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Supervisors' Interpersonal Styles: An Integrative Perspective and a Measure Based on Self-Determination Theory

Tiphaine Huyghebaert-Zouaghi[a], Alexandre J.S. Morin[b], Nikos Ntoumanis[c,d], Sophie Berjot[a], & Nicolas Gillet[e,f]

[a] Université de Reims Champagne Ardenne, France (E.A. 6291, Laboratoire C2S)
[b] Concordia University, Canada (Substantive Methodological Synergy Research Laboratory)
[c] University of Southern Denmark, Denmark (Danish Center for Motivation and Behaviour Change)
[d] Halmstad University, Sweden (School of Health and Welfare)
[e] Université de Tours, France (E.E. 1901, QualiPsy)
[f] Institut Universitaire de France (IUF)

Corresponding author :
Tiphaine Huyghebaert-Zouaghi
Université de Reims Champagne-Ardenne
Laboratoire C2S (E.A. 6291)
UFR Lettres et Sciences Humaines, Département de Psychologie
57 rue Pierre Taittinger, 51100 Reims, France
tiphaine.huyghebaert@univ-reims.fr

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Abstract

This research addresses recent calls for an alternative integrative framework to apprehend leaders' behaviors and examines the validity of a questionnaire anchored in this theoretical approach. Building upon Self-Determination Theory, we examined a tripartite approach of supervisors' behaviors (supportive, thwarting, and indifferent toward subordinates' psychological needs). The psychometric properties of this Tripartite Measure of Interpersonal Behaviors-Supervisor (TMIB-S) was tested through three studies. Results from bifactor exploratory structural equation modeling supported a solution including one global factor, and three specific factors reflecting need supportive, thwarting, and indifferent behaviors. This solution was fully invariant across distinct samples of French- and English-speaking employees. Results also supported the criterion-related and discriminant validity of the TMIB-S. More specifically, results supported the added-value of the TMIB-S, when compared to well-established measures of leadership (passive leadership, abusive supervision, LMX, and transformational leadership), in predicting well- and ill-being. Results also highlighted well-differentiated effects of the different components of supervisory behaviors and showed that supervisors' need indifferent behaviors constitute a key piece in the prediction of employees' health-related consequences.

Keywords: Supportive behaviors, thwarting behaviors, indifferent behaviors, psychological needs, employees' functioning

People do not leave their jobs. They leave their managers. This was suggested by a Gallup survey revealing that roughly half of 7272 surveyed American adults had left their job primarily to "get away from their manager" (Harter & Adkins, 2015). Managers are known to play a pivotal role as they contribute to propel organizations toward their desired future state while creating a work environment where employees can thrive and experience well-being (Inceoglu et al., 2018). This complex balancing act that managers have to perform on a daily basis emphasizes why their leadership styles (i.e., "sets of behaviors that leaders employ to influence the behaviors of subordinates"; Skakon et al., 2010, p. 109) constitute a high-stake issue for both organizations and employees.

Three core leadership styles were originally introduced by Lewin et al. (1939), namely democratic, authoritarian, and laissez-faire, setting the stage for over 80 years of research that has described a variety of leadership behaviors that still share conceptual similarities with Lewin et al.'s (1939) seminal proposal. These behaviors typically fall under three main categories: (1) Leadership behaviors relying on guidance, choice, and participative decision-making (autonomy and structure; e.g., leader-member exchange, LMX; Graen & Uhl-Bien, 1995) thus matching the democratic style; (2) leadership behaviors stressing control and order, leaving no room for initiative or choice (structure but no autonomy; e.g., abusive supervision; Tepper, 2000), thus matching the authoritarian style; and (3) behaviors characterizing leaders who provide no guidance or direction and give employees freedom (autonomy but no structure; e.g., passive-avoidant leadership; Avolio et al., 1999), thus matching the laissez-faire style. Because of this conceptual overlap, wherein many distinct theories encapsulate similar ideas in a fragmented manner, leadership researchers keep calling for a more integrative framework to apprehend leaders' behaviors (e.g., Avolio, 2007; Piccolo et al., 2012).

