

A CHINESE-CANADIAN CROSS-CULTURAL COMPARISON OF THE RELATION
BETWEEN SUPERVISORS' TRANSFORMATIONAL LEADERSHIP STYLE AND
SUBORDINATES' AUTONOMOUS MOTIVATION

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ABSTRACT

A Chinese-Canadian cross-cultural comparison of the relations between supervisors' transformational leadership style and subordinates' autonomous motivation

Zhe Ni Wang

Synthesizing the theories of transformational leadership (Bass, 1985; 1997) and self-determination (Deci & Ryan, 1985, 2000), this research investigated the mediating mechanism of the satisfaction of three basic psychological needs affecting the positive relation between managers' transformational leadership (TFL) and subordinates' autonomous motivation (AM) at work in two culture-specific samples from China and Canada. Cross-cultural comparisons were conducted to test if individual collectivistic values predicted autonomous motivation and if they positively moderated the relation between TFL and AM.

Hypotheses were tested using hierarchical linear modeling (HLM) which allows multi-level investigation in nested data. Two HLM models were analyzed in each sample, in which TFL was treated as an individual level variable (subordinates' perception) and a group level variable (mean of subordinates' evaluation). The results supported in both countries the positive relation between TFL and AM. In China, the satisfaction of the need for autonomy (marginally) and relatedness were found to mediate the relation between perceptions of TFL and AM. When testing for direct relations between basic needs satisfaction and AM, positive main effects for autonomy and relatedness need satisfaction were found in China. In Canada, besides the positive main effect of autonomy and competence need satisfaction on AM, relatedness also significantly predicted AM when autonomy was high. In addition, having high collectivistic value was related to higher AM but it did not significantly moderate the positive relation between TFL and AM in the cross-cultural comparison. Implications for management practice and limitations are discussed.

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Introduction

Ever since Bernard Bass (1985) developed transformational leadership theory as an extension of Burns' (1978) concept of "transforming" leadership in the 1980's, many research findings have supported the relationship between transformational leadership and positive employee and organizational outcomes (i.e. Bass, Avolio, Jung & Berson, 2003; Berson & Linton, 2005; Howell & Avolio, 1993; Jung & Avolio, 1999) in the last three decades. Meta-analyses also confirmed such relationships across different samples and industries (DeGroot, Kiker & Cross, 2000; Lowe, Kroeck, & Sivasubramaniam, 1996).

Despite research that has examined positive relations between transformational leadership behaviour and followers' loyalty, engagement and performance (Bass, 1998), few studies have systematically examined the psychological mechanism behind these positive relations. Some of the recently discovered mediators are: intrinsic motivation (Charbonneau, Barling & Kelloway, 2001), work meaningfulness (i.e. enjoying and finding work purposeful; Arnold, Turner, Barling, Kelloway, & McKee, 2007), psychological empowerment (Avolio, Zhu, Koh & Bhatia, 2004; Huang, Iun, Liu & Gong, 2010), trust in the supervisor (Huang, Iun, Liu & Gong, 2010), and identification to the work unit and self-efficacy (Walumbwa, Avolio & Zhu, 2008). These findings are encouraging, but the picture still lacks integration.

According to self-determination theory (SDT; Deci & Ryan, 1985, 2000; Gagné & Deci, 2005), leaders in organizations (e.g., managers) can create an autonomy supportive climate to promote and support employees' work motivation, which results in better performance and well-being (Baad, 2002; Ryan & Deci, 2000). These autonomy

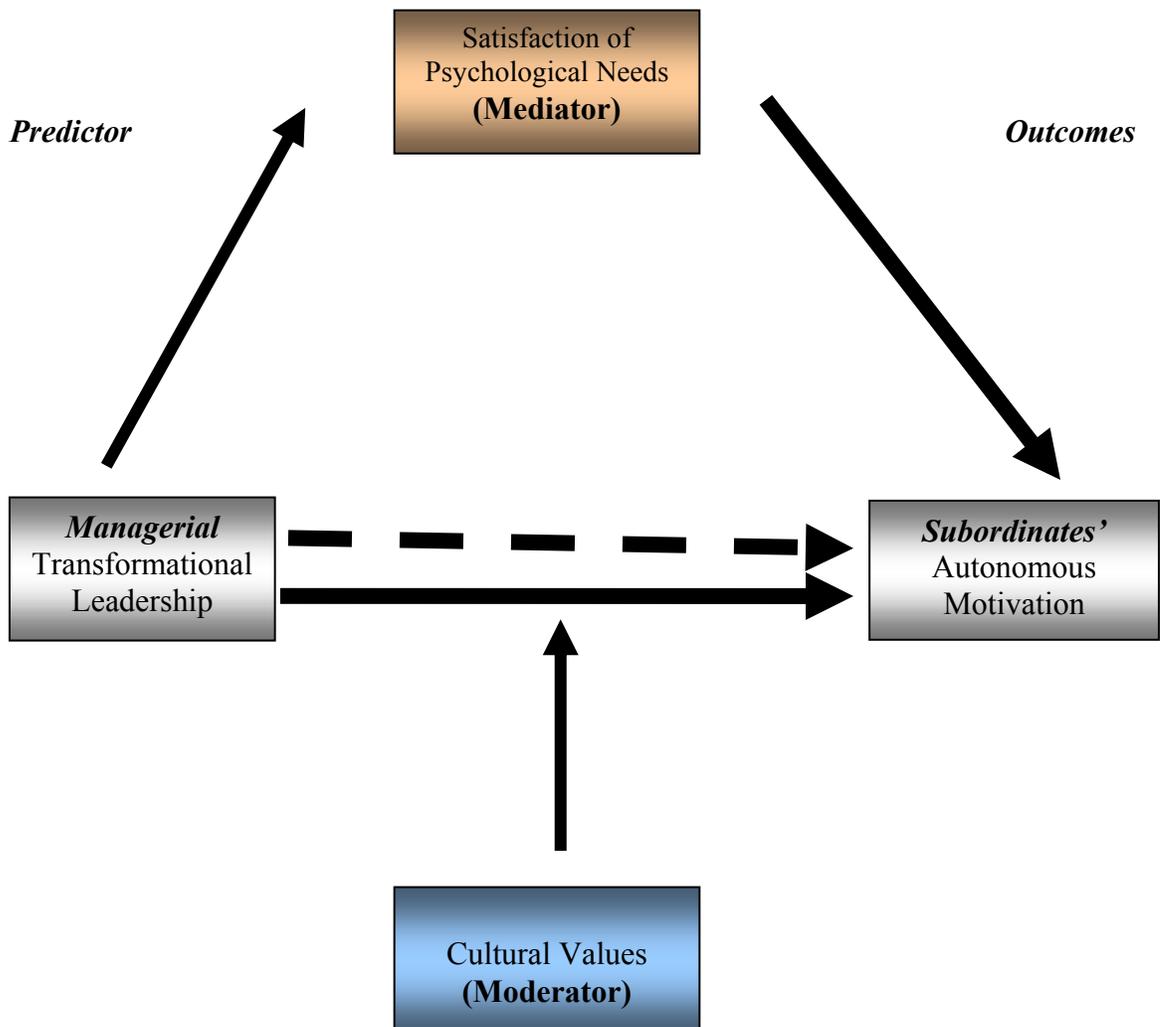
supportive factors include providing informative feedback, acknowledging individual feelings, facilitating access to necessary resources for employees to feel less controlled, as well as allowing choices and encouraging personal initiative before carrying out tasks (Deci, Ryan, Gagné, Leone, Usunov & Kornazheva, 2001; Gagné, 2003). In addition, studies have confirmed the mediating role of satisfaction of basic psychological needs on the positive relation between autonomy support and its positive outcomes (Baard, Deci & Ryan, 1999; Deci et al., 2001). Autonomy support from managers in the workplace can be seen as a proxy for transformational leadership due to their similar behavioural characteristics. Synthesizing the theories of transformational leadership (Bass, 1985; 1997) and self-determination (Deci & Ryan, 1985, 2000; Gagné & Deci, 2005), this research aims to study how a general psychological mechanism, the satisfaction of basic psychological needs (Ryan & Deci, 2000), explains the positive motivational outcomes resulting from managerial leadership behaviour in organizations in two culture-specific samples from China and Canada.

With the advance of modern technology and globalization, businesses need management and leadership styles that promote proactive attitudes and behaviours, such as transformational leadership. There is also evidence that the new generations of workers, namely Generation Y workers, respond better to transformational leaders (DeClerk, 2008). Transformational leadership is known to be especially effective in turbulent environments and is therefore the leadership style of choice for the future (Bass & Avolio, 1994). Transformational leadership also demonstrates its effectiveness beyond the Western world where it originated, though such effectiveness varies with value

orientations (Jung & Avolio, 1999). Hence this research also tried to investigate transformational leadership through the specific lens of cultural values.

Figure 1 presents the research model being tested.

Figure 1. Current Research Model



Self-determination Theory

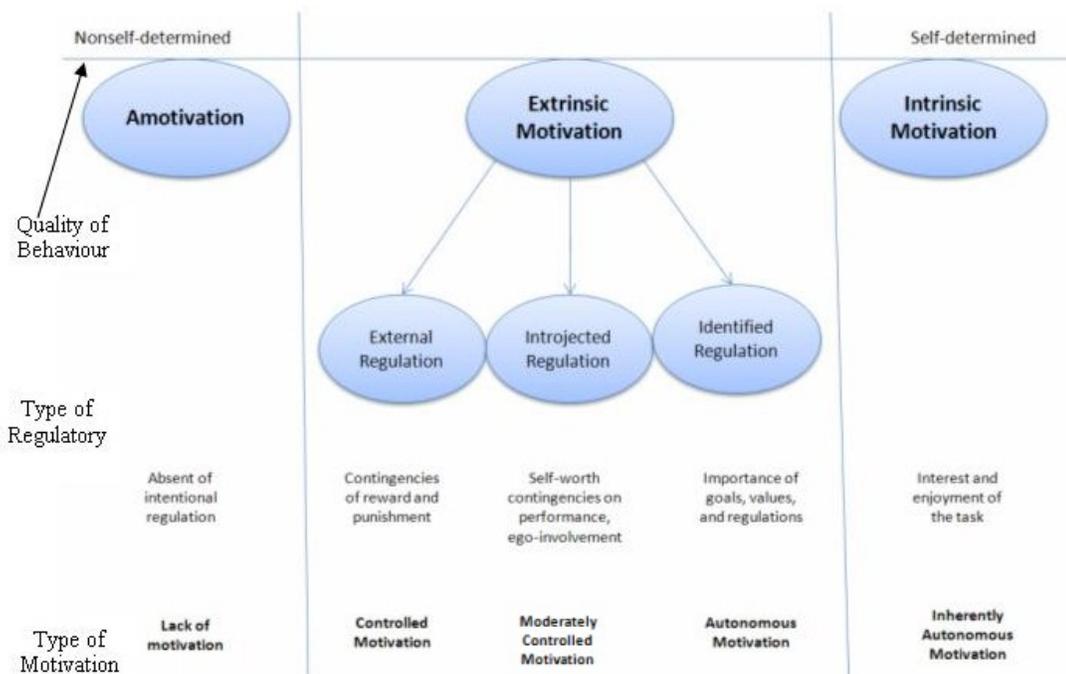
Work Motivation

SDT (Deci & Ryan, 1985, 2000) proposes a multidimensional conceptualization of motivation that includes *intrinsic motivation*, which is defined as doing an activity for its own sake; *extrinsic motivation*, which is defined as doing an activity for an instrumental reason; and *amotivation*, which is defined as the absence of motivation (Deci & Ryan, 2000; Gagné & Deci, 2005). Intrinsic motivation represents people's innate tendencies to seek out novelty and challenges, which evolutionarily give human beings developmental advantages (Ryan & Deci, 2000). Intrinsically motivated people engage in activities out of interest and enjoyment. Their behaviour is energized from the satisfaction of engaging in the activity itself rather than external or internal reinforcements. A good example in the workplace is a computer programmer who works overtime to code because he enjoys coding for challenging project demands rather than just for his work compensation.

Extrinsic motivation is differentiated into types that differ in their degree of autonomy/self-determination (see Figure 2). SDT (Ryan & Deci, 2000) proposes the concept of "internalization" to refer to "taking in" a behavioural regulation and the value that underlies it and making it one's own. Internalization helps explain how extrinsic motivation can become autonomously regulated. External regulation refers to behaviours that are mostly induced by external contingencies, and it can be poorly maintained or disappear once the external contingencies are gone. For example, if students study in order to obtain a monetary reward, if the reward is removed, their motivation to learn diminishes (Deci & Ryan, 1985). Introjected regulation refers to a regulation that has

been taken in but not been fully accepted. For example, people may be pressured to behave in order to protect their ego (Ryan, 1982), or public self-consciousness (Plant & Ryan, 1985). Identified regulation refers to the regulation process through which people accept the value underlying the behaviour. For example, people regularly exercise because they think it is important to maintain their physical health, which is something they value. Identified motivation makes people feel more freedom and volition as it provides more congruence between the action and their personal goals and identities, though it is still extrinsic motivation because it is done for an instrumental reason and not for the pure enjoyment of it (Gagné & Deci, 2005).

Figure 2. The Dimensional Model of Motivation. (adapted from Gagné & Deci, 2005)



Autonomous motivation includes the two forms of self-determined motivation, namely intrinsic motivation and identified regulation (Deci & Ryan, 2000). Controlled motivation includes external and introjected regulations (Deci & Ryan, 2000). Autonomous and controlled motivation predict different outcomes (Gagné & Deci, 2005). When people are autonomously motivated, they show more interest in the task itself, more creativity, more flexibility when encountering difficulties and they feel less pressured (Deci & Ryan, 1987) compared to having more controlled motivation. 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 also found that autonomous motivation predicted lower turn-over intentions (Richer, Blanchard, & Vallerand, 2002) and physical symptoms (Otis & Pelletier, 2005).

Basic Psychological Needs

According to SDT (Deci & Ryan, 1985, 2000), basic psychological needs act as the gateway to understand the motivation of the human being as an active organism. Deci & Ryan (2000, p.229) considered the needs as “innate psychological nutriments that are essential for ongoing psychological growth, integrity and well being.” Hence, people are naturally inclined to seek out need 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, 2008). The three basic psychological needs that are essential to SDT are autonomy, competence and relatedness

(Sheldon, Elliot, Kim & Kasser, 2001). Across different need theories and SDT, researchers have argued for the universality of the needs for competence (Csikszentmihalyi, 1988; White, 1959), relatedness (Baumeister & Leary, 1995) and autonomy (Chirkov, Ryan, Kim & Kaplan, 2003; DeCharms, 1968).

Need for Autonomy. The need for autonomy refers to “the need to be the origin or source of one’s own behaviours” (Ryan & Deci, 2002, p. 8), with an emphasis on experiencing oneself as the locus of causality for one’s own behaviours. This need is the most salient one and is necessary for intrinsic motivation and well-internalized extrinsic motivation (together referred as “autonomous motivation”) to emerge (Ryan & Deci, 2006). To act autonomously means to perceive that one’s behaviour is in accordance with one’s core self (who one is as a person). A person’s behaviour is constantly influenced by external factors, but it can still be autonomously regulated as long as the person fully endorses it and consciously approves it (Ryan & Deci, 2006). Like people need to autonomously learn, grow and development, for employees to produce desired outcomes in the workplace, they also need to have this sense of volition when they perceive they are given opportunities to make job related choice and fully endorse the external requests to work hard to achieve team or organizational goals (Gagné & Deci, 2005).

In addition, there is an important difference between autonomy and independence. A person can feel dependent or independent and autonomous at the same time, as long as the dependent/collectivistic behaviour/goals are fully endorsed by the individual. In other words, to be autonomous does not mean to not need others or to not rely on others. Within SDT, researchers specifically argue that autonomy is not independence (Ryan, 1993) or individualism (Chirkov, et al., 2003). Research finds that the need for autonomy

exists in different cultures that vary in terms of how collectivistic or individualistic they are (Chirkov, et al., 2003).

Need for Competence. The need for competence refers to the desire to master optimally challenging tasks, to have an effect on the environment, and to attain valued outcomes. People need to feel effective in their interaction with the social environment and be able to express and demonstrate their capabilities (Ryan & Deci, 2002). People's need for competence explains why they seek challenges and constantly strive to enhance their skills and knowledge to cope with such challenges in various fields (e.g., education, sports, and work; Ryan & Deci, 2002). In a study conducted by Vallerand and Reid (1984), perceived competence was found to mediate the relations between feedback gained by undergraduate students and their intrinsic motivation.

Need for Relatedness. Relatedness refers to the desire to feel mutual respect and feel connected to important ones in order to have a sense of social support. People need to feel connected to others, to care and be cared for by others, and to have a sense of “belongingness” to their community (Ryan & Deci, 2002, p. 7). In the workplace, satisfaction of the need for relatedness can be very important for employees to internalize team and/or organizational values, and act in the best interest of the team/organization that they feel they belong to (Gagné & Deci, 2005).

SDT researchers argued that conditions that support people's needs for autonomy, competence and relatedness foster the most volitional and high quality forms of motivation for many human behaviours, which enhance performance and well-being (Baard Deci & Ryan, 2004; Gagné, Ryan & Bargmann, 2003; Vansteenkiste, Neyrinck, Niemiec, Soenens, Witte & Van den Wroeck, 2007). Although SDT proposed that all

three needs are important to motivation (Ryan & Deci, 2000; Gagné & Deci, 2005), most of the previous empirical evidence tend to treat the three basic psychological needs for autonomy, competence and relatedness as a uni-dimensional variable (Dysvik, Kuvaas & Gagné, in press). Recent research, however, shows the value of examining the level of satisfaction of each need. In an experiment conducted by Sheldon and Filak (2008), not only autonomy support but also competence and relatedness support had significant main effects on participants' rated intrinsic motivation and performance outcomes in game-learning settings. This finding supports SDT's proposition that motivation increases additively with the degree of satisfaction of the three needs. In addition, a recent study found that only autonomy and relatedness satisfaction were related to higher intrinsic motivation, while competence was unrelated. Instead, satisfaction of needs for competence interacted with autonomy satisfaction in predicting higher intrinsic motivation (Dysvik, Kuvaas & Gagné, in press). In this research, I also examined satisfaction of each of the three different needs and their unique and synergistic impact on human autonomous motivation in both China and Canada.

