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How do transformational leaders foster positive employee outcomes? A self-determination-based analysis of employees' needs as mediating links†

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Summary Although followers' needs are a central aspect of transformational leadership theory, little is known about their role as mediating mechanisms for this leadership style. The present research thus seeks to integrate and extend theorizing on transformational leadership and self-determination. In particular, we propose that the satisfaction of followers' basic needs (autonomy, competence, and relatedness) mediates the relationship between transformational leadership and employee outcomes (job satisfaction, self-efficacy, and commitment to the leader). We tested this model in two studies involving employees from a broad spectrum of organizations in Germany ($N = 410$) and in Switzerland ($N = 442$). Results revealed largely consistent patterns across both studies. The need for competence fulfillment solely mediated the link between transformational leadership and occupational self-efficacy; the need for relatedness fulfillment solely mediated the link between transformational leadership and commitment to the leader. The mediating pattern for the link between transformational leadership and job satisfaction varied slightly across studies. In Study 1, only the need for autonomy fulfillment was a significant mediator, whereas in Study 2, all three needs mediated this relationship. Taken together, our study integrates theorizing on transformational leadership and self-determination by corroborating that need fulfillment indeed is a central mechanism behind transformational leadership. Copyright © 2012 John Wiley & Sons, Ltd.

Keywords: transformational leadership; self-determination theory; basic psychological needs

Leadership is widely regarded as one of the key factors for organizational success (Yukl, 2010). One leadership theory that has attracted a vast amount of attention is transformational leadership (Bass, 1985; Burns, 1978). Since 1990, more studies have been devoted to this leadership style than to all other major theories of leadership combined (Judge & Piccolo, 2004). On the basis of the accumulated research evidence, there can now be little controversy that transformational leadership is related to a wide range of positive outcomes (Judge & Piccolo, 2004).

Given the evidence for its effectiveness, it appears to be an important next step in the analysis of transformational leadership to examine *why* it evokes these desirable outcomes. In doing so, previous studies have focused largely on three types of mechanisms: (i) variables related to followers' self-perception (e.g., team potency; Schaubroeck, Lam, & Cha, 2007); (ii) followers' attitudes toward the leader (e.g., trust; Jung, Yammarino, & Lee, 2009); and (iii) followers' perceptions of their job (e.g., meaningfulness; Arnold, Turner, Barling, Kelloway, & McKee, 2007). These studies have doubtlessly advanced our understanding of transformational leadership processes. However, they seem to have overlooked a central tenet of this theory: its focus on followers' psychological needs as a mediating

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process. Accordingly, several scholars have called for additional research into the mechanisms of transformational leadership (e.g., Yukl, 2010). Judge, Woolf, Hurst, and Livingston (2006, p. 210) specifically have criticized that past research has focused largely on the "continued generation of individual mediator variables" and called for "more focus on integrative efforts." By integrating two prominent theoretical accounts and, thereby, examining a multiple mediator model, the present research addresses this call.

Introducing the concept of transformational leadership, Burns (1978) stated "the essence of the leaders' power is [. . .] the extent to which they can satisfy – or appear to satisfy – specific *needs* of the followers" (p. 294; emphasis in original). He defined the transformational leader as a person who "seeks to satisfy higher needs and engages the full potential of the follower" (p. 4). In a similar vein, Bass (1990) described the fulfillment of followers' emotional needs as a central aspect of transformational leadership. Transformational leaders go beyond social exchange and involve higher psychological needs including needs for competence and affection. By appreciating and addressing these needs, they develop the potential of their followers and foster their commitment to and effort for the collective. This, in turn, is seen as key for the effectiveness of transformational leaders (Bass, 1985; Burns, 1978). Indeed, the focus on followers' psychological needs seems to be a central aspect that differentiates transformational leadership from transactional leadership styles (Bono & Judge, 2003). Against this background, it seems surprising that this central tenet of transformational leadership theory has not yet been empirically examined. The present study strives to address this research gap by elaborating on the links between transformational leadership, employee outcomes, and employees' needs fulfillment as a mediator and by providing an empirical test of these relationships.

To explore employees' needs, we draw on self-determination theory (SDT; Deci & Ryan, 2000; Gagné & Deci, 2005), which can be regarded as one of the most detailed and best validated frameworks of psychological needs (Greguras & Diefendorff, 2009). SDT posits the existence of three universal needs: the needs for autonomy, for competence, and for relatedness. According to SDT, the fulfillment of these needs is essential for personal growth and optimal performance. The main source of need satisfaction is a person's social environment. In the organizational context, leaders are regarded as the central factor in satisfying employees' needs, given their influence on tasks characteristics and work design (Deci, Connell, & Ryan, 1989). By integrating transformational leadership theory and SDT, we hypothesize that basic need fulfillment mediates the link between transformational leadership and employee outcomes. More precisely, we propose that the satisfaction of the needs for autonomy, competence, and relatedness underlies the link between transformational leadership and followers' job satisfaction, self-efficacy, and affective commitment to the leader.

We chose these outcome variables because they have been frequently studied in the literature on transformational leadership, and they have been found to be significantly related to this leadership style (e.g., Bono & Judge, 2003; Kark, Shamir, & Chen, 2003; Walumbwa, Avolio, & Zhu, 2008). Further, they represent three different classes of dependent variables: employees' attitudes toward work (job satisfaction; Brief & Weiss, 2002), performance-related measures (self-efficacy; Stajkovic & Luthans, 1998), and relationship-based variables (affective commitment to the leader; Becker, Billings, Eveleth, & Gilbert, 1996). This enabled us to examine an important issue, that is, whether basic psychological needs *differentially* mediate the links between transformational leadership and different types of outcomes. Moreover, these outcomes are of central importance to organizational practice—to both management and employees. As meta-analytic reviews demonstrate, they are strongly linked to work-related performance, which tends to be of primary interest from a management perspective (Stajkovic & Luthans, 1998). But beyond that, they are also associated with employee health, which is a central outcome variable from an employees' point of view (Faragher, Cass, & Cooper, 2005). Finally, it is important to note that we examined all concepts and relationships of the present study at the individual level of analysis. This approach is in line with recent work on cross-level analyses of leadership, which found that transformational leadership operates at the individual level of analysis rather than at the dyadic or group level (Jung *et al*., 2009).

The present research seeks to make two important contributions. First, by examining the fulfillment of basic psychological needs as a mechanism for leadership influence, it tests a central assumption of transformational leadership theory. Second, the study examines the differential effects of basic psychological needs in linking transformational leadership to different kinds of outcome variables. We believe that this analysis may provide valuable insights into

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why this leadership style can be linked to such a wide variety of desirable employee outcomes. Additionally, this investigation may contribute to the theory development of SDT, which, in its current form, does not make outcome-specific predictions of need satisfaction (Sheldon & Filak, 2008).

Linking transformational leadership to need satisfaction

Transformational leadership has been conceptualized as comprising four dimensions (Bass, 1985): idealized influence (i.e., engaging in charismatic role modeling that earns the admiration of followers; articulating high expectations about the group's mission and goals), inspirational motivation (i.e., providing a vision and meaning to followers; demonstrating optimism and confidence that goals can be achieved), intellectual stimulation (i.e., encouraging followers to challenge existing approaches and assumptions; reframing problems to find new solutions), and individual consideration (i.e., considering followers' individual needs, strengths, and aspirations; developing their capabilities). As noted earlier, there is considerable evidence for the effectiveness of transformational leaders. We believe that SDT provides a highly valuable framework to understand the underlying processes behind this effectiveness.

