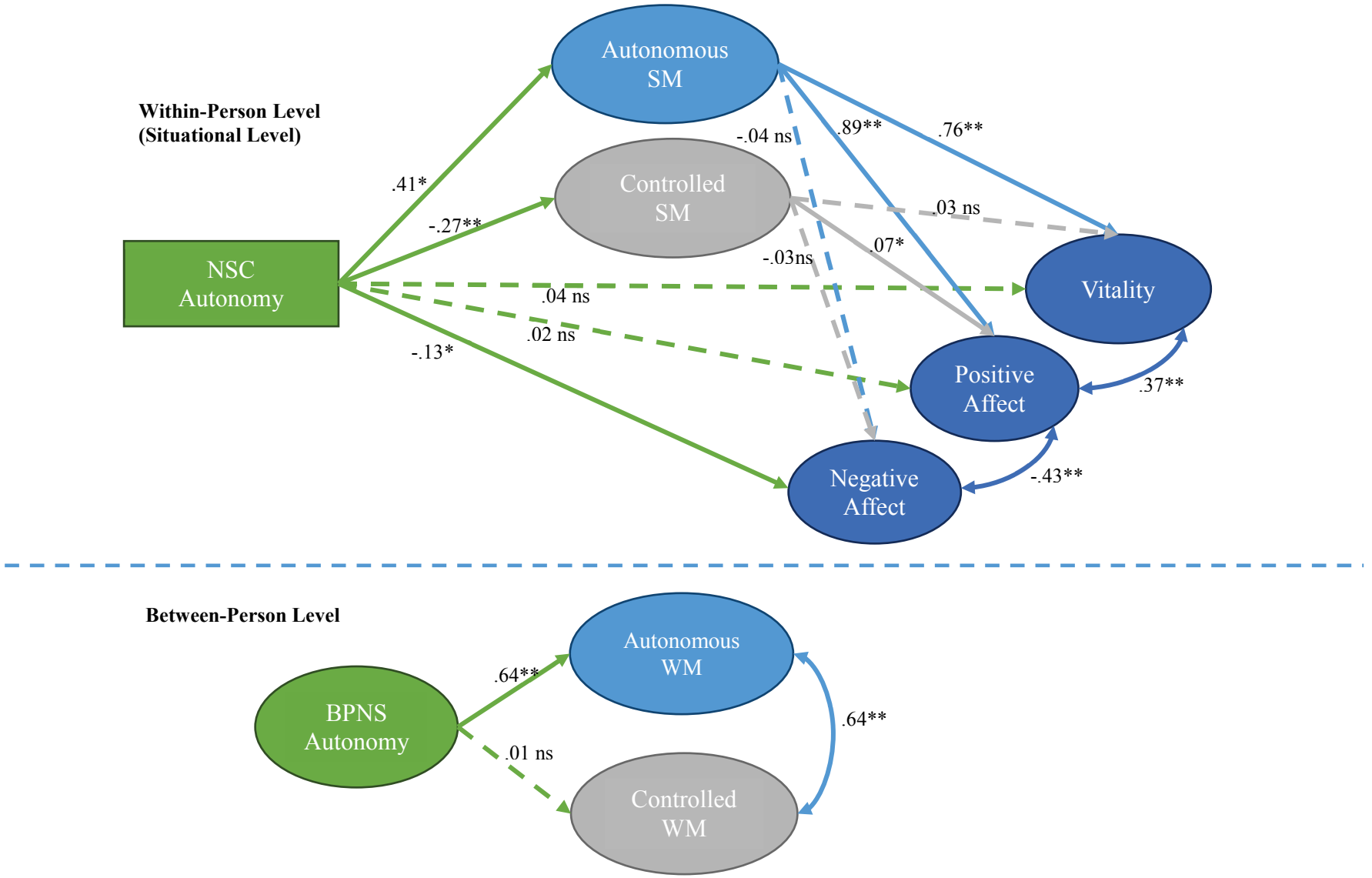


Figure 7. MEM Results for **Mediating Mechanism** of Situational Motivation on the Autonomy NSC and Well-being

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation



II. Testing the RELATEDNESS NSC

Since the DRM questionnaire captured the contextual nature of the relatedness-supportive characteristic of the work task by asking whether the participant was interacting with someone else (e.g., boss, client, and/or colleague) and, if so, how connected they perceived such interaction to be. When the participant answered that they were not interacting with anyone, such responses was coded as "not connected at all" for a continuous variable ("1") in this analysis. Hence, consistent with autonomy-supportive characteristic of the work task, I conducted MSEM to test the direct effect model (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .07 within / .00 between) and the mediation model (CFI = .96; TLI = .94; RESEA = .05; SRMR = .08 within / .00 between) for the relatedness-supportive characteristic of the work task.

The results (Figure 8 and Figure 9) confirmed the positive coefficients between the relatedness-supportive characteristic of the work task, situational autonomous motivation (β = .26, $p < .001$), vitality (β = .25, $p < .001$), and positive affect (β = .27, $p < .001$), but it was not significantly related to negative affect. In addition, situational autonomous motivation significantly mediated the relationship between the relatedness-supportive characteristic of the work task and vitality (*total indirect coefficient* = .27, $p < .05$), as well as that between the latter and positive affect (*total indirect coefficient* = .33, $p < .001$).

When controlling for the basic psychological needs satisfaction of relatedness at between-person level, the significant coefficient between relatedness needs satisfaction and autonomous work motivation (β = .40, $p < .001$) also confirmed the past understanding of needs satisfaction as an important antecedent of autonomous work motivation. Different patterns of the

coexistence of autonomous and controlled motivation at between-person (r = .48, p < .001) and within-person levels (r = -.18, p < .05) were also noted in the MSEM results.

Figure 8. MSEM Results for **Direct Effect** of the Relatedness NSC

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation

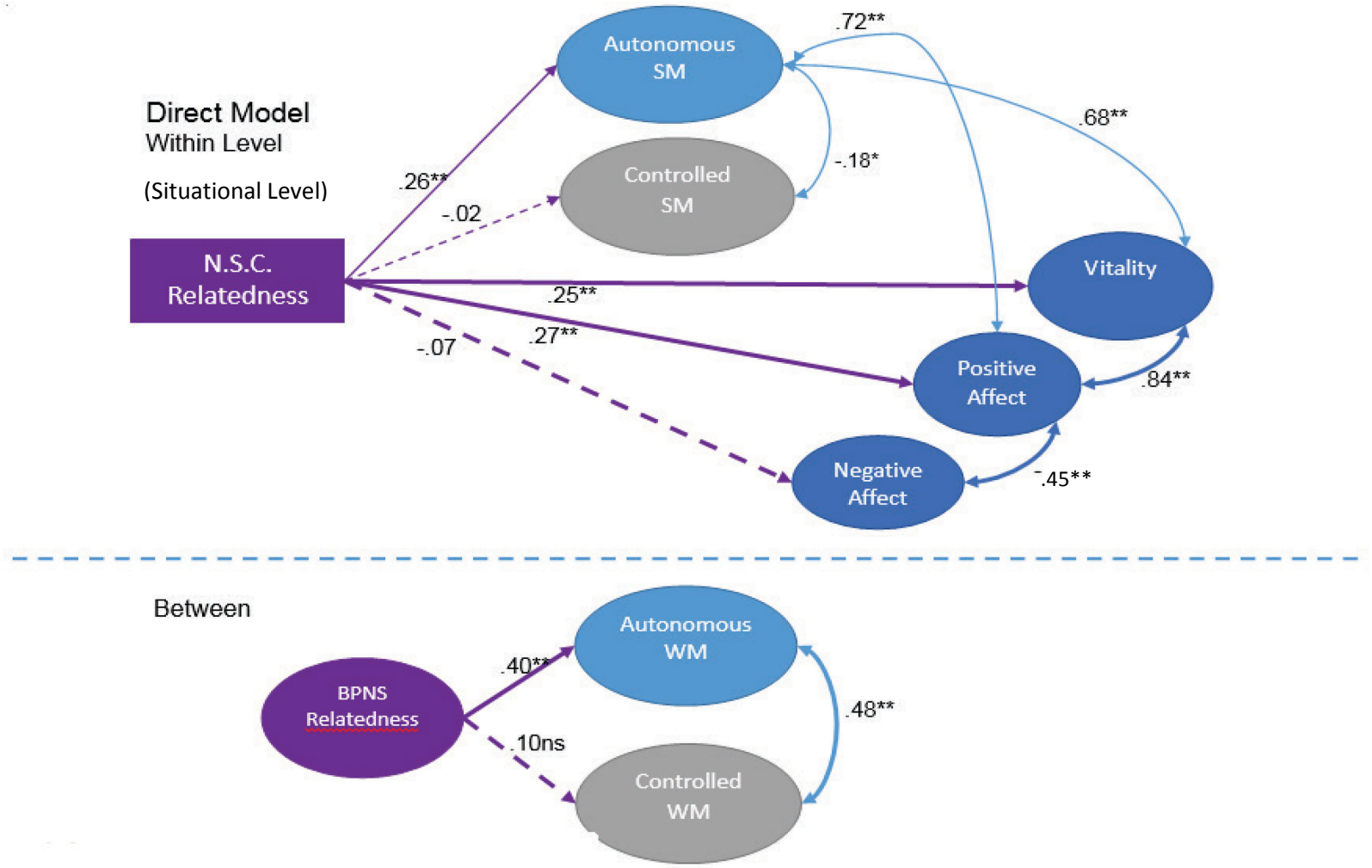
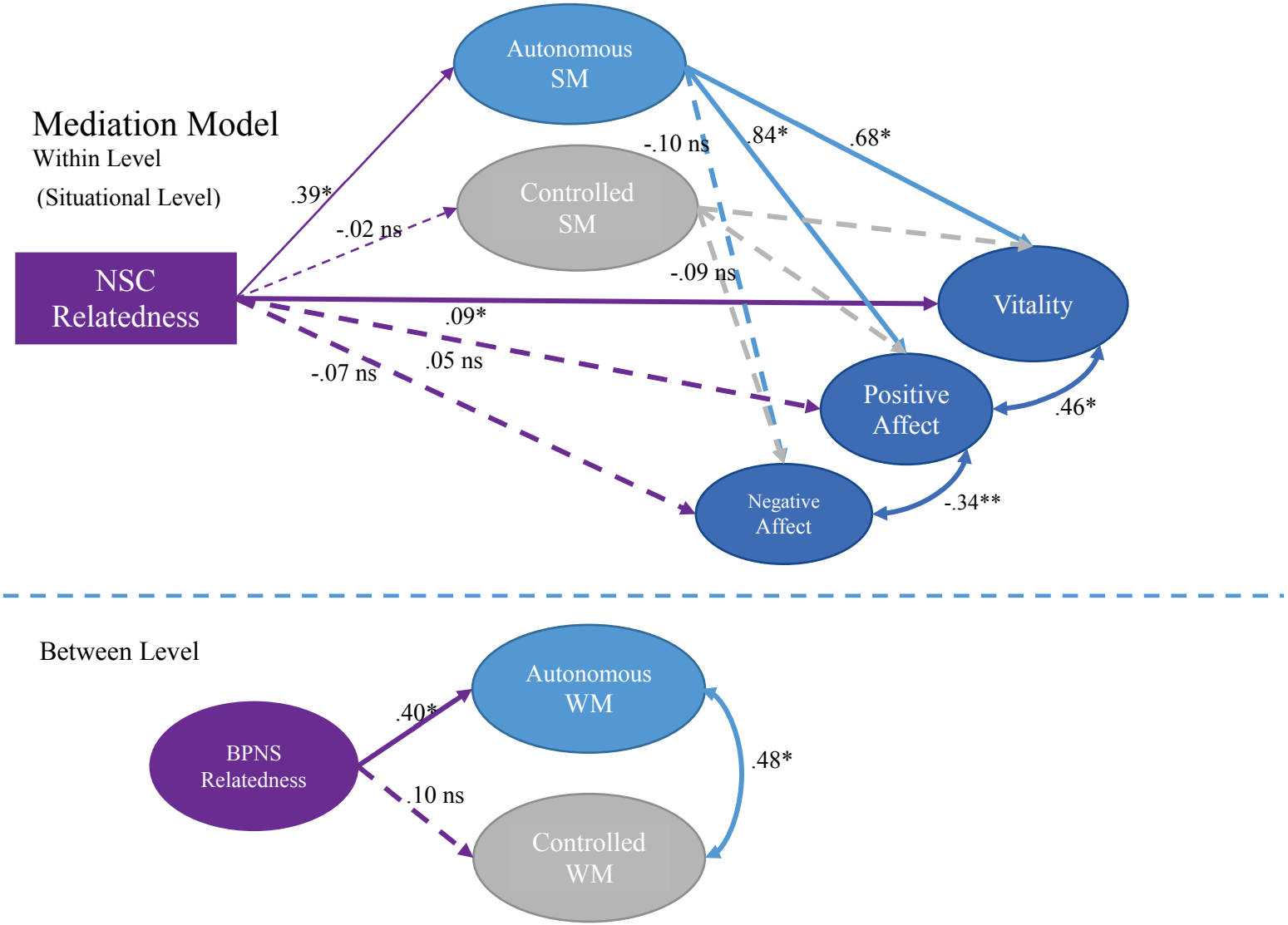


Figure 9. MSEM Results for **Mediating Mechanism** of Situational Motivation for the Relatedness NSC

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation



III. Testing the COMPETENCE NSC

In the DRM questionnaire packets, the competence-supportive characteristic of the work task responses was coded as follows: "receiving no performance feedback either on the spot or at some point in the future" was coded as "1," "receiving performance not now but at some point in the future" was coded as "2;" and "receiving performance feedback (positive or negative performance rating result) on the spot" was coded as "3."

The nature of this special contextual variable could be analyzed in two different ways, which I explain below in Table 5.

Table 5. Comparison of Two Testing Options for the Competence NSC

NSC (Competence)	**Option one: Timeliness of the feedback**	**Option two: Valence of performance rating provided in the feedback** (Deci & Ryan, 1980)
Assumption	Having timely and frequent performance feedback, be it instantaneous or given at some point in the future, without emphasizing the valence of performance (positive vs. negative), better satisfies the employee's competence needs than receiving no performance feedback at all.	Not only is performance feedback is available, but also that the performance rating gained from the feedback (measured from 1 to 5, with "1" being "very negative", "3" being "neutral," and "5" being "very positive") should be considered as the characteristic that supports the employee's competence needs for each work task.
Analysis procedures	- Treat as a continuous variable in running MSEM for hypothesis testing.	- Compare three groups (conditions) for the study variables (see Table 13). - Run additional MSEM treating level of performance rating as a continuous variable for the available work tasks.

Basic need for competence described in SDT emphasizes on both positive feedback and self-initiated optimal challenges (see option 2 in table 5; Deci & Ryan, 1980), so the perceived feeling of mastery could be gained during one's social interactions at work. Based on the above SDT understanding of the basic need for competence, and the assumption that people need to gain progressive information pertaining to a specific task to achieve optimal work results, timely feedback can be seen as the foundation for employees receiving repeated positive feedback and boosting their sense of mastery when experiencing the satisfaction of the competence need. I aimed to separate and test the two task-related characteristics, timeliness and valence of the feedback, of each work task in two testing options stated in Table 5. This way, future SDT-based interventions could be designed and tested with more specificity and accuracy to tackle different practical issues in the workplace.

For analysis option one (testing the competence NSC as timely feedback), competence-supportive characteristic were treated as one continuous variable assuming timely performance feedback served as a better competence needs-supportive condition for the work task. I did MSEM testing on the direct effect (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .07 within / .00 between) and the mediation effect (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .08 within /.00 between) for the proposed hypotheses.

Results (Figure 10 and Figure 11) showed that the competence-supportive characteristic (operationalized as timeliness of performance feedback) positively predicted situational controlled motivation ($\beta = .13$, $p < .05$) and vitality ($\beta = .14$, $p < .05$), but not situational autonomous motivation, positive affect, and negative affect. The mediating role of situational autonomous motivation was not supported when tested as a continuous variable for timeliness of

feedback. At the same time, situational controlled motivation also did not significantly mediate the relationship between the competence supportive characteristic and the employee's well-being, since there was no significant indirect path from controlled situational motivation to vitality in the mediation MSEM model.

I also conducted one sample t-test for the between conditions comparison of study variables in the MSEM (see Table 6 for the results). The t-test showed that study variables in three conditions were all significantly different across different conditions (groups). I then used the performance rating (from "1" ["very negative"] to "5" ["very positive"]) which participants received during the work tasks as the continuous variable (condition 3#) for the competence-supportive characteristic in order to run the MSEM testing of the direct effect (CFI = .95; TLI = .93; RMSEA = .06; SRMR = .07 within / .01 between) and the mediation effect (CFI = .95; TLI = .93; RMSEA = .06; SRMR = .07 within /.00 between) for the proposed hypotheses. Results (Figure 12 and Figure 13) showed that performance ratings positively predicted situational autonomous motivation (β = .16, p < .05) and positive affect (β = .22, p < .05); they negatively predicted negative affect (β = -.21, p < .05). In addition, situational autonomous motivation significantly mediated the positive relationship between performance ratings and positive affect (*total indirect coefficient* = .12, p < .05), but it did not do the same for the relationship between the former and negative affect.

To summarize, the competence-supportive characteristic of work tasks followed different paths to predict vitality and affect depending on how it was operationalized. Timeliness of performance feedback predicted higher levels of situational controlled motivation and vitality directly, but timeliness of performance feedback did not significantly predict situational

autonomous motivation. On the other hand, the valence of performance rating received for each work task (with the understanding that not all tasks could offer performance ratings right away, hence, N = 369) promoted positive affect and vitality through the mediation of situational autonomous motivation. In sum, using two testing approaches, results showed that being able to obtain performance feedback relatively soon (in the near future, but not knowing the performance rating right away) seemed very stressful for the participants (like those in Group 2 in Table 6, who would get a performance rating at some point in the future): it hindered vitality and positive affect, and it may have increased negative affect at the same time.

Table 6. One Sample T-test for Study Variables in the SEM Testing for the Competence NSC

Conditions (groups)	***Viable***	***t***	***n***	***Significant level (two-tailed)***	***Mean***
Group 1 **(no feedback at all)** ***45%***	Autonomous SM	49.26	492	*p <.001*	3.72
	Controlled SM	62.88	492	*p <.001*	4.71
	Vitality	45.67	492	*p <.001*	3.13
	Positive Affect	62.88	492	*p <.001*	4.19
	Negative Affect	42.43	492	*p <.001*	2.19
Group 2 **(feedback at some point in the future)** ***21%***	Autonomous SM	32.63	226	*p <.001*	3.44
	Controlled SM	49.66	226	*p <.001*	5.17
	Vitality	29.82	226	*p <.001*	3.07
	Positive Affect	43.01	226	*p <.001*	4.16
	Negative Affect	32.79	226	*p <.001*	2.42
Group 3 **(instant feedback with performance rating)** ***34%***	Autonomous SM	50.91	369	*p <.001*	3.95
	Controlled SM	67.19	369	*p <.001*	5.03
	Vitality	45.92	369	*p <.001*	3.62
	Positive Affect	67.39	369	*p <.001*	4.64
	Negative Affect	40.38	369	*p <.001*	2.45

Note: Total N = 1,092 (within); N' = 158 (between).