Autonomy Support

SDT researchers have studied which contexts are conducive to need satisfaction. Social contexts that facilitate people's satisfaction of three basic psychological needs facilitate the adoption of autonomous motivation (Baard, 2002). These social contextual factors can come from significant others during the life span, for example, support from parents in one's childhood; from teachers/coaches during one's adolescence; from leaders (e.g., managers or mentors) in adult life. SDT researchers postulated the concept of "autonomy support" mainly from the positive evidence collected from researches on

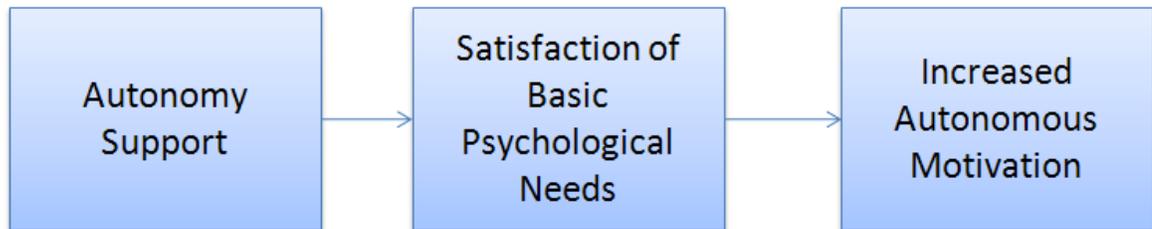
parental autonomy support (Grolnick, Ryan & Deci, 1991) and teacher autonomy support (Grolnick & Ryan, 1987) resulting in higher intrinsic motivation and self-regulated learning. These findings mostly focused on how parents and teachers provide non-controlling but informative guidance and feedback to facilitate children's learning and to promote self-motivation (Deci, Schwartz, Sheinman & Ryan, 1981; Grolnick & Ryan, 1989). SDT research on autonomy support found that it was also associated with student learning result (Vansteenkiste, Simons, Lens, Sheldon & Deci, 2004; Black & Deci, 2000), adolescent adjustment (Soenens, Vansteenkiste & Sieren, 2009), and achievement-related beliefs (Kenny, Walsh-Blair & Bluestein, 2010). In addition, the satisfaction of basic psychological needs for autonomy, competence, and relatedness provide the basis to predict which aspect of the social contextual factors (e.g., autonomy supportive behaviour) will nurture intrinsic motivation or facilitate internalization of extrinsic motivation (Baard, Deci & Ryan, 2004; Deci, et al., 2001).

This theorizing can also explain within-person fluctuation of motivation. In a very comprehensive research of young gymnastics athletes conducted by Gagné, Ryan & Bargmann (2003), they discovered that, at between-person level, perception of coaches' autonomy support positively correlate with athletes' autonomous motivation. More interesting is that at the within-person daily level, daily perception of coaches' support affected the satisfaction of psychological needs during a specific training session, which influenced changes in well-being during that session.

Implications drawn from these findings have since then been extended to the field of management (Baard, 2002). Generally, autonomy supportive behaviour in the workplace includes: providing meaningful rationales for action, acknowledging the

difficulties to finish the task, emphasis on choice of how to do the tasks, encouraging personal initiation and conveying confidence in ones' ability to accomplish tasks (Deci, et al. 2001; Gagné, Kostner & Zuckerman, 2000; Gagné, 2003). Autonomy supportive behaviours have been found to lead to greater internalization of regulations when tasks are relatively uninteresting (Deci, Eghrari, Patrick & Leone, 1994), to increased acceptance of organizational change (Gagné, Kostner & Zuckerman, 2000), to lower turnover (Gagné, 2003), trust in the organization, and positive affect at work (Deci, Connell & Ryan, 1989). In addition, autonomy supportive behaviour has also been shown to influence people's performance, engagement and well-being (Baard, Deci & Ryan, 2004; Deci, et al. 2001; Lynch, Plant & Ryan, 2005). There is also evidence supporting the mediating role of satisfaction of basic psychological needs on the relation between autonomy support and its positive outcomes (Baard, Deci & Ryan, 1999; Deci, et al. 2001). To summarize, Figure 3 illustrates the process of autonomous motivation promotion. Most of the supporting empirical evidence has been collected in non-management settings (see Gagné & Deci, 2005 for a review) to support this three-step-model in which managers' autonomy support results in employees' need satisfaction and then leads to increased motivation. However, no published studies, to date, have shown this full process in the workplace.

Figure 3. Relations Among Autonomy support, Satisfaction of Needs and Autonomous Motivation



The above review demonstrates how autonomy supportive managers have an effect on their employees' work motivation. However, managers can also be seen as the leaders who convey organizational goals to employees and act to improve organizational effectiveness through management of individual performance. I argue that managerial autonomy support behaviour is a proxy of managerial leadership, although managers' leadership may include similar but different supportive behaviour in a broader sense. The present study tests whether managerial leadership, like autonomy supportive behaviour, is related to the work motivation of subordinates.

Full-range Leadership Theory

In the full-range theory of leadership proposed by Bass (1985, 1998), besides the passive non-transactional laissez-faire leadership style, two major types of leaders are compared: transformational leaders (who lead by inspiration) and transactional leaders (who lead through contingent rewards/punishments). Transactional leaders motivate followers primarily through contingent-reward-based exchanges (Burns, 1978). Transactional leadership behaviours concentrate on accomplishing the tasks at hand, through clear goal setting and communicating expectations, and satisfying the self-

interest of those who do good work or penalizing employees who do not do good work (Bass, 1985). Often, transactional leaders will focus on specifying performance goals, clarifying the link between performance and rewards, and providing negative feedback or punishment for deviation from policies/standards (Bass, 1997). According to Bass & Avolio (1994), transactional leadership is theorized to have three factors: 1) *contingent reward leadership*, including leadership behaviours like clarifying role and task requirements and providing followers with material or psychological rewards contingent on meeting expectations; 2) *active management by exception*, referring to the close monitoring of employee behaviour and taking corrective action when deviations occur; and 3) *passive management by exception*, referring to the non-involvement of the leader until deviations occur, at which point the leader takes corrective action.

In contrast, transformational leadership motivates followers through transcending self-interest for the greater good of followers, the unit and the organization. There are four interrelated but distinct behaviour elements in transformational leadership: 1) *idealized influence (attributes and behaviour)*, consisting of charismatic behaviours, such as role modeling and risk sharing, and/or attributed charisma; 2) *inspirational motivation*, including clearly communicating high expectations concerning a vision, instilling pride, gaining respect and trust; 3) *individualized consideration*, implying paying attention to individual needs and continuously facilitating individual development through coaching and mentoring; and 4) *intellectual stimulation*, consisting of encouraging creativity and innovation, promoting rationality and careful problem solving (Bass & Avolio, 1994; Berson & Linton, 2005). In addition, Bass (1997) also mentioned that the concept and component of transformational leadership is applicable cross-culturally, not only in

United States of America (U.S.) but also in a number of different cultures, like China and of course, Canada.

Non-transactional laissez-faire leadership represents the absence of leadership behaviour of any form in a person who is in a leadership position. This involves the failure to make decisions, to set goals and communicate them, and to generally avoid the leadership responsibility. The resulting full-range leadership model includes four transformational, three transactional and one non-transactional laissez-faire leadership factors (Antonakis, Avolio & Sivasubramanicam, 2003). Though the full-range model is not intended to be a “stage” theory of leadership, as the “range” of leadership styles focuses on the difference in degree of proactivity and effectiveness in influencing followers’ motivation and performance through different leadership behaviour (Bass, 1985, 1997; Bass & Avolio, 1994; Burns, 1978).

Over two decades of empirical studies using the full-range model of leadership provides support for the positive relation between transformational leadership and follower performance and well-being (DeGroot, Kiker, & Cross, 2000; Dumdum, Lowe, & Avolio, 2002). Evidence also supports the fact that transformational leaders who demonstrated the four categories of behaviour described above are viewed as more effective than transactional leaders (Yammarino & Bass, 1990; Kirkpatrick & Locke, 1996). Transformational leaders tend to create organizational cultures and values that emphasize proactivity, creativity and transcendence through providing vision and proper stimulation (Bass, 1985). Transformational leadership enhances subordinates’ satisfaction (Hatter & Bass, 1988) and trust (Podsakoff, Makenzie & Boomer, 1996) in the leader, as well as affective commitment to the organization (Barling, Weber & Kelloway, 1996). In

a longitudinal survey study conducted by Griffin, Parker and Mason (2010) it was found that leaders' vision increased followers' adaptivity for employee who were high in openness to work-role change, and increased follower's proactivity when employees were high in role breath self-efficacy. In another study conducted by Sosik, Kahai, and Avolio (1998) it was found that groups that worked under a transformational leader generated more original ideas and solutions than groups that worked under a non-transformational leader.

Employees' subjective psychological well-being is another positive outcome of transformational leadership. For example, showing concern for individual needs has been found to be positively related to higher job satisfaction (Butler, Cantrell, & Flick, 1999); and feedback provided to clarify and reduce uncertainty predicted lower levels of work stress (Arnold, Turner, Barling, Kelloway & McKee, 2007). Others have shown how transformational leadership is related to numerous well-being indicators in employees (e.g., job satisfaction, negative/positive affect, and job burnout; Fuller, Patterson, Hester & Stringer, 1996; Densten, 2005; Sivanathan, Arnold, Turner, & Barling, 2004).

Transformational Leadership and Autonomy Support

Many parallels can be made between transformational leadership and autonomy supportive behaviour in the workplace. For example, transformational leaders motivate their followers by articulating a vision, clearly communicating expectations, instilling pride and gaining trust from followers (Bass, 1985). Similarly, autonomy supportive behaviour includes providing a meaningful rationale and feedback, allowing choices on how to accomplish desired results, and building trust to increase the sense of "belongingness" between leaders and followers (Gagné, Kostner, & Zukerman, 2000;

Gagné, 2003). Like individualized consideration behaviour (Bass, 1985), autonomy supportive managers also find opportunities to provide specific coaching and mentoring to meet subordinates' needs, and recognize their subordinates' perspective (Baard, 2002). As transformational leaders stimulate the creativity of subordinates (Bass & Avolio, 1994), autonomy supportive managers also encourage self-initiation (Baard, 1994, 2002).

Like autonomy support, transformational leadership, similar to other types of “charismatic” leadership, is likely to motivate followers through satisfaction of their needs. According to Shamir and his colleagues (1993), the new leadership theories have demonstrated that charismatic/transformational leadership behaviours significantly affect followers' attitude, well-being and performance positively, but there is a lack of motivational explanation for such results. Hence, they proposed that charismatic/transformational leaders produce motivational effects for self-expression, self-esteem, self-worth and self-consistency in their followers. Transformational leaders satisfy followers' needs for competence by instilling higher task-related self-efficacy and general self-worth, increasing followers' self-concept, which includes self-expression, self-esteem, self-worth and self-consistency, by emphasis on intrinsic valence of their effort through satisfying their needs for autonomy. In addition, it will be easy to see the alliance between behaviours of both leaders and followers, which enhances their collective identities through recognizing the organizational goals. Hence, through satisfaction of followers' needs for relatedness (e.g. being recognized in the same in-group), the more congruent the values held by transformational leaders and their followers, the more consistent in followers' effort and behaviour to achieve their collective goals.

Other research on psychological empowerment provides additional evidence for this link. Psychological empowerment refers to “increased intrinsic task motivation manifested in a set of four cognitions reflecting an individual’s orientation to his or her work role: competence, impact, meaning and self-determination” (Spreitzer, 1995, p. 1443). There is much overlap between these factors and the three needs postulated by SDT. In a study conducted with the staff nurses of a large public hospital in Singapore, psychological empowerment was found to mediate the relationship between supervisors’ transformational leadership and staff nurses’ organizational commitment (Avolio, Zhu, Koh & Bhatia, 2004). Gumusluoglu & Ilsev (2009) also recently found that psychological empowerment mediated the relationship between transformational leadership and individual creativity in a large sample of R&D staff in the software development industry. Finally, in a study conducted by Charbonneau, Barling & Kelloway (2001), intrinsic motivation was found to mediate the positive effect of coaches’ transformational leadership behaviour on athletes’ performance.

Main Hypotheses

On the basis of trying to bridge the literatures on transformational leadership (Bass & Avolio, 1994) and autonomy support in SDT (Baard, 2002; Baard, Deci & Ryan, 2004; Gagné, 2003), this research tried to extend the study of autonomy supportive behaviour of supervisor to the wider-ranged transformational leadership behaviour. This was done in concert with the evaluation of the relation of these behaviours with the satisfaction of the three psychological needs in two cultural-specific work samples from China and Canada. Based on the above literature review, I propose that the satisfaction of the three basic psychological needs mediate the positive relation between managers’

transformational leadership and subordinates' autonomous motivation, and that such model will be similar in two specific cultures (China and Canada).

H1. Perceptions of managers' transformational leadership are positively related to subordinates' autonomous motivation.

H2. Perceptions of manager's transformational leadership are positively related to the satisfaction of the three basic psychological needs.

H2a: Transformational leadership is positively related to the satisfaction of the need for autonomy in subordinates.

H2b: Transformational leadership is positively related to the satisfaction of the need for competence in subordinates.

H2c: Transformational leadership is positively related to the satisfaction of the need for relatedness in subordinates.

H3. Needs satisfaction mediates the positive relation between managers' transformational leadership and subordinates' autonomous work motivation.

Although the basic psychological needs of autonomy, competence and relatedness are postulated to have a distinct impact on motivation (Ryan & Deci, 2000), they have mostly been studied as a unidimensional construct (e.g., Baard, Deci & Ryan, 2004; Kasser, Davey & Ryan, 1992; Gagné, 2003; Van den Broeck, Vansteenkiste, DeWitte & Lens, 2008). As mentioned earlier, recent research examined their distinct effects on intrinsic motivation (Dysvik, Kuvaas & Gagné, in press), and have shown both additive and synergistic effects on intrinsic motivation. I therefore tried to replicate and extend

these research findings by testing the additive and synergistic effects in both China and Canada samples.

H4 (additive hypothesis). Satisfaction of three basic psychological needs separately is positively related to autonomous motivation (additive hypothesis).

H4a: When controlling for satisfaction of the needs for competence and relatedness, satisfaction of the need for autonomy is positively related to autonomous motivation.

H4b: When controlling for satisfaction of the needs for autonomy and relatedness, satisfaction of the need for competence is positively related to autonomous motivation

H4c: When controlling for satisfaction of the needs for autonomy and competence, satisfaction of the need for relatedness is positively related to autonomous motivation.

H5 (synergistic hypothesis). There will be significant two-way and/or three-way interaction effects of satisfaction of three basic psychological needs on autonomous work motivation.

Cultural Values and Moderation Hypotheses

Increases in international businesses, market globalization, innovation of technology, and changing workforce demographics in North America (e.g., Canada and U.S.) highlight the importance of understanding how to lead and motivate a culturally diverse workforce for both multi-national corporations and indigenous businesses. This trend brings up the issue of whether management and leadership techniques developed

and used in western cultures are equally motivating and effective in developing countries with emerging economies (Chen, Chen & Meindl, 1998; Hofstede, 1980).

Due to the fact that there are considerable interests as well as doubts about whether managers' leadership style have the same motivational effects on employees across cultures (Jogulu, 2010; Hofstede, 1980; Walumbwa, Lawler & Avolio, 2007), the second goal of my thesis was to compare how individual value orientations affect the positive relation between managerial transformational leadership and subordinates' autonomous motivation in two cultures: China vs. Canada. Due to the rapid globalization of the world's economy and the cultural diversification in Canada's work population resulting from recent immigration policies, this question is particularly relevant for managers leading diverse teams. Although there have been cross-cultural comparison of the effectiveness of transformational leadership (Jogulu, 2010; Walumbwa, Lawler & Avolio, 2007), as well as comparisons of how autonomy-supportive behaviours affect employee motivation (Deci et al., 2001) in different cultures, little is known about the moderating effect of cultural values on the motivational power of transformational leadership styles specifically in China and Canada.

Cultural values

A value is defined as “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence” (Rokeach, 1973, p. 5). It clearly states the dual nature of human value: personally preferable — at the individual level; and socially preferable –

at the societal level. Values are thought to be fairly stable across time, but can sometimes change due to changes of political practices, economic power, or globalization.

In terms of cultural practices and norms, the cultural value dimensions proposed by Triandis (1995) and Triandis & Gelfand (1998) were used in this research. Four different types of cultural behaviours and norms were built around two dimensions: 1) collectivism vs. individualism; and 2) vertical vs. horizontal. The dimension of collectivism/individualism refers to the relative preference given to the needs and/or goals of individuals versus the needs and goals of the individual's group. The other dimension of vertical/horizontal refers to the orientation of supporting equality versus the acceptance and respect for social status differences.

Transformational leadership and individual collectivistic values

Collectivists tend to value group goals over their own individual goals through their recognition of an enduring orientation towards organizational values and identities; they often demonstrate higher loyalty and commitments toward leaders and in-group members (Triandis, 1995; Jung, Bass & Sosik, 1995) than individualists. Hence, collectivistic followers more readily internalize the leaders' beliefs and vision (Hofstede, 1985; Triandis, 1995). The first experimental cross-cultural comparison of transformational and transactional leadership style was done by Jung and Avolio (1999) using Asian and Caucasian students; results showed that collectivists performed better with transformational leaders, while individualists performed better with transactional leaders. A more recent cross-cultural leadership study conducted in an international banking corporation found that collectivism positively moderated the relation between transformational leadership and work-related outcomes (e.g., job satisfaction,

organizational commitments) in three cultures: China, India and Kenya (Walumbwa & Lawler, 2003). What is particularly interesting is that while individual-level values have such an effect, country, where the leadership behaviour occurred, did not affect the positive relation between transformational leadership and work-related attitudes (Walumbwa, Lawler, Avolio, Wang & Shi, 2005).