Self-determination theory is a motivational framework that rests on the assumption that individuals possess an innate desire for personal growth (Deci & Ryan, 2000). The theory posits the fulfillment of three basic psychological needs as an essential prerequisite for human thriving and development: needs for autonomy, competence, and relatedness. *Autonomy* refers to being able to self-organize one's behavior. It involves a sense of choice and a feeling of not being controlled by forces alien to the self. *Competence* concerns feelings of mastery and effectiveness, which originate from opportunities to apply and expand one's capabilities. *Relatedness* refers to a feeling of connectedness and association and involves a sense of being significant to others. Past research has demonstrated that the satisfaction of these psychological needs is related to a wide range of positive outcomes including performance, self-esteem, and organizational commitment (Gagné & Deci, 2005). Contrary to other need theories that focus on stable *individual differences* in need strength, SDT rather proposes differences in *opportunities* to satisfy needs. Thus, SDT provides a well-elaborated framework of need satisfaction, which, in the present context, is of primary interest.

Prior to describing the theoretical model of the present study in detail, it appears crucial to note how it differs from and extends previous work, perhaps most importantly with respect to the research by Bono and Judge (2003). First, Bono and Judge (2003) focused on self-concordance theory, a derivative of SDT, to explain the effectiveness of transformational leaders. Even though we believe that this approach significantly contributed to the understanding of transformational leadership, self-concordance is related to SDT's organismic integration model, which clearly differs from SDT's basic needs model (Ryan & Deci, 2008). In contrast to SDT's need concept, self-concordance is a conative variable measuring whether individuals perceive work-related goals as self-chosen or as externally imposed (Sheldon & Elliot, 1999). Second, Bono and Judge (2003) proposed that followers of transformational leaders would *perceive* work-related goals as set internally rather than externally. Although we think that a perception of internally set goals may address the need for autonomy, we believe that this does not fully capture how transformational leadership fulfills this need. As Deci *et al*. (2001, p. 931) outlined, feeling autonomous "requires experiencing choice and feeling like the initiator of one's own actions," which, we believe, goes beyond a mere *perception* of goal consistency. As we will detail in the succeeding paragraphs, employee participation seems an integral part of transformational leadership (Kirkman, Chen, Farh, Chen, & Lowe, 2009). Third, autonomy represents only one of the three needs that SDT regards as essential for well-being and optimal functioning. The theory also emphasizes the importance of relatedness and competence needs. Both of these needs are strongly related to transformational leadership behavior and seem to play an important role for its effectiveness (Walumbwa *et al*., 2008).

Another framework that should be discussed here is Shamir, House, and Arthur's (1993) theory of leadership effectiveness. The model proposes that transformational leaders have a profound impact on followers' self-concepts. This, in turn, should translate into desirable employee attitudes and behaviors (Shamir *et al*., 1993). Despite being regarded as the most detailed account of the effects of transformational leadership, the model appears rather complicated, as it suggests a large number of diverse mechanisms. Additionally, not all of the proposed mechanisms

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seem elaborated upon sufficiently (Yukl, 2010). Consequently, most studies building upon this model have only examined subsets of the proposed processes (mainly one or two variables); to date, no study has examined all proposed links simultaneously. Against this background, it seems warranted to develop a more parsimonious model for the processes behind transformational leadership. The present research seeks to provide such a model.

Transformational leadership and the need for autonomy

Transformational leaders are characterized by providing followers with meaning for their work by articulating value-laden descriptions of tasks (idealized influence) and by communicating attractive goals for the future (inspirational motivation). When framing these goals, they are particularly adept at referring to universalistic values that appeal to followers (Bass, 1985). As a consequence, followers tend to perceive these goals as congruent with their own principles and thus perceive them as their own (Bono & Judge, 2003). Supporting this view, Arnold *et al.* (2007) found that followers of transformational leaders experience their work as more meaningful compared with subordinates of non-transformational leaders.

However, transformational leaders not only frame goals in a way that appeals to followers and fosters a *perception* of autonomy but also show individual consideration for their followers' opinions and take their perspective into account when making decisions (Bass, 1985). Additionally, transformational leaders encourage their followers to develop new approaches to efficiently accomplish their work (intellectual stimulation). Hence, they offer employees freedom and autonomy in the way they are to execute and fulfill their tasks. As Kirkman *et al.* (2009) argued, employee participation seems an integral aspect of transformational leadership behavior.

Another central aspect for followers' autonomy lies in the absence of close control (Ryan & Deci, 2008). As opposed to transactional leaders, who continuously monitor followers' actions and sanction employees' behavior through reward and punishment, transformational leaders strive to address followers' self-motivation for the group's goals (Bass, 1985). As Shamir *et al.* (1993) suggested, transformational leaders link collective goals to the self of their followers, which makes followers more likely to autonomously pursue these goals.

According to SDT, these leadership behaviors directly address followers' need for autonomy. As emphasized by SDT, autonomy concerns an experience of choice and feeling like the origin of one's actions (Ryan & Deci, 2008). It is fostered by a leadership style that offers opportunities for participation, provides meaning, acknowledges followers' perspectives, and encourages self-initiation (Deci *et al.*, 1989, 2001). Additionally, SDT underlines the absence of feeling externally controlled, which strongly undermines a sense of autonomy (Ryan & Deci, 2008). In summary, we expect that transformational leadership is positively related to followers' sense of autonomy.

Hypothesis 1a: Transformational leadership and satisfaction of followers' need for autonomy are positively related.

Transformational leadership and the need for competence

When explaining leadership effectiveness, transformational leadership theory emphasizes the importance of building followers' capabilities. Transformational leaders strive to enhance their followers' knowledge, skills, and abilities by investing considerable effort into their training (individual consideration). Furthermore, it has been argued that transformational leaders provide optimal conditions for learning by providing regular and adequate feedback (Kirkpatrick & Locke, 1996) and by creating a team climate of trust and respect (Isaksen, 1983). Hence, transformational leaders can be seen as highly effective coaches.

Besides providing support for personal development, transformational leaders also build a sense of confidence among employees. As Shamir *et al.* (1993) pointed out, they increase employees' feelings of competence by expressing high expectations (idealized influence) and by voicing confidence that these expectations can be met (inspirational motivation). Research in the tradition of goal setting theory suggests that these are central factors enhancing followers' sense of competence (Locke & Latham, 2002).

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Another way in which transformational leadership affects followers' sense of competence is role modeling (Walumbwa *et al*., 2008). As Bass (1985) pointed out, transformational leaders can be seen as ideal points of reference for social learning. By being optimistic about the future and showing confidence in their abilities, transformational leaders are likely to show high motivation in pursuing their goals (Bandura, 1997). Hence, transformational leaders can be regarded as confident and successful role models, who will enhance a sense of competence among their followers.

According to the basic needs framework of SDT, opportunities to express and expand one's capabilities are important factors for the need for competence (Deci & Ryan, 2000). An environment that provides optimal challenges, adequate feedback, and a supportive climate is regarded as a central factor for the need for competence fulfillment (Ryan & Deci, 2008). Hence, transformational leadership should effectively fulfill this need. In summary, we propose:

Hypothesis 1b: Transformational leadership and satisfaction of followers' need for competence are positively related.