Figure 10. MEM Results for the **Direct Effect** of the Competence NSC (Operationalized as Timely Feedback)

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation

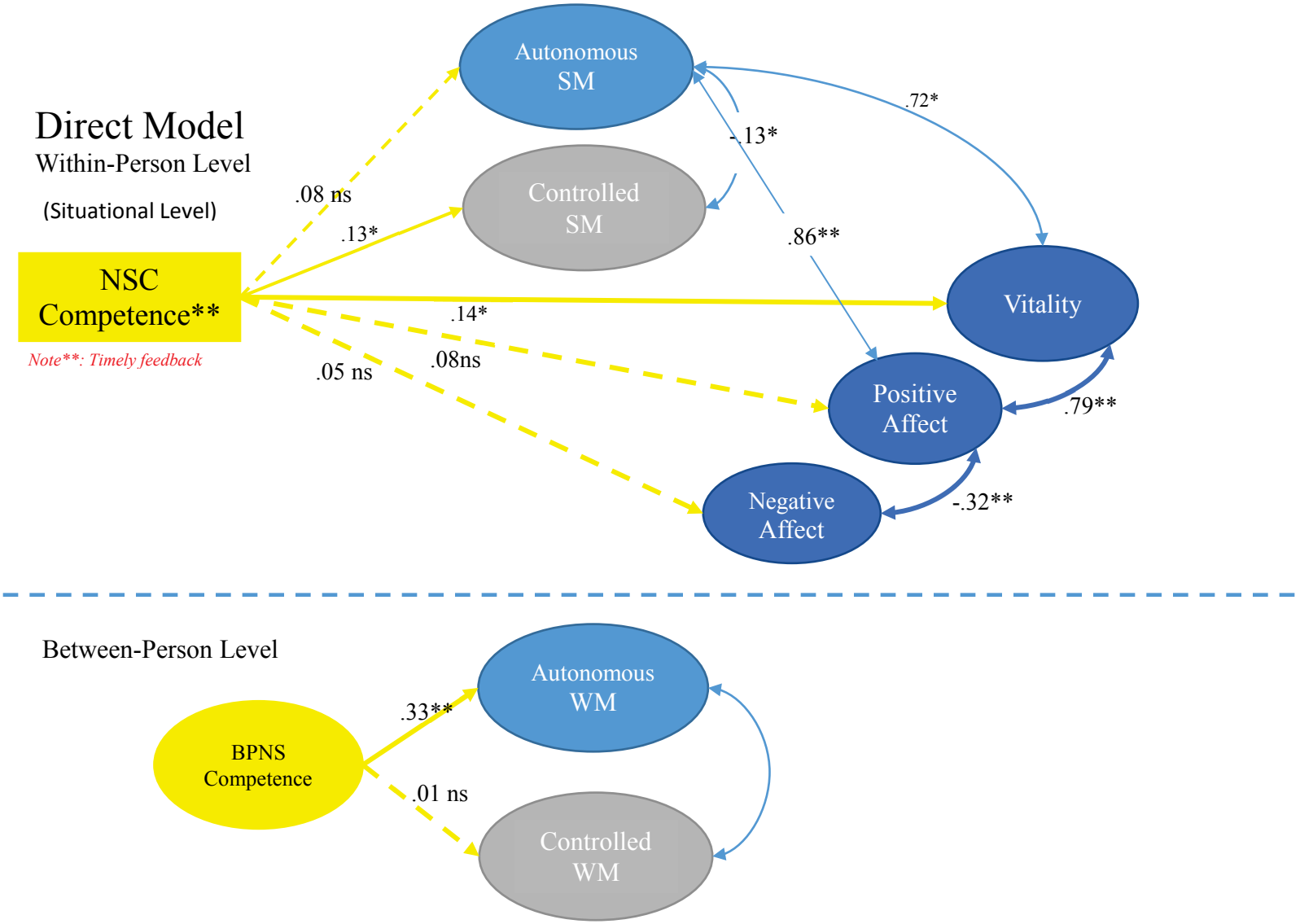


Figure 11. MSEM Results for the **Mediating Mechanism** of Situational Motivation for the Competence NSC (Operationalized as Timely Feedback)

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation

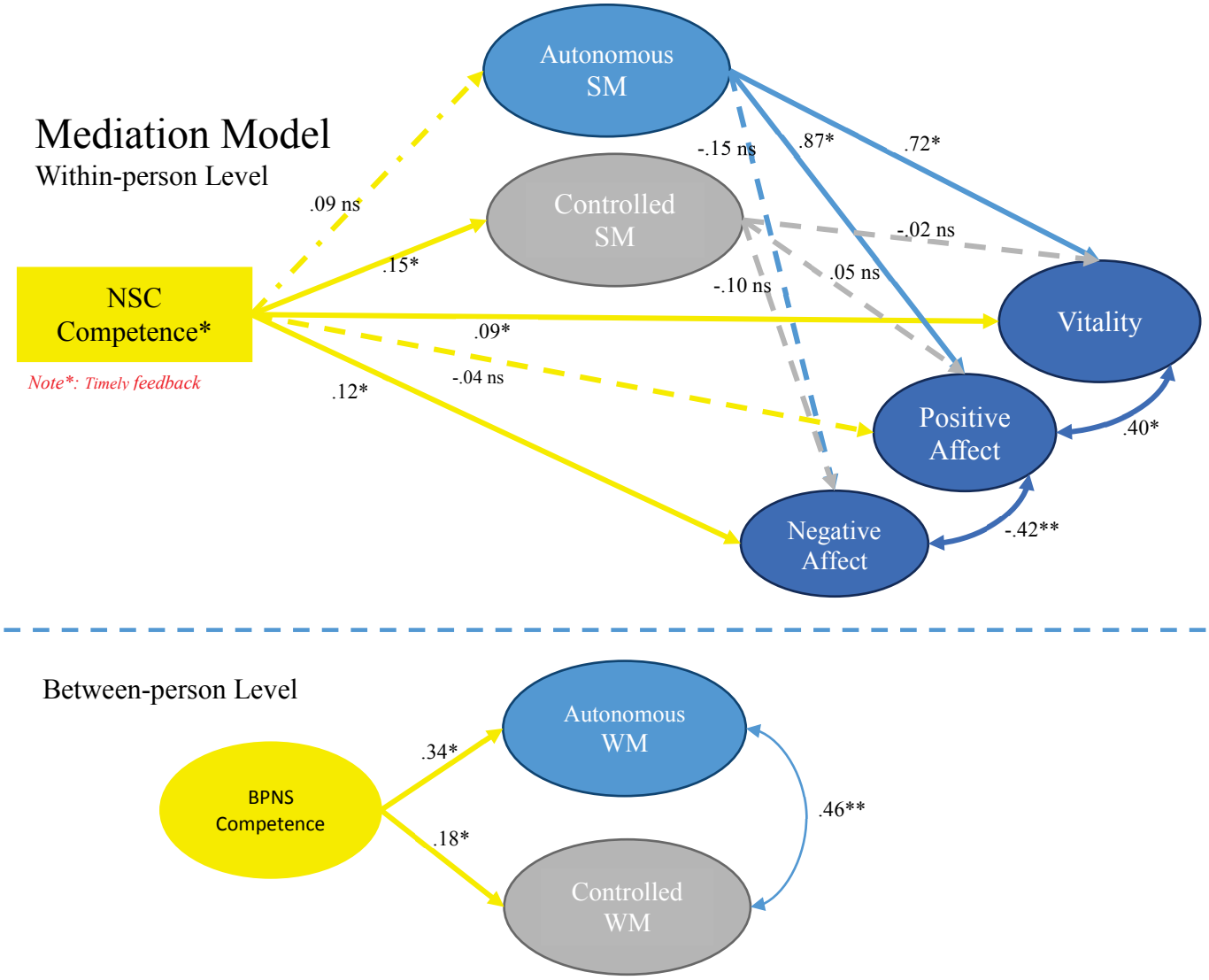


Figure 12. MSEM Results for the **Direct Effect** of the Competence NSC (Operationalized as Performance Rating)

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation

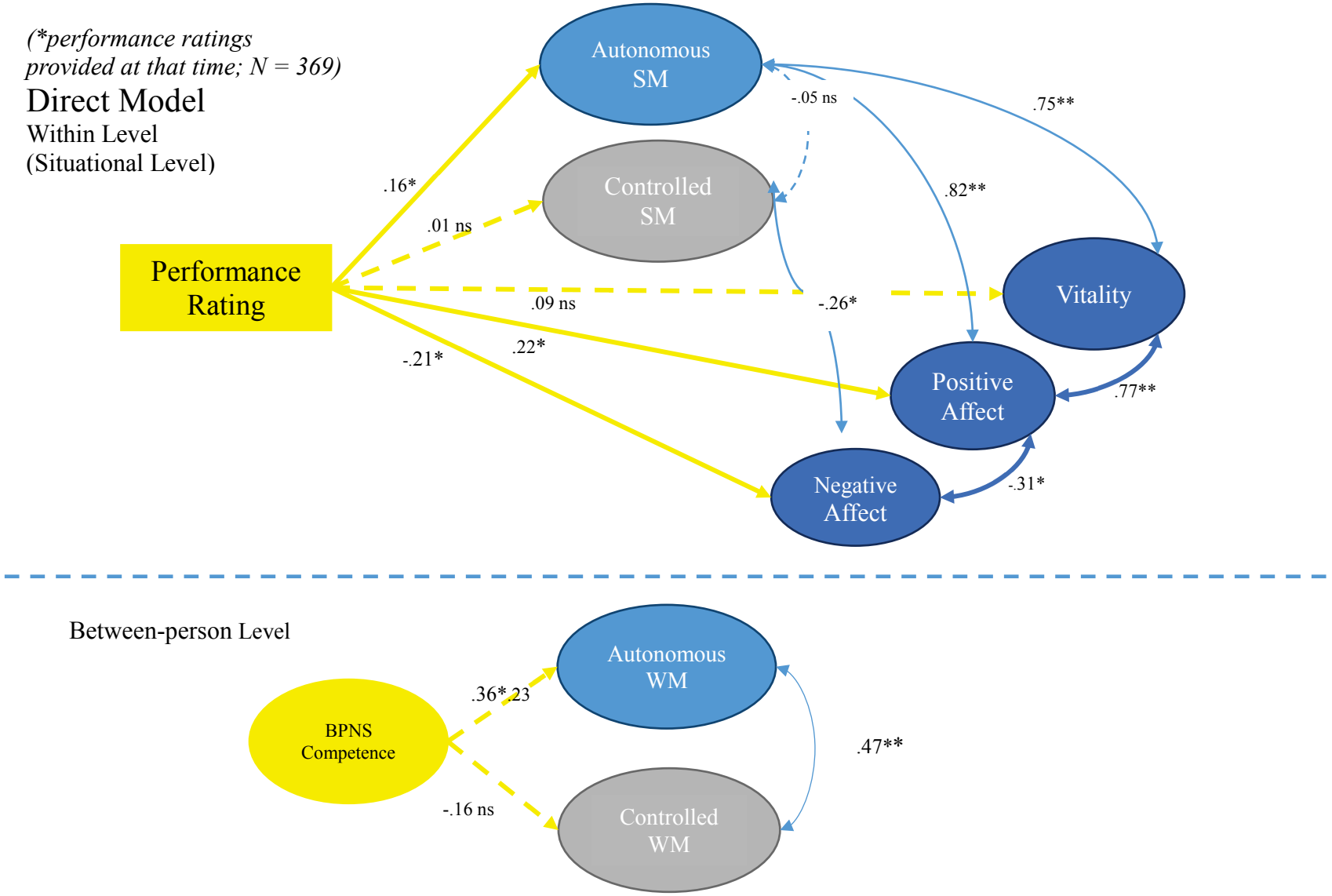
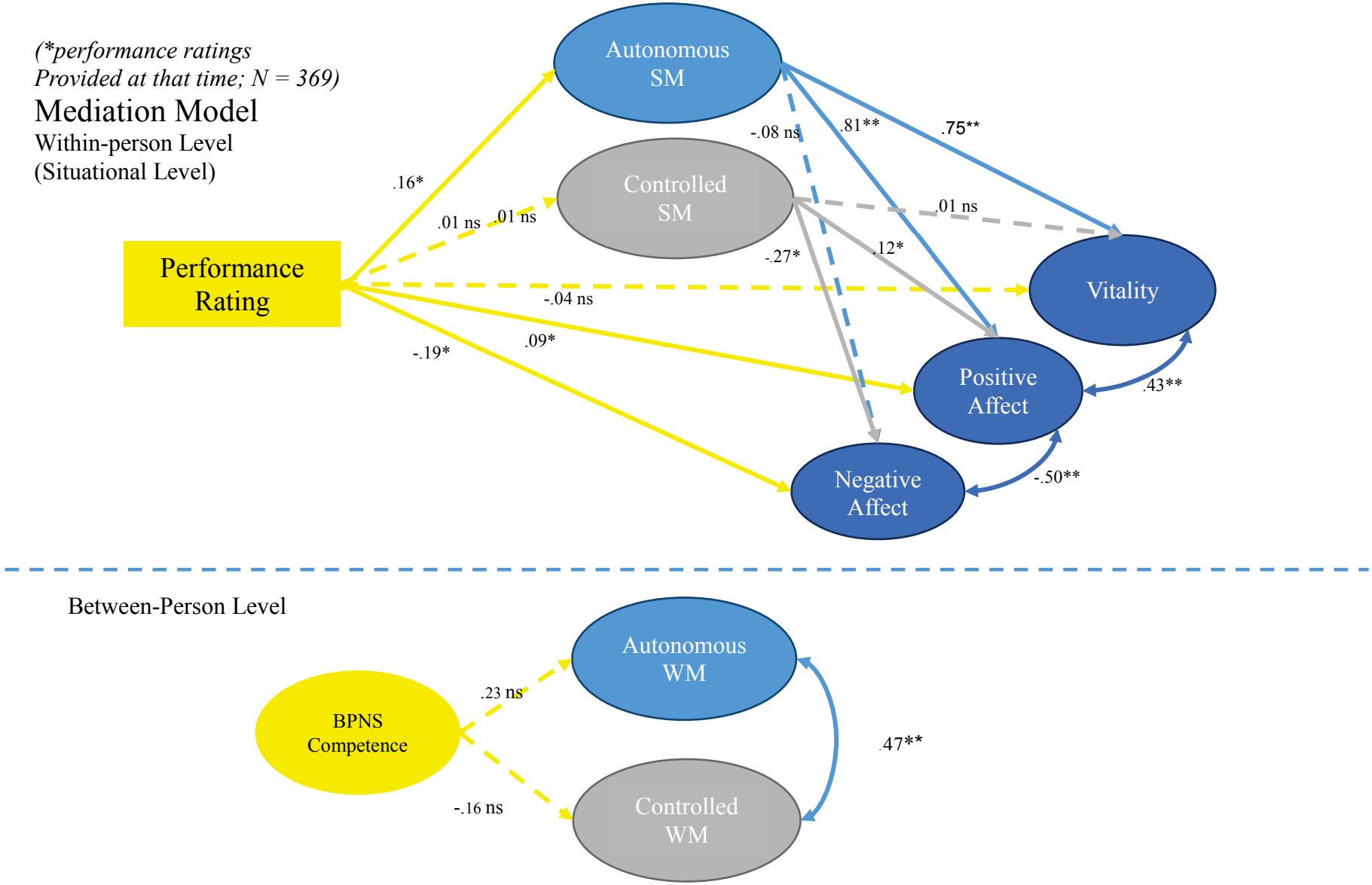


Figure 13. MSEM Results for the **Mediating Mechanism** of the Competence NSC (Operationalized as Performance Rating)

Notes: NSC = Needs-Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation



Discussion and Limitations for Study One

The purpose of this study was to answer the research question: how do situations affect employees' motivation and well-being at work? This multi-level empirical study also served as basis on which we can understand more about the psychological mechanisms that explain fluctuations in employees' daily well-being via analyses at both within-person and between-person levels. The results showed that the NSCs of work tasks (e.g., autonomy-, relatedness-, and competence-supportive characteristics of different work tasks) positively predicted situational autonomous motivation, positive affect, and vitality, but they did not consistently predict negative affect. Situational autonomous motivation positively predicted vitality and positive affect, but it did not negatively predict negative affect; it served as an important mediator between the NSCs of work events and positive psychological well-being outcomes (e.g., both positive affect and vitality). MSEM results again confirmed that perceived basic psychological needs satisfaction for autonomy, relatedness, and competence were antecedents for autonomous work motivation at between-person level. The findings of MSEM in this study also confirmed that situational autonomous motivation acts as the core aspect of the dynamic nature of human motivation based on the within-person motivational variance that pertained to different tasks at work. Please see Table 7 for a summary table of the main findings of Study One.

First, the findings of this study not only confirmed the theoretical understanding of the variances pertaining to task-related motivation and its well-being-related consequences at the situational level according to H-SDT (Vallerand, 1997; 2000), but they also pointed out that the quality of situational motivation (e.g., situational autonomous motivation) served as the foundation for positive and sustainable psychological mechanisms to fuel employees' daily well-

being in the workplace. Situational task factors such as needs-supportive characteristics could be seen as different types of job resources possessed by employees at work; such job-related resources promote positive individual outcomes (Schaufeli & Bakker, 2004; Schaufeli & Taris, 2014) according to the Job Demand and Recourse Model ("JDRM"). Although this study did not simultaneously tackle the job demand aspects (e.g., tight deadline, controlling interactions between colleagues/clients, lack of support from supervisor, etc.) of different work situations, the findings of this study dovetailed with the positive paths between perceived job resources, needs satisfaction, autonomous work motivation, and well-being at work discovered by Trépanier and colleagues (2015). Most importantly, this study specified that such paths existing at the situational level pertain to specific work tasks in addition to past cross-sectional research findings mainly on work context using between-person level testing methodologies according to the JDRM. The contribution of confirming such positive paths from situational needs-supportive characteristics (especially the autonomy characteristic) to employees' vitality and positive affect via situational autonomous motivation could also deepen the understanding of employees' proactive working behavior, such as "job crafting," a type of autonomous self-regulation at work represented by actively shaping their working experience in different situations on the job (Tims & Bakker, 2010). Future research is needed in order to understand how the situational factors interact with other social interactive factors such as leadership/followership to improve workplace situational outcomes by using more mixed research designs.

Second, the findings of this study also expand the SDT framework to include more details and understandings on how motivation varies with different daily activities as well as with other situational factors. The coexistence of both autonomous and controlled work motivation at between-person level was not replicated during my investigations at within-person

(situational) level; instead, needs-supportive situations (e.g., specific needs-supportive characteristics pertaining to different work tasks) promoted situational autonomous motivation while suppressing situational controlled motivation (e.g., negative correlations or no significant correlations between situational autonomous and controlled motivation were noticed at within-person level) when people were involved in different work tasks. These findings shed light on an interesting finding of the dynamics of motivational changes: levels (global, life-domain, and situational) play an important role when explaining the manifestation of changes in motivation at work. For example, undermining effects of extrinsic reward on intrinsic motivation (possible "externalization" changes) were discovered mainly using experimental design (i.e., at situational level; Deci, Koestner & Ryan, 1999), while the development of autonomous self-regulation (possible "internalization" changes) often occurred with school-aged children and learning adults in their early twenties during a relatively longer period of time (Deci & Ryan, 2008a; 2008b). These levels of motivation could be the threshold for certain motivational changes to break through in terms of their impacts on human affect, cognition, as well as behavior. For example, certain amounts of variance at a lower level is accumulated during a period of time to sustain the variance at a higher level of motivation; in addition to that, determinants and consequences of such motivational change stay similar at same level. Future research for sure needs to investigate such mechanism as well as the manifestation of these cross-level changes occurring at work during different time periods.