It is reasonable to argue for the study of motivation to include many value dimensions, and even for the study of different types of collectivism or individualism (four types cross the vertical and horizontal dimension; Triandis, 1995), which could affect the effectiveness of leadership styles in different countries. In fact, value is a new dimension gaining its momentum in motivation research across different cultures (Deci, et al., 2001; Markus & Kitayama, 1991). Past research has focused only on individual collectivistic values since: 1) it has been widely studied in both research of SDT and transformational leadership; 2) there has so far been limited research comparing Canada and China, and 3) most of the available past findings were based solely on categorizing people as either collectivists or individualists (Jung & Avolio, 1999; Walumbwa & Lawler, 2003; Walumbwa, Lawler, Avolio, Wang & Shi, 2005). In contrast, the present research treats collectivism/individualism on a continuum.

Collectivism vs. individualism in China and Canada

Cultural values are not static; they change with technological, economic, political as well as religious shifts in societies (Rokeach, 1973). Nowadays, globalization plays a key role on value shifts due to integrated world market resulted from intensive international trade, which is changing both between and within societies' business margins as well as technology advancement (Whally, 2008). Hence, other than

differences in legal, tax and political systems, national cultures no longer act as barriers for management in today's international business. In addition, Chinese and Canadian workers may have different levels of value shifts based on their age, work environment, as well as degree of exposure to other cultures due to globalization.

North America (mostly represented by the United States) demonstrates a well-developed economy and a culture that is highly individualistic. In Hofstede's (1980) study, Canada and the U.S. were close on almost all dimensions of his model of cultural values. As a result, assumptions of standardization of management practices can be developed with ease among cultures of the same type (Hofstede, 1980). For years, people took for granted that what works in the U.S. works in Canada. But the political sociologist, M. S. Lipset (1963, 1990), argued that the value systems between Canada and U.S. were actually quite different. Canadians, more specifically English Canadians, are more collectivistic than their U.S. counterparts (Alston, Morris, Vedlitz, 1996; Brym & Fox, 1989). Within Canada, Québec represent the culture of French Canadians which are historically thought to be more collectivistic than their English counterparts (Cardinal & Paquet, 2010).

China is among the world's most rapidly developing economies and is predominantly characterized as a collectivist society (Triandis, 1995). However, China's rapidly growing economy and its integration into the world market is causing changes in cultural values. Past research has focused on indigenous approaches to management and demonstrated the importance of paternalistic or autocratic management styles, which are mostly practiced in state-owned or family-owned enterprises in China today (Farh & Cheng, 2000). However, the younger workforce, who was born after the economic reform

of the 1980's are said to be more individualistic and less respectful for authority (Ralston, Holt, Terpstra, & Yu, 1997). This may imply that the leadership styles that are shown to be effective in North America, a more individualistic society, may also work better with the new generation of Chinese workers.

Research has typically examined country-level value differences when comparing groups (Hofstede, 1980; House, Wright, & Aditya, 1997). However, there is evidence of significant within-country variations in cultural values. In a study conducted by Sivadas, Bruvold & Nelson (2008), the value profiles collected through contemporary urban Chinese business students showed that they were higher on vertical-individualism rather than on, what has been assumed throughout history, horizontal-collectivism. In the same study, the value profile of U.S. at the country-level was horizontal-individualistic rather than what has been assumed earlier, vertical-individualistic (Triandis, 1995). Because Canada has been shown to have values that are quite close to those of the United States (though not identical; Hofstede, 1985), it is possible to assume that Canada falls on the individualistic side of the spectrum. The two countries share similar economic development and similar European descendents, but the two countries do have different cultural orientations towards immigrants, as Canada emphasizes the maintenance of one's cultural heritage, while the U.S. emphasizes full integration into mainstream culture.

Do most of the managers and employees in China and Canada still represent the stereotypical value profiles? New empirical evidence points toward change. In a cross-cultural investigation conducted by Pan, Song, Goldschmidt & French (2010), the discrepancy along the individualism-collectivism value dimension was not the major difference among American (e.g., including Canadian and U.S. managers) and Chinese

young managers anymore. In fact, sociologist Yan (2010) demonstrated how the sociocultural phenomenon of post-Mao economic reforms led to the transformation of modern China into an increasingly individualistic country. In summary, country profiles on cultural values, especially on individualism-collectivism dimension, may not be the best predictor of organizational behaviour. Instead, value orientations at the individual level should be studied, taking into consideration the historical country value profiles (Baker, Carson, & Carson, 2009; MacNab & Worthley, 2007; Pan, Song, Goldschmidt & French, 2010).

SDT research has accumulated cross-cultural evidence to support its premise regarding the universal importance of psychological needs. For example, in a cross-cultural study conducted by Deci and colleagues (2001), autonomy supportive work climates predicted psychological need satisfaction and psychological well-being in Bulgaria and the U.S. Other SDT studies showed that people internalize cultural value orientations to different degrees, and the more autonomously they do, the higher their well-being (Chirkov, Ryan, Kim & Kaplan, 2003). Based on these findings, further cross-cultural analysis is needed to investigate whether cultural differences moderate the relation between transformational leadership and work motivation. As result of the above literature review, the following hypotheses are proposed:

H6a: When controlling for country, individual collectivistic value is related to higher autonomous work motivation in both China and Canada.

H6b: In both Canada and China, individual collectivistic values positively moderate the relation between transformational leadership and autonomous motivation; such that the relationship is higher for people with greater collectivistic values.

Methods

Samples

The first set of data was collected through online surveys in a medium size private high-tech company in China (335 participants were invited, average 94% responded) in October 2010. In the online survey, participants were asked to report their ranks within the company according whether they had managerial/supervisory responsibilities (1 = employee, 2 = team supervisor, 3 = unit manager; 4 = division head; 5 = director; 6 = CEO). Besides employees without any managerial responsibilities, those who were classified as managers (e.g., ranked as “team supervisors”, “unit managers”, “division heads”, “directors”), were also asked to assess leadership behaviour of their direct supervisor (total 70 managers were invited, 85% responded; N=60). As for chief-executive officer, he was only asked to assess his own transformational leadership. Employees (total 265 employee invited, 87% responded; N=230) were asked to only assess the leadership behaviour of their direct supervisor. There were also a total of 43 managers’ assessments of transformational leadership for their direct supervisors who have matching leaders, which were included in the first level analysis. The final China sample to test the hypotheses consisted of 60 manager-employee matches (with 2-6 employees per manager) and total 288 employees.

In China, respondents were mostly customer service/sales representatives, computer programmers, system engineers and support staff. The average age of participants was 25.13 years ($SD = 3.54$) and 52 % of the survey participants were female. The average organizational tenure of the participants was 1.01 years ($SD = 0.85$), and more than 80 % of them had completed some college or university education. Average tenure was short because the company was only established three years earlier and significantly expanded within the last 24 months. Due the nature of the business, the company hired many fresh college graduates both for computer programming and e-marketing.

The second set of data was also collected through online surveys in a government agency in Quebec, Canada (256 participants were invited, 78% responded) during October 2010. In Canada, respondents were mostly clerks, secretaries and special government agents. The average age of participants was 41.65 years ($SD = 16.05$) and 41 % of the survey participants were female. The average organizational tenure of the participants was 3.3 years ($SD = 1.25$), and more than 75 % of them had completed some college or university education.

In Canada, surveys were sent to 256 participants of whom 25 received a leader questionnaire and 231 received the employee survey. Once the surveys for which there were data missing for either the employees or the leaders were discarded, the final sample to test the hypothesis consisted of 21 manager-employee matches (with 2-6 employee per manager) and total 155 employees.

Procedure

Research data were collected through online surveys. At the beginning of the employee survey, an invitation Email containing the individualized web-link to the online questionnaire was sent to each of the potential participants. Participants were told the purpose of the survey and briefed about the right to withdraw at anytime (see Appendix I and II for consent forms used in the China and Canada sample). They were also told that data would be stored on a server located at Concordia University and that their employer would only receive a report of aggregated results to preserve the confidentiality of their responses. During the second and the third week, two reminder Emails were sent out to employees who had not responded. A Chinese-language version of the survey was used in China; and a French-language version of survey was used in Canada (see Appendix III and IV for details). All questionnaires were developed originally in English. A bilingual speaker performed each initial translation. After this step was complete, the questionnaire was given to another bilingual translator, who then back-translated all questions into English in order to control the quality of the translation (Brislin, 1980).

Measures

Transformational Leadership. Twenty items from the Multifactor Leadership Questionnaire (MLQ) Form 5x were rated by subordinates to measure the transformational leadership behaviour of their direct supervisor (Bass & Avolio, 1995). This part of the questionnaire measures four types of transformational leadership style: idealized influence (8 items, e.g., “Talks about their most important values and beliefs”; combined $\alpha = .90$; China $\alpha = .73$; Canada $\alpha = .81$); inspirational motivation (4 items, e.g. “Articulates a compelling vision of the future”; combined $\alpha = .92$; China $\alpha = .82$;

Canada $\alpha = .89$); intellectual stimulation (4 items, e.g., “Suggests new ways of looking at how to complete assignments”; combined $\alpha = .86$; China $\alpha = .76$; Canada $\alpha = .82$); and individualized consideration (4 items, e.g., “Helps me to develop my strengths”; combined $\alpha = .70$; China $\alpha = .71$; Canada $\alpha = .75$). Participants were asked to evaluate how frequently their manager engages in these behaviours. Ratings were completed on a 0 (Not at all) to 4 (Frequently if not always) Likert scale. For the group-level analyses, the mean of all subordinates’ assessment were aggregated as each manager’s score of transformational leadership.

Although there have been criticisms about the dimensionality of the MLQ (Yukl, 1999), additional empirical evidence supported the convergent and discriminant validity of the instrument (Avolio, Bass & Jung, 1999). Following the recent theoretical development on transformational leadership (Bass, 1998), and because my hypotheses make no distinction between these component factors of transformational leadership, I combined the four dimensions of transformational leadership to form a single transformational leadership factor (overall combined $\alpha = .96$; China $\alpha = .93$; Canada $\alpha = .95$; Walumbwa & Lawler, 2003).

Autonomous Motivation. Work motivation was measured using the revised Motivation at Work Scale (Gagné, Forest, Vansteenkiste, Crevier-Braud & Van den Broeck, et al. 2011). There are 19 items in the scale, asking participants to describe why they put efforts into their job. Besides amotivation (3 items, e.g. “I do little because I don’t think this work is worth putting efforts to”, combined $\alpha = .81$; China $\alpha = .83$; Canada $\alpha = .64$), this questionnaire assesses four types of motivation: external regulation (6 items, e.g. “to get someone’s approval”; combined $\alpha = .82$; China $\alpha = .78$; Canada $\alpha =$

.79); introjection (4 items, e.g., “because I have to prove to myself that I can”; combined $\alpha = .75$; China $\alpha = .87$; Canada $\alpha = .67$); identification (3 items, e.g., “ Because I personally consider it important to put efforts in the job”; combined $\alpha = .77$; China $\alpha = .85$; Canada $\alpha = .65$) and intrinsic motivation (3 items, e.g., “ Because this work I do is interesting”; combined $\alpha = .90$; China $\alpha = .87$; Canada $\alpha = .94$). Ratings were on a 1 (Not at all for this reason) to 7 (Exactly for this reason) Likert scale.

The subscales can be regrouped into controlled motivation (the average of external regulation and introjected motivation) and autonomous motivation (the average of identified and intrinsic motivation). For this study’s purposes, the mean of the subscale items measuring identified and intrinsic motivation was calculated and used as “autonomous motivation” to test the hypotheses. In addition, the confirmatory factor analysis confirmed that a single factor (autonomous motivation) best represents those six items in each samples (China: $\chi^2_{(4)} = 4.24, p = .12$, RMSEA = .06, GFI = .99, CFI = 1.00; Canada: $\chi^2_{(4)} = 7.18, p = .13$, RMSEA = .07, GFI = .99, CFI = 1.00).

Basic Psychological Needs. Different scales were used when collecting data from China and Canada due to clerical mistakes. In the China sample, satisfaction of basic psychological needs was measured using the Basic Need Satisfaction at Work Scale (overall $\alpha = .82$; Deci, et al., 2001; Kasser, Davey, & Ryan, 1992). This scale has 21 items that assess the satisfaction of psychological needs for autonomy (7 items, e.g., “I am free to express my ideas and opinions on the job”; $\alpha = .52$), competence (6 items, e.g., “People at work tell me I am good at what I do.”, $\alpha = .64$) and relatedness (8 items, e.g., “People at work are pretty friendly towards me.”, $\alpha = .77$). Participants were asked to evaluate how true each statement reflects their feelings about their job using a 1 (not at

all) to 7 (very much) Likert scale. The internal reliability scores for each need were only marginal in the China sample, especially for the need of autonomy. As for the correlation between subscales, need for autonomy was significantly correlated with need for competence ($r = .13, p < .05$) and need for relatedness ($r = .31, p < .001$); need for competence was also significantly correlated with need for relatedness ($r = .23, p < .001$). Since the factor analysis of the full scale did not yield three separate factors, I performed separate confirmatory factor analyses for each subscale. The fit for single-factor subscales were adequate for autonomy ($\chi^2_{(9)} = 21.45, p = .12, RMSEA = .07, GFI = .98, CFI = .94$); competence ($\chi^2_{(6)} = 11.05, p = .10, RMSEA = .06, GFI = .99, CFI = .98$) and relatedness ($\chi^2_{(16)} = 17.75, p = .37, RMSEA = .02, GFI = .98, CFI = 1.00$).

In the Canada sample, the work-related Basic Needs Satisfaction Scale (Van den Broeck, Vansteenkiste, De Witte, Soenes & Lens, 2010) was used to assess the satisfaction of basic psychological needs (overall $\alpha = .86$). Similar to the Basic Need Satisfaction at Work scale, it has subscales to measure the three different basic psychological needs: autonomy (7 items, e.g., “I feel free to express my ideas and opinions in this work”; $\alpha = .80$), competence (5 items, e.g., “I feel I can accomplish even the most difficult tasks in my work”; $\alpha = .80$) and relatedness (10 items, e.g., “Some people at my work are real friends.”; $\alpha = .83$). Participants were asked to self-assess how strongly they agree with each item using 1 (not at all agree) to 5 (totally agree) Likert scale.

Cultural Values. Value was measured using the 14-item reduced version of the Horizontal and Vertical Individualism and Collectivism Scale (overall combined $\alpha = .67$; Sivadas, Bruvbold & Nelson, 2008) which was developed and validated originally by

Triandis and Gelfand (1998). I used the mean of 8 items for measuring both horizontal and vertical collectivism to form a single factor for collectivistic value orientation at the individual level (combined $\alpha = .72$; $\alpha = .69$ in Canada sample; $\alpha = .77$ in China sample). The overall correlation between horizontal and vertical collectivistic value was $r = .49$, $p < .001$ (in China, $r = .50$, $p < .001$; in Canada, $r = .43$, $p < .001$). Participants were asked to judge how properly the scale items describe them (e.g., “the well-being of my co-worker is important to me” and “I usually sacrifice my self-interest for the benefit of my group”). Rating was done using 1 (totally agree) to 7 (totally disagree) Likert scale. The means of collectivistic value were 5.15 for China ($N = 273$, $SD = 1.15$) and 4.97 for Canada ($N = 157$, $SD = .07$), which demonstrated that participants from China had higher collectivistic value than those from Canada ($t = 2.26$, $p < .05$).

Cross-Cultural measurement equivalence

The main purpose of this cross-cultural comparison was to investigate the similarity between and collect generalizable evidence for the moderating mechanism on the positive relation between transformational leadership and autonomous motivation across China and Canada. Because it is critical to establish the measurement equivalence in cross-cultural comparisons (Cheung & Rensvold, 2000; Little, Lindenberger, & Nesselroade, 1999), I used Lisrel 8.08 (Jöreskog & Sörbom, 2001) maximum likelihood estimation for multi-group confirmatory factor analysis (MGCFA) to establish measurement invariance (Cheung & Rensvold, 2002; Little 1997). I followed the guidelines proposed by Little (1997, 2000) and Cheung & Rensvold (2002), and examined the differences in the fit indices, such as the comparative fit index (CFI), non-normal fit index (NNFI), and root mean square of approximation (RMSEA), for the

constrained versus the unconstrained models, rather than using change in chi-square because change in chi-square is overly sensitive to the number of constraints (see also Marsh, Balla, & McDonald, 1988). If the fit of the measurement model is good (NNFI > .90, CFI > .90, and RMSEA ≤ .10) when no constraints are imposed, a difference of less than .05 between the values of the fit indices for the constrained versus unconstrained models indicates equivalence of the measurement models across the samples.

Fit indices supported measurement invariance for autonomous motivation (RMSEA = .09, CFI = .99, NNFI = .97 for the restricted model), individual values (RMSEA = .09, CFI = .96, NNFI = .91 for the restricted model) and transformational leadership (RMSEA = .10, CFI = .95, NNFI = .95 for the restricted model). Because different need satisfaction scales were used in each sample, measurement invariance could not be assessed.

Statistical Analysis

The survey data were first downloaded from the Concordia server into Excel files, and then transferred into SPSS 18.0 files. Data were examined for missing data. There were no missing data were found for all the measures used in the Chinese survey since all questions in online questionnaires had been set to be required. There were no missing data for autonomous work motivation and cultural values. There were two missing data points in one item of transformational leadership scale, three missing data for one item of the need for autonomy scale. Since the missing data points were at random and listwise deletion were used, there should be no significant impact on regression analysis. Kurtosis and skewness were verified to ensure the univariate normality of the data distribution

using the cut-off from -1 to +1 (Tabachnik & Fidell, 2007). All variables were normally distributed. Descriptive statistical analyses were then conducted, including means, frequencies as well as zero-order correlations, before hierarchical linear modeling (HLM) was used to test the hypotheses.