Transformational leadership and the need for relatedness

One key characteristic of transformational leaders is the sense of relatedness they foster among employees. They do so in two ways: (i) by strengthening the attraction between leader and followers and (ii) by increasing the bond among followers (Kark *et al*., 2003; Walumbwa *et al*., 2008). First, transformational leaders emphasize morale and adhere to high ethical standards (idealized influence). Because of their conviction in the goals and purpose of the team, they engage in self-sacrificing actions and are willing to neglect their own interests for the good of the group (Avolio, 1999). These behaviors earn the respect and admiration of employees (Conger & Kanungo, 1998). In line with this view, Wang, Law, Hackett, Wang, and Chen (2005) found that transformational leadership was positively linked to dyadic relationship quality between transformational leaders and their subordinates. This, in turn, should contribute to satisfying the need for relatedness.

Second, several scholars have emphasized the importance of social identity processes for the transformational leaders' influence. Transformational leaders are particularly apt to enthuse their followers to the mission and goals of the group (inspirational motivation). They do so by emphasizing the importance of the group's goals evoking a feeling of relatedness among employees (Walumbwa *et al*., 2008). Additionally, they highlight past achievements of the group and positively distinguish the team and its missions from other groups (Burns, 1978). In other words, they positively affect followers' perception of the group and, therefore, social identification.

Self-determination theory posits that need for relatedness fulfillment is critically dependent on a sense of connectedness to others (Deci & Ryan, 2000). Acknowledgement and support from other people who show genuine interest in one's thoughts and interests are important satisfiers of this need (Ryan & Deci, 2008). As outlined earlier, transformational leaders meet these conditions by fostering the bond between leader and follower and among followers. Therefore, we propose:

Hypothesis 1c: Transformational leadership and satisfaction of followers' need for relatedness are positively related.

Linking Need Satisfaction to Job Satisfaction, Self-Efficacy, and Affective Commitment

Need satisfaction and job satisfaction

In applying SDT to the work context, Gagné and Deci (2005) proposed that the fulfillment of basic psychological needs should contribute to employees' job satisfaction. According to SDT, situations that satisfy one or more basic psychological needs foster well-being and optimal functioning (Ryan & Deci, 2008). At work, this will contribute to

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a positive evaluative judgment of one's work environment. In support of this hypothesis, Lynch, Plant, and Ryan (2005) found that the fulfillment of basic psychological needs was positively related to employees' satisfaction with their job tasks. Their results also demonstrated that each of the three needs had a unique effect on job satisfaction.

This finding is fully in line with SDT. A central assumption of SDT's need concept is that all three basic needs *simultaneously* and *additively* foster positive outcomes. Indeed, SDT, in its current form, does not make differential predictions about the link between need satisfaction and outcomes (Sheldon & Filak, 2008). However, the theory maintains that the frustration of any of the three needs will result in diminished well-being (Ryan & Deci, 2008). Hence, we propose:

Hypothesis 2a: Autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction positively relate to followers' job satisfaction.

Self-determination theory's prediction of simultaneous and additive effects of need satisfaction on positive outcomes seems very reasonable for phenomena that are affected by a wide range of factors. For instance, job satisfaction, as a general appraisal of job experiences, is a broad construct and influenced by a variety of variables (Brief & Weiss, 2002). Conversely, other important work-related variables, such as self-efficacy or the relationship quality between leader and follower, focus on specific aspects of organizational life and are therefore narrower in scope. These outcomes are strongly affected by more domain-specific antecedents and are less sensitive to more general factors (Bandura, 1997; Becker *et al*., 1996). Transferring this insight to basic need fulfillment, we suggest that basic needs need not always to operate simultaneously to affect positive outcomes. Indeed, for specific, narrow outcomes (e.g., self-efficacy), the satisfaction of certain needs (e.g., need for competence) appears more important than the fulfillment of others (e.g., need for relatedness). Before we elaborate on this argument in the following section, we would like to emphasize that the term "narrow" does not mean that these constructs are unimportant. On the contrary, according to Ajzen and Fishbein's (1977) principle of attitude-behavior correspondence, narrow concepts play an important role in organizational research because they seem to possess considerable power when predicting desirable employee outcomes.

Need satisfaction and self-efficacy

In line with SDT's proposition, past research has shown that need satisfaction is positively related to optimal performance (Gagné & Deci, 2005). An essential factor for people's performance is the belief in their abilities to succeed, that is, their self-efficacy (Stajkovic & Luthans, 1998). Self-efficacy beliefs arise from past experiences with personal mastery as a key source (Bandura, 1997). They represent learned cognitions concerning one's expectations to accomplish specific future tasks. To determine their chances for success, individuals weigh and integrate information about their capabilities. As Bandura (1997) emphasized, emotional states are an important factor in this process. In line with this view, past research has shown that positive affect caused higher levels of self-efficacy (Kavanagh & Bower, 1985). Conversely, emotional arousal and negative affective states should diminish self-efficacy beliefs, because they signal a lack of ability (Bandura, 1977) and foster the recall of failure (Bower, 1981).

Although self-efficacy theory emphasizes that feeling capable is of importance to the evaluation of one's self-efficacy, it does not refer to autonomy or to the quality of interpersonal relationships as antecedents of self-efficacy beliefs. Likewise, SDT's conceptualizations of the needs for relatedness and autonomy do not suggest a relationship with self-efficacy. Therefore, we propose:

Hypothesis 2b: Competence need satisfaction (but not autonomy need satisfaction and relatedness need satisfaction) positively relates to followers' self-efficacy beliefs.

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Need satisfaction and affective commitment to the leader

Affective commitment reflects an individual's attachment and identification to a certain group or person (Meyer, Allen, & Smith, 1993). Past research has emphasized the importance of distinguishing between multiple foci of commitment, and studies have shown that commitment to the supervisor is a stronger predictor of work-related outcomes than commitment to the organization (Becker *et al*., 1996).

Stinglhamber and Vandenberghe (2003) argued that supervisors elicit affective commitment by taking care of employees' well-being and by appreciating their contributions. They concluded that these behaviors "increase affective commitment by fulfilling such socio-emotional needs as needs for esteem, approval and affiliation" (p. 252). In a similar vein, the group engagement model (Tyler & Blader, 2003) suggests that treatment by the supervisor is an important antecedent of attachment. Respectful treatment indicates that a person is valuable to the group, which results in stronger attachment to the group and its supervisor. Supporting this view, past research has consistently shown that a sense of personal significance for the organization has been the strongest antecedent of affective commitment (Meyer & Allen, 1997). In summary, we propose:

Hypothesis 2c: Relatedness need satisfaction (but not autonomy need satisfaction and competence need satisfaction) positively relates to followers' affective commitment to their leader.

Linking Transformational Leadership, Need Satisfaction, and Desirable Employee Outcomes

As noted earlier, numerous studies have demonstrated the link between transformational leadership and positive employee outcomes including followers' job satisfaction, self-efficacy, and affective commitment to the leader. However, no study to date has examined whether and how employees' need fulfillment may mediate these links. In line with transformational leadership theory and on the basis of the rationale developed in the previous sections, we expect that need satisfaction may be an important constituent of transformational leadership. In linking transformational leadership and SDT, we propose that transformational leaders shape employees' attitudes and behaviors by fulfilling basic psychological needs. Specifically, we propose:

Hypothesis 3a: Autonomy need satisfaction, competence need satisfaction, and relatedness need satisfaction mediate the link between transformational leadership and followers' job satisfaction.