Third, hedonistic well-being did not always get sustained or minimized by autonomous situational motivation, unlike calm psychological energy (e.g., vitality). Significant results from needs-supportive characteristics predicting positive affect (e.g., feeling excited, joyful) but not negative affect (e.g., feeling frustrated or depressed) were noticed; in addition, the positive

relationship between NSCs and positive affect was significantly mediated by situational autonomous motivation. These findings were also consistent with the broaden-and-build theory of positive emotions (Fredrickson, 2004); they showed evidence that situational autonomous motivation not only attracts employees' attention to specific work tasks, but also broadens their momentary thought-action repertoire for more adaptive outcomes at work. Employees need to be adaptive to survive, and so do organizations. The findings of this study may serve as a stepping stone to explore the dynamic change of employees' motivation and psychological well-being at work with the interaction of both intra-personal as well as inter-personal contextual factors.

There are alternative theoretical propositions of affect being antecedent of motivation rather than the outcome of it. Under the emotion-behavior theoretical framework (Custer & Aarts, 2005; Isen & Reeve, 2006), affect, especially positive affect, can act as an implicit motivator for the activation of behavioral potentials. Additionally, a recent empirical study carried out by Vandercammen and colleagues (2014) argued and tested that affect, especially positive affect, should be seen as a mediating mechanism between needs satisfaction and autonomous motivation under SDT. To answer my research question that asks how work tasks change employees' well-being through situational autonomous motivation, this study mainly focused on affect being one of the dimensions in employees' subjective well-being, seeing it as the psychological experience of people's cognitive evaluation of contexts (e.g., needs supportiveness of work tasks), social interactions, and life experiences (Diener, 2000; Kahneman, Diener, & Schwarz, 1999; Hofmans, Gelens, & Theuns, 2014; Van den Broeck et al., 2010) rather than a potential activator of situational motivation pertained to specific work task. Based on this theoretical reasoning, this study does not hypothesize the affect-motivation

mechanism argued by emotion theorists; rather, it is tested as an alternate model below in the discussion section.

Although this research aimed to test both positive and negative affect as sub-facets of multi-dimensional well-being outcomes, alternative models using affect as the mediator between the three NSCs and situational motivation were also tested. Among several MSEM models, only the relationship between the autonomy-supportive characteristic and the situational controlled/autonomous motivation were significantly mediated by both negative and positive affect (CFI = .96; TLI = .94; RMSEA = .05; SRMR = .11 within / .00 between; see Appendix II for detailed testing results). The alternate model's testing results only replicated a small part of the findings of Vandercammen and colleagues (2014), and the other two needs-motivation models were not significantly mediated in this study. Specifically, MSEM was not able to test the temporal sequence theorized by Vandercammen et al. (2014) besides the mediation hypotheses. Thus, future empirical investigations should be conducted to verify the temporal sequence of the target research model. In addition, the competing "affect-motivation" claims also need to be integrated with the H-SDT model and validated as to its possibility of being the mediating force between needs-motivation processes across all three levels of generality in motivation (Vallerand, 1997; 2000).

Finally, this research has important practical implications. People often interact with others within the organizational context (e.g., leadership style, job/role design, business decision process, performance management, management by objectives, compensation/reward management, etc.) to thrive daily at work. Findings in Study One can deepen our understanding of the psychological mechanisms for how and when to help individuals to work more effectively,

proactively, as well as creatively, and they provide empirical evidence that can help to shape future organizational ecosystems (e.g., with regard to job/role maintenance, process re-engineering, performance management, decision making within an organizational context) and form more evidence-based management practices.

Regarding the interesting findings for the competence-supportive characteristic (valence of performance rating vs. timeliness of performance feedback), they showed that timeliness and performance feedback rating evoked different motivational reactions and can be seen as different well-being indicators in the workplace. For example, employees' being able to obtain timely feedback positively predicted situational controlled motivation (e.g., externalization of work behavior, which could be the stress reaction of their worrying about their performance level), vitality, and negative affect (e.g., feeling tired, feeling frustrated). On the other hand, an immediate and positive performance rating (e.g., a higher rating reflects and reinforces employees' perception of their satisfaction of the basic psychological need for competence) received right on the spot (e.g., in a timely manner) positively predicted situational autonomous motivation, positive affect, and it negatively predicted negative affect. These findings emphasize the implications of possible anxious feelings that employees may have (e.g., worry about not being able to meet performance expectations) that are created by the timeliness of performance feedback. They also emphasize the fact that the repetitive positive experiences gotten from a high-performance feedback rating are important antecedents for situational autonomous motivation. All the results discussed above, then, suggest that there are multiple factors that act together to promote higher levels of well-being for employees at their jobs on a daily basis. With more empirical evidence showing support for multi-dimensional and multi-level conceptualizations of individual performance in the workplace (Carpini, Parker, & Griffin, 2017)

– for example, in-role performance vs. extra-role performance, proactive performance, creative performance (Oldham & Cummings, 1996) – it appears as though the basic psychological need for competence may involve more than seeking instant feedback, receiving praise for an excellent outcome, or meeting higher standards. Different types of performance management practices may trigger and induce different motivational effects for different types of work tasks. Future research may need to be conducted to understand how different situational motivating (autonomous vs. controlled) mechanisms work under different circumstances (e.g., interaction with different situational/social-relational factors). If so, then such research will therefore be able to more specifically determine how both organizations and individuals can be more productive, efficient, and optimal when it comes to coping with daily workplace challenges.

One limitation of this study is that its participants were university students working part-time across different industries, and who are still in the very early stages of their career path. Hence, many of them could be working for extrinsic reasons (e.g., to pay bills or to cover part of their tuition), and this could be a factor that could indicate lower external validity for the findings of this study. Nevertheless, we still see a relatively high level of situational autonomous motivation covariate with a higher level of well-being across different work tasks. Hence, it was meaningful to see how organizations frame the nature of their work tasks as well as how the interpersonal interactions at work could improve employee outcomes through a relatively higher level of situational autonomous motivation – even if the sample was composed of working student participants.

Another limitation of this study is that in spite of the fact that I conducted multi-level analyses, the cross-sectional nature of the research design in this study cannot guarantee causal

relationships among the constructs in the research model. Hence, caution is needed when attempting to use this study's findings of to explain practical issues that arise in organizations.

Table 7. Summary of Hypotheses Testing Results for Study One

	Summary of Hypotheses	Final Results
1	*Hypothesis 1a:* Autonomy-supportive characteristics of work tasks (e.g., existence of volitional choice) positively predict autonomous situational motivation at within-person level.	**Supported**
2	*Hypothesis 1b:* Relatedness-supportive characteristics of work tasks (e.g., interpersonal interactions, perception of feeling connected to others in the workplace) positively predict autonomous situational motivation at within-person level.	**Supported**
3	*Hypothesis 1c:* Competence-supportive characteristics of work tasks (e.g., timeliness and performance feedback rating) positively predict autonomous situational motivation at within-person level.	**Timely feedback: Not supported** **Performance rating: Supported**
4	*Hypothesis 2a-1*: Autonomy-supportive characteristics of work tasks (e.g., existence of volitional choice) positively predict vitality at within-person level. *Hypothesis 2a-2*: Autonomy-supportive characteristics of work tasks (e.g., existence of volitional choice) positively predict positive affect at within-person level. *Hypothesis 2a-3*: Autonomy-supportive characteristics of work tasks (e.g., existence of volitional choice) negatively predict negative affect at within-person level.	**Supported** **Supported** **Not supported**
5	*Hypothesis 2b-1*: Relatedness-supportive characteristics of work tasks (e.g., interpersonal interaction) positively predict vitality at within-person level. *Hypothesis 2b-2*: Relatedness-supportive characteristics of work tasks (e.g., interpersonal interaction) positively predict positive affect at within-person level. *Hypothesis 2b-3*: Relatedness-supportive characteristics of work tasks (e.g., interpersonal interaction) negatively predict negative affect at within-person level.	**Supported** **Supported** **Not supported**
6	*Hypothesis 2c-1*: Competence-supportive characteristics of work tasks (e.g., performance feedback) positively predict vitality at within-person level. *Hypothesis 2c-2*: Competence-supportive characteristics of work tasks (e.g., performance feedback) positively predict positive affect at the within- person level.	**Timely feedback: Supported** **Performance rating: Supported** **Timely feedback: Supported** **Performance rating: Not supported**

	Summary of Hypotheses	Final Results
	Hypothesis 2c-3: Competence-supportive characteristics of work tasks (e.g., performance feedback) negatively predict the negative affect at within-person level.	**Timely feedback: Not supported** **Performance rating: Not supported**
7	*Hypothesis 3a*: During the workday, situational autonomous motivation positively predicts vitality at within-person level.	**Supported**
8	*Hypothesis 3b*: During the workday, situational autonomous motivation positively predicts positive affect at within-person level.	**Supported**
9	*Hypothesis 3c*: During the workday, situational autonomous motivation negatively predicts negative affect at within-person level.	**Not supported**
10	*Hypothesis 4a-1*: Situational autonomous motivation mediates the relationship between autonomy, as an NSC of work tasks, and vitality during the workday. *Hypothesis 4a-2*: Situational autonomous motivation mediates the relationship between autonomy, as an NSC of work tasks, and positive affect during the workday. *Hypothesis 4a-3*: Situational autonomous motivation mediates the relationship between autonomy, as an NSC of work tasks, and negative affect during the workday.	**Supported** **Supported** **Not supported**
11	*Hypothesis 4b-1*: Situational autonomous motivation mediates the relationship between relatedness, as an NSC of work tasks, and vitality during the workday. *Hypothesis 4b-2*: Situational autonomous motivation mediates the relationship between relatedness, as an NSC of work tasks, and positive affect during the workday. *Hypothesis 4b-3*: Situational autonomous motivation mediates the relationship between relatedness, as an NSC of work tasks, and negative affect during the workday.	**Supported** **Supported** **Not supported**
12	*Hypothesis 4c-1*: Situational autonomous motivation mediates the relationship between competence, as an NSC of work tasks, and vitality during the workday. *Hypothesis 4c-2*: Situational autonomous motivation mediates the relationship between competence, as an NSC of work tasks, and positive affect during the workday. *Hypothesis 4c-3*: Situational autonomous motivation mediates the relationship between competence, as an NSC of work tasks, and negative affect during the workday.	**Timely feedback: Not supported** **Performance rating: Supported** **Timely feedback: Not supported** **Performance rating: Supported** **Timely feedback: Not supported** **Performance rating: Not supported**

Study Two

Do Changes in Basic Needs Predict the Changes of Employees' Well/Ill-being via Work Motivation?

Introduction

SDT (Deci & Ryan, 2000; Gagné & Deci, 2005) implies that humans seek out various situations that will satisfy their basic psychological needs. Across different needs theories and SDT, researchers have argued for the universality of the needs for autonomy (Chirkov, Ryan, Kim, & Kaplan, 2003; DeCharms, 1968), relatedness (Baumeister & Leary, 1995), and competence (Csikszentmihalyi, 1988). Needs-support-seeking behavior (e.g., seeking feedback or recognition) forms the foundation for internalization, a positive dynamic process of motivational change in self-regulation that unfolds over time (Deci & Ryan, 2000; Gagné & Deci, 2005). Past research in organizational settings suggests that satisfying the three basic psychological needs for autonomy, relatedness, and competence results in better individual subjective well-being at work (e.g., Boezeman & Ellemers, 2009; Milyavskaya & Koestner, 2011). Conversely, needs frustration – something that has been less studied – resulting from thwarting contexts and/or interpersonal interactions (e.g., deprivation of work resources; abusive work environment) has been found to have a negative impact on employees' motivation as well as negative psychological/physical outcomes. This, too, is a process: a process of negative motivational change – externalization – that results from repeated needs frustration over time (Deci & Ryan, 2008a; Gagné & Deci, 2005).

SDT suggests that work contexts with a high degree of needs support/thwarting should directly impact motivation and result in highly functional/dysfunctional consequences for different work tasks (Ryan & Deci, 2017). SDT also recognizes that factors affecting needs

satisfaction and needs frustration will produce variations in people's daily functioning (Deci & Ryan, 2000). Viewed from a dynamic perspective, this study seeks to examine and explain whether within-person changes in needs satisfaction and needs frustration lead to changes in employee well-being and ill-being through the change of autonomous and controlled motivation, respectively, following two distinct paths (see Figure 14): internalization and externalization. This study uses a longitudinal field research design to understand such within-person fluctuations of needs satisfaction/frustration, work motivation, and employees' psychological health in the workplace.

Research Model and Hypotheses

Autonomy in the workplace, often described as a perception of volition such as being able to control something and having a sense of security and dignity (Ryan & Deci, 2001), captures the essence of many "best practices" in organizations, including empowerment, quality management, autonomous work groups, and job/work design (Gagné & Bhave, 2011). Research evidence supports a positive relationship between work autonomy and job satisfaction, commitment, and performance (Spector, 1986). Satisfaction of the basic psychological need for autonomy has also been found to be related to many well-being indicators, such as work engagement (Baard, Deci, & Ryan, 2004), less stress and work-family conflict (Thompson & Prottas, 2006), and lower burnout (Taris, Kalimo, & Schaufeli, 2002). In addition, the satisfaction of the basic psychological needs for relatedness and competence have also been found to be related to one's daily well-being (Reis et al., 2000).

Accumulated research investigating perceived needs support and/or needs thwarting from significant ones (e.g., life partners, coaches, teachers, supervisors) suggests that needs

satisfaction/frustration leads to well-being/ill-being separately (Deci & Ryan, 2008a). While there is evidence that shows that people's well-being levels decrease with lower levels of needs satisfaction, it is also likely that active disturbances such as specific actions/interactions that thwart psychological needs are detrimental to people's growth and adaptation in different contexts (Vansteenkiste & Ryan, 2013). Empirical evidence also suggests that if basic psychological needs are thwarted, personal goal setting, behavior, and affect regulation may have even more negative outcomes compared to when such needs are not-satisfied (Bartholomew et al., 2011; Deci & Ryan, 2008b). Few studies have examined these distinct paths, but Gillet and colleagues (2012) have found that perceived organizational and personal support impacted employees' well-being and ill-being through their perceived satisfaction and frustration of basic psychological needs resulting from work tasks via two distinct paths. However, these effects have not been examined from the perspective of changes over time. Adopting a dynamic perspective with which to view the two processes travelling on like paths, I expect that, over time, changes in basic needs satisfaction and frustration will lead to corresponding changes in employee well-being and ill-being. This expectation leads me to make the following hypotheses:

Hypothesis 1. Within-person change in satisfaction of the basic psychological needs for autonomy, relatedness, and competence is positively related to change in employee well-being over time.

Hypothesis 2. Within-person change in frustration of the basic psychological needs for autonomy, relatedness, and competence is positively related to change in employee ill-being over time.

The dimensional motivation model proposed by SDT (Deci & Ryan, 1985a, 2000) suggests that people can be motivated by controlled desires (e.g., to obtain monetary

compensation, or to avoid punishment) as well as autonomous desires (e.g., to have fun, or to realize one's values). Autonomous motivation includes two forms of self-determined motivation, intrinsic motivation and identified regulation, while controlled motivation includes external regulation and introjected regulation (Deci & Ryan, 2000; Gagné & Deci, 2005). According to SDT, self-determined regulation (e.g., autonomous work motivation) stems from repeated experiences of the satisfaction of basic psychological needs, which is seen as being essential for people to be able to internalize organizational values and goals over time (Gagné & Deci, 2005). Empirical evidence supports this view, as autonomy, relatedness, and competence needs satisfaction has been found to be related to a higher level of autonomous motivation in various settings, for example in sports (Standage, Duda, & Ntoumanis, 2006), in the workplace (Baard, Deci, & Ryan, 2004), and in education (Standage, Duda, & Ntoumanis, 2006).

Recently, Bidee and colleagues (2016) tested, using a dynamic approach, a dual-path model that included needs satisfaction and needs frustration as well as autonomous and controlled motivation. They found that the growth curves for controlled and autonomous work motivation were simultaneously opposite to each other. Surprisingly, there were no significant relationships between the change in needs satisfaction and the change in autonomous work motivation, as well as between the initial level and the change in needs frustration and the change in controlled work motivation. Only the initial level of needs satisfaction was positively related to the change in autonomous work motivation. The findings from this study – the only one to my knowledge that used a dynamic approach to examine these paths – were not consistent with the theoretical understanding and empirical findings at between-person level, suggesting a need for further research on the dynamic nature of work motivation across all the conceptual levels. The present study attempted to replicate and extend this line of research on the dynamic

nature of motivational change, and tried to further test such a temporal relationship with a longer time span between different measurements (e.g., two months in this study compared to one to two days in Bidee et al., 2016). In this vein, I propose the following hypotheses:

Hypothesis 3. Initial level as well as within-person change in satisfaction of the basic psychological needs for autonomy, relatedness, and competence are positively related to change in autonomous motivation over time.

Hypothesis 4. Initial level as well as within-person change in frustration of the basic psychological needs for autonomy, relatedness, and competence are positively related to change in controlled motivation over time.

According to SDT and the H-SDT model, work motivation mediates relationships between perceived basic needs satisfaction/frustration and their psychological consequences (Ryan & Deci, 2017; Vallerand, 1997, 2000), and these psychological mechanisms could form the behavior-regulatory processes of internalization and externalization over time (Gagné & Deci, 2005; Bidee et al. 2016). For instance, the satisfaction of the three basic psychological needs has been found to mediate the relationship between perceived supervisor autonomy support and job satisfaction (Adie, Duda, & Ntoumanis, 2008; Deci et al., 2001). These studies were, however, conducted at between-person level and mostly using cross-sectional research designs.

While most prior studies have relied on cross-sectional research designs alone, a few longitudinal studies using athlete samples support these process-oriented relationships. For instance, relationships have been found between perceived coach autonomy support, basic needs satisfaction, and well-being (e.g., Gagné, Ryan, & Bargmann, 2003), and similar results have been obtained through multi-level investigation (within- vs. between-person) in sports (Reinboth

& Duda, 2006; Adie, Duda, & Ntoumanis, 2012). Needs support from coaches has also been found to result in higher perceived needs satisfaction, leading to higher autonomous motivation and ultimately predicting end-of-season performance (Smith, Ntoumanis, & Duda, 2007). Extending this line of research, I propose that such motivational change processes should occur in the workplace over time, with changes in needs satisfaction and frustration leading to changes in well-being and ill-being over time through changes in autonomous and controlled motivation (e.g., autonomous vs. controlled self-regulatory patterns in the workplace context), respectively.

Hypothesis 5. Change in autonomous motivation mediates a positive relationship between change in satisfaction of the three basic psychological needs and change in employee well-being over time.

Hypothesis 6. Change in controlled motivation mediates a positive relationship between change in frustration of the three basic psychological needs and change in employee ill-being over time.