Data Aggregation

Autonomous work motivation and satisfaction of basic psychological needs were examined as individual-level variables. Transformational leadership was measured as the perception of subordinates' transformational leadership behaviour of their direct manager. This variable can therefore be examined at both the individual level and at the group level (by aggregating the individual perceptions within a group). Because individual-level data was nested within groups under a particular manager, HLM was used because it controls for both within-group and between-group variance in the variables and allows for the analysis of possible cross-level effects (Gavin & Hofmann, 2002). To justify the suitability of aggregating testing variables at the group level, I calculate both r_{wg} (James, Demaree & Wolf, 1993) and intra-class correlations (ICCs) (Bliese, 2000). High r_{wg} (.70 or higher) indicates a higher level of agreement among subordinates toward their leader whereas a low r_{wg} value is sign of subordinate disagreement (James Demaree & Wolf, 1993). According to the general rule, indices of inter-rater agreement and reliability (ICCs) above .51 are interpreted as moderate (especially for newly developed measurement/scales), and above .71 as high (Lebreton & Senter, 2008).

In the China sample, average $r_{wg(j)}$ across groups was .88 for transformational leadership, .65 for autonomous work motivation, .63 for autonomy need, .58 for

competence need, and .59 for relatedness need. These results demonstrated that there was only low to moderate level of agreement for both autonomous work motivation and satisfaction of needs, but high level of agreement when assessing their direct supervisors' transformational leadership. The ICC(1) was .37 and ICC(2) = .92 ($F = 13.65, p < .001$) for transformational leadership, ICC(1) was .53 and ICC(2) = .87 ($F = 9.58, p < .001$) for autonomous work motivation, ICC(1) was .09 and ICC(2) = .40 ($F = 1.92, p < .001$) for autonomy, ICC(1) was .22 and ICC(2) = .62 ($F = 2.80, p < .001$) for competence, ICC(1) was .27 and ICC(2) = .75 ($F = 4.34, p < .001$) for relatedness, providing sufficient evidence for both between group reliability and with-in group agreement for transformational leadership, autonomous work motivation, but the ICCs for satisfaction of certain needs (e.g., autonomy) were only at low to moderate levels. Therefore, it is possible to aggregate the transformational leadership scores of subordinates at the group level but inappropriate to aggregate other variables at the group level.

In the Canada sample, average $r_{wg(j)}$ across groups was .72 for transformational leadership, .60 for autonomous work motivation, .87 for autonomy need, .90 for competence need, and .95 for relatedness need. The results demonstrated a high level of agreement among subordinates when assessing leaders' transformational leadership and the satisfaction of their needs, but the level of agreement for autonomous motivation was relatively low. The ICC(1) was .36 and ICC(2) = .92 ($F = 20.85, p < .001$) for transformational leadership, ICC(1) was .54 and ICC(2) = .87 ($F = 8.44, p < .001$) for autonomous work motivation, ICC(1) was .10 and ICC(2) = .43 ($F = 2.15, p < .001$) for autonomy, ICC(1) was .42 and ICC(2) = .78 ($F = 4.93, p < .001$) for competence, ICC(1) was .12 and ICC(2) = .57 ($F = 3.73, p < .001$) for relatedness, providing sufficient

evidence for both between group reliability and with-in group agreement for transformational leadership, autonomous work motivation, but the ICCs for satisfaction of certain needs (e.g., autonomy, relatedness) were only at low to moderate levels. Therefore, it is possible to aggregate the transformational leadership scores of subordinates at the group level but inappropriate to aggregate other variables at the group level.

In the combined sample for cross-cultural comparison, average $r_{wg(i)}$ across groups was .83 for transformational leadership, .62 for autonomous work motivation, .76 for cultural values. The results demonstrated a high level of agreement among subordinates when assessing leaders' transformational leadership and cultural values, but the level of agreement for autonomous motivation was moderate. The ICC(1) was .48 and ICC(2) = .95 ($F = 22.35, p < .001$) for transformational leadership, ICC(1) was .53 and ICC(2) = .87 ($F = 8.57, p < .001$) for autonomous work motivation, ICC(1) was .21 and ICC(2) = .68 ($F = 3.56, p < .001$) for cultural values, providing sufficient evidence for both between group reliability and with-in group agreement for the measure of transformational leadership, autonomous work motivation, but the ICCs for cultural value were only at marginally high levels.

Results

China Sample

Descriptive Statistics. Please see table 1 for means, standard deviations and zero-order correlation between the variables and demographic variables. Sex was coded as a dummy variable (female = 1, male = 2). Mean perceptions of managerial

transformational leadership was low, whereas the mean of autonomous work motivation was moderate. Satisfaction of the needs for competence and relatedness were moderate, while satisfaction of the need for autonomy was low. There was no significant correlation between age and the other variables. There was a significant negative correlation between subordinates' sex and transformational leadership, showing that male subordinates tended to evaluate their direct supervisor as less transformational than female subordinates. Both transformational leadership and autonomous work motivation were positively correlated to the satisfaction of needs for autonomy and relatedness, but not to the need for competence.

Table 1

Means, Standard Deviations and Correlations for Subordinates (China sample)

Variables	Mean	SD	1	2	3	4	5	6	7	8
1 Age	24.8	3.58								
2 Sex	1.42	0.49	.29**							
3 Transformational leadership	2.16	0.66	-.01	-.19**						
4 Autonomous motivation	4.67	1.73	.08	-.11	.30**					
5 Need-Autonomy	3.98	1.02	.08	.08	.17**	.30**				
6 Need -Competence	5.47	1.28	-.03	-.06	-.03	.07	.14**			
7 Need -Relatedness	5.07	1.28	.03	-.04	.16**	.38**	.33**	.22**		
8 Total needs	4.84	0.84	.03	-.03	.13*	.35**	.65**	.68*	.76**	

N = 273

* $p < .05$ (2-tailed). ** $p < .001$ (2-tailed).

Hypothesis Testing. Due to the multi-level nature of the data (subordinates within a group led by an individual manager), HLM was used when testing the hypotheses. Autonomous work motivation was examined as a function of need satisfaction of the subordinates and perception of their managers' transformational leadership for a total of 60 managers with their respective 228 subordinates. In order to test for the mediating mechanism of need satisfaction between autonomous motivation and managers' transformational leadership, the effects of managers' transformational leadership on satisfaction of each need (e.g. autonomy, competence and relatedness) were also examined.

The mediation model was tested according to steps proposed by Zhang and colleagues (2009) for multi-level analysis: 1) the independent variable (e.g. aggregated subordinates' assessment of their direct managers' transformational leadership) should significantly predict the dependent variable (autonomous work motivation); 2) the independent variable should significantly predict the mediating variable (need satisfaction); 3) when the dependent variable is regressed on both the mediator and the independent variable, the mediator should significantly predict the dependent variable, while the predictive utility of the independent variable is reduced.

Since the perception of manager's transformational leadership was assessed by each subordinate of that particular manager, and the inter-rater agreement was adequate for the scales, mediating hypotheses that test for the motivational effectiveness of managers transformational level was conducted using Model 2-1-1 (Zhang, Zyphur & Preacher, 2009), in which the independent variable (transformational leadership; "TFL"), assessed as the mean score of subordinate ratings for each manager, was regarded as

variable at the group level, while the mediating variable (satisfaction of needs) and dependent variables (autonomous work motivation) were regarded as variables at the individual level. A second model was also tested, Model 1-1-1 (Zhang, Zyphur & Preacher, 2009), in which the independent variable was represented by each individual perception of a managers' TFL, while the mediating variables as well as the dependent variable were all regarded as individual level variables. If results concur between these two rounds of analyses, we can be confident that they are valid for the current sample.

HLM analyses were performed using HLM 6.06 (Raudenbush, Bryk & Richard, 2000) with predictors centered around the grand mean for all equations and the residual parameter variance for level 1 coefficient was set at zero.

Model 2-1-1

Model 2-1-1 was tested using HLM through equations at two levels. For the first step, I tested hypothesis 1, which states that transformational leadership is related to autonomous motivation. The *level 1 equation* was calculated as:

$$\text{Autonomous Work Motivation} = \beta_0 + r$$

where β_0 represents average autonomous work motivation within a group, and r represents residual error. The effect of the group's average assessment of a manager's transformational leadership on employee individual autonomous work motivation was calculated through a *level 2 equation*:

$$\beta_0 = \gamma_{00} + \gamma_{01} (\text{aggregated Managers' TFL}) + u_0$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; γ_{01} refers to the average variation in motivation as the function of the aggregated assessment of their manager's TFL, and u_0 represents the average error. Please see table 2 for the

analysis results for step one. We can see that managers' mean TFL scores were unrelated to autonomous motivation; hence, H1 was not supported.

Table 2

HLM Analysis of Transformational Leadership on Autonomous Work Motivation (China Model 2-1-1)

<i>Predictor</i>	<i>Autonomous work motivation</i>		
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>
Intercept β_0			
Intercept γ_{00}	4.57	.08	.00
Transformational leadership (TFL) γ_{01}	.27	.17	.13

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

In a second step, I tested hypothesis 2 (a, b, and c), which states that transformational leadership is related to need satisfaction. The *level 1 equation* was calculated as:

$$\text{Need Satisfaction} = \beta_0 + r$$

where β_0 represents average need satisfaction within a group, and r represents residual error. The effect of aggregated manager's TFL on employee individual need satisfaction was calculate through a *level 2 equation*:

$$\beta_0 = \gamma_{00} + \gamma_{01} (\text{aggregated Managers' TFL}) + u_0$$

where γ_{00} refers to the sample mean of employees' need satisfaction; γ_{01} refers to the average variation in means of each need satisfaction as the function of the aggregated managers' TFL, and u_0 represents the average error. Please see table 3 for the HLM

results for step two. We can see that the mean transformational leadership scores were unrelated to the satisfaction of the psychological needs; hence, H2 was not supported.

Table 3

*HLM Analysis of Transformational Leadership on Three types of Needs Satisfaction
(China Model 2-1-1)*

<i>Predictor</i>	Autonomy			Competence			Relatedness		
	<i>Coeff.</i>	<i>SE</i>	<i>P</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept β_0									
Intercept γ_{00}	3.91	.07	.00	5.53	.08	.00	5.07	.08	.00
Managers' TFL γ_{01}	.24	.16	.14	.33	.22	.13	.17	.21	.41

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Then in step three, I tested hypothesis 3, which states that autonomous work motivation is related to need satisfaction and to transformational leadership, where need satisfaction mediates the effect of transformational leadership on autonomous motivation.

The *Level 1 equation* was calculated as:

$$\text{Autonomous work motivation} = \beta_0 + \beta_1(\text{Autonomy}) + \beta_2(\text{Competence}) + \beta_3(\text{Relatedness}) + r$$

where β_0 represents average autonomous work motivation within a group, β_1 , β_2 , β_3 represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of need satisfaction and r represents residual error. The effect of managers' transformational leadership on employees' average autonomous motivation was calculate through the *level 2 equations*:

$$\beta_0 = \gamma_{00} + \gamma_{01} (\text{aggregated Managers' TFL}) + u_0$$

$$\beta_1 = \gamma_{10} + \gamma_{11} (\text{aggregated Managers' TFL}) + u_1$$

$$\beta_2 = \gamma_{20} + \gamma_{21} (\text{aggregated Managers' TFL}) + u_2$$

$$\beta_3 = \gamma_{30} + \gamma_{31} (\text{aggregated Managers' TFL}) + u_3$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}$ refer to the sample average slope or relation between employees' autonomous work motivation and satisfaction of each basic need; γ_{01} refers to the average variation in motivation as the function of manager's transformational leadership; $\gamma_{11}, \gamma_{21}, \gamma_{31}$ refer to the average variation of autonomous motivation slopes as a function of manager's aggregated transformational leadership; and u_0, u_1, u_2, u_3 represent the average errors. Please see table 4 and 5 for the regression result of step three.

We can see that transformational leadership scores did not significantly predict autonomous motivation when need satisfaction was entered into the model to predict autonomous work motivation. Because H1, H2a, H2b and H2c were not supported (see table 2 and 3), H3 was not supported. Table 5 showed the comparative results calculated from model fit statistic among different models from step one to step three. The difference in chi-square test was 35.66, which was significant when compare to the critical value of 16.92 with 9 degrees of freedom ($p = .05$). Hence, the results indicated that need satisfaction is important in the model when trying to predict autonomous motivation.

Table 4

HLM Analysis of Transformational Leadership and Satisfaction of Needs on Autonomous Work Motivation (China Model 2-1-1)

<i>Predictor</i>	<i>Autonomous work motivation</i>		
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>
Intercept β_0			
Intercept γ_{00}	4.57	.07	.00
Managers' mean TFL γ_{01}	.15	.16	.34
Needs satisfaction - Autonomy β_1			
Intercept γ_{10}	.18	.08	.03
Managers' mean TFL γ_{11}	-.03	.23	.88
Needs satisfaction - Competence β_2			
Intercept γ_{20}	-.03	.05	.63
Managers' mean TFL γ_{21}	-.05	.16	.77
Needs satisfaction - Relatedness β_3			
Intercept γ_{30}	.30	.06	.00
Managers' mean TFL γ_{31}	.19	.16	.26

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 5

HLM Model Fit Statistic for Mediation Testing (China Model 2-1-1)

	Unconditioned Model	Step 1 Model (TFL added)	Step 3 Model (Needs added)
Variance Estimate			
<i>Level 1 variance</i>	.92	.92	.67
<i>Intercept (τ_0)</i>	.09	.08	.07
<i>Level 2 coeff (τ_1)</i>	-	-	.09
<i>Level 2 coeff (τ_2)</i>	-	-	.02
<i>Level 2 coeff (τ_3)</i>	-	-	.02
R ² change for level 1 model	-	.01	.14
Iterations	16	16	2988
Deviance (Model fitness index)	646.13	647.61	611.95
Parameters estimated for covar model	2	2	11
$\Delta\chi^2$ deviance (df)	-	1.48	35.66

Model 1-1-1

Model 1-1-1 was also tested using HLM through equations at two levels. For the first step, I tested hypothesis 1, which states that transformational leadership is related to autonomous motivation. The level 1 equation was calculated as:

$$\text{Autonomous Work Motivation} = \beta_0 + \beta_1 (\text{perception of Managers' TFL}) + r$$

where β_0 represents average autonomous work motivation within a group, β_1 represents the maximum likelihood estimate of the employee's autonomous work motivation from

the perception of his/her supervisor's transformational leadership; and r represents residual error. Then, employees' average autonomous work motivation was calculate through a *level 2 equation*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; γ_{10} refers to the sample average slope or relation between employees' autonomous work motivation and managers' transformational leadership, and u_0, u_1 represents the average error. Please see table 6 for the analysis results for step one. We can see that perception of managers' TFL scores were positively related to autonomous motivation; hence, H1 was supported.

Table 6

HLM Analysis of Transformational Leadership on Autonomous Work Motivation (China Model 1-1-1)

<i>Predictor</i>	<i>Autonomous work motivation</i>		
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	4.56	.07	.00
TFL γ_{10}	.43	.11	.00

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

In a second step, I tested hypothesis 2 (a, b, and c), which states that transformational leadership is related to need satisfaction. The *level 1 equation* was calculated as:

$$\text{Needs Satisfaction} = \beta_0 + \beta_1 (\text{perception of Managers' TFL}) + r$$

where β_0 represents average need satisfaction within a group, β_1 represents the maximum likelihood estimate of the employee's need satisfaction from the perception of his/her supervisor's transformational leadership; and r represents residual error. Then, employees' average need satisfaction was calculated through *level 2 equations*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

where γ_{00} refers to the sample mean of employees' need satisfaction; γ_{10} refers to the sample average slope or relation between employees' need satisfaction and their perception of managers' transformational leadership, and u_0 represents the average error.

Please see table 7 for the HLM results for step two. We can see that perception of manager's transformational leadership scores were positively related to the satisfaction of the needs for autonomy and relatedness but not to the need for competence; hence, H2a and H2c were supported but H2b was not supported.

Table 7

*HLM Analysis of Transformational Leadership on Three types of Needs Satisfaction
(China Model 1-1-1)*

<i>Predictor</i>	Autonomy			Competence			Relatedness		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	3.91	.07	.00	5.52	.08	.00	5.07	.08	.00
TFL γ_{10}	.32	.11	.00	-.06	.13	.63	.47	.11	.00

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Then in step three, I tested hypothesis 3, which states that autonomous work motivation is related to need satisfaction and transformational leadership, where need satisfaction mediates the effect of transformational leadership on autonomous motivation.

The *Level 1 equation was calculated as:*

$$\text{Autonomous work motivation} = \beta_0 + \beta_1(\text{autonomy}) + \beta_2(\text{competence}) + \beta_3(\text{Relatedness}) + \beta_4(\text{perception of Managers' TFL}) + r$$

where β_0 represents average autonomous work motivation within a group, β_1 , β_2 , β_3 represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of need satisfaction; β_4 represents the maximum likelihood estimate of the employee's autonomous work motivation from the perception of his/her supervisor's transformational leadership; and r represents residual error. Then employees' average autonomous work motivation was calculate through *level 2 equations:*

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

$$\beta_2 = \gamma_{20} + u_2$$

$$\beta_3 = \gamma_{30} + u_3$$

$$\beta_4 = \gamma_{40} + u_4$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; γ_{10} , γ_{20} , γ_{30} refer to the sample average slope or relation between employees' autonomous work motivation and satisfaction of each basic need; γ_{40} refers to the average slope or relation between employees' autonomous work motivation and their perception of managers' transformational leadership and u_0 , u_1 , u_2 , u_3 , u_4 represent the average error at group level.