Hypothesis 3b Competence need satisfaction (but not autonomy need satisfaction and relatedness need satisfaction) mediate the link between transformational leadership and followers' self-efficacy beliefs.

Hypothesis 3c Relatedness need satisfaction (but not autonomy need satisfaction and competence need satisfaction) mediates the link between transformational leadership and followers' affective commitment to their leader.

General Method

To test our theoretical model, we conducted two studies. In Study 1, we collected data in Germany using a cross-sectional design. In Study 2, we collected data in the German-speaking part of Switzerland and induced a time lag between the measurement of leadership behavior and the remaining variables. In both studies, we used the same

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measures. Further, we analyzed both data sets by applying the same statistical methods. For the sake of parsimony, we have merged their method sections, yet highlighting the sample characteristics for each study.

Overview of procedure

To reach a broad cross section of the working population, we recruited participants on diverse online portals. We included only those participants who were employed at the time of the study and who reported having a specific leader in the final analyses. In Study 1, participants completed all measures in a single session. In Study 2, participants first answered demographic questions and rated transformational behavior of their leader (T1). Four weeks later (T2), they filled in questionnaires measuring need fulfillment, job satisfaction, occupational self-efficacy, and affective commitment to the leader. We sent the link for the second survey via email to each participant.

Measures

Transformational leadership

We measured transformational leadership using Bass and Avolio's (1995) Multifactor Leadership Questionnaire (MLQ 5 x Short) in the German version by Felfe (2006), which comprises 19 items measuring all facets of transformational leadership behavior. A sample item is *My supervisor helps me to develop my strengths* (1 = *never* to 5 = *almost always*). Consistent with previous research, we combined all facets into one single factor of transformational leadership (e.g., Bono & Judge, 2003). A series of confirmatory factor analyses (CFAs), which we report in the succeeding paragraphs, provided justification for this approach. Cronbach's alpha of the scale is .96 in Study 1 and .95 in Study 2.

Need satisfaction

We measured need satisfaction using the Basic Needs Satisfaction in Relationship Scale by La Guardia, Ryan, Couchman, and Deci (2000). We chose this scale because we were interested in the effects of need satisfaction derived from the leader rather than in the effects of need fulfillment derived from the broader working context. The scale measures each basic need satisfaction with three items (response scale: 1 = *totally disagree* to 5 = *totally agree)*. The sample items are as follows: *In the working relationship with my direct supervisor, I have a say in what happens and I can voice my opinion* (*autonomy*), *In the working relationship with my direct supervisor I feel like a competent person* (*competence*), *In the working relationship with my direct supervisor, I often feel a large personal distance* (*relatedness*, reversely coded). In Study 1, Cronbach's alpha for autonomy satisfaction is .82, .80 for competence satisfaction, and .86 for relatedness satisfaction; in Study 2, Cronbach's alpha are .82, .84, and .83, respectively.

Job satisfaction

We measured general job satisfaction using the 3-item scale of Hackman and Oldham's (1975) Job Diagnostic Survey. A sample item is *Generally speaking, I am very satisfied with my job* (1 = *totally disagree* to 7 = *totally agree*). Cronbach's alpha for the scale is .82 in Study 1and .85 in Study 2.

Occupational self-efficacy

To measure occupational self-efficacy, we adapted Schwarzer and Jerusalem's (1995) General Self-Efficacy Scale to fit the work context by adding the phrase "when I am at work" to each item. A sample item is *When I am at work, I can always manage to solve difficult problems if I try hard enough* (1 = *not at all true* to 4 = *exactly true*). Cronbach's alpha of the scale is .89 in Study 1 and .87 in Study 2.

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Affective commitment

To assess participants' affective commitment to their leader, we used the Affective Organizational Commitment Scale from Meyer *et al.* (1993), replacing the expression "my organization" with "my leader." A sample item is *My leader has a great deal of personal meaning for me* (1 = *totally disagree* to 5 = *totally agree*). Cronbach's alpha of the scale is .76 in Study 1 and .80 in Study 2.

The original language of the affective commitment scale, as well as of the job and need satisfaction measures, is English. To ensure translation equivalence, we translated all items in German and then back-translated in English by two separate bilingual persons proficient in both German and English. The comparison between the original and the back-translated versions supported the conceptual equivalence between the items.

Control variables

Past research has shown that employees' age, gender, and leader–follower dyadic tenure are related to affective commitment (e.g., Meyer, Stanley, Herscovitch, & Topolnytsky, 2002) as well as to job satisfaction (e.g., Bellou, 2010). Thus, we controlled for these variables in both studies.

Study 1

Method

Sample

In total, we analyzed data from 410 employees. The sample comprised 64.9 per cent ($n = 266$) female employees. The average age of the participants was 36.03 years ($SD = 11.55$). Thirty per cent of the participants held at least an academic master's degree; 37 per cent met the general requirements for university admission or had a bachelor's degree. Participants worked in various industries. The most prominent sectors were service (11.3 per cent), education (8.9 per cent), and health care (7.1 per cent). Most participants (70 per cent) were employed at least 32 hours per week. Finally, the average tenure with the current leader was 3.65 years ($SD = 4.07$).

Results

Validity analyses

Given that a large number of items can be problematic in structural equation models, we used item parcels as indicators of constructs that were assessed by more than three items: we parceled indicators of transformational leadership according to its five subscales, whereas we parceled indicators of occupational self-efficacy and affective commitment to the leader according to the *item-to-construct balance* technique (Little, Cunningham, Shahar, & Widaman, 2002). The CFA showed that the measurement model fits the data well ($\chi^2/df = 1.68$; Tucker–Lewis index = 0.98; comparative fit index = 0.98; root mean square error of approximation = 0.04). The inspection of factor loadings showed that all indicators significantly loaded on their intended latent factor (standardized loadings ranged from .65 to .95, $p < .001$). Further, we observe no cross-loadings.

In a next step, we compared the fit of our measurement model against two alternative models derived from theoretical considerations of the transformational leadership model and SDT's basic needs framework: (i) an 11-factor model, in which all five subscales of transformational leadership were considered individually; and (ii) a 5-factor model, in which all three need satisfaction scales were combined into one factor. The chi-square difference test showed that the proposed 7-factor model fitted the data significantly better than the two alternative models ($\Delta\chi^2[363, N = 410] = 707.19$, $p < .001$ and $\Delta\chi^2[21, N = 410] = 448.51$, $p < .001$, respectively). To test for divergent validity, we followed the recommendation by Kelloway (1998) and compared our measurement model with all possible models, in which each pair of

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constructs forms a single factor. The chi-square difference tests showed that the measurement model fitted the data significantly better than any of the alternative models.

To provide further evidence for the validity of our measures, we examined each factor's average variance extracted (AVE; i.e., the average variance explained by the items composing each scale) as suggested by Fornell and Larcker (1981). On the basis of this procedure, two criteria must be met to support construct validity: (i) the AVE of each scale should exceed .50, and (ii) the squared correlation between two scales should be lower than the AVE of each of the two scales. This latter criterion indicates divergent validity. In line with both criteria, the AVE of all constructs exceeded .50 (AVE ranged from .64 to .79 fulfilling the first criterion), and all squared correlations between scales were lower than the AVE of the compared scales (fulfilling the second criterion). Taken together, these analyses support the validity of the present constructs.