General causality orientations ("GCOs") constitute the "characteristic adaptations" (McAdams & Pals, 2006) which reveal peoples' propensities to orient themselves toward different motivationally relevant aspects of various situations (Ryan & Deci, 2017). There are three types of GCOs: (1) autonomous orientation, described as the degree to which people orient themselves toward their environments by treating them as sources of relevant information, since they take interest in both external events and the accompanying inner experiences; (2) controlled orientation, which is the degree to which people's attention and concerns tend to be oriented only toward external contingencies and controls; and (3) impersonal orientation, which is the degree to which people orient themselves toward obstacles to their goals when they react to their lack of

control over outcomes – and this could easily lead to amotivation (Ryan & Deci, 2017). Beyond being indicators of the different forms of contextual motivation that one could demonstrate in different domains, GCOs are really trait-level constructs focusing on capturing individual differences (Deci & Ryan, 1985b). Such individual differences are the persistent results of contextual support vs. deprivation that one can experience through long-term learning (Ryan & Deci, 2017).

Accumulated empirical evidence supports the fact that higher levels of autonomous orientation are related to higher levels of self-esteem and self-actualization (Deci & Ryan, 1985a). Williams and colleagues (1996) have demonstrated that higher individual autonomous orientations resulted in higher autonomous motivation to lose weight and led to better weight loss result maintenance over time. In a longitudinal study conducted by Kwan and colleagues (2011), autonomous orientation predicted higher positive affect better than impersonal orientation during the period of self-selected exercises. In addition, Koestner and Zuckerman (1994) found that college students with stronger controlled orientation tended to set performance-oriented goals (e.g., similar to controlled regulatory styles) and experienced more anxiety when they received failure feedback. Lonky and Reihman (1990) also found that higher controlled orientation predicted more student cheating behavior when opportunities were provided. In the present research, I also examined whether controlled general orientation induces people toward more venerable contextual needs-thwarting factors and whether it results in higher levels of ill-being such as psychological and physical exhaustion as part of the dual-path model.

According to SDT, employees with higher trait-level autonomous causality orientation will be more ready to adapt to contextual factors that support basic psychological needs and then result in more autonomous self-regulation as well as in a higher level of well-being (Gagné &

Deci, 2005). In the H-SDT model (Vallerand, 1997, 2000), the recursive relationships (both top-down and bottom-up effects) between the higher level of motivation and the lower level of motivation are also part of the cross-level motivational mechanisms when the changes are examined through different temporal lenses (Vallerand, 1997; Vallerand & Ratelle, 2002). In addition, the global level of motivation (i.e., trait), such as the GCO, could be a part of the top-down effect, and predict the changes in the motivation at work at the lower level (Vallerand, 1997). In a multi-level and multi-wave empirical study conducted by Blanchard and colleagues (2007), the reciprocal effect from contextual motivation to situational motivation in an athlete sample was confirmed. On the other hand, Guay, Mageau, and Vallerand (2003) used a different global-level motivation (e.g., trait-level) measurement and different testing strategies (time-lagged analyses), and results showed that general- (trait-) level motivation predicted changes in learning motivation (in the educational domain for this study) over time. My study aimed to replicate and extend the understanding of the dynamic nature of such top-down effects of trait-level motivational orientation (i.e., GCO), and see whether it triggers changes in employees' work motivation via their perception of needs satisfaction or frustration – in other words, how the GCO, employees' trait characteristics resulting from one's long-term learning experience, predicts the within-person changes in well/ill-being via the changes in their work motivation. Since the present study is one of the first to engage in an explanatory longitudinal investigation of the temporal relationship between GCO and the changes in employees' work motivation as well as well/ill-being over time, it lacks the theoretical and empirical basis to hypothesize the speed (e.g., acceleration or deceleration) of such changes. Thus, I simply hypothesize a stable, linear temporal relationship between GCO and work motivation as well as employee well/ill-being in the spirit of a preliminary exploration.

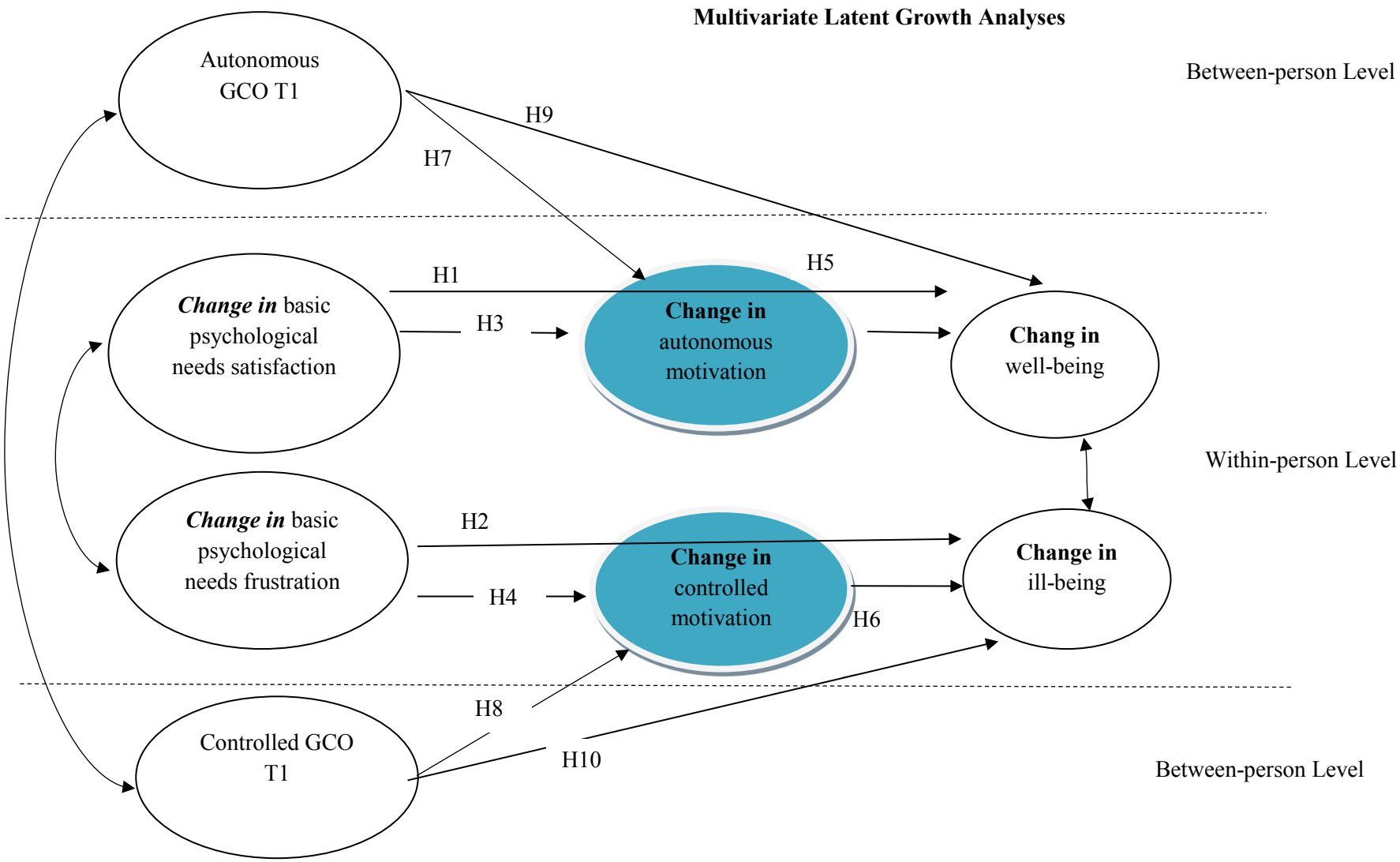
Hypothesis 7: Autonomous GCO predicts an increase (e.g., even positive changes) in employees' autonomous work motivation over time.

Hypothesis 8: Controlled GCO predicts an increase in employees' controlled work motivation at work over time.

Hypothesis 9: Autonomous GCO predicts an increase in employees' well-being at work over time.

Hypothesis 10: Controlled GCO predicts an increase in employees' ill-being at work over time.

Figure 14. Hypothesized Research Model for Study Two



Methods

Procedures

With permission obtained from Concordia University's ethics committee and the participating organizations, an invitation email was sent to employees of three small and medium-sized (fewer than 500 permanent employees) private retail organizations in China to introduce the research project. This email contained the link to access an online questionnaire. Follow-up emails were sent to remind participants to complete the questionnaire. Similar procedures were followed from Time 1 to Time 3 (T1 to T3). Interviews were also conducted with the CEO and/or a representative from the human resources department in each organization to understand the general business cycle, ongoing business activities, and recent management interventions. At the end of the data collection period, business analysis reports and advice on potential management improvement were provided to the management of the participating organizations.

Sample

Data were collected from several established small-size private organizations in China in the consumer product retail industry (final sample was N = 110 across T1 to T3; average age = 34 with SD = 7 yrs; 43% of the participants were male; 32% of the participants had a bachelor's degree or higher). Out of 220 permanent employees contacted for participation, 190 (86% of the total number of contacted employees) responded to my T1 survey, 166 (87% of T1 survey responders) employees responded to my T2 survey, 4 weeks later, and 110 (69% of T2 survey responders) employees responded to my T3 survey, 4-5 weeks after T2. Most of the drop-outs from T1 to T3 were due to random personal and/or business (e.g., job transfer, resignation, or

layoff) reasons. Logistic regression analyses were conducted to examine whether subject attrition across three measurement times led to non-random sampling (Goodman & Blum, 1996). Results showed that the probabilities of remaining at T2 ($\chi^2 = 14.29$; $df = 10$; $p < .16$; n.s.) and T3 ($\chi^2 = 6.04$; $df = 10$; $p < .82$; n.s.) from T1 variables (N = 190) were not significant, nor were the probabilities of remaining at T3 ($\chi^2 = 9.76$; $df = 10$; $p < .46$; n.s.) from T2 variables (N = 166), which suggested that respondent attrition was statistically random.

Measurements

The following measures were used to capture basic needs satisfaction/frustration, work motivation, employee well-being/ill-being, and GCO. Most of the scales had been validated in Chinese, and for those that had not been translated before I used the standard translation–back-translation procedure for cross-cultural studies to ensure the valid translation (Brislin, 1980).

Work motivation. Motivation in the work domain was measured by the revised motivation at work scale (Gagné et al., 2015). In this measurement, participants were asked to use a scale of 1 to 7 (1 being "not at all for this reason" and 7 being "exactly for this reason") to answer the question "Why do you put effort into your job?" This scale comprises 19 items ($\alpha = .86, .89, .83$ for T1, T2, and T3, respectively), with 4 items measuring intrinsic motivation (e.g., "because I have fun doing my job"), 4 items measuring identified regulation (e.g., "because putting effort into this job aligns with my personal values"), 3 items measuring introjected regulation (e.g., "because otherwise I feel ashamed of myself), and 6 items measuring external regulation (e.g., "because I risk losing my job if I don't put effort into it").

Basic needs satisfaction. The satisfaction of basic needs was measured by the satisfaction of basic psychological needs scale for work (Van den Broeck et al., 2010). Participants were

asked to use a scale of 1 to 5 (1 being "strongly disagree" and 5 being "strongly agree") to evaluate how they felt about their jobs. This scale comprises 16 items (α = .73, .70, and .73 for T1, T2, and T3, respectively) to measure the satisfaction of basic psychological needs of autonomy (6 items; e.g., "I feel I can be myself at my job"), relatedness (6 items; e.g., "At work, I feel part of a group"), and competence (7 items; e.g., "I have the feeling that I can even accomplish the most difficult task at work").

Basic needs frustration. Psychological needs frustration was measured by the scale developed by Bartholomew and colleagues (2011). Participants were asked to use a scale of 1 to 7 (1 being "strongly disagree" and 7 being "strongly agree") to evaluate 12 statements (α = .86, .88, and .86 for T1, T2, and T3, respectively) describing the thwarting of the three basic psychological needs of autonomy (4 items; e.g., "I feel like I am being pushed to behave in certain ways"), relatedness (4 items; e.g., "I feel that other people dislike me"), and competence (4 items; e.g., "There are situations where I am made to feel inadequate").

Well-being/ill-being. Well-being measurements included work engagement. Work engagement was measured by using the short version of the scale developed by Schaufeli, Bakker, and Salanova (2006). Respondents were provided a scale of seven, with "0" representing "never" and "6" representing "always, almost every day". The measurement has 17 items (α = .96, .97, .95 for T1, T2, and T3, respectively) measuring vigour (6 items; e.g., "At work, I feel full of with energy"), absorption (6 items; e.g., "I get carried away when I am working"), and dedication (5 items; e.g., "My job inspires me").

Ill-being measurements included measures of both emotional and physical exhaustion. In order to incorporate both types of exhaustion, I used a facet of the Athlete Burnout Questionnaire

(ABQ; Raedeke & Smith, 2001), which was adapted to the workplace: it measures the frequency with which employees perceive having very low energy levels at work. Participants were asked to use a five-point scale (1 being "almost never" and 5 being "almost always") to rate their psychological and physical exhaustion with 15 items (α = .83, .87, .79 for T1, T2, and T3, respectively) of reduced accomplishment (5 items; e.g., "I am not achieving much at work"), devaluation (5 items; e.g., "I am not as into my work as I used to be"), and physical exhaustion (5 items; e.g., "I am exhausted by the mental and physical demands of my work").

General causality orientation. GCO was measured by using the general causality orientation scale, which contains 12 vignette questions (Deci & Ryan, 1985b). The vignettes describe different hypothetical sketches, for example: "You have been offered a new position in a company where you have worked for some time. The first question that is likely to come to mind is…" with 36 items (α = .79, full scale at T1) measuring autonomous GCO (12 items; α = .78), controlled GCO (12 items; α = .75), and impersonal GCO (12 items; α = .70) by using a scale between 1 and 7 ("1" being "very unlikely" and "7" being "very likely"). Example items are "I wonder if the new work will be interesting" for autonomous GCO, "Will I make more at this position?" for controlled GCO, and "What if I can't live up to the new responsibility?" for impersonal GCO.

Statistical Analyses

The data was first examined for missing information, and kurtosis and skewness were verified to ensure the univariate normality of the data distribution. Descriptive statistical analyses as well as zero-order correlations were then conducted. Multi-group confirmatory factor analyses among measures were conducted to ensure the equivalence among the measurements across T1,

T2, and T3. Following the suggestions mentioned in Ployhart and Vandenberg (2010) for longitudinal research design and data analyses in LGM analysis conducted by Chan and Schmitt (2000) and Lance, Vandenberg, and Self (2000), I carried out latent growth curve modelling ("LGM"; von Soest & Hagtvet, 2011) analyses by using Mplus 7.0 (Muthén & Muthén, 2012).

In order to test the temporal relationships proposed in this study, I conducted second-order LGM by calculating the latent factor of change using multivariate SEM. Then, correlations and coefficients between latent factors were regressed to test the direct and mediation hypotheses (von Soest & Hagtvet, 2011). Please see the results section for details.

Results

Descriptive Statistics

Please see Table 8 for descriptive statistics of study variables at both the within-person and between-person levels.

Independent t-tests between the three measurement occasions (T1, T2, and T3) were also performed to see whether there were significant differences between the study variables at the three points in time.

Table 8. Descriptive Statistics for Study Variables at within-person and between-person levels

Study Variables			Min.	Max.	Mean	SD	Variance	Skewness		Kurtosis		Independent t-test		
								Stat	Std. Err.	Stat	Std. Err.	T1 vs. T2	T1 vs. T3	T2 vs. T3
Basic Needs Satisfaction	Autonomy	T1	3	7	4.31	.93	.86	.15	.23	-.20	.46	A	A	A
		T2	3	7	4.41	.73	.53	.38	.23	.95	.46			
		T3	2	7	4.38	.76	.57	.35	.23	1.31	.46			
	Competence	T1	3	7	5.44	.86	.74	-.34	.23	-.29	.46	A	A	A
		T2	4	7	5.24	.82	.66	-.02	.23	-.67	.46			
		T3	4	7	5.27	.89	.80	.02	.23	-.88	.46			
	Relatedness	T1	3	7	4.96	.63	.39	.13	.23	.62	.46	B	B	A
		T2	4	6	4.80	.54	.29	-.15	.23	-.53	.46			
		T3	3	6	4.78	.58	.34	-.24	.23	-.32	.46			
Basic Needs Frustration	Autonomy	T1	1	7	3.54	1.12	1.26	-.07	.23	.34	.46	A	A	A
		T2	1	6	3.59	1.07	1.14	-.40	.23	.12	.46			
		T3	1	6	3.45	1.08	1.17	-.27	.23	.13	.46			
	Competence	T1	1	7	4.24	1.06	1.13	-.48	.23	1.02	.46	B	B	A
		T2	1	6	3.93	.86	.75	-.45	.23	.79	.46			
		T3	2	6	3.78	.98	.95	-.04	.23	-.31	.46			
	Relatedness	T1	1	7	2.93	1.09	1.19	.15	.23	1.15	.46	A	A	A
		T2	1	6	2.92	.99	.98	.10	.23	-.09	.46			
		T3	1	7	2.67	1.03	1.07	1.11	.23	-.31	.46			

Study Variables			Min.	Max.	Mean	SD	Variance	Skewness		Kurtosis		Independent t-test		
								Stat	Std. Err.	Stat	Std. Err.	T1 vs. T2	T1 vs. T3	T2 vs. T3
Motivation at Work	Autonomous Motivation	T1	1	7	4.77	1.01	1.03	-.92	.23	2.83	.46	A	A	A
		T2	2	7	4.76	.80	.64	-.09	.23	.58	.46			
		T3	1	7	4.77	1.02	1.04	-.07	.23	1.28	.46			
	Controlled Motivation	T1	1	7	4.27	.96	.92	-.82	.23	1.78	.46	A	A	A
		T2	1	7	4.39	.96	.92	-.47	.23	1.36	.46			
		T3	1	6	4.25	.99	.99	-.29	.23	.59	.46			
Well-being	Work Engagement	T1	2	7	5.02	1.06	1.13	-.20	.23	-.41	.46	A	A	A
		T2	2	7	4.99	.99	.98	-.29	.23	-.01	.46			
		T3	2	7	5.00	1.05	1.10	.08	.23	-.46	.46			
Ill-being	Physical and Psychological Exhaustion	T1	1	5	2.44	.52	.25	-.09	.23	-.98	.46	A	A	A
		T2	1	4	2.38	.50	.25	-.15	.23	.20	.46			
		T3	1	5	2.37	.55	.30	.23	.23	.84	.46			
GCO	Autonomous	T1	2	6	3.61	.72	.51	.18	.24	.61	.47	N/A	N/A	N/A
	Controlled	T1	3	7	4.83	.78	.62	-.14	.24	-.12	.47			
	Impersonal	T1	3	7	4.34	.76	.58	.45	.24	.09	.47			

Note: T1= Time one; T2 = Time two; T3 = Time three; N = 110 (list-wise deletion, between-person level); A = no difference in mean between groups; B = significant difference in mean between groups ($p < .5$).

Zero-Order Correlations

Please see Table 9 for simple correlations between study variables at both the within-person and between-person levels.