Please see table 8 and 9 for the regression results for step three. We can see that transformational leadership and satisfaction of needs for relatedness (autonomy was not significant at .05 level, but it was marginal, $p < .07$) positively related to subordinates' autonomous work motivation; the coefficient between transformational leadership and autonomous work motivation was reduced from .43 ($p < .001$; see table 6) to .24 ($p < .05$; see table 8); hence, H3 was partially supported. Table 9 showed the comparative results calculated based on model fit statistic among different models from step one to step three. The difference in chi-square test for the model with TFL added was 14.59, which was significant when compare to the critical value of 5.99 with 2 degrees of freedom ($p = .05$). The difference in chi-square test for the model with need satisfaction added was 31.17, which was also significant when compare to the critical value of 23.69 with 14 degrees of freedom ($p = .05$). Hence, the results indicate that although the regression results were

only partially supported, need satisfaction is still an important factor in the model predicting autonomous motivation.

Table 8

HLM Analysis of Transformational Leadership and Satisfaction of Needs on Autonomous Work Motivation (China Model 1-1-1)

<i>Predictor</i>	Autonomous work motivation		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	4.57	.07	.00
Needs satisfaction - Autonomy γ_{10}	.14	.08	.07
Needs satisfaction - Competence γ_{20}	-.00	.05	.98
Needs satisfaction - Relatedness γ_{30}	.27	.06	.00
TFL γ_{40}	.24	.10	.02

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 9

HLM Model Fit Statistic for Mediation Testing (China Model 1-1-1)

	Unconditioned Model	Step 1 Model (TFL added)	Step 3 Model (Needs added)
Variance Estimate			
<i>Level 1 variance</i>	.92	.83	.63
<i>Intercept (τ_0)</i>	.09	.08	.07
<i>Level 2 coeff (τ_1)</i>	-	.07	.08
<i>Level 2 coeff (τ_2)</i>	-	-	.01
<i>Level 2 coeff (τ_3)</i>	-	-	.03
<i>Level 2 coeff (τ_4)</i>	-	-	.06
R ² change for level 1 model	-	.06	.19
Iterations	16	2347	3858
<i>Deviance (Model fitness index)</i>	<i>646.13</i>	<i>631.54</i>	<i>600.37</i>
<i>Parameters estimated for covar model</i>	<i>2</i>	<i>4</i>	<i>16</i>
$\Delta\chi^2$ deviance (df)	-	14.59	31.17

A separate HLM model was run to test the fourth major hypothesis regarding the importance of satisfaction of all three types of psychological needs on autonomous work motivation. In this analysis, three two-by-two interactions and one three-way interaction were added to the stepwise regression analysis in the HLM accordingly.

For the first step, I tested the main effect (H4a, H4b and H4c) of satisfaction of three basic psychological needs in the *level 1 equation*:

$$\text{Autonomous work motivation} = \beta_0 + \beta_1(\text{Autonomy}) + \beta_2(\text{Competence}) + \beta_3(\text{Relatedness}) + r$$

where β_0 represents average autonomous work motivation within a group, β_1 , β_2 , β_3 represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of need satisfaction; and r represents residual error. Then, employees' average need satisfaction was calculated through *level 2 equations*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

$$\beta_2 = \gamma_{20} + u_2$$

$$\beta_3 = \gamma_{30} + u_3$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; γ_{10} , γ_{20} , γ_{30} refer to the sample average slope or relation between employees' autonomous work motivation and satisfaction of each basic need; u_0 , u_1 , u_2 , u_3 represent the average error.

According to the results showed in first part of table 10, satisfaction of the needs for autonomy and relatedness positively predicted autonomous work motivation, but not the need for competence. Hence, H4a and H4c were supported, H4b was not supported. Then, in step two, I tested the two-by-two interaction (H5) effects of satisfaction of three basic psychological needs in the *level 1 equation*:

$$\begin{aligned} \text{Autonomous work motivation} = & \beta_0 + \beta_1(\text{Autonomy}) + \beta_2(\text{Competence}) + \beta_3 \\ & (\text{Relatedness}) + \beta_4 (\text{Autonomy} * \text{Competence}) + \beta_5(\text{Autonomy} * \text{Relatedness}) + \\ & \beta_6(\text{Autonomy} * \text{Relatedness}) + \beta_6(\text{Competence} * \text{Relatedness}) + r \end{aligned}$$

where β_0 represents average autonomous work motivation within a group, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of need satisfaction and interactions; and r represents residual error. Then, employees' average needs satisfaction was calculate through *level 2 equations*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

$$\beta_2 = \gamma_{20} + u_2$$

$$\beta_3 = \gamma_{30} + u_3$$

$$\beta_4 = \gamma_{40} + u_4$$

$$\beta_5 = \gamma_{50} + u_5$$

$$\beta_6 = \gamma_{60} + u_6$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50}, \gamma_{60}$ refer to the sample average slope or relation between employees' autonomous work motivation and satisfaction of each basic need and its two-by-two interaction; $u_0, u_1, u_2, u_3, u_4, u_5, u_6$, represent the average error. According to the result showed in the second part of table 10, the two-by-two interactions among satisfaction of three needs were not significant.

Lastly, I tested the three-way interaction (H5) effect of satisfaction of three basic psychological needs in the *level 1 equation*:

$$\begin{aligned} \text{Autonomous work motivation} = & \beta_0 + \beta_1(\text{Autonomy}) + \beta_2(\text{Competence}) + \beta_3 \\ & (\text{Relatedness}) + \beta_4 (\text{Autonomy} * \text{Competence}) + \beta_5(\text{Autonomy} * \text{Relatedness}) + \\ & \beta_6(\text{Autonomy} * \text{Relatedness}) + \beta_7(\text{Competence} * \text{Relatedness}) + \beta_8(\text{Competence} * \\ & \text{Relatedness} * \text{Autonomy}) + r \end{aligned}$$

where β_0 represents average autonomous work motivation within a group, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of need satisfaction and interactions; and r represents residual error. Then, employees' average needs satisfaction was calculate through *level 2 equations*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10} + u_1$$

$$\beta_2 = \gamma_{20} + u_2$$

$$\beta_3 = \gamma_{30} + u_3$$

$$\beta_4 = \gamma_{40} + u_4$$

$$\beta_5 = \gamma_{50} + u_5$$

$$\beta_6 = \gamma_{60} + u_6$$

$$\beta_7 = \gamma_{70} + u_7$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50}, \gamma_{60}, \gamma_{70}$ refer to the sample average slope or relation between employees' autonomous work motivation and satisfaction of each basic needs and its two-by-two interactions as well as the three-way interaction; $u_0, u_1, u_2, u_3, u_4, u_5, u_6, u_7$ represent the average error.

The analysis results showed that neither the two-way interaction nor the three-way interaction related to autonomous motivation. Hence, H5 was not supported. Table 11 showed the comparative results calculated based on model fit statistic among different models from step one to step three. The difference in chi-square test for model with need satisfaction added was 39.29 ($df = 9$), which was significant when compare to the critical value of 16.92 with 9 degrees of freedom ($p = .05$). The difference in chi-square test for the model with two-way interaction terms added was 43.87 ($df = 27$), which was significant when compare to the critical value of 40.11 with 27 degrees of freedom ($p = .05$). Finally, the difference in chi-square test for model with three-way interaction terms added was 40.64, which was not significant when compare to the critical value of 49.8 with 35 degrees of freedom ($p = .05$).

Table 10

HLM Analysis of Satisfaction of Three Basic Psychological Needs on Autonomous Work Motivation (China)

<i>Predictor</i>	Autonomous Work Motivation								
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	4.57	.07	.00	4.59	.07	.00	4.58	.07	.00
Needs satisfaction - Autonomy γ_{10}	.17	.08	.04	.12	.08	.12	.11	.08	.15
Needs satisfaction - Competence γ_{20}	-.02	.05	.73	-.01	.05	.81	-.03	.05	.47
Needs satisfaction - Relatedness γ_{30}	.29	.06	.00	.28	.06	.00	.27	.06	.00
Autonomy * Competence γ_{40}				-.03	.08	.69	-.00	.07	.98
Autonomy * Relatedness γ_{50}				-.01	.07	.94	-.01	.08	.93
Competence * Relatedness γ_{60}				.09	.07	.24	.08	.08	.32
Autonomy * Competence* Relatedness γ_{70}							.06	.06	.33

Note: n = 228 subordinates nested within 60 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 11

HLM Model Fit Statistic for Needs Hypotheses Testing (China)

	Unconditioned Model	Step 1 Model (needs added)	Step 2 Model (2*2 interaction added)	Step 3 Model (3 way interaction added)
<i>Variance Estimate</i>				
<i>Level 1 variance</i>	.92	.66	.55	.52
<i>Intercept (τ_0)</i>	.09	.07	.08	.09
<i>Level 2 coeff (τ_1)</i>	-	.10	.11	.10
<i>Level 2 coeff (τ_2)</i>	-	.01	.02	.02
<i>Level 2 coeff (τ_3)</i>	-	.03	.04	.03
<i>Level 2 coeff (τ_4)</i>	-	-	.05	.04
<i>Level 2 coeff (τ_5)</i>	-	-	.05	.08
<i>Level 2 coeff (τ_6)</i>	-	-	.05	.08
<i>Level 2 coeff (τ_7)</i>	-	-	-	.03
<i>R² change for level 1 model</i>	-	.14	.06	.02
<i>Iterations</i>	16	3488	5500	6240
<i>Deviance (Model fitness index)</i>	<i>646.13</i>	<i>606.84</i>	<i>602.26</i>	<i>605.49</i>
<i>Parameters estimated for covar model</i>	<i>2</i>	<i>11</i>	<i>29</i>	<i>37</i>
$\Delta\chi^2$ deviance (df)	-	39.29	43.87	40.64

Canada Sample

Descriptive Statistics. Please see Table 12 for means, standard deviations and zero-order correlations between the variables and demographic variables. Sex was coded as a dummy variable (female = 1, male = 2). Mean perceptions of managerial transformational leadership was high, whereas the mean of autonomous work motivation was moderately high. Satisfaction of the need for competence was high, while satisfaction of the need for autonomy and relatedness were moderate. There was no significant correlation between age and other variables besides the negative correlation with relatedness need, which showed that the older the subordinate, the more they were less satisfied with the need of relatedness. There was no significant correlation between subordinates' sex and other variables. Transformational leadership positively correlated with autonomous work motivation, the need for autonomy and relatedness, but not with the need for competence.

Table 12

Means, Standard Deviations and Correlations for Subordinates (Canada)

Variables	Mean	SD	1	2	3	4	5	6	7	8
1 Age	45.52	10.16								
2 Sex	1.53	.50	.14							
3 Transformational Leadership	3.73	.91	-.14	-.06						
4 Autonomous Motivation	5.00	1.13	.02	-.04	.45**					
5 Need-Autonomy	3.75	.64	-.03	-.08	.54**	.42**				
6 Need-Relatedness	3.44	.43	-.17*	.03	.47**	.29**	.37**			
7 Need-Competence	4.33	.51	.06	-.06	.05	.37**	.32**	.07		
8 Total Needs	3.85	.42	-.13	-.06	.55**	.47**	.83**	.72**	.52**	

N = 174

* $p < .05$ (2-tailed). ** $p < .001$ (2-tailed).

Hypothesis Testing. The same testing procedures and analyses used in the China sample were applied to test the hypotheses in the Canada sample. Autonomous work motivation was examined as a function of need satisfaction of the subordinates and perception of their managers' transformational leadership for a total 21 managers with their respective 155 subordinates.

Please see Table 13 to Table 16 for testing the mediation hypotheses 1-3 using Model 2-1-1 (Zhang, Zyphur & Preacher, 2009). Based on the results from HLM model 2-1-1, we can see that managers' aggregated transformational leadership positively predicted their subordinates' autonomous work motivation (H1 was supported, see Table

13). In addition, the aggregated transformational leadership score of each manager (e.g., between-group difference of transformational leadership) only positively predicted the higher level satisfaction of psychological need for autonomy (H2a was supported) but not for competence and relatedness (H2b, H2c were not supported, see table 14). For H3 testing, we can see that transformational leadership scores did not significantly predict autonomous motivation ($p > .05$; see Table 15) when need satisfaction was entered into the model to predict autonomous work motivation based on the results. Hence, H3 was not supported, although the positive coefficient between managers' transformational leadership was lowered from $.35$ ($p < .05$; see table 13) to $.30$ ($p > .05$; see table 15) when satisfaction of three needs was added as mediator. Table 16 showed the comparative results calculated from model fit statistic among different models from step one to step three for the Canada sample. The difference in chi-square test for the model with need satisfaction added was 63.48 ($df = 9$), which was significant when compare to the critical value of 16.92 with 9 degrees of freedom ($p = .05$). Hence, this demonstrated that need atisfaction is an important variable to consider in the model predicting autonomous motivation.

Table 13

*HLM Analysis of Transformational Leadership on Autonomous Work Motivation
(Canada Model 2-1-1)*

<i>Predictor</i>	Autonomous work motivation		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept β_0			
Intercept γ_{00}	5.10	.07	.00
TFL γ_{01}	.35	.14	.02

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 14

*HLM Analysis of Transformational Leadership on Three types of Needs Satisfaction
(Canada Model 2-1-1)*

<i>Predictor</i>	Autonomy			Competence			Relatedness		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept β_0									
Intercept γ_{00}	3.82	.05	.00	4.33	.05	.00	3.48	.03	.00
TFL γ_{01}	.28	.06	.00	-.03	.09	.74	.13	.08	.16

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 15

HLM Analysis of Transformational Leadership and Satisfaction of Needs on Autonomous Work Motivation (Canada Model 2-1-1)

<i>Predictor</i>	Autonomous work motivation		
	<i>Coefficient</i>	<i>SE</i>	<i>p</i>
Intercept β_0			
Intercept γ_{00}	5.12	.07	.00
Manager's mean TFL γ_{01}	.30	.14	.06
Needs satisfaction - Autonomy β_1			
Intercept γ_{10}	.36	.16	.03
Manager's mean TFL γ_{11}	.15	.30	.62
Needs satisfaction - Competence β_2			
Intercept γ_{20}	.72	.12	.00
Manager's mean TFL γ_{21}	-.28	.28	.33
Needs satisfaction - Relatedness β_3			
Intercept γ_{30}	.12	.20	.54
Manager's mean TFL γ_{31}	-.07	.46	.88

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 16

HLM Model Fit Statistic for Mediation Testing (Canada model 2-1-1)

	Unconditioned Model	Step 1 Model (TFL added)	Step 3 Model (Needs added)
<i>Variance Estimate</i>			
<i>Level 1 variance</i>	1.08	1.07	.78
<i>Intercept (τ_0)</i>	.02	.01	.01
<i>Level 2 coeff (τ_1)</i>	-	-	.06
<i>Level 2 coeff (τ_2)</i>	-	-	.02
<i>Level 2 coeff (τ_3)</i>	-	-	.28
<i>R² change for level 1 model</i>	-	.02	-.05
<i>Iterations</i>	21	21	2700
<i>Deviance (Model fitness index)</i>	456.77	453.22	393.29
<i>Parameters estimated for covar model</i>	2	2	11
$\Delta\chi^2$ deviance (df)	-	3.55	63.48

Please see Table 17 to Table 20 for testing the mediation hypotheses 1-3 using Model 1-1-1 (Zhang, Zyphur & Preacher, 2009). Table 17 showed that individual perceptions of managerial transformational leadership positively predicted subordinates' autonomous motivation (H1 was supported). In Table 18, we see that among the three basic psychological needs, the more subordinates perceived their manager to be transformational, the more satisfied they felt for the satisfaction of needs of autonomy and relatedness, but not competence (H2a and H2c were supported, but not H2b). Finally, H3 was not supported since satisfaction of the needs for autonomy and relatedness were not significant anymore when all three basic psychological needs and transformational

leadership were entered into the model together to predict autonomous work motivation (see table 19). Table 20 showed the comparative results calculated from model fit statistic among different models from step one to step three. The difference in chi-square test for model with need satisfaction added was 89.51 ($df = 14$), which was significant when compare to the critical value of 23.69 with 14 degrees of freedom ($p = .05$). Hence, this demonstrated that although the mediation hypotheses were not supported, need satisfaction is still an important variable to consider in the model predicting autonomous motivation.

Table 17

*HLM Analysis of Transformational Leadership on Autonomous Work Motivation
(Canada Model 1-1-1)*

<i>Predictor</i>	<i>Autonomous work motivation</i>		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	5.07	.08	.00
TFL γ_{10}	.44	.09	.00

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 18

*HLM Analysis of Transformational Leadership on Three Types of Needs Satisfaction
(Canada Model 1-1-1)*

<i>Predictor</i>	Autonomy			Competence			Relatedness		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	3.72	.07	.00	4.33	.04	.00	3.44	.03	.00
TFL γ_{10}	.37	.05	.00	.01	.06	.26	.22	.03	.00

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 19

*HLM Analysis of Transformational Leadership and Satisfaction of Three Types of Needs
on Autonomous Work Motivation (Canada Model 1-1-1)*

<i>Predictor</i>	Autonomous work motivation		
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	5.09	.06	.00
Needs satisfaction - Autonomy γ_{10}	.17	.13	.20
Needs satisfaction - Competence γ_{20}	.79	.12	.00
Needs satisfaction - Relatedness γ_{30}	-.10	.23	.67
TFL γ_{40}	.38	.09	.00

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 20

HLM Model Fit Statistic for Mediation Testing (Canada Model 1-1-1)

	Unconditioned Model	Step 1 Model (TFL added)	Step 3 Model (needs added)
<i>Variance Estimate</i>			
<i>Level 1 variance</i>	1.08	.92	.73
<i>Intercept (τ_0)</i>	.02	.00	.00
<i>Level 2 coeff (τ_1)</i>	-	.00	.02
<i>Level 2 coeff (τ_2)</i>	-	-	.01
<i>Level 2 coeff (τ_3)</i>	-	-	.17
<i>Level 2 coeff (τ_4)</i>	-	-	.01
<i>R² change for level 1 model</i>	-	.16	.15
<i>Iterations</i>	2	2370	3473
<i>Deviance (Model fitness index)</i>	456.77	395.38	367.29
<i>Parameters estimated for covar model</i>	2	4	16
<i>$\Delta\chi^2$ deviance (df)</i>	-	61.39	89.51

Please see Table 21 and 22 for the results testing hypotheses 4 and 5 regarding the importance of satisfaction of three types of needs on employees' autonomous work motivation. Main effects of satisfaction of the needs for autonomy and competence were found to predict higher levels of autonomous work motivation; hence H4a and H4b were supported. The analysis results also showed a significant two-way interaction between the needs for autonomy and relatedness (see Table 21) to predict higher autonomous work motivation. Hence, H5 was partially supported. Table 22 shows the comparative results

calculated based on model fit statistic among different models for the Canada sample.