The present research offers to address this call. Rather than adding one more highly specific type of behavior to the already long list of behaviors considered in leadership research (Anderson & Sun, 2017; Piccolo et al., 2012), we take a step back to propose an overarching representation of leadership behaviors anchored in Self-Determination Theory (SDT; Ryan & Deci, 2000, 2017). This theory conceptualizes leadership as a way to promote subordinates' self-determined motivation and well-being. Indeed, most of the existing leadership research has treated leadership as a way to influence subordinates' behaviors and performance (see Inceoglu et al., 2018) and, in doing so, has failed to document the differentiated effects of distinct supervisory behaviors for motivation and well-being. Therefore, we build upon recent advances in SDT, uncovered in the sport context (Bhavsar et al., 2019), to test the validity of an alternative integrative conceptual approach and measurement (one grounded in a motivational perspective) of work supervisors' interpersonal behaviors. This perspective might not replace classical leadership theories (e.g., Avolio & Bass, 1991) when organizational outcomes are considered. Yet, being anchored in the currently dominant theoretical framework on employee motivation and well-being, our perspective has the advantage of providing clearer guidance regarding the motivational and health implications of leaders' behaviors for subordinates.

This better understanding is not only made possible by the theoretical framework we rely upon (i.e., SDT), but also by the methodological approach we pursue. Indeed, prior leadership research has failed to adequately address the multidimensionality of supervisory behaviors, which has led to erroneously similar levels of predictive validity of distinct supervisory behaviors across several criteria (Judge & Piccolo, 2004). In contrast, recent research based on SDT has resorted to a rigorous examination of the multidimensionality of interpersonal behaviors (Bhavsar et al., 2019; Tóth-Király et al., 2021), allowing to better grasp their unique implications. In the present research, we adopt this advanced methodological approach (i.e., bifactor exploratory structural equation modeling) to achieve a fine-grained representation of employees' perceptions of their supervisors' behaviors. In sum, our research seeks to (1) offer an alternative integrative theoretical approach of leaders' behaviors based on recent findings from SDT in the sport domain; (2) test the validity of a questionnaire (adapted from the sport area) anchored in this theoretical approach; (3) analyze the multidimensionality of supervisory behaviors; and (4) examine the motivational and well-being consequences associated with these distinct types of leadership behaviors.

Self-Determination Theory as an Integrative Framework

To answer scholars' call for an alternative integrative framework to apprehend leaders' behaviors (Anderson & Sun, 2017), we propose to shift attention toward the motivational perspective offered by Self-Determination Theory (SDT; Ryan & Deci, 2000, 2017). Unlike most leadership theories (Inceoglu et al., 2018), SDT has a main focus on subordinates' motivation and well-being and considers that any

type of environmental characteristic is likely to impact on these critical indices of individual functioning. In this regard, SDT proposes the satisfaction of employees' basic psychological needs for autonomy (feeling ownership of one's actions), competence (feeling efficient in accomplishing personally important tasks), and relatedness (feeling secure and accepted in one's relationships) as the most critical drivers of motivation and well-being (Ryan & Deci, 2017). The existence and importance of these three needs for motivation and well-being has been empirically validated across cultures (for an overview, see Vansteenkiste et al., 2020). From this perspective, any environmental condition, including leadership behaviors, likely to nurture the satisfaction of these needs should help drive employees' motivation and support their well-being (Ryan & Deci, 2017). This core assumption of SDT has thus far been supported across various domains in research focusing on the need supportive interpersonal behaviors of sport coaches (Ntoumanis et al., 2018), healthcare workers (Ntoumanis et al., 2020), teachers (Cheon et al., 2019), and supervisors (Slemp et al., 2018).

A Tripartite Approach of Supervisors' Behaviors

Initial propositions showed the importance, and qualitatively distinct nature, of interpersonal behaviors likely to satisfy these basic psychological needs versus those likely to thwart these needs (Myers et al., 2014; Rocchi et al., 2017a, 2017b). More recently, Bhavsar et al. (2019) proposed, and validated, a more comprehensive tripartite conceptualization of coaches' interpersonal behaviors including need indifferent behaviors alongside need supportive and thwarting ones. Interestingly, this conceptualization echoes the three types of leadership behaviors (democratic, authoritarian, and laissez-faire) initially described by Lewin et al. (1939), thus suggesting that this conceptualization might also be relevant in the work area. Hence, we suggest that supervisors, just like coaches (Bhavsar et al., 2019), can display behaviors that can be perceived as supportive, thwarting, or indifferent toward the psychological needs of their employees. More precisely, need supportive supervisors promote the satisfaction of their subordinates' psychological needs through behaviors conveying understanding, encouragement, and appreciation. Need thwarting supervisors threaten their subordinates' psychological needs through behaviors involving pressure, non-constructive criticism, and rejection. Finally, need indifferent supervisors are those who neglect, or ignore, their subordinates' psychological needs through behaviors reflecting disinterest, disorganization, and relational distance.