Common method bias

To examine the potential influence of common method variance in our data, we applied the CFA marker variable technique by Williams, Hartman, and Cavazotte (2010). To examine the presence of biasing effects, this procedure uses a variable that is theoretically unrelated to at least one other variable in the proposed model (i.e., a marker variable). Following this procedure, five nested CFA models must be estimated. In Model 1, we allowed all variables to correlate and estimated freely all parameters. In Model 2, we fixed the marker variables' parameters to the values obtained from the initial CFA model and forced to zero the correlations between the marker variable and all other variables. The third model (Method-C model) adds method factor loadings, which are constrained to be equal in size. The fourth model (Method-U model) allows the added method factor loadings to be freely estimated. The final model (Method-R model) is identical to the fourth or third model (depending on which of them provided a better fit to the data), but the correlations between the variables are constrained to their values from the baseline model. If Method-R model does not fit the data better than Method-C or Method-U model, the relationships in the model are *not* significantly biased by method variance.

In line with the recommendations of Williams *et al*. (2010), we selected occupational self-efficacy as a marker variable because it has the weakest relationships to other variables in the model (Table 1). In establishing the five models, we included all variables except for need for competence satisfaction, because it, on the basis of our hypotheses, should be significantly linked to self-efficacy (and, therefore, may bias the results of the analysis). The results showed that the Method-R model was not superior to the Method-U model ($\Delta\chi^2[13, N=410] = 11.54, p = .57$). This indicates that the relationships between the concepts of our study were *not* significantly biased by common method variance (Williams *et al*., 2010). To examine whether common method variance influenced the link between need for competence satisfaction and occupational self-efficacy, we conducted a second marker analysis using affective commitment as the marker (because it shows the lowest correlation with occupational self-efficacy). This analysis also revealed that common method variance did not bias the examined relationship ($\Delta\chi^2[1, N=410) = 1.19, p = .17$].

Descriptive statistics

Table 1 contains the means, standard deviations, and zero-order correlations of all studied variables. In line with previous research, transformational leadership was positively related to job satisfaction ($r = .47, p < .001$), occupational self-efficacy beliefs ($r = .11, p < .05$), and affective commitment to the leader ($r = .74, p < .001$).

Hypothesis testing

Hypotheses 1a–c

To test Hypotheses 1a–c, we conducted partial correlations controlling for age, gender, and leader–follower dyadic tenure. In support of Hypotheses 1a–c, partial correlations showed that transformational leadership was positively associated with the satisfaction of followers' needs for autonomy ($r = .69, p < .001$; Hypothesis 1a), competence ($r = .51, p < .001$, Hypothesis 1b), and relatedness ($r = .78, p < .001$; Hypothesis 1c).

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Table 1. Means, standard deviations, and zero-order correlations; Studies 1and 2.

	Study 1		Study 2											
Variable	*M*	*SD*	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
1. Age	36.03	11.55	33.36	11.32	—	−.22	.30	−.18	−.07	.00	−.16	.03	.21	−.11
2. Gender[a]	—	—	—	—	−.27	—	−.05	.01	−.02	−.08	.02	−.04	−.08	.01
3. Tenure	3.65	4.07	2.54	2.20	.39	−.17	—	−.11	−.11	−.04	−.08	.04	.04	−.05
4. TFL	2.99	0.90	3.33	0.85	−.16	.06	−.15	–	.69	.59	.79	.47	.11	.74
5. Autonomy	3.33	1.16	3.72	1.04	−.04	.01	−.03	.65	—	.69	.78	.46	.16	.62
6. Competence	3.67	0.91	3.95	0.88	.04	−.09	.01	.46	.67	—	.60	.38	.34	.47
7. Relatedness	2.81	1.16	3.40	1.06	−.06	.01	−.05	.70	.74	.57	—	.45	.09	.77
8. Job satisfaction	4.72	1.61	4.93	1.40	.01	−.01	−.04	.53	.56	.51	.54	—	.14	.38
9. Occupational self-efficacy	3.08	0.45	2.91	0.41	.13	−.09	.06	.21	.34	.53	.28	.37	—	.08
10. Affective commitment	2.75	0.91	3.10	1.03	.03	−.44	.05	.67	.62	.47	.73	.51	.23	—

Note: TFL, transformational leadership. Values above the diagonal are correlation coefficients of Study 1; values under the diagonal are correlations coefficients of Study 2. All correlations above .10 are significant, $p < .05$.
[a]0 = male, 1 = female.

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Hypotheses 2a–c

To test Hypotheses 2a–c, we conducted multiple regression analyses for each work-related outcome. In the first step, we entered the control variables into the equation; in the second step, we entered the centered need satisfaction scores. Entering all scores of need satisfaction simultaneously allows determining the unique contributions of each need (Preacher & Hayes, 2008). A partial support of Hypothesis 2a was found as job satisfaction was predicted by satisfaction of the need for relatedness ($\beta = .24$, $p < .01$) and satisfaction of the need for autonomy ($\beta = .23$, $p < .01$) but not by satisfaction of the need for competence ($\beta = .07$, $p = .23$). In line with Hypothesis 2b, occupational self-efficacy beliefs were predicted only by satisfaction of the need for competence ($\beta = .44$, $p < .001$). Finally, supporting Hypothesis 2c, affective commitment to the leader was predicted only by satisfaction of the need for relatedness ($\beta = .73$, $p < .001$).

Hypotheses 3a–c

To test Hypotheses 3a–c concerning the mediation effects of needs satisfaction, we followed the procedure for multiple mediator models developed by Preacher and Hayes (2008). This procedure tests the effects for all mediators and all dependent variables simultaneously; that is, each indirect effect is examined while controlling for all other mediators, and the effects on all dependent variables are estimated as a structural equation model (Preacher & Hayes, 2008). Further, this procedure allows examining whether the indirect effects significantly differ in size. To test the proposed indirect paths, we computed 90 per cent confidence interval (CI) as they correspond to one-tailed $\alpha = .05$ hypothesis tests (Preacher, Zyphur, & Zhang, 2010). Similarly, contrast tests for the different indirect paths were conducted by computing 95 per cent CI, which correspond to two-tailed $\alpha = .05$ hypothesis tests. Prior to testing Hypotheses 3a–c, we inspected the variance inflation factors. The highest value in our data equaled 3.8, indicating that multicollinearity did not bias our mediation analyses because the critical value is 10 (Myers, 1990).