The difference in chi-square test for model with three needs satisfaction added was 97.25 ($df = 9$), which was significant when compare to the critical value of 16.92 with 9 degrees of freedom ($p = .05$). The difference in chi-square test for the model with two-way interaction terms added was 57.97 ($df = 27$), which was significant when compare to the critical value of 40.11 with 27 degrees of freedom ($p = .05$). Finally, the difference in chi-square test for model with three-way interaction terms added was 57.08, which was significant when compare to the critical value of 49.8 with 35 degrees of freedom ($p = .05$).

Table 21

HLM Analysis of Satisfaction of Three Basic Psychological Needs on Autonomous Work Motivation (Canada)

<i>Predictor</i>	Autonomous Work Motivation								
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	5.08	.08	.00	5.06	.07	.00	5.07	.07	.00
Needs satisfaction - Autonomy γ_{10}	.34	.13	.02	.48	.13	.00	.51	.14	.00
Needs satisfaction - Competence γ_{20}	.75	.12	.00	.72	.14	.00	.75	.14	.00
Needs satisfaction - Relatedness γ_{30}	.22	.24	.36	.12	.19	.55	.10	.19	.61
Autonomy * Competence γ_{40}				-.06	.06	.28	-.09	.05	.11
Autonomy * Relatedness γ_{50}				.18	.07	.03	.19	.08	.02
Competence * Relatedness γ_{60}				.06	.10	.54	.07	.11	.51
Autonomy * Competence* Relatedness γ_{70}							.06	.03	.11

Note: n = 155 subordinates nested within 21 managers. The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

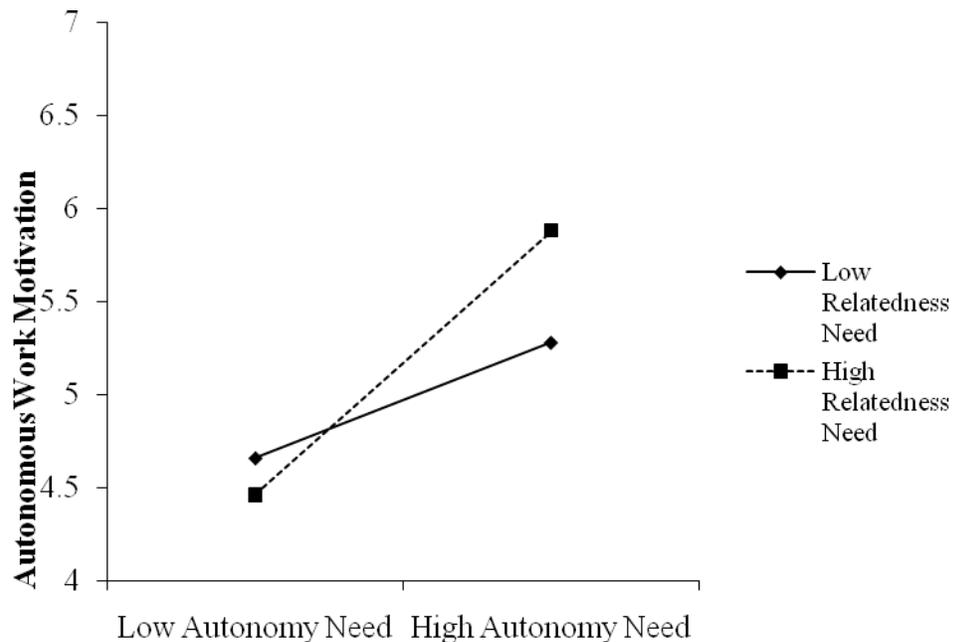
Table 22

HLM Model Fit Statistic for Satisfaction of Basic Psychological Needs (Canada)

	Unconditioned Model	Step 1 Model (Individual need added)	Step 2 Model (2*2 interaction added)	Step 3 Model (3 way interaction added)
<i>Variance Estimate</i>				
<i>Level 1 variance</i>	1.08	.77	.70	.70
<i>Intercept (τ_0)</i>	.02	.01	.02	.02
<i>Level 2 coeff (τ_1)</i>	-	.06	.07	.06
<i>Level 2 coeff (τ_2)</i>	-	.01	.08	.07
<i>Level 2 coeff (τ_3)</i>	-	.28	.12	.11
<i>Level 2 coeff (τ_4)</i>	-	-	.00	.01
<i>Level 2 coeff (τ_5)</i>	-	-	.03	.03
<i>Level 2 coeff (τ_6)</i>	-	-	.07	.08
<i>Level 2 coeff (τ_7)</i>	-	-	-	.00
<i>R² change for level 1 model</i>	-	.01	.01	.02
<i>Iterations</i>		21	3470	5717
<i>Deviance (Model fitness index)</i>	456.77	395.52	398.80	399.69
<i>Parameters estimated for covar model</i>	2	11	29	37
<i>$\Delta\chi^2$ deviance (df)</i>	-	97.25	57.97	57.08

Analyses were performed to investigate the significant interaction between satisfaction of the needs for autonomy and relatedness noticed in the model. Please see figure 4 for the two-way interaction results.

Figure 4. The Synergistic Role of Need for Relatedness and Autonomy as Predictors of Autonomous Work Motivation (Canada sample)



In order to further analyze the interaction effect, data were split according to standardized scores of autonomy needs (high vs. low). A simple slope analysis revealed significant results using need for relatedness to predict autonomous work motivation ($\beta = .32, p < .05$) when satisfaction of autonomy need was high, while it was non-significant when autonomy need was low ($\beta = -.05, p > .05$). Based on the above result, we can see that satisfaction of the needs for relatedness significantly predicted higher autonomous

work motivation only when satisfaction of autonomy needs was high. Hence, there was evidence to partially support the synergetic (H5) hypotheses in this particular Canadian sample.

Cross-cultural comparison

Descriptive Statistics. Please see Table 23 for means, standard deviations and zero-order correlation between the variables and demographic variables. Sex was entered into the analysis as a dummy variable (female = 1; male = 2). Country was also entered into the analysis as a dummy variable (Canada = 1; China = 2).

There was no significant correlation between sex and other variables. Age was negatively correlated to country which was consistent with the age difference between Canadian and Chinese Sample (the Chinese participants were much younger than the Canadian participants). In the combined sample, the older the employees, the more they perceived their manager to be transformational. Please also refer to results of mean comparisons between samples for details (see Table 24). Similar findings can be noted between the negative correlation between age and collectivistic value. Besides the negative correlation between the country dummy variable with transformational leadership and autonomous work motivation, transformational leadership was positively correlated with autonomous work motivation, while autonomous work motivation was positively correlated with subordinates' collectivistic values.

Table 23

Means, Standard Deviations and Correlations for Subordinates (Canada & China)

Variables	Mean	SD	1	2	3	4	5	6
1 Age	30.96	13.17						
2 Sex	1.44	.51	.01					
3 Country	1.58	.49	-.58**	-.06				
4 TFL	2.82	1.11	.32**	-.00	-.72**			
5 Autonomous Work Motivation	4.87	1.14	-.01	.03	-.21**	.42**		
6 Collectivistic value	5.10	.79	-.11*	.02	.08	.08	.32**	

N = 446 (list-wise)

* $p < .05$ (2-tailed). ** $p < .001$ (2-tailed).

Since the data aggregation index for the combined sample were at moderate to high levels, the aggregated correlations were also calculated ($n = 77$ managers). It showed that aggregated managers' transformational leadership was significantly related to the aggregated subordinates' autonomous work motivation ($r = .53, p < .001$); subordinates' autonomous work motivation positively correlated with their collectivistic values ($r = .47, p < .001$); on the other hand, subordinates' collectivistic value orientation also significantly correlated with managers' transformational leadership ($r = .91, p < .001$).

Independent t-tests were conducted to see country differences in variable means. Please see Table 24 for group statistics. The t-test results demonstrated that all variables (perception of managerial transformational leadership ($t = 20.16, p < .001$), autonomous work motivation ($t = 3.15, p < .002$), and collectivism value ($t = -2.26, p < .05$)) were

significantly different between China and Canada. Besides Chinese participants were lower in transformational leadership and autonomous work motivation comparing to Canadian participants, they demonstrated relatively higher collectivistic values than the Canadian participants.

Table 24

Group Statistics for Independent Sample t-test (China & Canada)

Variables		N	Mean	SD
1	Transformational Leadership	China	2.17	.67
		Canada	3.71	.92
2	Autonomous Work Motivation	China	4.66	1.07
		Canada	5.01	1.13
3	Collectivistic value	China	5.15	1.15
		Canada	4.97	.87

Hypotheses were tested using HLM (Bryk & Raudenbush, 1992). First, I tested whether the main effects of transformational leadership as well as collectivistic values lead to higher autonomous work motivation (without interaction terms). Age, sex and country were entered as control variables. The *level 1 equation* was calculated as:

$$\text{Autonomous work motivation} = \beta_0 + \beta_1(\text{age}) + \beta_2(\text{sex}) + \beta_3(\text{Country}) + \beta_4(\text{perception of Managers' TFL}) + \beta_5(\text{collectivistic value}) + r$$

where β_0 represents average autonomous work motivation within a group, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ represent the maximum likelihood estimate of the employee's autonomous work

motivation from each type of demographic variables and testing variables (transformational leadership and collectivistic value); and r represents residual error. Then, employees' average autonomous work motivation was calculate through *level 2 equation*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50}$ refer to the sample average slope or relation between employees' autonomous work motivation, demographic variables (age, sex, country) and testing variables (transformational leadership and collectivism values); u_0 represents the average error.

Then, I added the two-by-two interaction terms to test the model again in the previous level 1 *equation*:

$$\begin{aligned} \text{Autonomous work motivation} = & \beta_0 + \beta_1(\text{age}) + \beta_2(\text{sex}) + \beta_3(\text{Country}) + \beta_4 \\ & (\text{perception of Managers' TFL}) + \beta_5(\text{collectivistic value}) + \beta_6(\text{perception of} \\ & \text{Managers' TFL} * \text{collectivistic value}) + \beta_7(\text{perception of Managers' TFL} * \\ & \text{country}) + \beta_8(\text{country} * \text{collectivistic value}) + r \end{aligned}$$

where β_0 represent average autonomous work motivation within a group, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6$ represent the maximum likelihood estimate of the employee's autonomous work

motivation from each type of demographic variables and transformational leadership; and r represents residual error. Then, employees' average autonomous work motivation was calculated through *level 2 equation*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50}, \gamma_{60}, \gamma_{70}, \gamma_{80}$ refer to the sample average slope or relation between employees' autonomous work motivation, demographic variables (age, sex, country) and testing variables (transformational leadership, collectivistic values and its two-by-two interaction); u_0 represents the average error.

Finally, in step three, I added the three way interaction effect to the previous *level 1 equation*:

$$\begin{aligned} \text{Autonomous work motivation} = & \beta_0 + \beta_1(\text{age}) + \beta_2(\text{sex}) + \beta_3(\text{Country}) + \beta_4 \\ & (\text{perception of Managers' TFL}) + \beta_5(\text{collectivism value}) + \beta_6(\text{perception of} \\ & \text{Managers' TFL} * \text{collectivism value}) + \beta_7(\text{perception of Managers' TFL} * \end{aligned}$$

$$\text{country}) + \beta_8 (\text{country} * \text{collectivistic value}) + \beta_9 (\text{perception of Managers' TFL} * \text{collectivistic value} * \text{country}) + r$$

where β_0 represents average autonomous work motivation within a group, $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$, represent the maximum likelihood estimate of the employee's autonomous work motivation from each type of demographic variables and transformational leadership; r represents residual error. Then, employees' average autonomy work motivation was calculated through *level 2 equation*:

$$\beta_0 = \gamma_{00} + u_0$$

$$\beta_1 = \gamma_{10}$$

$$\beta_2 = \gamma_{20}$$

$$\beta_3 = \gamma_{30}$$

$$\beta_4 = \gamma_{40}$$

$$\beta_5 = \gamma_{50}$$

$$\beta_6 = \gamma_{60}$$

$$\beta_7 = \gamma_{70}$$

$$\beta_8 = \gamma_{80}$$

$$\beta_9 = \gamma_{90}$$

where γ_{00} refers to the sample mean of employees' autonomous work motivation; $\gamma_{10}, \gamma_{20}, \gamma_{30}, \gamma_{40}, \gamma_{50}, \gamma_{60}, \gamma_{70}, \gamma_{80}, \gamma_{90}$ refer to the sample average slope or relation between employees' autonomous work motivation, demographic variables (age, sex, country) and testing variables (transformational leadership, collectivism values, its two by two interaction and three way interaction); u_0 represents the average error. Please see Table 25 for the test results.

The analysis result listed in Table 25 showed that both transformational leadership and individual collectivistic values positively predicted autonomous work motivation (H6a was supported) across China and Canada samples. On the other hand, there were no interaction effects between transformational leadership and individual collectivistic values nor was there a three-way interaction with countries (H6a was not supported). Table 26 shows the comparison among different models with or without interaction terms. The change in r-square of level 1 models demonstrated the effect size did not significantly improve when the two-way and three-way interaction terms were added, which is consistent with the fact that there is not significant two-way and three-way interaction found in the regression results.

Table 25

*HLM Analysis of Moderation of Collectivistic Value on the Function of Transformational Leadership of Autonomous Work Motivation
(Canada & China)*

<i>Predictor</i>	Autonomous Work Motivation								
	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>	<i>Coeff.</i>	<i>SE</i>	<i>p</i>
Intercept γ_{00}	4.83	.06	.00	4.84	.06	.00	4.84	.06	.00
Age γ_{10}	-.01	.01	.10	-.01	.01	.14	-.00	.01	.19
Sex γ_{20}	.04	.08	.59	.04	.08	.62	.04	.08	.57
Country γ_{30}	-.21	.19	.27	-.18	.19	.34	-.17	.19	.37
Transformational leadership (TFL) γ_{40}	.38	.07	.00	.38	.07	.00	.38	.07	.00
Collectivistic Values (CV) γ_{50}	.42	.06	.00	.42	.06	.00	.52	.07	.00
TFL* CV γ_{60}				-.09	.09	.31	-.07	.09	.48
TFL*Country γ_{70}				-.02	.07	.74	-.03	.07	.63
CV* Country γ_{80}				.03	.06	.56	.02	.05	.70
TFL*CV*Country γ_{90}							.12	.09	.15

Note: n = 382 subordinates nested within 77 managers (list-wise). The Gammas (γ) are unstandardized and centered around the grand mean. The standard errors are robust.

Table 26

HLM Model Fit Statistic for Moderation Testing (China & Canada)

	Unconditioned Model (With only Control variables)	Step 1 Model (TFL& Value added)	Step 2 Model (2*2 interaction added)	Step 3 Model (3 way interaction added)
Variance Estimate				
<i>Level 1 variance</i>	.97	.81	.80	.80
<i>Intercept (τ_0)</i>	.06	.05	.05	.05
R ² change for level 1 model	-	.17	.02	-.01
Iterations	11	46	41	46
<i>Deviance (Model fitness index)</i>	<i>1046.25</i>	<i>982.76</i>	<i>989.09</i>	<i>989.42</i>
<i>Parameters estimated for covar model</i>	2	2	2	2
$\Delta\chi^2$ deviance (df)	-	63.49	7.33	.33

Table 27

Summary of Support for Hypotheses

	Hypothesis	Country	Supported	
			Model 2-1-1	Model 1-1-1
H1	Transformational leadership positively predicts	China	No	Yes
	Autonomous work motivation	Canada	Yes	Yes
H2a	Transformational leadership positively predicts	China	No	Yes
	Need for autonomy	Canada	Yes	(marginally) Yes
H2b	Transformational leadership positively predicts	China	No	No
	Need for competence	Canada	No	No
H2c	Transformational leadership positively predicts	China	No	Yes
	Need for relatedness	Canada	No	Yes
H3	Need satisfaction as mediator to the positive	China	No	Partial
	relation between transformational leadership and autonomous work motivation	Canada	No	No
H4	Additive effects of need satisfaction	China	-	Partial
		Canada	-	Partial
H5	Synergistic effects of need satisfaction	China	-	No
		Canada	-	Partial
H6a	Collectivistic value to autonomous motivation	Both	-	Yes
H6b	Collectivism as moderator to the positive relation	Both	-	No
	between transformational leadership and autonomous work motivation			

Discussion

The purpose of this research was to investigate whether managers' transformational leadership (Bass, 1984, 1995), a proxy of autonomy supportive behaviour proposed by SDT (Deci & Ryan, 2000; Gagné & Deci, 2005), was positively related to autonomous motivation in subordinates, and whether such a process was mediated by the satisfaction of three basic psychological needs (Black & Deci, 2000; Gagné, 2003). Specific cross-cultural comparisons were conducted to identify whether differences in collectivistic values moderate the motivational effectiveness of transformational leadership (Triandis, 1995; Jung, Bass & Sosik, 1995; Jung & Avolio, 1999) between China and Canada samples. Table 27 summarizes the support obtained for the hypotheses.