Table 9. Simple Correlations between Study Variables at within-person and between-person levels

	Scale			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1			T1	.97																															
2		**A**	T2	.59**	.70																														
3			T3	.48**	.67**	.75																													
4			T1	..29*	.24*	.28**	.97																												
5	**Basic Needs Satisfaction**	**C**	T2	.15	.40**	.36**	.49**	.70																											
6			T3	.21*	.29**	.45**	.43**	.59**	.83																											
7			T1	.28**	.29**	.23**	.38**	.18	.13	.94																										
8		**R**	T2	.19*	.36**	.45**	.30**	.36**	.35**	.38**	.78																									
9			T3	.21*	.36**	.42**	.20**	.17	.33**	.37**	.55**	.70																								
10			T1	-.58**	-.46**	-.35**	-.25**	-.33**	-.27**	-.23*	-.19*	-.22*	.94																							
11		**A**	T2	-.47**	-.60**	-.54**	-.13	-.24**	-.12	-.31**	-.25**	-.24*	.51**	.86																						
12			T3	-.42**	-.47**	-.67**	-.22*	-.23**	-.30**	-.14	-.17	-.24*	.45**	.62**	.88																					
13			T1	-.40**	-.25**	-.21*	-.13	-.08	-.01	-.04	-.15	-.03	.48**	.21*	.24*	.94																				
14	**Basic Needs Frustration**	**C**	T2	-.34**	-.36**	-.33**	-.29**	-.18	-.11	-.10	-.06	-.04	.35**	.44**	.38**	.45**	.86																			
15			T3	-.22*	-.29**	-.43**	-.21*	-.23*	-.29**	.07	-.03	-.11	.24*	.36**	.59**	.22*	.42**	.75																		
16			T1	-.41**	-.36**	-.38**	-.42**	-.20*	-.32**	-.23*	-.38**	-.30*	.55**	.27**	.28**	.41**	.41**	.24*	.94																	
17		**R**	T2	-23*	-.26**	-.25**	-.16	-.10	-.13	-.06	-.21*	-.19	.25**	.32**	.31**	.42**	.54**	.34**	.42**	.80																
18			T3	-.15	-.13	-.23**	-.12	.06	-.28**	-.03	-.15	-.19*	.15	.03	.39**	.20**	.19	.32**	.36**	.54**	.87															
19			T1	.23*	.22*	.26**	.31**	.42**	.33**	.21*	.32**	.24*	-.30**	-.18	-.17	-.03	-.08	-.11	-.32**	-.02	-.02	.97														
20		**AM**	T2	.21*	.34**	.29**	.23*	.32**	.24**	.16	.21*	.25**	-.22*	-.19*	-.17	.09	-.05	-.21*	-.08	.05	.02	.37**	.81													
21	**Motivation at Work**		T3	.23*	.21*	.32**	.25*	.40**	.59**	.22*	.22*	.40**	-.44**	-.13	-.32**	-.15	-.16	-.23*	-.30**	-.04	-.20*	.43**	.43**	.94											
22			T1	-.21*	-.14	-.07	-.01	.11	.22*	.06	.02	.09	.04	.18	.13	.18	.21*	.19	.06	.28**	.10	.40**	.23*	.35**	.97										
23		**CM**	T2	-.17	-.04	.04	.11	.16	.13	-.03	.16	.09	.08	.15	.11	.19*	.02	.00	.10	.21*	.17	.25**	.50**	.32**	.49**	.93									
24			T3	-.10	-.12	.01	.09	.13	.25**	.04	.09	.08	-.06	.17	.10	.08	.02	.14	-.05	.22*	.04	.32**	.29**	.51**	.62**	.60**	.91								
25			T1	.43**	.42**	.22**	.25**	.31**	.22*	.15	.16	.26**	-.41**	-.24*	-.26**	.18	-.25**	-.12	-.15	-.18	-.12	.27**	.38**	.29**	-.02	.21*	-.01	.98							
26	**Well-being**	**WE**	T2	.30**	.44**	.25**	.20*	.31**	.25**	.12	.21*	.22*	-.37**	-.26**	-.21*	.04	-.18	-.18	-.11	-.03	-.02	.35**	.57**	.42**	.12	.37**	.11	.75**	.96						
27			T3	.26**	.39**	.28**	.26**	.39**	.41**	.29**	.24*	.30**	-.43**	-.29**	-.26**	.08	-.22*	-.19*	-.17	-.19	-.16	.29**	.43**	.53**	.04	.24*	.13	.67**	.72**	.97					
28			T1	-.62**	-.42**	-.34**	-.34**	-.35**	-.28**	-.24*	-.20*	-.28**	.62**	.41**	.31**	.39*	.31**	.19*	.36**	.29**	.17	-.25**	-.19*	-.31**	.12	.03	.04	-.53**	-.40**	-.34**	.99				
29	**Ill-being**	**ABQ**	T2	-.35**	-.50**	-.43**	-.30**	-.37**	-.30**	-.19*	-.16	-.29**	.35**	.49**	.43**	.08	.37**	.40**	.15	.27**	.06	-.27**	-.38**	-25**	-.07	-.20*	.03	-.48**	-.55**	-.50**	.57**	.90			
30			T3	-.24**	-.37**	-.42**	-.19**	-.30**	-.48**	-.15	-.19*	-.38**	.36**	.32**	.53**	.17	.30**	.56**	.26**	.31**	.39**	-.18	-.32**	-.51**	-.12	-.13	-.11	-.35**	-.40**	-.48**	.42**	.62**	.92		
31	**GCO**	**AUT**	T1	.05	.09	.09	.12	.05	.27**	.21*	.26**	.30**	-.09	.03	.11	.09	.07	-.26*	.01	-.07	-.07	.20*	.34**	.27**	.29**	.13	.18	.12	.21*	.16	.02	.00	-.17	.78	
32		**CON**	T1	-.01	.03	.01	.26**	.20*	.30**	.12	.09	.22*	.06	.10	.17	05	-.07	-.20*	.13	.13	.02	.26**	.32**	.32**	.33**	.24	.28**	.18	.30**	.28**	-.18	.20*	-.31**	.46**	.75

Note: WE = Work Engagement; AM = Autonomous Motivation; CM = Controlled Motivation; T1 = Time one; T2 = Time two; T3 = Time three; AUT = Autonomous Causality Orientation; CON = Controlled Causality Orientation; N = 110 (list-wise deletion); ** p <.001 *(two-tailed);* * p <.05 *(two-tailed).*

As seen in Table 13, all the variables displayed an acceptable reliability level ($\alpha \geqslant .70$). Interestingly, controlled motivation was not significantly correlated with both psychological needs frustration and ill-being variables (e.g., psychological and physical exhaustion) across T1 to T3.

Measurement Invariance

Satisfactory multi-group CFA testing results for both configuring invariance (i.e., the nature of the construct that is operationalized by measured variables remains unchanged across measurement occasions) as well as metric invariance (i.e., the relationships between measures and their corresponding constructs are invariant across all measurement occasions; see Table 10) for all the variables across the three times were obtained. Nested model comparison results showed that the assumptions of configural and metric invariance were met for all variables.

Table 10. Model Fit Index for Multi-group CFA Testing Metric Invariance for All the Measurements across the Three Times

	Model Fit Index	χ2	*df*	CFI	TLI	RMSEA	SRMR
Work Motivation	Autonomous Motivation	547.56	30	.95	.95	.09	.13
	Controlled Motivation	1,348.62	135	.96	.96	.06	.10
Needs Satisfaction	Autonomy	312.03	18	.98	.98	.06	.07
	Competence	219.73	18	.996	.997	.02	.09
	Relatedness	347.70	18	.96	.97	.08	.08
Needs Frustration	Autonomy	296.51	45	.96	.96	.04	.08
	Competence	245.48	18	1.00	1.00	.00	.10
	Relatedness	260.25	45	.91	.92	.06	.10
Well-being	Work Engagement	3,993.11	408	.95	.95	.07	.08
Ill-being	ABQ	2,090.22	315	.96	.95	.08	.10

Note: N = 110 across T1 to T3.

Multivariate Latent Growth Curve Modelling

Multivariate Latent Growth Curve Modelling ("LGM"; von Soest & Hagtvet, 2011) was run in Mplus 7.0 (Muthén & Muthén, 2012) for growth analysis in this study. To test the temporal hypotheses, I relied on a SEM (Structural Equation Modelling) operationalization. Due to the fact that dynamics of motivation at work are rather episodic and context-dependent, and there were no significant deviations (for example, changes in executive team; potential mergers and acquisitions; launched of new products/services) from organizations' normal operation were noticed for my longitudinal data-set, no growth trajectories were hypothesized and tested here.

Several parallel LGM models (see Table 11 for model fix index) were run to regress the latent change score of perceived satisfaction and frustration of basic psychological needs for autonomy, competence, and relatedness on the intercept and slope of employees' well/ill-being for their hypothesized temporal relationships (H1 & H2).

Table 11. Model Fit Index for LGM Models: Needs Satisfaction/Frustration and Well-being/Ill-being

Model Fit index		$\chi 2$	*df*	CFI	TLI	RMSEA	SRMR
Model 1# - 3#	Autonomy	836.11	66	.96	.93	.09	.07
	Competence	626.15	66	.98	.97	.05	.05
	Relatedness	583.44	66	.96	.94	.06	.07

The correlational results (Table 12) showed that the change in satisfaction of needs for autonomy ($\beta = .90$, $p < .001$) and competence ($\beta = 1.09$, $p < .001$) positively predicted the change in employees' well-being across the three times (H1); and the change in the frustration of needs for autonomy ($\beta = .94$, $p < .001$), relatedness ($\beta = 1.09$, $p < .001$), and competence ($\beta = 1.24$, $p < .001$) positively predicted the change in employees' ill-being across the three times (H2). In addition, the changes in well-being and ill-being were negatively correlated at within-person level across the three times for autonomy ($r = -.68$; $p < .001$) and competence ($r = -.63$, $p < .001$) needs. It also showed that the initial level (intercepts) of ill-being were negatively related to the changes in the frustration of needs for autonomy ($\beta = -.37$, $p < .05$) and competence ($\beta = -.53$, $p < .001$), which means that individuals with higher starting levels of ill-being tended to experience a decrease in the perceived frustration of needs for autonomy and competence over time. There was also a negative coefficient between the intercept of the need

satisfaction for autonomy (β = -.51, p < .001) and the change in well-being, which showed that employees with higher starting levels of perceived needs satisfaction of autonomy were more likely to experience a decrease in well-being over time. The intercept of employees' ill-being was negatively related to the changes in perceived needs frustration of autonomy (β = -.49, < .001), relatedness (β = -.28, p < .05), and competence (β = -.46, p < .05), which showed that employees with higher starting levels of ill-being were predicting decreases in the perceived needs frustration of autonomy, competence, and relatedness. Similar patterns were only noticed between the intercept (i.e., starting level) of employees' well-being and a decrease (i.e., negative slope) in perceived needs satisfaction for autonomy (β = -.29, p < .05).

At the same time, the intercepts of the satisfaction for the needs for autonomy (r = .56; p <.001*)*, relatedness (r = .14; p <.05*)*, and competence (r = .45; p <.001*)* and employees' well-being were positively correlated, which implies that a higher level of perceived needs satisfaction tends to be associated with a higher level of self-reported subjective well-being at work. Similarly, the same correlational patterns existed between the intercepts of perceived needs frustration of autonomy (r = .79; p <.001*)*, relatedness (r = .56; p <.001), and competence (r = .16; p <.001*)* and employees' ill-being part of the model. The tow path being "symmetrical" to each other could be understood as confirming the parallel dual-path of employees' psychological health (i.e., well-being vs. ill-being) initiated by perceived needs satisfaction and frustration independently at work.

In summary, H1 was supported for the needs of autonomy and competence, and H2 was supported for the needs of autonomy, relatedness, and competence in the proposed dual-path model.

Table 12. Parameter Estimates for LGM Models: Needs Satisfaction/Frustration and Well-being/Ill-being

	Autonomy Need			**Competence Need**			**Relatedness Need**		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Mean Levels									
Intercept $_{Needs\_S}$	4.43**	.11	.00	5.50**	.08	.000	4.94**	.08	.000
Slope $_{Needs\_S}$	.007	.07	.92	-.05	.07	.46	-.04	.05	.396
Intercept $_{Needs\_F}$	3.66**	.11	.00	4.17**	.11	.000	3.01**	.11	.000
Slope $_{Needs\_F}$	-.03	.06	.64	-.11	.07	.11	-.08	.06	.221
Intercept $_{well}$	5.02**	.10	.00	4.97**	.10	.000	4.97**	.12	.000
Intercept $_{ill}$	2.39**	.05	.00	2.38**	.06	.000	2.38**	.06	.000
Slope $_{well}$	-.004	.04	.93	-.01	.04	.92	-.01	.04	.86
Slope $_{ill}$	-.04	.03	.12	-.04	.03	.13	-.04	.03	.14
Variances									
Intercept $_{Needs\_S}$	.40**	.07	.00	.38**	.08	.000	.16**	.04	.000
Slope $_{Needs\_S}$	.02	.03	.36	-.01	.04	.75	.01	.02	.64
Intercept $_{Needs\_F}$	.69**	.12	.00	.43**	.09	.000	.48**	.11	.000
Slope $_{Needs\_F}$	.02	.02	.51	-.03	.03	.36	.06	.04	.18
Intercept $_{well}$	.74**	.12	.00	.77**	.12	.000	.76**	.12	.000
Intercept $_{ill}$	.15**	.03	.00	.15**	.03	.000	.13**	.03	.000
Slope $_{well}$	.03	.02	.13	.03	.02	.13	-.02	.02	.41

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Slope $_{ill}$	.05**	.01	.00	.04*	.01	.005	.04*	.02	.01
Correlations									
Intercept $_{Needs\_S}$ ⟷ Intercept $_{Needs\_F}$	-.84**	.07	.000	-.40*	.12	.001	-.14*	.04	.002
Intercept $_{Needs\_S}$ ⟷ Intercept $_{ill}$	-.72**	.08	.000	-.58**	.09	.000	-.07*	.02	.001
Intercept $_{well}$ ⟷ Intercept $_{Needs\_F}$	-.48**	.09	.000	-.28*	.11	.009	-.12	.08	.115
Intercept $_{well}$ ⟷ Intercept $_{Needs\_S}$	.56**	.10	.000	.45**	.11	.000	.14*	.05	.005
Intercept $_{ill}$ ⟷ Intercept $_{Needs\_F}$	.79**	.10	.000	.56**	.12	.000	.16**	.04	.000
Slope $_{well}$ ⟷ Slope $_{ill}$	-.68**	.14	.000	-.63*	.19	.001	-.02	.01	.119
Coefficients									
Intercept $_{Needs\_S}$ → Slope $_{well}$	-.51**	.12	.000	-.11	.19	.57	-1.28	.88	.15
Intercept $_{Needs\_F}$ → Slope $_{ill}$	-.37*	.12	.002	-.53**	.12	.000	-.67	.67	.33
Intercept $_{well}$ → Slope $_{Needs\_S}$	-.29*	.13	.020	-.17	.15	.27	-.64	1.28	.62
Intercept $_{ill}$ → Slope $_{Needs\_F}$	-.49**	.11	.000	-.28*	.13	.03	-.46*	.25	.05
Slope $_{Needs\_S}$ → Slope $_{well}$ (H1)	**.90****	**.11**	**.000**	**1.09****	**.29**	**.000**	**.82**	**.58**	**.16**
Slope $_{Needs\_F}$ → Slope $_{ill}$ (H2)	**.94****	**.08**	**.000**	**1.09****	**.11**	**.000**	**1.24***	**.49**	**.01**

Note: Needs_S = Needs Satisfaction; Needs_F = Needs Frustration; well = Well-being; ill= Ill-being; *$p < .05$; **$p < .001$.

Parallel LGM models (see Table 13 for model fit index) were run to regress the latent change scores of the perceived satisfaction and frustration of basic psychological needs for autonomy, competence, and relatedness on the intercept and slope of employees' autonomous and controlled work motivation for their hypothesized temporal relationships (H3 and H4).

Table 13. Model Fit Index for LGM Models: Needs Satisfaction/Frustration and Autonomous/Controlled Motivation

Model Fit Index		**$\chi 2$**	***df***	**CFI**	**TLI**	**RMSEA**	**SRMR**
Model 4# - 6#	Autonomy	636.52	66	.98	.96	.05	.08
	Competence	477.41	66	.96	.91	.07	.07
	Relatedness	444.14	66	.96	.90	.07	.07

See Table 14 for detailed parameters estimation of LGM testing H3 and H4. No significant coefficients were identified between the changes of autonomy, relatedness, as well as competence needs satisfaction and the changes in autonomous work motivation (H3). At the same time, no significant coefficients were identified between the changes in autonomy, relatedness, as well as competence needs frustration and controlled work motivation (H4). Hence, both H3 and H4 were not supported.

In the correlational results, the initial level of employees' autonomous work motivation was positively correlated with the initial level of the satisfaction of basic needs for autonomy ($r = .20$, $p < .05$), competence ($r = .29$, $p < .001$), and relatedness ($r = .56$, $p < .001$). Intercepts between needs satisfaction and frustration of autonomy ($r = -.51$, $p < .001$) and competence ($r = -.63$, $p < .05$) were negatively correlated. At the same time, intercepts between autonomous work motivation and controlled work motivation were positively correlated for the needs of autonomy ($r = .40$, $p < .001$) and competence ($r = .48$, $p < .05$).

Table 14. Parameter Estimates for LGM Models: Needs Satisfaction/Frustration and Autonomous/Controlled Motivation

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Mean Levels									
Intercept $_{Needs\_S}$	4.43**	.08	.000	5.50**	.08	.000	4.96**	.06	.000
Intercept $_{Needs\_F}$	3.72**	.10	.000	4.26**	.10	.000	3.02**	.10	.000
Intercept $_{Auto\_M}$	4.87**	.10	.000	4.87**	.10	.000	4.86**	.09	.000
Slope $_{Auto\_M}$	-.03	.06	.54	-.03	.06	.57	-.03	.06	.60
Intercept $_{Contr\_M}$	4.37**	.09	.000	4.36**	.09	.000	4.36**	.09	.000
Slope $_{Contr\_M}$	-.03	.04	.51	-.03	.04	.54	-.03	.04	.57
Slope $_{Needs\_S}$	-.00	.05	.93	-.02	.06	.71	-.02	.06	.72
Slope $_{Needs\_F}$	-.09	.06	.12	-.21*	.06	.001	-.04	.17	.81
Variances									
Intercept $_{Needs\_S}$	.41**	.09	.000	.42**	.10	.000	.16*	.05	.002
Intercept $_{Needs\_F}$	.66**	.13	.000	.34*	.10	.001	.66*	.19	.001
Intercept $_{Auto\_M}$	.31	.24	.19	.41**	.11	.000	.38**	.10	.000
Slope $_{Auto\_M}$	-.06	.10	.54	.09	.06	.14	.03	.03	.41
Intercept $_{Contr\_M}$	.30*	.15	.04	.41*	.15	.008	.55**	.11	.000
Slope $_{Contr\_M}$	-.13	.08	.10	-.04	.06	.50	.00	.01	.97
Slope $_{Needs\_S}$	.06*	.03	.03	-.001	.04	.98	.01	.02	.67

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Slope $_{Needs\_F}$	.11*	.05	.03	-.007	.05	.87	.16	.10	.12
Correlations									
Intercept $_{Needs\_S}$ ⟷ Intercept $_{Needs\_F}$	-.51**	.12	.000	-.13	.07	.06	-.63*	.20	.002
Intercept $_{Needs\_F}$ ⟷ Intercept $_{Auto\_M}$	-.17	.09	.10	-.09	.08	.27	-.42*	.17	.017
Intercept $_{Auto\_M}$ ⟷ Intercept $_{Needs\_S}$	.20*	.07	.007	.29**	.09	.001	.56**	.16	.000
Intercept $_{Auto\_M}$ ⟷ Intercept $_{Contr\_M}$	.40**	.05	.000	.16	.09	.08	.48*	.16	.003
Intercept $_{Needs\_F}$ ⟷ Intercept $_{Contr\_M}$	.17	.09	.06	.17*	.08	.03	.13	.10	.19
Slope $_{Needs\_S}$ ⟷ Slope $_{Needs\_F}$	-.07*	.05	.01	.02	.03	.62	.41	1.24	.74
Slope $_{Auto\_M}$ ⟷ Slope $_{Contr\_M}$	-.01	03	.67	-.01	.02	.72	-6.51	92.63	.94
Intercept $_{Needs\_F}$ ⟷ Slope $_{Auto\_M}$	.07	.05	.17	-.003	.04	.94	.04	.11	.91
Intercept $_{Needs\_S}$ ⟷ Slope $_{Contr\_M}$	-.08	.06	.18	.03	.08	.72	-.09	-.24	.81
Intercept $_{Needs\_S}$ ⟷ Slope $_{Auto\_M}$	**.03**	**.05**	**.60**	**.04**	**.04**	**.21**	**4.19**	**59.02**	**.97**
Intercept $_{Needs\_F}$ ⟷ Slope $_{Contr\_M}$	**.08***	**.04**	**.05**	**.07**	**.05**	**.13**	**-2.84**	**39.37**	**.34**
Coefficients									
Slope $_{Needs\_S}$ ⟶ Slope $_{Auto\_M}$ (H3)	**.09**	**.34**	**.79**	**.94**	**.53**	**.07**	**.82**	**.38**	**.22**
Slope $_{Needs\_F}$ ⟶ Slope $_{Contr\_M}$ (H4)	**.16**	**.21**	**.44**	**-.40**	**.53**	**.45**	**.14**	**1.92**	**.94**

Note: Needs_S = Needs Satisfaction; Needs_F = Needs Frustration; Auto_M =Autonomous Motivation; Contr_M = Controlled Motivation; *$p < .05$; **$p < .001$.