Figure 1 presents the path weights of our mediation model. In Table 2, we report the results from the proposed indirect effects and the pairwise contrasts of these paths. Providing partial support for Hypothesis 3a, the effect of transformational leadership on job satisfaction was mediated by satisfaction of the need for autonomy ($b = .23$, standard error [SE] = 0.11, CI = 0.05 to 0.41) but not by satisfaction of the needs for competence ($b = .08$, $SE = 0.06$, $CI = -0.02$ to 0.18) and relatedness ($b = .07$, $SE = 0.11$, $CI = -0.11$ to 0.27). The pairwise contrasts showed that the three indirect effects could not be distinguished in terms of their magnitude. This result suggests that all three needs are equally important for mediating the link between transformational leadership and job satisfaction. Such apparently paradox

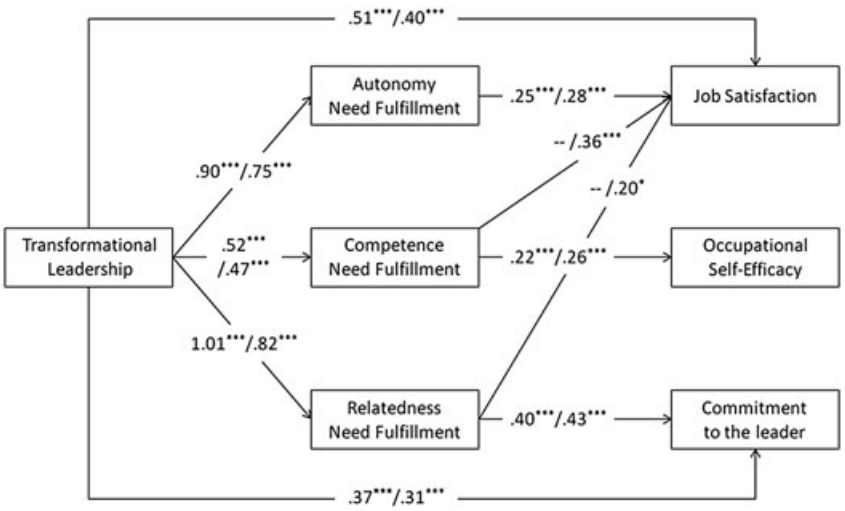


Figure 1. Unstandardized path coefficients for the proposed mediation effects. The first weight of each path refers to Study 1, the second one to Study 2. *$p < .05$; ***$p < .001$

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Table 2. Results of multiple mediation analysis; Studies 1and 2.

	Dependent measures											
	Job satisfaction				Occupational self-efficacy				Affective commitment to the leader			
			BCa 90% CI				BCa 90% CI				BCa 90% CI	
Indirect effect of TFL through	Point estimate	*SE*	Lower	Upper	Point estimate	*SE*	Lower	Upper	Point estimate	*SE*	Lower	Upper
Autonomy[a]	0.23	0.11	0.05	0.41	−0.03	0.03	−0.07	0.02	−.02	0.04	−0.08	0.04
Competence[a]	0.08	0.06	−0.02	0.18	0.12	0.02	0.08	0.15	.00	0.02	−0.04	0.04
Relatedness[a]	0.07	0.11	−0.11	0.27	−0.06	0.04	−0.13	0.00	.40	0.05	0.32	0.49
Autonomy[b]	0.21	0.08	0.08	0.35	0.00	0.03	−0.03	0.03	.04	0.04	−0.02	0.11
Competence[b]	0.17	0.05	0.09	0.26	0.12	0.02	0.09	0.16	.00	0.02	−0.03	0.04
Relatedness[b]	0.17	0.09	0.02	0.31	0.00	0.03	−0.04	0.04	.35	0.04	0.28	0.42
Contrasts			BCa 95% CI				BCa 95% CI				BCa 95% CI	
C1[a]	−0.15	0.15	−0.45	0.15	0.14	0.04	0.07	0.22	0.02	0.05	−0.07	0.12
C2[a]	0.00	0.14	−0.28	0.25	0.18	0.05	0.10	0.27	−0.40	0.06	−0.52	−0.29
C3[a]	0.15	0.20	−0.24	0.53	0.04	0.05	−0.06	0.15	−0.42	0.07	−0.56	−0.27
C1[b]	−0.04	0.11	−0.26	0.19	0.13	0.03	0.07	0.18	−0.05	0.05	−0.12	0.03
C2[b]	0.00	0.11	−0.21	0.23	0.13	0.04	0.07	0.19	−0.35	0.05	−0.43	−0.27
C3[b]	0.04	0.14	−0.22	0.31	0.00	0.04	−0.05	0.06	−0.31	0.07	−0.41	−0.18
Model[a] R^2	0.28***				0.18***				0.64***			
Model[b] R^2	0.40***				0.29***				0.61***			

Note: TFL, transformational leadership; BCa, bias corrected and accelerated; *CI*, confidence interval for the population parameter; *SE*, standard error. Bootstrap sample size = 5000. C1 = autonomy path versus competence path; C2 = competence path versus relatedness path; C3 = autonomy path versus relatedness path.
[a]Study 1.
[b]Study 2.
***$p < .001$.

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effects can occur and result from power differences among the applied tests (Preacher & Hayes, 2008). In support of Hypothesis 3b, only satisfaction of the need for competence mediated the relationship between transformational leadership and occupational self-efficacy beliefs ($b = .12$, $SE = 0.02$, $CI = 0.08$ to 0.15). As the pairwise contrasts showed, the indirect effect triggered by the satisfaction of the need for competence was significantly different from the indirect effect through autonomy and relatedness satisfaction. Finally, in support of Hypothesis 3c, the effect of transformational leadership on affective commitment to the leader was mediated only by satisfaction of the need for relatedness ($b = .40$, $SE = 0.05$, $CI = 0.32$ to 0.49). This effect was significantly different from the other two effects as indicated by the pairwise contrasts.

Discussion

The primary goal of Study 1 was to examine whether the satisfaction of the basic needs for autonomy, competence, and relatedness mediates the relationship between transformational leadership and work-related outcomes. Furthermore, our aim was to show that these three needs are differentially related to the examined outcomes. The results largely supported our hypotheses.

However, the fact that all data were obtained from the same source at the same time may give rise to concerns of common source variance—despite the results of the CFA marker variable analysis. Although potentially inflated correlations cannot explain the differential links for the need satisfaction and employee outcomes, they may pose a threat to the conclusion that transformational leadership is related to basic psychological needs in the first place. According to Podsakoff, MacKenzie, Lee, and Podsakoff, (2003), one effective remedy against common method bias is to create temporal separation of measurements. For this reason, we conducted a second study in which we induced a time lag between transformational leadership ratings and the measures of need fulfillment.

Study 2

Method

Sample

In the first part of the study (T1), 541 participants completed the survey providing demographic information and their assessment of the transformational leadership behaviors of their leader. Approximately five weeks later, 460 participants (85 per cent from the original sample) responded to our email to participate in the second part of the study, which measured need fulfillment and work-related variables (T2). As noted by Podsakoff *et al.* (2003), it is important to choose a time lag that is neither too short nor too long (see also Ployhart & Vandenberg, 2010). If the time lag is too short, factors that can artificially inflate the relationship between variables (e.g., memory effects) may not have sufficiently vanished. Conversely, choosing an inadequately long separation increases the risks of (i) strong respondent attrition and (ii) influence of contaminating factors that may mask existing links between variables (e.g., leadership development activities). Considering these effects, we felt that a five-week interval provides an optimal choice (for similar time lags, see Greguras & Diefendorff, 2009). To examine whether the dropout from T1 to T2 occurred randomly or whether it was induced by participant's characteristics (i.e., age, gender, leader–follower dyadic tenure, or perceived transformational leadership behavior), we ran a multiple logistic regression as recommended by Goodman and Blum (1996). The results suggested that the dropout was random.

We had to exclude 18 participants from our analyses, as they were no longer working for the same leader or for the same company. Hence, our final sample consisted of 442 employees. The sample comprised 57.5 per cent ($n = 254$) female employees, and the average age of participants was 33.36 years ($SD = 11.32$). Thirty-four per cent of the participants held at least an academic master's degree; 28 per cent met the general requirements for university

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admission or had a bachelor's degree. As intended, participants were employed in various industries. The most prominent sectors were education (10.4 per cent), service (10.4 per cent), and health care (8.8 per cent). Most participants (63 per cent) were working at least 32 hours per week. Finally, the average tenure with the current leader was 2.54 years ($SD = 2.20$).