Overall, the results supported the general motivational impact of transformational leadership across China and Canada samples. At the same time, different results were obtained in the samples, which could stimulate many interesting future cross-cultural investigations about the motivational effectiveness of transformational leadership through the mediating mechanism of satisfaction of psychological needs.

First, for hypothesis 1, results confirmed that transformational leadership predicted higher levels of autonomous work motivation in China and Canada when transformational leadership was tested as an individual variable. Hence, these findings generally confirmed our speculation of transformational leadership act as a proxy to autonomy support behaviour (Deci & Ryan, 2000; Gagné & Deci, 2005) to promote autonomous motivation at work across different cultures, specifically, the Chinese culture and Canadian culture in this research.

Second, for the hypothesis 2, transformational leadership didn't predict satisfaction of need for competence neither in the China sample nor in the Canada sample (H2b was not supported cross-culturally). This is surprising since many leadership theories stress the importance of making subordinates feel capable of achieving goals (e.g., House, 1977; House, Wright, & Aditya, 1997; Shamir, House & Arthur, 1993), including the full-range model, which stresses inspirational motivation as a core component of transformational leadership, and which implies to convey one's confidence in one's subordinates. It is also surprising that competence was unrelated to autonomous motivation in both samples as not only self-determination theory, but also social cognitive theory (Bandura, 1977) suggests that competence or self-efficacy is a core requirement for motivation. One reasonable speculation for this finding could be that transformational leader's emphasis on intellectual stimulation, which often enables followers to find new fresh perspectives, solutions, and become more creative, may de-emphasizes subordinates' current level of capability (i.e. competence) to the benefit of their development and future performance (Bass & Avolio, 1994). This type of stimulation may require people to think outside the box and step out of their comfort zone (e.g., current competence level) to perform. In fact, the results showed that transformational leaders motivate followers mostly through satisfaction of the other two needs, autonomy and relatedness. Future studies should extend these findings to see if other types of leadership (e.g., transactional leadership) may be able to satisfy the need for competence possibly through contingency reward (Bass & Avolio, 1994), and then result in other types of motivation, such as controlled motivation (Deci & Ryan, 2000; Gagné & Deci, 2005). This would be especially relevant for management practices in

China and Canada, when managers are in the face of rapidly changing economical, social, and technological changes, which may affect how managers may approach different types of managerial tasks. On the other hand, transformational leadership predicted higher satisfaction of needs for autonomy and relatedness in both China and Canada samples (H2a & H2c was supported in both samples).

Thirdly, hypothesis 3 was only partially supported in China and Canada samples. In China, both needs for autonomy and relatedness mediate the positive relation between transformational leadership and autonomous motivation, mostly in model 1-1-1. Different results were obtained from two models where transformational leadership was treated as group level variable in model 2-1-1 and individual variable in model 1-1-1. These may mainly resulted from the fact that Canadian managers had higher average level of transformational leadership than Chinese managers, who were much younger and had less managerial experience. As a result, the variance in between-group managerial transformational leadership was able to be captured by model 2-1-1 only in the Canada sample. By testing the hypotheses in two different HLM models, the motivational effectiveness of leadership can be deconstructed from different aspects, which may point to different solutions in different organizations. In this research, it also allow comparison and validation between models when transformational leader were treated as individual level as well as group level variable.

Generally, research findings from both samples confirmed the importance of satisfying basic psychological needs in order to foster autonomous motivation in workplaces. Findings also indicated that autonomous motivation can be achieved through managerial transformational leadership, a type of leadership which is vital to

organizational performance (Avolio, 1999). But patterns of satisfaction of which type/types of needs differed across the two samples. Whether such differences resulted from organizational characteristics (privately-owned vs. government organizations, industries, job design, reward systems, etc.) or national culture, additional variables may also need to be considered in future research. The above findings from testing hypothesis 1 to 3 generally support the motivational advantages of transformational leadership through the mediating mechanism of satisfaction of basic psychological needs proposed by SDT cross two cultural specific samples of China and Canada.

Fourthly, the test of the relative importance of three types of psychological needs turns out to partially support the additive hypothesis across China and Canada samples; Indeed, the results revealed that in China, only main effects for satisfaction of autonomy and relatedness on autonomous work motivation, while in Canada, main effects for satisfaction of autonomy and competence were found, along with an interaction where relatedness was only related to autonomous motivation when autonomy was high. These were similar to the findings discovered by Dysvik and colleagues (in press), who found that synergistic effects between needs for autonomy and competence on intrinsic motivation but found no main effect for the need for competence, only for autonomy and relatedness; they also argued that the assessment of need for competence may need to be rethought and re-operationalized as the process of acquiring competence (mastery) as opposed to acquired competence when examining effects on motivation (Csikszentmihalyi, 1988; Speitzer, Sutcliffe, Dutton, Sonenshein & Grand, 2005). Another possible reason why need for competence did not influence autonomous motivation in the China sample could be the long-term orientation and collectivistic

nature of the Chinese culture (Hofstede, 1980), which implies that Chinese employees tend to set mastery-goals (Sheldon & Elliot, 1998) compared to their North-American counterparts, especially at early career stages (as it was the case in the current Chinese sample). Hence, satisfaction of the need for competence may be relatively less important for them, and less autonomously motivating, when compared with the satisfaction of needs for autonomy and relatedness. On the other hand, it is also possible once again that need satisfaction effects may be moderated by other organizational and other cultural factors, which should be investigated in more depth in future research.

Transformational leadership and collectivistic values were studied in other culture-specific studies (Jung & Avolio, 1999; Walumbwa & Lawler, 2003). The present study compared two samples in different cultures, which provides a wider range of cultural values to test hypotheses that can potentially have greater implications for international management and the management of a diverse workforce. In this research, the hypothesis regarding cultural values on transformational leadership and autonomous motivation were only partially supported: collectivistic value was found to be a main predictor of autonomous motivation. However, culture did not moderate the effect of transformational leadership on autonomous work motivation.

Future research may further study the role that collectivistic value orientation plays in the “internalization” of societal, organizational, and/or team values/goals, in the enhancement of support in the work environment (e.g., through managerial transformational leadership or autonomy supportive behaviour; Ryan, 1995), which should impact organizational effectiveness (e.g., performance, retention and return on investment) through improved individual performance. Since the results did not support

the moderating effect of collectivistic values on the motivational impact of transformational leadership across China and Canada, this may imply that other factors, for example, locus of control (Judge, Bono, Ilies & Gerhardt, 2002), self-efficacy (Walumbwa, et al., 2005), job design (Piccolo & Colquitt, 2006), or value congruence between leader and subordinate (Walumbwa, et al., 2005) should also be considered in future cross-cultural validations. In addition, as this research is still in an early stage, I also could not rule out the possible limitation of using single, industry-specific samples with relatively small sample sizes. In addition, replication of non-significant results for the three-way interaction provided additional support to past research findings but still may not completely rule out the impact of national cultural values (Walumbwa & Lawler, 2003; Walumbwa, Loawler, Avolio, Wang & Shi, 2005), but it also suggested that the importance of national cultural values in this specific motivational leadership model may be less influential.

Limitations

Like all empirical research, this research was bounded by certain limitations. First, the use of cross-sectional data precludes definitive assertions regarding causality and directionality, in addition to the fact that the statistical procedures used here cannot unequivocally sort out the true direction of relationships. Longitudinal and experimental designs are needed in future research to answer the causality question. Second, although I used both group-level and individual-level assessments of managerial transformational leadership to partly circumvent the common-method problem, other testing variables were still collected using self-report measures. However, the use of subordinate reports for the assessment of managerial leadership is considered a better alternative to asking

managers to self-report on their leadership behaviour (Bass & Avolio, 1994), especially when assessing the impact of leadership on subordinate outcomes. Nonetheless, future studies should consider employing multiple sources of data, like observer reports and behavioural measures of motivation. Future research could also collect independent and dependent variables at different times to lower the risk of common method variance (Podsakoff, Mackenzie, Paine & Bachrach, 2000). Finally, this research also has sampling limitation as the China sample came from the IT sector while Canada sample came from a government organization. These types of samples not only had limitations in terms of generalization to different samples, but also created a less homogeneous sample when combining the two country specific samples for cross-cultural analysis. In general, it would be useful to replicate similar research in other country and other industries.

Another important limitation of this research was that different measurements for satisfaction of basic needs had been used in two countries which prevented cross-cultural comparisons. Though both scales were previously validated, the one used in the Canada sample is more recent and was developed based on more stringent psychometric criteria, such as showing a clear three-factor structure, instead of one for the old one (Van den Broeck, et al, 2010). Therefore, the results from the two measures are difficult to compare. Moreover, future research should also take into account the limitations encountered and improve the measurement of satisfaction of the need for competence discussed earlier (Dysvik, Kuvaas & Gagné, in press).

Implications

Putting self-determination theory and the transformational leadership component of the full range theory of leadership together provided an easier and more natural way to

investigate the psychological mechanisms that explain the effects of leadership on motivation. This approach allowed the examination of employees' perceptions of managerial leadership behaviour and how such perceptions result in the satisfaction of basic psychological needs, which in turn affects employee autonomous motivation. Since we know from past research that autonomous motivation is a fruitful predictor of many desired organizational behaviour, gaining a good understanding of such mechanisms will bring it about means to open the black box of leadership (Shamir, House & Arthur, 1993).

The results of this research suggest some practical implications that are likely to help manage diverse workforces or manage internationally. First, by confirming the positive motivational impact of transformational leadership both in China and Canada provides strong evidence for the necessity of developing managers' transformational leadership skills. What remains to be tested is whether current transformational leadership training used widely in North-America (Deci, Connell, & Ryan, 1989; Barling, Weber & Kelloway, 1996) would be effective in China. It is possible that such training may need to be adapted to the culture. Second, by showing that satisfaction of the needs for autonomy and relatedness is related to autonomous work motivation, interventions aimed at improving the satisfaction of psychological needs (other than leadership training) could be used to promote autonomous work motivation. Since self-determination theory research has shown that job design, for example, also affects work motivation, interventions to enrich jobs could be used. Again, these interventions have been used mostly in the Western world (Wall, Kemp, Jackson & Clegg, 1986) and would need to be tested in China, too.

On the other hand, when talking about leadership and motivational outcomes, cultural elements need to be properly addressed, especially in culturally diversified organizations or global firms. This research supported the cross-cultural effectiveness of transformational leadership (Jogulu, 2010), but it also revealed different cultural profiles regarding the priority of satisfying different needs in different cultures, suggesting the importance of increasing managers' cultural sensitivities and of understanding better followers' value orientations in order to effectively lead. In addition, because autonomous work motivation has been equated with employee engagement (Meyer & Gagné, 2008), such interventions are likely to improve work engagement, as well as other outcomes (e.g., performance, well-being, and retention) in the workplace (Baard, Deci, & Ryan, 2004; Gagné, 2003; Gagné, Koestner, & Zuckerman, 2000).

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APPENDICES

Appendix I: Consent form for CHINA survey

同意参与管理调查申明

本申明旨在说明我同意参与由 Dr. Marylène Gagné (Department of Management, John Molson School of Business at Concordia University) 组织的本次科学调研活动。电话: 1-514-848-2424 ext. 2484. 电邮: mgagne@jmsb.concordia.ca.

A. 目的

我已经被告知本次调查的目的在于研究有关能够提高员工归属感与健康水平的最佳管理方法。

B. 程序

本次调查将会向 XXX 公司的经理以及员工提供本次调查的在线问卷。您就本次调研活动而被要求填写该等问卷。本次在线调查大概需要 50-60 分钟完成。希望您能够安排足够的时间一次完成本次在线调查。你可能会留意到在问卷中存在相似或相同的问题。虽然我们同意回答相似或相同的问题可能让您觉得有点沮丧, 但是我们必须做如此的安排以期得到可靠的调查结果。所以, 我们要求您回答本次在线调查问卷中的所有问题, 这样我们就能够在调查结束后向公司提供有效的管理报告和建议。

虽然您通过个人电子邮件收到我们的在线调查邀请, 我们将会确认一个代表符给您提供的调查信息以确保您的个人信息得到保护。公司的管理层不会得知任何员工针对本次调查的具体信息, 而是会得到一份仅汇报整合信息的报告。我们已经与公司的管理层签订了一份关于保护公司以及员工保密信息, 限制在科学期刊发表有关调查发现的协议。所有数据将由位于 CONCORDIA UNIVERSITY 的伺服器收集并在安全的电脑上进行数据分析。

C. 风险与收益

我们没有预见任何关于您参与本次调研的风险。但是, 您的参与将带来如下的收益: 它将为将来可能提供的管理培训提供有效的反馈信息。公司的管理层可以全面了解员工动态。而员工可以从管理层将改善的管理行为或策略中获得长期收益。

D. 参与条件

- 我了解我可以随时自由退出本次调研而不带来任何负面影响。
- 我了解我参与本次调研是严格保密的 (例如: 调研者知道, 但是不会披露, 我的个人信息)。
- 我了解本次调研获得的数据可能会在科研期刊或学术研讨会议中发表, 但是我的个人信息及公司信息是不会被披露的。

我已经仔细阅读并了解上述信息。我同意自由参与本次调研。完成本次调研的所有问题成为我同意参与的一部分。

如果在任何时候您针对您作为调研参与者的权力有任何问题，请随时与 Adela Reid, Concordia University 的学术研究道德与规范官员联系。联系电话：1- (514) 848-2424 x7481。电子邮件：areid@alcor.concordia.ca。

（您可以打印本页作为您的保留文档）。

Sondage sur l'engagement des employés du XXX

Consentement de participation au sondage sur l'engagement des employés du XXX

Par la présente, je déclare consentir à participer à un programme de recherche mené par Mme Marylène Gagné du département de gestion, École de Gestion John- Molson de l'Université Concordia. Téléphone: 514-848-2424 poste 2484. Courriel: mgagne@jmsb.concordia.ca.

A. BUT DE LA RECHERCHE

On m'a informé(e) du but de la recherche, soit l'examen des meilleures pratiques de gestion pour améliorer l'engagement des employés.

B. PROCÉDURES

Cette recherche consiste à demander aux employés et aux gestionnaires du Directeur Général des XXX. Nous vous demandons aujourd'hui de remplir le sondage sur l'engagement des employés, ce qui devrait vous prendre environ 30 minutes. Nous vous recommandons de remplir le sondage en une seule session. Vous pourriez remarquer que certaines questions sont semblables. Cette procédure est essentielle afin d'obtenir des résultats fiables. Nous vous demandons donc de répondre à TOUTES les questions pour que nous puissions donner des résultats fiables et valides au XXX.

Même si nous vous avons envoyé un courriel personnalisé, nous identifierons votre sondage par un code numérique personnel pour préserver la confidentialité de vos réponses individuelles. XXX ne recevra aucune réponse individuelle, mais recevra plutôt un rapport des résultats d'ensemble. Nous avons signé une entente de confidentialité avec le XXX qui protège votre identité et l'identité du XXX dans toute présentation ou publication des résultats dans des revues scientifiques. Toutes les données obtenues lors

de ce sondage sont sauvegardées sur un serveur sécurisé, localisé à l'Université Concordia. Les données seront traitées exclusivement à partir d'ordinateurs sécurisés par les chercheurs.

C. CONDITIONS DE PARTICIPATION

Vous ne courez aucun risque en participant à ce sondage. Par contre, votre participation peut engendrer plusieurs bénéfices. Elle contribuera à développer des informations et des interventions utiles pour le XXX et à tester de nouvelles idées et interventions en gestion. Vous bénéficierez donc à long terme en aidant le XXX à améliorer ses pratiques de gestion.

D. CONDITIONS DE PARTICIPATION

- Je comprends que je peux retirer mon consentement et interrompre ma participation à tout moment, sans conséquences négatives.
- Je comprends que ma participation à cette étude est CONFIDENTIELLE (c.-à-d. le chercheur connaît mon identité mais ne la révélera pas)
- Je comprends que les données de cette étude peuvent être publiées
- Je comprends le but de la présente étude ; je sais qu'elle ne comprend pas de motifs cachés dont je n'aurais pas été informé(e).

J'AI LU ATTENTIVEMENT CE QUI PRÉCÈDE ET JE COMPRENDS LA NATURE DE L'ENTENTE. JE CONSENS LIBREMENT ET VOLONTAIREMENT À PARTICIPER À CETTE ÉTUDE. EN COMPLÉTANT CE SONDAGE JE SIGNIFIE QUE JE CONSENS À PARTICIPER À CETTE RECHERCHE.

Si vous avez des questions concernant vos droits en tant que participant à l'étude, nous vous prions de contacter Adela Reid, Agente d'éthique en recherche/conformité, Université Concordia, au 514-848-2424 poste 7481 ou par courriel : adela.reid@concordia.ca

(vous pouvez imprimer cette page pour vos dossiers)

Appendix III: Questionnaires used in CHINA survey

(Basic Psychological Needs) BPN

The following questions concern your feelings about your job during the last year. (If you have been on this job for less than a year, this concerns the entire time you have been at this job.) Please indicate how true each of the following statement is for you given your experiences on this job. Remember that your boss will never know how you responded to the questions. Please use the following scale in responding to the items.