Parallel LGM models (see Table 15 for model fit index) were run to regress the latent change score of perceived satisfaction and frustration of basic psychological needs for autonomy, competence, and relatedness on employees' well/ill-being via their autonomous/controlled work motivation for the mediation hypotheses (H5 and H6).

Table 15. Model Fit Index for LGM Models: Mediated Relationships

Model Fit Index		$\chi 2$	*df*	CFI	TLI	RMSEA	SRMR
Model 7# - 9#	Autonomy	1,259.89	153	.95	.93	.07	.07
	Competence	1,067.58	153	.96	.94	.06	.07
	Relatedness	1,001.08	153	.96	.95	.05	.07

See Table 16 for detailed parameters estimation of LGM testing H5 and H6. The coefficients for the change in autonomous motivation on the relationship between the changes in satisfaction for all three needs of autonomy, competence, as well as relatedness were not significant. Coefficients between the changes in autonomous work motivation and the change in employee well-being were not significant either. Hence, the H5 of how change in employees' autonomous work motivation mediates the positive relationship between changes in employees' perceived needs satisfaction and well-being was not supported. At the same time, the coefficients for controlled work motivation on the relationship between the changes in the frustration of all three needs were not significant, and the coefficient between the change in employee ill-being and controlled motivations was not significant either. Again, the H6 of how changes in employees' controlled work motivation mediated the positive relationship between changes in employees' perceived needs frustration and ill-being was not supported.

Correlational results also showed that the changes in needs satisfaction of competence positively predict changes in employees' autonomous work motivation ($\beta = .69$, $p < .01$). The only significant path across the three basic needs was the positive coefficient between the change in basic needs frustration of autonomy ($\beta = .90$, $p < .05$), competence ($\beta = .94$, $p < .05$), as well as relatedness ($\beta = .84$, $p < .05$) and the change in employees' ill-being.

Table 16. Parameter Estimates for LGM Models: Mediated Relationships

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Mean Levels									
Intercept $_{Needs\_S}$	4.41**	.09	.000	5.50**	.08	.000	4.96**	.06	.000
Slop $_{Needs\_S}$	-.01	.05	.98	-.05	.07	.46	-.05	.04	.18
Intercept $_{Needs\_F}$	3.72**	.11	.000	4.25**	.10	.000	3.05**	.10	.000
Slope $_{Needs\_F}$	-.09	.06	.11	-.19	.06	.11	-.14*	.06	.01
Intercept $_{Auto\_M}$	4.86**	.09	.000	4.86**	.10	.000	4.85**	.09	.000
Intercept $_{Contr\_M}$	4.36**	.10	.000	4.35**	.09	.000	4.35**	.09	.000
Intercept $_{Well}$	5.00**	.10	.000	5.00**	.10	.000	5.01**	.10	.000
Intercept $_{Ill}$	2.43**	.05	.000	2.44**	.05	.000	2.44**	.05	.000
Slope $_{Auto\_M}$	-.03	.05	.64	.01	.06	.88	.06	.08	.45
Slope $_{Contr\_M}$	-.01	.05	.89	.00	.06	.99	-.01	.06	.87
Slope $_{Well}$	-.06	.17	.72	.03	.06	.61	.10	.21	.64
Slope $_{Ill}$	.05	.06	.38	.14	.09	.14	.08	.08	.29
Variances									
Intercept $_{Needs\_S}$	.58**	.11	.000	.40**	.09	.000	.16**	.05	.001
Slop $_{Needs\_S}$	.10*	.03	.003	.09*	.04	.016	.02	.02	.24
Intercept $_{Needs\_F}$	.77**	.14	.000	.49**	.12	.000	.50**	.11	.000
Slope $_{Needs\_F}$	.08	.05	.07	.10	.06	.08	.06	.04	.15
Intercept $_{Auto\_M}$	.44**	.09	.000	.42**	.09	.000	.38**	.10	.000
Intercept $_{Contr\_M}$	.59**	.11	.000	.57**	.11	.000	.57**	.11	.000
Intercept $_{well}$	.82**	.13	.000	.79**	.12	.000	.77**	.12	.000
Intercept $_{ill}$	.22**	.04	.000	.19**	.03	.000	.18**	.04	.000
Slope $_{Auto\_M}$	-.02	.03	.56	-.03	.03	.44	-.02	.04	.54
Slope $_{Contr\_M}$	.03	.03	.41	.04	.03	.19	.04	.03	.26
Slope $_{well}$	.08	.18	.65	-.03	.04	.43	.02	.11	.83
Slope $_{ill}$	-.02	.03	.47	-.05	.04	.17	-.00	.02	.92

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Correlations									
Slop $_{Needs\_S}$ ⟷ Intercept $_{Needs\_S}$	-.12*	.05	.01	-.03	.04	.40	.002	.02	.92
Intercept $_{Needs\_F}$ ⟷ Intercept $_{Needs\_S}$	-.54**	.11	.001	-.22*	.07	.002	.11*	.05	.05
Intercept $_{Needs\_F}$ ⟷ Slope $_{Needs\_S}$	.08	.05	.09	.08	.04	.40	.01	.03	.78
Slope $_{Needs\_F}$ ⟷ Intercept $_{Needs\_S}$	.08*	.04	.04	.04	.03	.18	.03	.03	.26
Slope $_{Needs\_F}$ ⟷ Slope $_{Needs\_S}$	-.05*	.03	.03	-.05	.03	.06	-.03	.02	.10
Slope $_{Needs\_F}$ ⟷ Intercept $_{Needs\_F}$	-.09	.05	.10	-.10	.07	.14	-.02	.04	.57
Intercept $_{Auto\_M}$ ⟷ Intercept $_{Needs\_S}$	.19*	.08	.01	.27**	.07	.000	.10	.06	.06
Intercept $_{Auto\_M}$ ⟷ Slope $_{Needs\_S}$	.02	.04	.59	-.01	.04	.86	.01	.03	.85
Intercept $_{Auto\_M}$ ⟷ Intercept $_{Needs\_F}$	-.24*	.08	.003	-.14*	.06	.03	-.02	.07	.82
Intercept $_{Auto\_M}$ ⟷ Slope $_{Needs\_F}$	-.02	.03	.42	-.03	.03	.91	.01	.03	.75
Intercept $_{Contr\_M}$ ⟷ Intercept $_{Needs\_S}$	-.20*	.08	.01	.05	.07	.43	.01	.05	.80
Intercept $_{Contr\_M}$ ⟷ Slope $_{Needs\_S}$	.11*	.04	.008	.07	.04	.07	.03	.02	.27
Intercept $_{Contr\_M}$ ⟷ Intercept $_{Needs\_F}$	.19*	.09	.03	.20*	.08	.01	.21*	.08	.01
Intercept $_{Contr\_M}$ ⟷ Slope $_{Needs\_F}$	-.07*	.03	.03	-.08*	.04	.05	-.06	.04	.09
Intercept $_{Contr\_M}$ ⟷ Intercept $_{Auto\_M}$	.29**	.08	.000	.25**	.08	.001	.25**	.08	.001
Intercept $_{well}$ ⟷ Intercept $_{Needs\_S}$	.40**	.10	.000	.25*	.08	.002	.12*	.05	.02
Intercept $_{well}$ ⟷ Slope $_{Needs\_S}$	-.10*	.05	.03	-.03	.04	.46	.01	.03	.65
Intercept $_{well}$ ⟷ Intercept $_{Needs\_F}$	-.39**	.10	.000	-.18*	.08	.02	-.11	.08	.18
Intercept $_{well}$ ⟷ Slope $_{Needs\_F}$	.04	.04	.33	-.001	.03	.96	-.002	.03	.95
Intercept $_{well}$ ⟷ Intercept $_{Auto\_M}$	.36**	.09	.000	.39**	.09	.000	.36**	.09	.000
Intercept $_{well}$ ⟷ Intercept $_{Contr\_M}$	.07	.08	.40	.07	.08	.29	.14	.08	.09
Intercept $_{ill}$ ⟷ Intercept $_{Needs\_S}$	-.27**	.05	.000	-.15**	.04	.000	-.07*	.03	.01
Intercept $_{ill}$ ⟷ Slope $_{Needs\_S}$	.07*	.02	.005	.02	.02	.35	-.004	.01	.76
Intercept $_{ill}$ ⟷ Intercept $_{Needs\_F}$	.30**	.06	.000	.19**	.05	.000	.16*	.05	.002
Intercept $_{ill}$ ⟷ Slope $_{Needs\_F}$	-.06	.03	.053	-.04	.02	.11	-.04	.02	.13
Intercept $_{ill}$ ⟷ Intercept $_{Auto\_M}$	-.13*	.04	.002	-.15**	.04	.000	-.14**	.04	.001
Intercept $_{ill}$ ⟷ Intercept $_{Contr\_M}$	.04	.04	.39	.03	.04	.54	.006	.04	.90
Intercept $_{ill}$ ⟷ Intercept $_{Well}$	-.26**	.06	.000	-.21**	.05	.000	-.20**	.05	.001

	Autonomy Need			Competence Need			Relatedness Need		
	Estimate	**S.E.**	***P***	**Estimate**	**S.E.**	***P***	**Estimate**	**S.E.**	***P***
Coefficients									
Slope $_{Needs\_S}$ ⟶ Slope $_{Auto\_M}$ (H5a')	**.13**	**.23**	**.56**	**.69***	**.27**	**.01**	**1.54**	**.80**	**.06**
Slope $_{Needs\_S}$ ⟶ Slope $_{Well}$ (H5c')	**.81**	**.80**	**.31**	**.97**	**.67**	**.14**	**2.55**	**4.03**	**.53**
Slope $_{Auto\_M}$ ⟶ Slope $_{Well}$ (H5b')	**-2.21**	**4.13**	**.59**	**-.44**	**1.01**	**.66**	**-1.45**	**2.64**	**.58**
Slope $_{Needs\_F}$ ⟶ Slope $_{Contr\_M}$ (H6a')	**.21**	**.23**	**.35**	**.14**	**.21**	**.51**	**.06**	**.27**	**.83**
Slope $_{Needs\_F}$ ⟶ Slope $_{ill}$ (H6c')	**.90***	**.39**	**.02**	**.94***	**.41**	**.02**	**.84***	**.42**	**.05**
Slope $_{Contr\_M}$ ⟶ Slope $_{ill}$ (H6b')	**.18**	**.53**	**.74**	**.14**	**.35**	**.70**	**.43**	**.57**	**.45**

Note: Needs_S = Needs Satisfaction; Needs_F = Needs Frustration; Auto_M =Autonomous Motivation; Contr_M = Controlled Motivation; Ill = Ill-being; Well = Well-being; *$p < .05$; **$p < 0$.

Next, I tested LGM models (see Table 17 for model fit index) which included GCO, work motivation, and well/ill-being. The correlational regression results (Table 18) showed that employees' controlled GCO positively predicted the initial level of employees' controlled work motivation ($\beta = .24$, $p < .05$) but not the change in employee controlled work motivation. At the same time, employees' autonomous GCO positively predicted the initial level of employee autonomous motivation ($\beta = .24$, $p < .05$) but not the change in employee autonomous work motivation. Hence, the results did not support H7 and H8.

Table 17. Model Fit Index for LGM Models: GCO, Motivation, and Well/Ill-being

Model Fit Index		**$\chi 2$**	***df***	**CFI**	**TLI**	**RMSEA**	**SRMR**
Model 10#	GCO - Motivation	258.27	27	.97	.92	.08	.08
Model 11#	GCO - Well/Ill being	373.75	27	.98	.97	.06	.07

The results (Table 18, Table 19) showed that the intercepts of employees' well-being and ill-being were significantly correlated (r = -.25, $p < .001$). They also showed that employees' autonomous GCO positively predicted the initial level of employee well-being ($\beta = .22$, $p < .05$) but not the change in employee well-being, which means that employees with higher levels of autonomous GCO often have higher initial levels of well-being to start with during the measured working period. At the same time, employees' controlled GCO did not predict the initial level of employee ill-being or the slope of employee ill-being. Hence, H9 and H10 were not supported.

Table 18. Parameter Estimates for LGM Models: GCO and Motivation

	Parameter Estimate	S.E.	*P*
Mean Levels			
Intercept $_{Auto\_M}$	3.70**	.53	.000
Slope $_{Auto\_M}$	-.22	.33	.52
Intercept $_{Contr\_M}$	3.31**	.46	.000
Slope $_{Contr\_M}$	.11	.23	.64
Auto_GC	4.89**	.09	.000
Contr_GC	4.41**	.08	.000
Variances			
Intercept $_{Auto\_M}$	.16	.17	.35
Slope $_{Auto\_M}$	-.13	.10	.21
Intercept $_{Contr\_M}$	.28	.15	.06
Slope $_{Contr\_M}$	-.08	.08	.34
Auto_GC	.76**	.10	.000
Contr_GC	.71**	.10	.000
Correlations			
Intercept $_{Auto\_M}$ ⟷ Intercept $_{Contr\_M}$	.04	.12	.74
Slope $_{Auto\_M}$ ⟷ Slope $_{Contr\_M}$	-.07	.07	.14
Intercept $_{Auto\_M}$ ⟷ Slope $_{Auto\_M}$	.14	.11	.22
Intercept $_{Contr\_M}$ ⟷ Slope $_{Auto\_M}$	.10	.08	.24
Intercept $_{Auto\_M}$ ⟷ Slope $_{Contr\_M}$	.11	.07	.14
Intercept $_{Contr\_M}$ ⟷ Slope $_{Contr\_M}$	.14	.08	.11
Coefficients			
Auto_GC ⟶ Slope $_{Auto\_M}$ (H7)	**.04**	**.07**	**.57**
Auto_GC ⟶ Intercept $_{Auto\_M}$	.24*	.11	.03
Contr_GC ⟶ Slope $_{Contr\_M}$ (H8)	**-.03**	**.05**	**.55**
Contr_GC ⟶ Intercept $_{Contr\_M}$	.24*	.10	.02

Note: Auto_M =Autonomous Motivation; Contr_M = Controlled Motivation; Auto_GC = Autonomous General Causality; Contr_GC = Controlled General Causality; *$p < .05$; **$p < 0$.

Table 19. Parameter Estimates for LGM Models: GCO and Well/Ill-being

	Parameter Estimate	S.E.	*P*
Mean Levels			
Intercept $_{well}$	3.93**	.49	.000
Slope $_{well}$	-.005	.23	.98
Intercept $_{ill}$	2.64**	.22	.000
Slope $_{ill}$	.12	.14	.42
Auto_GC	4.89**	.09	.000
Contr_GC	4.41**	.08	.000
Variances			
Intercept $_{well}$	.82**	.16	.000
Slope $_{well}$	.03	.06	.61
Intercept $_{ill}$	.16**	.04	.000
Slope $_{ill}$	.03	.02	.08
Auto_GC	.76**	.10	.000
Contr_GC	.71**	.10	.000
Correlations			
Intercept $_{well}$ ↔ Intercept $_{ill}$	-.25**	.06	.000
Slope $_{well}$ ↔ Slope $_{ill}$	-.04	.03	.26
Intercept $_{well}$ ↔ Slope $_{well}$	-.06	.08	.43
Intercept $_{ill}$ ↔ Slope $_{well}$	.04	.03	.26
Intercept $_{well}$ ↔ Slope $_{ill}$	.04	.04	.32
Intercept $_{ill}$ ↔ Slope $_{ill}$	-.02	.02	.30
Coefficients			
Auto_GC → Slope $_{well}$ (H9)	**.00**	**.05**	**.35**
Auto_GC → Intercept $_{well}$	.22*	.10	.03
Contr_GC → Slope $_{ill}$ (H10)	**-.05**	**.05**	**.27**
Contr_GC → Intercept $_{ill}$	-.05	.05	.35

Note: Ill = Ill-being; Well = Well-being; Auto_GC = Autonomous General Causality; Contr_GC = Controlled General Causality; *$p < .05$; **$p < 0$.

Discussion and Limitations for Study Two

This study sought to investigate and explain, from a dynamic perspective, whether changes in the satisfaction and frustration of basic needs for autonomy, relatedness, and competence led to changes in well-being and ill-being through the changes in autonomous and controlled motivation via two distinct paths. At the same time, this longitudinal study also tried to move forward with the preliminary findings in some descriptive pioneer studies (i.e., Wang & Gagné, 2013; Bidee et al., 2016) to build more temporal explanations of the changes in motivation and its health consequences at work. The results suggest that changes in needs satisfaction/frustration predicted the changes in employees' well-being/ill-being over time, but that these effects were direct. In other words, the results did not support the mediating role of changes autonomous and controlled motivation in the regression change analysis done through LGM. When testing the cross-level effect of general causality orientations predicting the change in work motivation and employees' psychological health, again no significant change hypotheses were supported, but the results showed that autonomous general causality orientation positively predicted higher initial levels (i.e., intercepts) of autonomous work motivation and employees' subjective well-being; at the same time, controlled general causality orientation positively predicted higher initial levels (i.e., intercepts) of controlled work motivation but not employees' subjective ill-being.

From a theoretical standpoint, the results of this study suggested that dynamic relationships may not unfold as would be expected, that is, as linear temporal change relations. It is also possible that other factors may intervene in these relationships, such as affective reactions and cognitive evaluation processes, in which both contextual/situational factors could interact to initiate and/or sustain changes in motivation differently (e.g., at different direction and/or speed).