Results

Validity analyses

The CFA showed that our measurement model fitted the data well ($\chi^2/df = 2.51$; Tucker–Lewis index = 0.95; comparative fit index = 0.96; root mean square error of approximation = 0.06). The inspection of factor loadings revealed that all indicators loaded significantly on their intended latent factor (standardized loadings ranged from .64 to .95, $p < .001$). Further, we observe no cross-loadings. In line with Study 1, these results provide evidence for the construct validity of the measures.

To test for divergent validity of the constructs, we followed the same steps as in Study 1. First, we tested the measurement model against the two theoretically competing models. The proposed 7-factor model showed again the best fit to the data ($\Delta\chi^2[363, N = 410] = 783.21$, $p < .001$ and $\Delta\chi^2[21, N = 410] = 448.87$, $p < .001$, respectively). Second, we compared our measurement model with all possible models, in which each pair of constructs formed a single factor. In line with Study 1, the measurement model fitted the data significantly better than each of the alternative models. Third, we followed the procedure developed by Fornell and Larcker (1981). Again, our data fulfilled both criteria of this test: (i) all AVE exceeded the threshold of .50 (AVE ranged from .67 to .74) and (ii) all squared correlations between scales were lower than the AVE of the compared scales. Taken together, these analyses support the divergent validity of the present concepts.

Common method bias

As in Study 1, we followed the procedure by Williams *et al*. (2010). Again, we used self-efficacy and affective commitment as marker variables. Like in Study 1, the Method-R models were not superior to the Method-U models, indicating that common method variance did not significantly bias the relationships in our data (self-efficacy: $\Delta\chi^2[13, N = 410] = 6.74$, $p = .92$; affective commitment $\Delta\chi^2[1, N = 410] = .72$, $p = .40$).

Descriptive statistics

Table 1 contains the means, standard deviations, and zero-order correlations of all variables in Study 2. In line with previous research, we found transformational leadership to be positively related to job satisfaction ($r = .53$, $p < .001$), occupational self-efficacy beliefs ($r = .21$, $p < .05$), and affective commitment to the leader ($r = .67$, $p < .001$).

Hypothesis testing

Hypotheses 1a–c

In support of Hypothesis 1a–c, partial correlations controlling for age, gender, and leader–follower dyadic tenure showed that transformational leadership was positively associated with the satisfaction of followers' needs for autonomy ($r = .66$, $p < .001$; Hypothesis 1a), competence ($r = .48$, $p < .001$, Hypothesis 1b), and relatedness ($r = .71$, $p < .001$; Hypothesis 1c).

Hypotheses 2a–c

The results of multiple regression analyses showed that job satisfaction was predicted by satisfaction of the needs for autonomy ($\beta = .25$, $p < .001$), competence ($\beta = .20$, $p < .001$), and relatedness ($\beta = .24$, $p < .001$), supporting Hypothesis 2a. Further, the results revealed that occupational self-efficacy beliefs were only predicted by the

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satisfaction of the need for competence ($\beta = .54$, $p < .001$), supporting Hypothesis 2b. Finally, satisfaction of the need for relatedness ($\beta = .63$, $p < .001$) and satisfaction of the need for autonomy ($\beta = .15$, $p < .01$) predicted affective commitment to the leader. Accounting for 40 per cent of the variance in affective commitment, satisfaction of the need for relatedness was, as expected, the most important predictor among the needs. In accordance to our predictions, satisfaction of the need for competence was not a significant predictor of affective commitment to the leader ($\beta = .01$, $p = .89$). Hence, Hypothesis 2c was partly supported.

Hypotheses 3a–c

The variance inflation factor values showed that multicollinearity did not bias our mediation analyses (the highest value was 3.0). The results of the mediation analyses are reported in Figure 1 and Table 2. In support of Hypothesis 3a, satisfaction of the needs for autonomy ($b = .21$, $SE = 0.08$, $CI = 0.08$ to 0.35), competence ($b = .17$, $SE = 0.05$, $CI = 0.09$ to 0.26), and relatedness ($b = .17$, $SE = 0.09$, $CI = 0.02$ to 0.31) mediated the effect of transformational leadership on job satisfaction. The pairwise contrasts showed that the three indirect effects could not be distinguished in terms of magnitude. This result indicates that all three needs mediated the relationship to an equal extent, accounting for unique portions of this association. In support of Hypothesis 3b, only satisfaction of the need for competence mediated the relationship between transformational leadership and occupational self-efficacy beliefs ($b = .12$, $SE = 0.02$, $CI = 0.09$ to 0.16). As indicated by the significant pairwise contrasts, this specific indirect effect was distinguishable from the indirect effects through autonomy and relatedness satisfaction. Finally, only the satisfaction of the need for relatedness ($b = .35$, $SE = 0.04$, $CI = 0.28$ to 0.42) mediated the effect of transformational leadership on affective commitment to the leader, providing full support for Hypothesis 3c. This effect was significantly different from the other two effects as indicated by the pairwise contrasts.

Discussion

The aim of Study 2 was to provide further evidence of our theoretical model while reducing the potential influence of common method bias. Overall, the results supported our hypotheses. Remarkably, despite the time lag we induced in Study 2, the correlations between transformational leadership and need fulfillment were consistent with Study 1. This result provides further support for the relationship we hereby advance. Additionally, the results of Study 2 were fully in line with Hypotheses 2a and 3a, which received mixed support in Study 1.

General Discussion

Integrating transformational leadership theory (Bass, 1985) and SDT's basic needs framework (Deci & Ryan, 2000), we proposed that the fulfillment of the needs for autonomy, competence, and relatedness differentially mediate the link between transformational leadership and desirable employee outcomes. In doing so, the study answers to calls by Judge *et al*. (2006) and Yukl (2010), who argued that the processes behind transformational leadership are not adequately understood and suggested that more research is needed. Two empirical studies provided support for our theoretical model. In what follows, we summarize their central findings and discuss how they relate and contribute to the literatures of transformational leadership and SDT.

As hypothesized, results revealed a strong relationship between transformational leadership and fulfillment of all three basic needs. More importantly, we found that need satisfaction played the expected mediating role in linking transformational leadership and employee outcomes. Specifically, in Study 2, we found that all three needs additively mediated the relationship between transformational leadership and job satisfaction. In a similar vein, the planned pairwise contrasts in Study 1 showed that all three needs were equally important in mediating this relationship. The links between transformational leadership and the two other outcomes (self-efficacy and affective commitment) were, across

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both studies, mediated by one need only (need for competence fulfillment and need for relatedness fulfillment, respectively). These results contribute to the literature on transformational leadership in two important ways. First, they support Burns' (1978) and Bass' (1985) position regarding the importance of need satisfaction in the leadership processes. Additionally, they extend this notion by shedding first light on *which* needs are affected by transformational leadership (i.e., the needs for autonomy, competence, and relatedness). Second, these findings also may provide an explanation for why this leadership style can be linked to a *wide variety* of positive outcomes. Indeed, the present study suggests that different mediating processes are responsible for the relationship between transformational leadership and different kinds of outcome variables.