下面的问题都是关于你去年间对工作的感觉。（如果你在现有工作职位的时间少于一年，则根据你在职的全部时间回答）。基于你的在职工作经验，请使用下面的量表衡量下列每个说法有多么真实地反应你的情况。请记住：你得上司时不会得知你对本问卷的具体回应的。

1	2	3	4	5	6	7
一点也不（真实） not at all						非常（真实） very

1	I feel like I can make a lot of inputs to deciding how my job gets done. 我感觉自己可以个人投入很多（努力与建议）来决定如何完成我的工作。	1 2 3 4 5 6 7
2	I really like the people I work with. 我真喜欢与我一起工作的人（们）。	1 2 3 4 5 6 7
3	I do not feel very competent when I am at work. 我在工作时感觉自己不是非常胜任。	1 2 3 4 5 6 7
4	People at work tell me I am good at what I do. 公司的人（们）告诉我工作很能干。	1 2 3 4 5 6 7
5	I feel pressured at work. 我在上班时感到有压力。	1 2 3 4 5 6 7
6	I get along with people at work. 我与公司的人（们）合得来。	1 2 3 4 5 6 7

7	I pretty much keep to myself when I am at work. 上班时，我蛮独来独往的。	1 2 3 4 5 6 7
8	I am free to express my ideas and opinions on the job. 工作上我能自由地表示我的想法和意见。	1 2 3 4 5 6 7
9	I consider the people I work with to be my friends. 我认为与我共事的人（们）是我的朋友。	1 2 3 4 5 6 7
10	I have been able to learn interesting new skills on my job. 我能够通过我的工作学会有意思的新技能。	1 2 3 4 5 6 7
11	When I am at work, I have to do what I am told. 在上班时，我必须依令行事。	1 2 3 4 5 6 7
12	Most days I feel a sense of accomplishment from working. 大多数的时候，我感到工作的成就感。	1 2 3 4 5 6 7
13	My feelings are taken into consideration at work. 上班时，我的感觉是被顾及的。	1 2 3 4 5 6 7
14	On my job I do not get much of a chance to show how capable I am. 在我的工作中，我很少有机会展示我自己的能力。	1 2 3 4 5 6 7
15	People at work care about me. 公司的人（们）关心我。	1 2 3 4 5 6 7
16	There are not many people at work that I am close to. 公司里没有几个人与我很亲近。	1 2 3 4 5 6 7
17	I feel like I can pretty much be myself at work. 上班时，我觉得可以大致做回我自己。	1 2 3 4 5 6 7
18	The people I work with do not seem to like me much. 公司的人（们）好像不太喜欢我。	1 2 3 4 5 6 7
19	When I am working I often do not feel very capable. 我上班的时候经常觉得自己不是非常力所能及。	1 2 3 4 5 6 7
20	There is not much opportunity for me to decide for myself how to go about my work. 我没许多机会自己决定如何开展我的工作。	1 2 3 4 5 6 7
21	People at work are pretty friendly towards me. 公司的人（们）对我挺友好的。	1 2 3 4 5 6 7

Motivation at Work Scale (MAWS)

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.

人们会因为多种原因而为他们的工作付出努力。为什么你会为自己的工作或愿意为自己的工作而付出努力？应用下列量表，请指出以下的陈述在何种程度上契合你会为自己的工作或愿意为自己的工作而付出努力的原因之一。

1 完全不因为这个原因 not at all for this reason	2 非常少 very little	3 少 a little	4 适中 moderately	5 强烈 strongly	6 非常强烈 very strongly	7 完全因为这个原因 exactly for this reason
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I put effort in my job...

我为我的工作付出努力.....

1	to get others' approval (e.g., supervisor, colleagues, family, clients...). 由此得到其他人的认可。(例如： 上级， 同事， 家人， 客户.....)	1	2	3	4	5	6	7
2	Because others will respect me more (e.g., supervisor, colleagues, family, clients...). 因为其他人将会更加尊重我。(例如： 上级， 同事， 家人， 客户.....)	1	2	3	4	5	6	7
3	to avoid being criticized by others (e.g., supervisor, colleagues, family, clients...) 为了避免被其他人批评。(例如： 上级， 同事， 家人， 客户.....)	1	2	3	4	5	6	7
4	Because others will reward me financially only if I put enough effort in my job (e.g., employer, supervisor, ...). 因为其他人仅会在我为工作付出足够努力后才会给我财物上的回报。(例如： 雇主， 上级.....)	1	2	3	4	5	6	7
5	Because others offer me greater job security if I put enough effort in my job (e.g., employer, supervisor...). 因为如果我为我的工作付出足够努力，其他人会提供给我更好的工作保障。(例如： 雇主， 上级.....)	1	2	3	4	5	6	7
6	Because I risk losing my job if I provide insufficient efforts. 因为如果我为我的工作付出的努力不足够的话，我会有失业的风险。	1	2	3	4	5	6	7
7	Because I have to prove to myself that I can. 因为我必须向自己证明我能行。	1	2	3	4	5	6	7
8	Because it makes me feel proud of myself. 因为这会令我为自己感到骄傲。	1	2	3	4	5	6	7

9	Because otherwise I will feel ashamed of myself. 因为否则的话我会为自己感到羞耻。	1 2 3 4 5 6 7
10	Because otherwise I will feel bad about myself. 因为否则的话我会对自己感觉很不爽。	1 2 3 4 5 6 7
11	Because I personally consider it important to put efforts in this job. 因为我个人认为为这项工作付出努力是重要的。	1 2 3 4 5 6 7
12	Because putting efforts in this job aligns with my personal values. 因为为这项工作付出努力和我的个人价值观一致。	1 2 3 4 5 6 7
13	Because putting efforts in this job has personal significance to me. 因为为这项工作付出努力对我个人意义重大。	1 2 3 4 5 6 7
14	Because I have fun doing my job. 因为我在工作的时候获得很多乐趣。	1 2 3 4 5 6 7
15	Because what I do in my work is exciting. 因为在我工作中的所作所为令人激动。	1 2 3 4 5 6 7
16	Because the work I do is interesting. 因为我所做的工作有很有趣。	1 2 3 4 5 6 7
17	I don't , because I really feel that I'm wasting my time at work. 我没付出努力，因为我真觉得我正在工作中浪费我的时间。	1 2 3 4 5 6 7
18	I do little because I don't think this work is worth putting efforts into. 我付出少许努力，因为我不认为这项工作值得付出努力。	1 2 3 4 5 6 7
19	I don't know why I'm doing this job, it's pointless work. 我不知道为什么我在做这项工作，这是一项毫无意义的工作。	1 2 3 4 5 6 7

MLQ_5x-short (Rater Form- Example questions)

领导人姓名 : _____

公司编号 _____ 领导人编号 _____

This questionnaire is to describe the leadership style of the above-mentioned individual as you perceived it.

Please answer all items on this answer sheet. If an item is irrelevant, or do not know the answer, leave the answer blank. Please answer this questionnaire anonymously.

这是一份描述你所意识到的关于上述领导人之领导风格的问卷。请回答所有问卷中的问题。如果其中一个条目不相关或者你不知道答案，可以跳过不答。请匿名填写本问卷。

	IMPORTANT (necessary for processing): Which best describes you? 非常重要 (对问卷处理非常必要): 下列哪项最好地描述了你的情况?
<input type="checkbox"/>	I am at a higher organizational level than the person I am rating 我比我要评价的领导人的组织级别高
<input type="checkbox"/>	The person I am rating is at my organizational level 我与我要评价的领导人组织级别一样
<input type="checkbox"/>	I am at a lower organizational level than the person I am rating 我比我要评价的领导人组织级别低
<input type="checkbox"/>	I do not wish my organizational level to be known 我不希望披露我的组织级别信息

Forty-five descriptive statements are listed on the following pages. Judge how frequently each statement fits the person you are describing. Using the following rating scale.

以下列有 45 条描述性陈述。运用下列量表判断一下每种陈述适合你所描述的人的频率。

0 一点也不 Not at all	1 偶尔 Once in a while	2 有时 Sometimes	3 相当的经常 Fairly often	4 如果不是一直如此, 至少也是频率很高 Frequently, if not always
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The person I am rating...

我所描述的这个人.....

1	provides me with assistance in exchange for my efforts 为我提供协助以换取我的努力。	0	1	2	3	4
2	Re-examine critical assumptions to question whether they are appropriate 再次检查问题的重要假设以质疑它们是否恰当。	0	1	2	3	4
3	Fails to interfere until problems become serious 失于干涉直到问题变得严重起来。	0	1	2	3	4

.....

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Individualism-Collectivism Value Questionnaire

Please read the following statements carefully to see how each statement properly describe you for the most of the time. Circle the appropriate number using the below scale.

请仔细地阅读，看看这些陈述句在大多数时间里对你的适合程度。根据下面每个数字的意义，请在每个陈述句后圈上相应的数字。

- (1) 完全同意 Totally Agree
- (2) 同意 Agree
- (3) 有点同意 Somehow Agree
- (4) 既不同意也不反对（中立） Neutral
- (5) 有点反对 Somehow Disagree
- (6) 反对 Disagree
- (7) 完全反对 Totally Disagree

- | | |
|---|---------------|
| 1. I often “do my own thing”
我常常做自己的事情 | 1-2-3-4-5-6-7 |
| 2. I am a unique individual
我是一个独特的人 | 1-2-3-4-5-6-7 |
| 3. I enjoy being unique and different from others in many ways
在许多方面我都欣赏自己与众不同 | 1-2-3-4-5-6-7 |
| 4. Competition is the law of nature
竞争是自然规律 | 1-2-3-4-5-6-7 |
| 5. I enjoy working in situations involving competition with others
我喜欢竞争的工作环境 | 1-2-3-4-5-6-7 |
| 6. The well-being of my co-workers is important to me
合作伙伴的幸福对我而言很重要 | 1-2-3-4-5-6-7 |
| 7. If a co-worker gets a prize, I would feel proud,
如果我的合作伙伴得到嘉奖，我会感到自豪 | 1-2-3-4-5-6-7 |

8.	I feel good when I cooperate with others 当与别人合作时，我感觉好	1-2-3-4-5-6-7
9.	My happiness depends very much on the happiness of those around me 我的快乐很大程度上取决于我周围人的快乐	1-2-3-4-5-6-7
10.	I would sacrifice an activity that I enjoy very much If my family did not approve of it 如果我的家人不赞成，我会放弃我很喜欢的活动	1-2-3-4-5-6-7
11.	I would do what would please my family, even if I detested that Activity 如果能使我的家人愉快，即使是很讨厌的活动我也会参与	1-2-3-4-5-6-7
12.	I usually sacrifice my self-interest for the benefit of my group 为了集体的利益，我常常牺牲自己的利益	1-2-3-4-5-6-7
13.	Children should feel honoured if their parents receive a distinguished award 如果父母得到一次重大的嘉奖，孩子也应该感到很光荣	1-2-3-4-5-6-7
14.	I enjoy being unique and different from others in many ways 在许多方面我都欣赏自己与众不同	1-2-3-4-5-6-7

Appendix IV: Questionnaires used in CANADA survey

Engagement

Veillez indiquer à quelle fréquence vous éprouvez les sentiments ci-dessous lorsque vous êtes au travail.

Veillez indiquer à quelle fréquence vous éprouvez les sentiments ci-dessous lorsque vous êtes au travail.						
	Jamais	Rarement	Quelques fois	Souvent	Très souvent	Toujours
Je déborde d'énergie pour mon travail.	<input type="radio"/>					
Je trouve que mon travail a un sens et une utilité.	<input type="radio"/>					
Le temps passe très vite lorsque je travaille.	<input type="radio"/>					
Je me sens fort(e) et énergique pour faire ce travail.	<input type="radio"/>					
Je suis passionné(e) par mon travail.	<input type="radio"/>					
Lorsque je travaille, j'oublie tout autour de moi.	<input type="radio"/>					
Faire ce travail est stimulant.	<input type="radio"/>					
Lorsque je me lève le matin, j'ai envie d'aller travailler.	<input type="radio"/>					
Je suis content(e) lorsque je suis captivé(e) par mes tâches.	<input type="radio"/>					
Je suis fier(e) du travail que je fais.	<input type="radio"/>					
	Jamais	Rarement	Quelques fois	Souvent	Très souvent	Toujours

Je suis complètement absorbé(e) par mon travail.	<input type="radio"/>					
J'arrive à travailler longtemps sans m'arrêter.	<input type="radio"/>					
Selon moi, mon travail est un véritable défi.	<input type="radio"/>					
Je suis littéralement plongé(e) dans mon travail.	<input type="radio"/>					
Je ne me laisse pas abattre dans mon travail.	<input type="radio"/>					
Il m'est difficile de me détacher de mon travail.	<input type="radio"/>					
Je persévère toujours dans mon travail, même quand les choses ne vont pas bien.	<input type="radio"/>					

Votre motivation au travail

Les employés peuvent mettre des efforts dans leur travail pour plusieurs raisons. Pourquoi faites-vous des efforts au travail?

Veillez utiliser l'échelle ci-dessous pour indiquer si chacune des raisons est une des raisons pour lesquelles vous faites des efforts au travail actuellement. Nous entendons ici les efforts intellectuels, physiques et mentaux que vous déployez dans votre travail.

	Pas du tout	Très peu	Un peu	Moyennement	Fortement	Très fortement	Exactement
Pour obtenir des récompenses financières.	<input type="radio"/>						
Pour obtenir l'approbation de certaines personnes (mes supérieurs, collègues, clients, famille ...).	<input type="radio"/>						
Parce qu'autrement	<input type="radio"/>						

je me sentirais mal.							
Je ne sais pas pourquoi je fais ce travail, il ne sert à rien.	<input type="radio"/>						
Parce que mes supérieurs m'assurent une plus grande sécurité d'emploi.	<input type="radio"/>						
Parce que certaines personnes me respecteront davantage (mes supérieurs, collègues, clients, famille ...).	<input type="radio"/>						
Pour conserver mon emploi.	<input type="radio"/>						
Pour éviter les critiques de certaines personnes (mes supérieurs, collègues, clients, famille ...).	<input type="radio"/>						
Pour être fier de moi.	<input type="radio"/>						
J'en fais peu car j'ai vraiment l'impression de perdre mon temps à faire ce travail.	<input type="radio"/>						
	Pas du tout	Très peu	Un peu	Moyennement	Fortement	Très fortement	Exactement
Car je dois me prouver à moi-même que j'en suis capable.	<input type="radio"/>						
Car ce que je fais dans mon travail est stimulant.	<input type="radio"/>						
Parce qu'autrement j'aurais honte de moi.	<input type="radio"/>						

Car je considère qu'il est important de faire des efforts dans ce travail.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Parce que j'ai du plaisir à faire ce travail.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Car ce travail correspond bien à mes valeurs personnelles.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Parce que le travail que je fais est très intéressant.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

J'en fais peu car je ne crois pas que ce travail en vaille la peine.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Car ce travail a une signification personnelle pour moi.

<input type="radio"/>							
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

? Veuillez utiliser l'échelle ci-dessous pour indiquer si chacune des raisons est une des raisons pour lesquelles vous faites des efforts au travail actuellement. Nous entendons ici les efforts intellectuels, physiques et mentaux que vous déployez dans votre travail.

Votre satisfaction au travail

Les questions suivantes concernent votre satisfaction au travail. Veuillez évaluer à quel point vous êtes d'accord avec chacun des énoncés.

	Tout à fait en désaccord	en désaccord	Neutre	en accord	Tout à fait d'accord
Je me sens libre d'exprimer mes idées et opinions dans ce travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je ne me sens pas vraiment lié(e) aux autres personnes au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Au travail j'ai souvent l'impression d'avoir à suivre les ordres des autres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je ne me sens pas vraiment compétent(e) dans mon travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J'ai le sentiment de faire partie d'un groupe au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je peux parler de choses qui me tiennent à cœur avec les gens au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Certaines personnes à mon travail sont de vrais amis.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J'ai l'impression de pouvoir être moi-même au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J'ai l'impression de pouvoir accomplir les tâches même les plus difficiles dans mon travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Personne ne tient à moi au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je me sens libre d'exécuter mon	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

travail comme je
crois qu'il est bon de
le faire.

Les questions suivantes concernent votre satisfaction au travail. Veuillez évaluer à quel point vous êtes d'accord avec chacun des énoncés.

	Tout à fait en désaccord	en désaccord	Neutre	en accord	Tout à fait d'accord
Je ne me mêle pas aux autres à mon travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je suis bon(ne) dans ce que je fais dans mon travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Au travail, je me sens forcé(e) de faire des choses que je ne veux pas faire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je maîtrise bien mes tâches dans mon travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Si je pouvais choisir, je ferais les choses différemment au travail.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Les tâches que je dois faire au travail sont celles que je veux vraiment faire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je me sens compétent(e) dans mon travail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je me sens souvent seul(e) quand je suis avec mes collègues.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Au travail, les gens m'incitent à participer aux activités	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

sociales.

Au travail, il y a des gens qui me comprennent vraiment bien.	<input type="radio"/>				
Il n'y a personne avec qui je peux partager mes pensées si je voulais le faire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Les questions suivantes ont pour objectif d'évaluer vos valeurs profondes. Nous vous posons les questions suivantes pour nous permettre de comparer les résultats de cette étude dans votre organisation avec celles d'une organisation en Chine. Nous vous sommes reconnaissants d'évaluer comment chacun des énoncés ci-dessous vous représente en général dans votre vie (ou représente vos valeurs profondes).

	Tout à fait En Désaccord	En Désaccord	Quelque peu En Désaccord	Incertain	Quelque peu D'accord	D'accord	Tout à fait D'accord
Mon bonheur dépend beaucoup du bonheur de ceux qui m'entourent.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je ferais ce qui ferait plaisir à ma famille, même si je déteste cette activité.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je sacrifie habituellement mes intérêts personnels pour ceux de mon groupe.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J'aime travailler dans des situations où je suis en compétition avec d'autres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
J'aime être unique et différent des autres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Les enfants devraient se sentir honorés si leurs parents reçoivent un prix ou une reconnaissance de distinction.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je fais souvent ma propre affaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
La compétition est une loi de la nature.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Si un collègue de travail reçoit un prix, je me sentirais fier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je suis un individu unique.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Tout à fait En Désaccord	En Désaccord	Quelque peu En Désaccord	Incertain	Quelque peu D'accord	D'accord	Tout à fait D'accord
Je sacrifierais une activité que j'aime beaucoup si ma famille était en désaccord avec sa pratique.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sans la compétition, ce serait impossible d'avoir une bonne société.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Je me sens bien lorsque que je coopère avec les autres.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Le bien-être de mes collègues de travail est important pour moi.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>