Of note, in this study, the change in employees' autonomous motivation was found to be positively predicted by the change in their needs satisfaction for competence ($\beta = .94$, marginal, $p = .07$ in Table 14; $\beta = .69$, $p < .05$ in Table 16) but not the need satisfaction for autonomy and relatedness.

Although the concepts of needs satisfaction and needs frustration were cross-culturally validated as universal (Chen et al. 2015; Nishimura & Suzuki, 2016), individual beliefs and values of employees in different cultures could still magnify their perceptions of different contextual/situational settings as well as social interactions occurring within organizations, which may end up with different levels of motivational consequences. As this study was conducted in several small Chinese private organizations, a possible explanation could be that performance-focused and collectivistic value-oriented employees may be more sensitive to organizational cues to satisfy the needs for competence and less sensitive to organizational cues to satisfy the needs for autonomy and relatedness. Further cross-cultural studies examining the effects of individual cultural values on the motivational and health consequences resulting from satisfaction/frustration of the three basic psychological needs are warranted.

In addition, when testing whether trait-level causality orientations predicted the changes in autonomous and controlled motivation as well as the changes in employee psychological health over the four-month period, results showed that they only positively predicted the initial level of work motivation and well-being/ill-being. The findings of this study, then, can only be said to have partially discovered the cross-level relationships between global and work-domain level motivation according to the H-SDT model. These findings may serve as preliminary evidence for further investigation of the cross-level "top-down" effects of GCO, which may also be non-linear. For example, from the global to the work-domain level, employees may

demonstrate a higher level of autonomous and/or controlled work motivation to start with when they show a higher level of autonomous and/or controlled causality orientation, but the increase or decrease (i.e., direction and/or speed of change) may vary with its interactions among other contextual/situational factors (rather than with personal factors) over time. Future studies are needed to understand the detailed change mechanisms across the levels of different types of motivation (i.e., top-down as well as bottom-up internalization vs. externalization across all conceptual levels) over a relatively long period of time (e.g., 1-5 years).

It should be noted that the means and variance of the changes (e.g., slopes) calculated for the variables in this study (perceived needs satisfaction/frustration, work motivation, and psychological health) were not significant in the LGM results of this study, which suggests an absence of change-related variance in major variables. As this study is one of the preliminary explanatory longitudinal studies using SDT and H-SDT, an absence of linear change variances during a relative short period of time (e.g., three time measurement occasions over a period of 4-5 months) suggests that future research may need to include more frequent measurement intervals during a longer period of time to properly capture the temporal variances and to allow for the possibility of testing more complex hypotheses (e.g., non-linear temporal relations among multiple measurements of key variables across different testing levels). At the same time, conceptual levels of different types of work motivation (e.g., situational vs. life-domain level vs. global levels) also need to be carefully planned and measured at different times to incorporate all possible change parameters (e.g., different change speed, direction at different conceptual levels). For example, with regard to designing future research, multiple synchronized frequencies could be applied when using situational as well as domain-level measurement across time; in

addition, different synchronized frequencies can then be compared to understand more possible non-linear progressions.

From a practical standpoint, the results indicate that it is crucial for organizations not only to actively support the satisfaction experience of their employees' basic psychological needs for autonomy, relatedness, and competence, but to try to avoid situations in which such needs could be frustrated, as such situations will lead to the deterioration of their employees' psychological and physical engagement at work over time. In other words, organizations should actively adopt preventive measures against needs-thwarting contexts such as abusive supervision, lack of resources to complete work tasks, excessively tight deadlines that minimize feelings of competence, and social isolation among co-workers. At the same time, needs-supportive environments which include autonomy-supportive leadership, a friendly work environment, and positive and constructive performance feedback should be established to promote employee well-being.

Findings on the trait level of autonomous GCO predicted initial levels of autonomous motivation as well as employee well-being over a short period of time (i.e., four months). These results could help organizations if they were to use GCO as a possible selection and recruiting criterion to form effective talent acquisition policies as well as human resource management strategies. The assessment of GCO could also be used in human resource development with companies to help line up talent pools for better strategic results at the organizational level.

This study, of course, is not without its limitations. Even though latent growth modelling techniques were used to establish the temporal relationship among variables, experimental studies are still needed to establish causal relationships. The sample size in this study also constitutes an important limitation, and the limited number of participants in all three time data

collection samples may constitute a possible reason for a lack of temporal variance in the LGM analysis. Another limitation was related to the organizational context in which the data was collected: employees working for Chinese private organizations could have some individualized values and perceptions which are hard to generalize cross-culturally. These limitations likely hinder the generalizability of the results. However, this study contributes to the understanding of how basic psychological needs satisfaction/frustration can contribute to or be detrimental to, respectively, employee psychological health in a dual-path dynamic change process over time.

Table 20. Summary of Hypotheses Testing Results for Study Two

	Summary of Hypotheses		Final Results
1	*Hypothesis 1*: Within-person change in satisfaction of the basic psychological needs for autonomy, relatedness, and competence is positively related to change in employee well-being over time.	Autonomy	**Supported**
		Relatedness	**Supported**
		Competence	**Supported**
2	*Hypothesis 2*: Within-person change in frustration of the basic psychological needs for autonomy, relatedness, and competence is positively related to change in employee ill-being over time.	Autonomy	**Supported**
		Relatedness	**Supported**
		Competence	**Supported**
3	*Hypothesis 3*: Initial level as well as within-person change in satisfaction of the basic psychological needs for autonomy, relatedness, and competence are positively related to change in autonomous motivation over time.	Autonomy	**Not Supported**
		Relatedness	**Supported**
		Competence	**Supported**
4	*Hypothesis 4:* Initial level as well as within-person change in frustration of the basic psychological needs for autonomy, relatedness, and competence are positively related to change in controlled motivation over time.	Autonomy	**Not Supported**
		Relatedness	**Not Supported**
		Competence	**Not Supported**
5	*Hypothesis 5:* Change in autonomous motivation mediates a positive relationship between change in satisfaction of the three basic psychological needs and change in employee well-being over time.	Autonomy	**Not Supported**
		Relatedness	**Not Supported**
		Competence	**Not Supported**
6	*Hypothesis 6:* Change in controlled motivation mediates a positive relationship between change in frustration of the three basic psychological needs and change in employee ill-being over time.	Autonomy	**Not Supported**
		Relatedness	**Not Supported**
		Competence	**Not Supported**
7	*Hypothesis 7:* Autonomous GCO predicts an increase (e.g., even positive changes) in employees' autonomous motivation over time.		**Not supported**
8	*Hypothesis 8:* Controlled GCO predicts an increase in employees' controlled motivation at work over time.		**Not supported**
9	*Hypothesis 9:* Autonomous GCO predicts an increase in employees' well-being at work over time.		**Not supported**
10	*Hypothesis 10:* Controlled GCO predicts an increase in employees' ill-being at work over time.		**Not supported**

General Discussion and Future Research

Trying to enrich the understanding of the dynamic mechanisms of motivation at work, this empirical research (Study One and Study Two) intended to lay the groundwork for the advancement of the core premises of SDT and H-SDT, which are to describe and explain the manifestation of changes in situational/contextual needs satisfaction/frustration in employees' psychological health via the changes of different types of motivations at work. In order to understand more about the nature of such complex change processes, all three conceptual levels of motivation at work were measured and tested in this research through the capture of motivational variances at both within-person and between-person levels. Theoretical, methodological, and practical implications of the results were discussed here.

This research aimed to capture the dynamic nature of motivation at work and employees' well-being/ill-being, specifically, when the employees were engaged in different work tasks and interacting with others differently in a relatively short period of time (one work shift in Study One and over a four-month period in Study Two). The purpose of Study One was to answer the research question: how do situations affect employees' motivation at work and well-being? Study Two tried to use a longitudinal research design and LGM analyses to capture the temporal relationships between changes in employees' perceived needs satisfactions and their psychological health via the changes in different types of work motivation. The results of Study One showed that employees' vitality and positive affect as well as situational autonomous motivation were directly predicted by all three types of needs-supportive characteristics (e.g., volitional choice; social connection, as well as timeliness/valence of performance feedback obtained when doing the work task). No similar pattern was noticed for negative affect related to

specific situational work tasks. This was consistent with the negative correlation noticed between positive and negative affect at within-person level from recent research (Brose, Woelkle, Lövdén, Lindenberger & Schmiedek, 2015). In addition, situational autonomous motivation significantly mediated the positive relationship between the three task-specific basic needs and employees' vitality and positive affect. The findings with regard to these within-person variations in situational motivation pertaining to specific work tasks laid the groundwork for using situational configurations (e.g., work tasks) as the basic unit to map the moment-to-moment change in employee subjective well-being. Furthermore, these findings, form the foundation for the further study of theory-based management interventions to nurture (e.g., to promote positive changes; and/or to stop or prevent negative changes) psychological energy at the individual level, so more prosperous long-term organizational outcomes could be achieved in today's fast-changing environment. In Study Two, the results confirmed the positive temporal relations between the changes in employees' perceived needs satisfaction/frustration of autonomy, competence, and relatedness and the changes in their well/ill-being. Such dynamic temporal relations seemed to be direct, as no linear temporal relations between needs satisfaction/frustration and autonomous/controlled work motivation were noticed in this study; hence, no significant indirect effect between changes in needs satisfaction/frustration and changes in employees' well/ill-being via changes in work motivation were found in the results of Study Two, either.

Empirical results from Study One and Study Two confirmed only part of my proposed multi-level temporal research model, while they extended the theoretical understanding of the dynamic characteristics of motivation at work as an important psychological mechanism that initiated and sustained employees' affective, cognitive, and behavioral outcomes in an

organizational context. Findings having to do with the negative correlation of (or no significant relationship between) autonomous motivation and controlled motivation at the situational level were highly intriguing, while autonomous work motivation and controlled work motivation had been found to be positively correlated to each other at a higher (i.e. work domain) level. Seeing time as a physical change agent, my findings, again, focused on variance at the lowest conceptual level: at the situational level, there was an absence of the coexistence of multiple types of motivation at work here, unlike certain other positive motivation profiles (e.g., profiles represented by high levels of autonomous and controlled work motivation) captured in past research using a "person-centered approach" (van den Broeck, Lens, de Witte, & Van Coillie, 2013). Hence, configurations of different work tasks in a more needs-supportive way facilitate a positive and joyful working experience, which directly fosters one's psychological energy and reduces fatigue. Based on the organismic assumption of SDT (Ryan & Deci, 2017), motivation at work may need to be further studied according to different types, combinations, sequences, or arrangements of work tasks at the situational level. Since humans naturally seek needs-supportive environments and interactions in order to grow and master challenges (Deci & Ryan, 2000), supporting employees (for example, by allowing them more autonomy, fostering meaningful connections among them, and providing them with constructive/positive feedback) to craft their work activities (when, what, how, and with whom to work) may significantly nurture a higher quality of motivation at work and ultimately increase productivity (Aguinis, O'Boyle, Gonzalez-Mulé, & Joo, 2016). Repeated positive needs satisfaction experiences would induce the internalization process for more self-determined regulation at work (Gagné & Deci, 2005), but we need to know more about the change details on forming such regulatory styles. Although Study Two did not obtain significant mediation results, non-linear changes (for example, changes

between needs satisfaction and autonomous work motivation could be going in the same direction but at uneven speeds, which means that changes in needs satisfaction can be faster than the changes in autonomous work motivation in an organizational context depending on different situations) between needs satisfaction/frustration and work motivation may need to be further explored to properly understand the dynamics of motivational change across time in the workplace.

Methodologically, the multi-level modelling in Study One provided empirical support for the within-person variances of employees' situational motivation in reaction to needs-supportive characteristics which were embedded in the work context as well as its impact on employees' daily well-being. In addition, the latent curve growth modelling in Study Two provided evidence for the temporal relationships in the perceived satisfaction/frustration of basic psychological needs and employees' well-being/ill-being. From both empirical studies, I simultaneously investigated the between- and within-person variance as well as the change in motivational reactions at all three conceptual levels of generality: this mixed-method and time-related approach helped deepen my understanding of the dynamics of social support and/or thwarting of the basic psychological needs of autonomy, relatedness, and competency in the organizational context.

Practically, the results of Study One and Study Two formed a very good basis for the designing and testing of different interventions that aim to prevent employees' ill-being and to promote well-being, and this is due to the distinct dual-path-model employed in this research. In addition, positive motivational and well-being consequences related to the task-specific needs-supportive characteristics discovered in Study One are the empirical evidence that support the

development of more needs-supportive human resource management practices in organizations (e.g., job autonomy, job meaningfulness, empowering leadership, flexible work arrangement, ecological/agile work process design).

In summary, the main contributions of the two empirical studies are as follows: 1) Study One links task characteristics with the variance of situational work motivation in a more precise manner (e.g., using DRM); 2) Study Two conducts an explanatory longitudinal analysis on the change mechanism of work motivation at the domain level (tested at within-person level); and 3) both studies use complex survey infrastructures and statistical modelling methodologies (e.g., MSEM and multivariate LGM), as they allow for the testing of the determinants and consequences of different work motivation at all three conceptual levels through different combinations of operationalization, measurement frequencies, and formulation/testing of linear change assumptions under the SDT and H-SDT theoretical framework.

SDT and H-SDT propose a complex theoretical framework which values supporting basic psychological needs as the essential nutrients for people's well-being (Deci & Ryan, 2000; Ryan & Deci, 2000b) as well as a dimensional motivation model that can incorporate both changes in the quality and quantity of motivation (Ryan & Deci, 1985a; Gagné & Deci, 2005). Again, research evidence from recent longitudinal investigations using SDT have called for the extension of the theory to incorporate the key element of "time" (i.e., temporal changes; Shipp & Cole, 2015) in order to further explain the factors, formulas, processes, and patterns of changes in motivation at work. When integrating the findings of the two empirical studies, I found that the results of my studies could extend some aspects of the theoretical understanding of the change process of motivation at work under the SDT framework. Within-person variations in

different types of situational motivation again confirmed the possibilities for changes to happen at the task level; basic psychological needs acted as the gateway to initiate different motivational changes (e.g., "internalization" vs. "externalization") at different levels of motivation when people were engaged in different work contexts. In order for the motivational changes to occur, personal (e.g., traits such as GCO), contextual as well as situational (e.g., needs-supportive/thwarting characteristics) and temporal (e.g., different perceptions of temporal urgency/depth/influence, speed of change according to time, etc.) factors must all react together to fuel human behavior as a means for humans to thrive in the workplace.

The findings of the present research also shed light on several interesting directions for future research: (1) when trying to understand the processes that change individuals' internalized as well as externalized regulatory styles across time, one can test the different configurations of emotional and cognitive elements at all levels (e.g., at the situational level [like the one proposed by Meyer & Turner, 2006 and tested by Isen & Reeve, 2005]) of motivational processes according to the frequency, speed, and direction of such motivational changes; (2) one can broaden the theoretical framework by further trying to understand motivational change at different temporal intervals (e.g., Shipp & Cole, 2015; from moment to moment, from shorter intervals like hours, days, and weeks to longer intervals such as years, decades, and generations) while taking into consideration the different ways in which human cultures interpret and discuss time; (3) and one can, in another promising direction for future investigation into dynamic motivational changes in the workplace, capture possible non-linear progressive relationships between needs satisfaction/frustration and quality/quantity of work motivation as well as their consequences at all three conceptual levels in a synchronized manner (Vallerand, 1997; Vallerand & Ratelle, 2002).

Conclusion

In conclusion, this research aimed to understand the dynamic motivational processes underlining the temporal relationships between changes in employees' basic psychological needs satisfaction/frustration and their psychological health in the workplace. Multi-level and longitudinal analyses conducted in this empirical investigation laid the groundwork for the development of theory-based management interventions designed to nurture employees' well-being and prevent their ill-being simultaneously in organizations in the future. In addition, the promising results of this research call on researchers to carry on this line of inquiry so that the theoretical framework of SDT/H-SDT can be expanded, using dynamic research designs, from the time perspective used here.

Research is a process of endless exploration and adventure, where there are always unknown destinations to be discovered in the future. As a researcher, I would like nothing more than to emulate the famous last words of Alfred, Lord Tennyson's poem *Ulysses* (1842), that is, "to strive, to seek, to find, and not to yield."

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Appendix I. DRM Questionnaire Packets

Packet 1

First we have some general questions about your life. Please answer these questions by placing a check mark next to the answer that best describes your opinion.

1. Taking all things together, how satisfied are you with your life as a whole these days? Are you

__ very satisfied, __ satisfied, __ not very satisfied, __ not at all satisfied?

2. Next, let's turn to your life at home. Overall, how satisfied are you with your life at home? Are you

__ very satisfied, __ satisfied, __ not very satisfied, __ not at all satisfied?

3. And how about your job? Overall, how satisfied are you with your present job? Are you

__ very satisfied, __ satisfied, __ not very satisfied, __ not at all satisfied?

4. We would also like to know how you feel and what mood you are in when you are at work. When you are at work, what percentage of the time are you

in a bad mood ____%
a little low or irritable ____%
in a mildly pleasant mood ____%
in a very good mood ____%
Sum 100%

Next, we would like to ask for some background information about you, for statistical purposes.

1. What year were you born? _____

2. What is your gender? __ Male __ Female

3. What is the highest level of education you have completed?

__ Some high school or less
__ High school diploma or equivalent
__ Some college
__ College diploma
__ Some graduate school
__ Graduate degree

4. What is your marital status?

__ single (never married) __ married __ divorced/separated __ widowed

5. Which of the following categories best describes you?

__ African American
__ Hispanic
__ Caucasian
__ Asian American
__ Native American
__ South Asian/Indian Subcontinent
__ Multi-racial
__ Other, please specify: _____

6. What is your total annual household income?

__ $10,000 or less
__ $10,001 - $20,000
__ $20,001 - $30,000
__ $30,001 - $40,000
__ $40,001 - $50,000
__ $50,001 - $60,000
__ $60,001 - $70,000
__ $70,001 - $80,000
__ $80,001 - $90,000
__ $90,001 - $100,000
__ more than $100,000

Thank you!
You may now start on Packet 2

Packet 2

Yesterday's work

We would like to learn what you did and how you felt at work yesterday. Not all days are the same – some are better, some are worse and others are pretty typical. Here we are only asking you about yesterday.

Because many people find it difficult to remember what exactly they did and experienced, we will do this in three steps:

1. On the next page, we will ask you when you arrived your work and when you're at your work yesterday.

2. We would like you to reconstruct what your workday was like, as if you were writing in your diary. Where were you? What did you do and experience? How did you feel? Answering the questions on the next page will help you to reconstruct your day.

This diary packet is to help you remember and describe what happened during yesterday's work. Please be noted that your notes are strictly personal and confidential. The content of your diary is strictly confidential.

3. After you have finished reconstructing your day in your diary, we will ask you specific questions about this time (these questions are in Packet 3). In answering these questions, we would like you to consult your diary page and the notes you made to remind you of what you did and how you felt.

To begin, please circle the day of the week that YESTERDAY was:

Monday Tuesday Wednesday Thursday Friday Saturday Sunday

Diary Pages

About what time did you arrive at work? _____

And when did you leave work? _____

On the next page, please describe your workday. Think of your workday as a continuous series of scenes or episodes in a film. Give each episode a brief name that will help you remember it (for example, "having a meeting with supervisor", or "at a business lunch with B, where B is a person or a group of people", or "working on drafting a technical memo"). Write down the approximate times at which each episode began and ended. The episodes people identify usually last between 15 minutes and 2 hours. Indications of the end of **an episode** might be going to a different location, ending one activity and starting another or a change in the people you are interacting with.