Besides the mediating effects of basic need satisfaction, we also found direct paths from leadership behavior to job satisfaction and affective commitment. These direct paths indicate partial rather than full mediation and suggest the existence of additional underlying processes. This finding appears important because it suggests that transformational leadership unfolds its effectiveness not only through intrinsically motivating processes (i.e., fulfillment of the basic psychological needs) but potentially also through extrinsically motivating influences (i.e., processes that are not reflected in basic psychological need fulfillment). We believe that this distinction indicates an interesting starting point for future research on leadership processes.

Although mainly contributing to the leadership literature, the present findings may also provide valuable insights for the development of SDT—particularly with regard to the effects of need fulfillment. In Study 2, consistent with our hypotheses, satisfaction of all three basic needs was positively related to job satisfaction. In Study 1, however, we only found significant relationships for need for autonomy and need for relatedness satisfaction (but not for need for competence satisfaction). Although multicollinearity was not a problem in our data, we believe that this unexpected result might be due to the substantial correlation among the need satisfaction scores, which decrease the statistical power of detecting unique effects (Field, 2009). In summary, these analyses add to SDT literature, which has mainly examined the effects of an *aggregated* measure of need fulfillment (i.e., by combining all three needs in one score; Gagné & Deci, 2005). However, it is a key assumption of SDT that the fulfillment of all three needs has *unique, additive* effects (Ryan & Deci, 2008). By linking each need individually to job satisfaction (while controlling for the remaining two needs), the present research provided a critical test of this tenet. Given the unexpected results in Study 1, we received mixed support for this notion.

Besides this additive effect, we also examined the differential influence of need satisfaction on employee outcomes. As expected, we found differential effects on outcomes with a comparably narrow focus: Across both studies, only need for competence fulfillment predicted employees' self-efficacy. In a similar vein, need for relatedness fulfillment mainly predicted affective commitment to the supervisor. Hence, our results provide evidence for the differential effects of need fulfillment. This finding appears highly beneficial for the refinement of SDT as they provide first insights into which effects are triggered by which need.

Limitations and future research

In noting central limitations of the present studies, we also want to point out several avenues for future research. Perhaps the primary concern about the current research relates to potential effects of common source bias. However, there are several arguments that bolster our confidence in the findings. First, the analytical procedures we applied to determine the influence of common method bias consistently suggested that common source variance did not affect the present findings. Second, we found remarkably consistent patterns of results across both studies despite the time lag we had introduced in Study 2 (Podsakoff *et al*., 2003). Third, the differential relationships for the mediating processes and for the link between need fulfillment and our outcome variables cannot be accounted for by common source bias. Even though we agree that potential problems regarding common source bias should not be light-heartedly discarded, these arguments suggest they did not inflate the relationship in the present study. Nevertheless, we would like to encourage future research to test our model by using multi-source data to confirm its explanatory power.

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A second limitation, the present research shares with most studies on organizational behavior, is its correlational design, which does not provide direct evidence for causality. However, we believe that our theoretical rationale together with the existing theoretical and empirical literature provides a solid account for the proposed causal direction. Specifically, with regard to the leader–employee link, theory and empirical findings suggest that the predominant direction of influence in organizations follows the direction of formal power, that is, from leaders to followers (Yukl, 2010). For the link between need fulfillment and employee outcomes, our hypotheses strictly follow SDT, which posits that need satisfaction fosters positive employee outcomes (Ryan & Deci, 2008). In support of this causal link, longitudinal research by Gagné, Chemolli, Forest, and Koestner (2008) showed that intrinsic need satisfaction predicted changes in affective commitment; in their research, no such effect was found for the converse path.

On the basis of the results of the present studies, there are several other promising avenues for future research. First, it appears worthwhile to examine the effect of supervisors on employees' need fulfillment against the background of other factors. Recent work suggests that different aspects of person environment fit may play an important role for need satisfaction (Greguras & Diefendorff, 2009). Disentangling the effects of different organizational factors may provide valuable insights into their relative importance for need fulfillment. Second, as stated earlier, it may also be interesting to examine the interplay of intrinsically and extrinsically motivating processes for effective leadership. As our results indicate, the influence of transformational leaders may be based on both kinds of motivation. Given that extrinsic rewards and intrinsic motivation are often seen as antagonists, exploring these processes might make an important contribution to the understanding of effective leadership. Finally, one level of analysis that seems to have been underrepresented in empirical leadership research is the dyadic level. This may be due to challenges that used to be associated with analysis at this level. However, recent methodological developments have effectively addressed these (Gooty & Yammarino, 2011). Consequently, applying the basic needs model to leader–follower dyad may be another fruitful area for future research (Markham, Yammarino, Murry, & Palanski, 2010).

We also want to point out several strengths of the present study. These include the diverse samples of subjects from a wide range of organizational settings, random choice of subordinates, and testing our research model in two different countries. Even though Germany and Switzerland may appear very similar on first sight, cross-cultural comparisons (e.g., the Global Leadership and Organizational Behavior Effectiveness project; House, Hanges, Javidan, Dorfman, & Gupta, 2004) show differences on central cultural dimensions. The strongest differences have been found on the dimensions power distance, humane orientation, and collectivism. Compared with Germany, Switzerland generally scores higher on these dimensions—although these differences are rather small compared with the overall differences between the 62 countries included in the Global Leadership and Organizational Behavior Effectiveness study. As Studies 1 and 2 also differed in study design, we feel it may be dangerous to over-interpret the cultural influence on the differences in findings. However, given that all three cultural dimensions differentiating Switzerland and Germany seem closely linked to need for relatedness satisfaction (all of them are associated to interpersonal relationships) may suggest that Swiss employees score higher on need for relatedness satisfaction (because their work environment provides them with more opportunities to fulfill this need) and that the relationship between transformational leadership and need for relatedness satisfaction may be lower in Switzerland (because the work context already addresses this need, which may weaken the additional contribution of leadership). Indeed, the data supported these assumptions. However, despite these differences, we feel that the central aspect of the cultural difference between Studies 1 and 2 is the remarkable consistency in the findings, which can be seen as an encouraging sign for the generalizability of the present findings.

Implications for management

Overall, our findings suggest that job satisfaction, self-efficacy, and commitment to the leader will be enhanced when basic psychological needs are satisfied. Further, they indicate that transformational leadership may be a central way to positively address employees' needs. Past research indicates the effectiveness of leadership development programs that targeted at understanding and fulfilling employees' needs. For instance, in a longitudinal field experiment, Deci *et al*. (1989) found that training programs teaching leaders to provide guidance in a non-controlling way

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enhanced their ability to fulfill employees' need for autonomy. This, in turn, translated into increased job satisfaction among employees. Indeed, investing into training programs at the leadership level may provide a sensitive way to allocate organizational resources given that most organizations are structured in a pyramid-shaped way with few at the top affecting many below. Our studies show that addressing all three basic needs is an important issue for leadership effectiveness, and they provide valuable input for the development of leadership trainings.

Another practical implication relates to the differential effects of need fulfillment. Practitioners may encounter situations where addressing all three psychological needs simultaneously is not feasible. Under these circumstances, they might have to prioritize the fulfillment of one need at the expense of another (Sheldon & Filak, 2008). The findings of the present research suggest that a central way to increase employees' self-efficacy is by addressing the need for competence, whereas commitment to the supervisor may be enhanced by fulfilling the need for relatedness. On the other hand, addressing all three psychological needs appears to additively benefit employees' job satisfaction.

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