There is one page for each part of the day – Morning (from waking up until noon), Afternoon (from noon to 6:00 pm) and Evening (from 6:00 pm until you left your work, only if you work overtime). There is room to list 10 episodes for each part of the day, although you may not need that many, depending on your day. It is not necessary to fill up all of the spaces – use the breakdown of your day that makes the most sense to you and best captures what you did and how you felt.

Try to remember each episode in detail, and write a few words that will remind you of exactly what was going on. Also, try to remember how you felt, and what your mood was like during each episode. What you write only has to make sense to you, and to help you remember what happened when you are answering the questions in Packet 3.

Remember, what you write in your diary will not be seen by anybody else.

Morning
(from arrival at work until just before lunch)

What happened? Episode name	Time it began	Time it ended	Notes to yourself: What did you feel?
_____ 1M	_____	_____	_____
_____ 2M	_____	_____	_____
_____ 3M	_____	_____	_____
_____ 4M	_____	_____	_____
_____ 5M	_____	_____	_____
_____ 6M	_____	_____	_____
_____ 7M	_____	_____	_____
_____ 8M	_____	_____	_____
_____ 9M	_____	_____	_____
_____ 10M	_____	_____	_____

Afternoon
(from lunch until 6:00 pm)

What happened? Episode Name	Time it Began	Time it Ended	Notes to yourself: What did you feel?
Lunchtime	_____	_____	_____
1A			
_____	_____	_____	_____
2A			
_____	_____	_____	_____
3A			
_____	_____	_____	_____
4A			
_____	_____	_____	_____
5A			
_____	_____	_____	_____
6A			
_____	_____	_____	_____
7A			
_____	_____	_____	_____
8A			
_____	_____	_____	_____
9A			
_____	_____	_____	_____
10A			

Evening*
(from dinner time until you left your work) ***Only fill this if you work overtime after the dinner***

What happened Episode Name	Time it Began	Time it Ended	Notes to yourself: What did you feel?
Dinnertime 1E	_____	_____	_____
_____ 2E	_____	_____	_____
_____ 3E	_____	_____	_____
_____ 4E	_____	_____	_____
_____ 5E	_____	_____	_____
_____ 6E	_____	_____	_____
_____ 7E	_____	_____	_____
_____ 8E	_____	_____	_____
_____ 9E	_____	_____	_____
_____ 10E	_____	_____	_____

Please look over your diary once more. Are there any other episodes that you'd like to revise or add more notes to? Is there an episode that you would want to break up into two parts? If so, please go back and make the necessary adjustments on your diary pages. If not, you may go on to Packet 3.

Thank You
You may now start on Packet 3.

Packet 3

How Did You Feel Yesterday?
Before we proceed, please look back at your diary pages.

How many episodes did you record for the Morning? _____

How many episodes did you record for the Afternoon? _____

How many episodes did you record for the Evening? _____

Now, we would like to learn in more detail about how you felt during those episodes. For each episode, there are several questions about what happened and how you felt. Please use the notes on your diary pages as often as you need to.

Please answer the questions for every episode you recorded, beginning with the first episode in the Morning. To make it easier to keep track, we will ask you to write down the number of the episode that is at the end of the line where you wrote about it in your diary. For example, the first episode of the Morning was number 1M, the third episode of the Afternoon was number 3A, the second episode of the Evening was number 2E, and so forth.

It is very important that we get to hear about all of the episodes you experienced yesterday, so please be sure to answer the questions for each episode you recorded. After you have answered the questions for all of your episodes, including the last episode of the day (just before you went to bed), you can go on to Packet 4.

First Morning Episode

Please look at your Diary and select the earliest episode you noted in the Morning.

When did this first episode begin (e.g., 7:30 am)?

Please try to remember the times as precisely as you can.

This is episode number _____, which began at _____ and ended at _____.

What were you doing? (please check all that apply)

__ commuting (e.g., to client's location/another work-side)
__filling out forms/documents/paper work
__praying/worshipping/meditating
__having a meeting
__writing memo/letters
__complex calculation/analysis
__computer/internet/email
__communicating on a telephone
__checking equipment/procedures
__reading
__researching (e.g., looking for information)
__gossiping/chatting
__solving issues/problems
__other (please specify_____)

Using the scale from 1 to 5 to rate the following question (**Q1-Q3**) regarding your sense of autonomy for this work activity. ("1" is "not my choice at all"; "5" is "entirely my choice")
Q1. To what extent was it your choice to do that activity?
Q2. To what extent was it your choice to do that activity at that time?
Q3. To what extent was it your choice to do that activity in that way?

Q4. Did you receive any information about your performance (e.g., quality, quantity of it)?

☐ Yes ☐ No

Q5. If no to **Q4**, are there procedures and policies that will allow you to obtain information regarding your performance at later time?

☐ Yes ☐ No

Q6. If yes to **Q4**, please use the scale from 1 to 5 ("1" is "very negative", "5" is "very positive") to evaluate the information you received about your performance.

Q7. Were you interacting with anyone (including on the phone, in a teleconference, etc.)?

☐ no one ☐ *skip to next question*

If you were interacting with someone (please check all that apply)
☐ co-worker(s)
☐ subordinates
☐ clients/customers
☐ boss(es)
☐ other people not listed _____

Q8. If you pick someone for **Q7**, please use the scale from 1 to 5 ("1" being not connected at all, "5" being very much connected) to evaluate how connected (i.e., close) did you feel to that person/these people when you interacted with them?

Why were you engaged in this episode?

Read each item carefully. Using the scale below, please circle the number that best describes the reason why you were currently engaged in this episode yesterday. Answer each item according to the following scale:

1	2	3	4	5	6	7
not all	*very little*	*a little*	*moderately*	*enough*	*a lot*	*exactly*

- Because I think that it was interesting 1 2 3 4 5 6 7
- Because I was doing it for my own good 1 2 3 4 5 6 7
- Because I was supposed to do it 1 2 3 4 5 6 7
- There may be good reasons to do it, but personally I don't see any 1 2 3 4 5 6 7
- Because I think that it was pleasant 1 2 3 4 5 6 7
- Because I think that it was good for me 1 2 3 4 5 6 7
- Because it was something that I had to do 1 2 3 4 5 6 7
- I did it but I was not sure if it was worth it 1 2 3 4 5 6 7
- Because it was fun 1 2 3 4 5 6 7
- By personal decision 1 2 3 4 5 6 7
- Because I didn't have any choice 1 2 3 4 5 6 7
- I didn't know; I didn't see what it would bring to me 1 2 3 4 5 6 7
- Because I felt good when doing it 1 2 3 4 5 6 7
- Because I believed that it was important for me 1 2 3 4 5 6 7
- Because I felt that I had to do it 1 2 3 4 5 6 7
- I did this activity, but I was not sure it is a good thing to pursue it 1 2 3 4 5 6 7

How did you feel during this episode?
Please rate each feeling on the scale given. A rating of 0 means that you did not experience that feeling at all. A rating of 6 means that this feeling was a very important part of the experience. Please circle the number between 0 and 6 that best describes how you felt.

	Not at all						Very much
Impatient for it to end	0	1	2	3	4	5	6
Happy	0	1	2	3	4	5	6
Frustrated/annoyed	0	1	2	3	4	5	6
Depressed/blue	0	1	2	3	4	5	6
Competent/capable	0	1	2	3	4	5	6
Hassled/pushed around . . .	0	1	2	3	4	5	6
Warm/friendly	0	1	2	3	4	5	6
Angry/hostile	0	1	2	3	4	5	6
Worried/anxious	0	1	2	3	4	5	6
Enjoying myself	0	1	2	3	4	5	6
Criticized/put down	0	1	2	3	4	5	6
Tired	0	1	2	3	4	5	6

Please respond to each of the following statements in terms of how you were feeling **for this episode**. Indicate how true each statement was for you at that time, using the following scale:

1	2	3	4	5	6	7
not at all true			somewhat true			very true

1.	At that moment, I felt alive and vital.	1 2 3 4 5 6 7
2.	I felt so alive I just wanted to burst during that episode.	1 2 3 4 5 6 7
3.	At that moment, I had energy and spirit.	1 2 3 4 5 6 7
4.	I was looking forward to each new task.	1 2 3 4 5 6 7
5.	At that moment, I felt alert and awake.	1 2 3 4 5 6 7
6.	At that moment, I felt energized.	1 2 3 4 5 6 7

Please use the scale from 1 to 7 ("1" as "not at all true"; "4" as "somewhat true"; "7"as " very true") to evaluate the following statement for the working events that you had experienced:

- I felt connected to one or more people during this episode.
- I felt capable or skillful during this episode during this episode.
- I felt free to do things and to think how I wanted during this episode.

Next Episode (Each episode will contain the same questionnaires as the previous one. To save space, just two episodes will be included in the sample packets).

Have you rated all of your episodes, including the last episode of the day just before you went to bed? If so, you may move on to Packet 4.

Packet 4

A Few More Questions about Yesterday
Now that you have told us about your day in detail, we have a few more general questions to ask you.

Now we would like to know overall how you felt and what your mood was like yesterday. Thinking only about yesterday, what percentage of time were you

in a bad mood ____%

a little low or irritable ____%
in a mildly pleasant mood ____%
in a very good mood ____%
Sum 100%

Now we would like to know how typical yesterday was for that day of the week (i.e., for a Monday, for a Tuesday, and so on). Compared to what that day of the week is usually like, yesterday was (please circle one):

1. Much Worse
2. Somewhat Worse
3. Pretty Typical
4. Somewhat Better
5. Much Better

Now we would like to know how yesterday compares to a typical day at work. Compared to a typical day at work, my time spent at work yesterday was (please circle one):

Much Worse	Somewhat Worse	Pretty Typical	Somewhat Better	Much Better
1	2	3	4	5

Your Job
Now we would like to learn more about your current job.

Do you work more than one job? Yes No

If you work more than one job, please answer these questions for your main job.

By main job we mean the one at which you usually work the most hours in a typical week.

When did you begin to work for your current employer? ___/___ (month / year)

If you worked previously for this employer in a different position, when did your present position start? ___/___ (month / year)

Within your organization, is your current position considered
__ a low-level position
__ a mid-level position
__ a high-level position

What type of organization do you work for?

__ Government
__ Private for profit company
__ Nonprofit organization (including tax exempt and charitable organizations)
__ Self-employed
__ Working in the family business

What industry is this organization in? (check all that apply)

__ Agriculture, forestry and fishing
__ Mining, natural resources
__ Utilities
__ Construction
__ Manufacturing
__ Wholesale and warehousing
__ Retail
__ Transportation
__ Information (e.g., newspapers, magazines, software)
__ Finance and insurance
__ Real estate and rental
__ Professional services (e.g., consulting, law, engineering or accounting firms)
__ Administrative and support services
__ Education

__ Health care
__ Social services
__ Arts, entertainment and recreation
__ Accommodation (e.g., hotels)
__ Other services (e.g., automotive repair, cleaning, yard services)
__ Public administration

Counting all locations where your employer operates, what is the total number of people who work for your employer?

__ 25 or less
__ between 26 and 100
__ between 101 and 500
__ between 501 and 1000
__ 1001 or more

What kind of work do you do, that is, what your occupation? (For example: plumber, typist, farmer)

_____

Next, we would like to know how well the statements below describe your situation at work. *Please rate each statement on the scale given. Please circle the number to indicate how well the statement describes your work situation.*

Does this statement describe your situation at work?

Definitely Not	***Mostly Not***	***Mostly Yes***	***Definitely Yes***
1	***2***	***3***	***4***

It takes specialized education or training to do my job	1 2 3 4
My employer provides all of the resources needed to do my job well	1 2 3 4
Giving advice to other workers is part of my job	1 2 3 4
There are opportunities to make decisions that help clients/ customers/students/patients	1 2 3 4
People in my position are at risk of being fired or laid off	1 2 3 4
Frequent interactions with co-workers is an important part of my job	1 2 3 4
There are many opportunities to show initiative	1 2 3 4
Under constant and close supervision	1 2 3 4
Supervise others	1 2 3 4
Can chat with other workers while on job	1 2 3 4
Can plan my own activities	1 2 3 4
Telecommute/work at home	1 2 3 4
Flexible hours	1 2 3 4
Can be required to work overtime	1 2 3 4
Work night shifts	1 2 3 4
Work different shifts from day to day or week to week	1 2 3 4
Breaks are infrequent and short	1 2 3 4
There is time pressure; constant pressure to work fast	12 3 4
Have to travel frequently	1 2 3 4
Have to do pretty much the same thing all day	1 2 3 4
Involves a significant risk of injury	1 2 3 4
Requires constant attention to avoid mistakes	1 2 3 4
Small mistakes can have serious consequences	1 2 3 4
Have direct interactions with unhappy clients/customers/ students/patients	1 2 3 4
Exposed to offensive noise	1 2 3 4
Exposed to dust, dirt, bad smells	1 2 3 4
Exposed to the weather	1 2 3 4
Have to stand on my feet most of the time	1 2 3 4
Work is physically demanding, requires muscle	1 2 3 4
Excellent benefits	1 2 3 4
I am overqualified for the job	1 2 3 4

How does your current job compare to the job you had a year ago?
__ Better than a year ago
__ About the same as a year ago
__ Worse than a year ago

How easy would it be for you to find another job that is at least as attractive as your main job? (please circle a number)

Very Difficult						Very easy
0	1	2	3	4	5	6

For your job, what is the easiest way for you to report your total earnings before taxes or other deductions?

__ Hourly
__ Weekly
__ Biweekly (every two weeks)
__ Twice monthly
__ Monthly
__ Annually
__ Other (specify) _____

Including overtime pay, tips and commissions, and before taxes or other deductions, what are your usual earnings for the period of time you indicated in the previous question?

_____

Why do you put efforts in your job?
People might put effort in their job for various reasons. Why do you or would you put efforts in your job? Using the scale below, please indicate for each of the following statements to what degree they correspond to one of the reasons for which you would or do put efforts in your job.

1	2	3	4	5	6	7
Not at all for this reason	Very little	A little	Moderately	Strongly	Very Strongly	Exactly for this reason

I put effort in my job…

To get others' approval (e.g., supervisor, colleagues, family, clients...).	1 2 3 4 5 6 7
Because I have to prove to myself that I can do it.	1 2 3 4 5 6 7
Because I personally consider it important to put effort in this job.	1 2 3 4 5 6 7
Because I have fun doing my job.	1 2 3 4 5 6 7
Because others will respect me more (e.g., supervisors, colleagues, family, clients...).	1 2 3 4 5 6 7
Because it makes me feel proud of myself.	1 2 3 4 5 6 7
Because putting effort in this job aligns with my personal values.	1 2 3 4 5 6 7
Because what I do in my work is exciting	1 2 3 4 5 6 7
To avoid being criticized by others (e.g., supervisors, colleagues, family, clients...).	1 2 3 4 5 6 7
Because otherwise I will feel ashamed of myself.	1 2 3 4 5 6 7
Because putting effort in this job has personal significance to me.	1 2 3 4 5 6 7
Because the work I do is interesting.	1 2 3 4 5 6 7
Because others will reward me financially only if I put enough effort in my job.	1 2 3 4 5 6 7
Because otherwise I will feel bad about myself.	1 2 3 4 5 6 7
Because others offer me greater job security if I put enough effort in my job (e.g., employer, supervisor...).	1 2 3 4 5 6 7
Because I risk losing my job if I don't put enough effort in it.	1 2 3 4 5 6 7
I don't, because I really feel that I'm wasting my time at work.	1 2 3 4 5 6 7
I do little because I don't think this work is worth putting efforts into.	1 2 3 4 5 6 7
I don't know why I'm doing this job, it's pointless work.	1 2 3 4 5 6 7

How do you feel about your job?

The following questions concern your feelings about your job over the past year. If you have held your current position for less than one year, please answer the questions based on your experience thus far. Remember, your answers are held completely confidential and your boss will never know how you responded to these questions. Please indicate to what extent the following statements correspond to your experience at work.

1	2	3	4	5
Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree

I feel like I can be myself at my job.	1 2 3 4 5
I really master my tasks at my job.	1 2 3 4 5
I don't really feel connected with other people at my job.	1 2 3 4 5
At work, I often feel like I have to follow other people's commands.	1 2 3 4 5
I feel competent at my job.	1 2 3 4 5
At work, I feel part of a group.	1 2 3 4 5
If I could choose, I would do things at work differently.	1 2 3 4 5
I am good at the things I do in my job.	1 2 3 4 5
I don't really mix with other people at my job.	1 2 3 4 5
The tasks I have to do at work are in line with what I really want to do.	1 2 3 4 5
I have the feeling that I can even accomplish the most difficult tasks at work.	1 2 3 4 5
At work, I can talk with people about things that really matter to me.	1 2 3 4 5
I feel free to do my job the way I think it could best be done.	1 2 3 4 5
I often feel alone when I am with my colleagues.	1 2 3 4 5
In my job, I feel forced to do things I do not want to do.	1 2 3 4 5
Some people I work with are close friends of mine.	1 2 3 4 5

The following 17 statements are about how you feel at work. Please read each statement carefully and decide if you ever feel this way about your job. If you have never had this feeling, cross the "0" (zero) in the space after the statement. If you have had this feeling, indicate how often you felt it by crossing the number (from 1 to 6) that best describes how frequently you feel that way.

Never	Almost Never	Rarely	Sometimes	Often	Very Often	Always
0	**1**	**2**	**3**	**4**	**5**	**6**
Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Everyday

1. At my work, I feel bursting with energy	0 1 2 3 4 5 6
2. I find the work that I do full of meaning and purpose	0 1 2 3 4 5 6
3. Time flies when I am working	0 1 2 3 4 5 6
4. At my job, I feel strong and vigorous	0 1 2 3 4 5 6
5. I am enthusiastic about my job	0 1 2 3 4 5 6
6. When I am working, I forget everything else around me	0 1 2 3 4 5 6
7. My job inspires me	0 1 2 3 4 5 6
8. When I get up in the morning, I feel like going to work	0 1 2 3 4 5 6
9. I feel happy when I am working intensely	0 1 2 3 4 5 6
10. I am proud of the work that I do	0 1 2 3 4 5 6
11. I am immersed in my work	0 1 2 3 4 5 6
12. I can continue working for very long periods at a time	0 1 2 3 4 5 6
13. To me, my job is challenging	0 1 2 3 4 5 6
14. I get carried away when I am working	0 1 2 3 4 5 6
15. At my job, I am very resilient, mentally	0 1 2 3 4 5 6
16. It is difficult to detach myself from my job	0 1 2 3 4 5 6
17. At my work, I always persevere, even when things do not go well	0 1 2 3 4 5 6

You have now completed the survey. Please review each packet to be sure you have answered all the questions. Thank you very much for participating.

After you have checked your answers, put all of the numbered packets (except the diary if you wish to keep it) in the large envelope. Then take your large envelope to the coordinator at the back of the room. Please be as quiet as possible, since others are still working.

Appendix II.

Multi-level SEM Testing Results for Alternative Mediation Model

Figure 15. MSEM Results for Mediating Mechanism of Positive/Negative Affect on Autonomy Needs-Supportive Characteristic and Situational Work Motivation

Notes: NSC = Needs Supportive Characteristics; BPNS = Basic Psychological Needs Satisfaction; SM = Situational Motivation; WM = Work Motivation;