Interestingly, this conceptualization also echoes the "full-range leadership theory" (Avolio & Bass, 1991), which has dominated the leadership field up to this day by offering an integration of three distinct leadership styles (laissez-faire, transactional, and transformational). The popularity of this theory has been further increased by the creation of the Multifactor Leadership Questionnaire (MLQ; Avolio et al., 1999), which constitutes a clear asset for practitioners and researchers who want to simultaneously assess all three forms of leadership behaviors. Indeed, besides the MLQ, most other measures only focus on a narrow subset of leadership behaviors (e.g., Tepper, 2000). The MLQ thus appears to be a very practical measure. However, research anchored in this framework has shown that the behaviors assessed by the MLQ display similar levels of predictive validity across several criteria (e.g., subordinates' performance) and has failed to document which of the less desirable forms of leadership (i.e., transactional and laissez-faire) have the most detrimental effects for subordinates (Judge & Piccolo, 2004; Skogstad et al., 2007). More generally, research based on this theoretical approach has mostly ignored the motivational processes and health consequences associated with these distinct leadership behaviors (Inceoglu et al., 2018). Finally, a more practical limitation is that the MLQ has been copyrighted (*via* Mindgarden) and is thus not easily accessible to researchers and practitioners. These limitations have obvious and important implications for researchers and practitioners. In trying to overcome these limitations, our research, based on SDT, does not claim to replace existing leadership conceptualizations and measures, but rather to complement these well-established approaches with a new perspective that could contribute to a better understanding of supervisors' interpersonal behaviors and their implications for employees' motivation and well-being.

Existing Instruments to Measure Supervisors' Behaviors within the SDT Framework

In work-related SDT research, autonomy-supportive behaviors (for a review see Slemp et al., 2018) and, in a more limited way, autonomy-thwarting (or controlling) behaviors (e.g., Richer & Vallerand, 1995; Gillet et al., 2012a), have attracted the most attention. A few instruments have been developed to measure these interpersonal styles (e.g., WCQ; Baard et al., 2004; PASS-E; Moreau & Mageau, 2012). However, no multidimensional tool has been developed to concurrently measure work supervisors' supportive and thwarting behaviors in relation to the other two needs (competence and relatedness),

alongside behaviors that support or thwart the need for autonomy. Indeed, although autonomy supportive behaviors (and the construct of autonomy support more generally) can theoretically be seen as contributing to the satisfaction of all three needs (Ryan & Deci, 2000), most measures developed to assess these behaviors have mainly focused on the need for autonomy (Slemp, 2018). The broader construct of need supportive behaviors (Bhavsar et al., 2019; Rocchi et al., 2017a, 2017b) helps to better delineate how supervisors may contribute to the satisfaction of all three needs. Furthermore, despite the connection between need indifferent behaviors and *laissez-faire* leadership (Avolio et al., 1999; Lewin et al., 1939), as well as between need thwarting behaviors and various types of authoritarian leadership behaviors (e.g., Lewin et al., 1939; Tepper, 2000), no effort has yet been made to adapt Bhavsar et al. (2019) tripartite conceptualization of supervisors' need supportive, thwarting and indifferent behaviors to the work context. The present research was designed to directly address this limitation by proposing an adaptation of the Tripartite Measure of Interpersonal Behaviors-Coach (TMIB-C, Bhavsar et al., 2019) to supervisors' behaviors (TMIB-S), and to test the construct validity of this measure in two languages (English and French).

A Multidimensional Perspective on Supervisors' Behaviors

In their original validation study conducted in the sport area, Bhavsar et al. (2019) found support for a three-factor structure of athletes' ratings of their coaches' need-related behaviors based on the type of behavior (supportive, thwarting, and indifferent) but not further broken down by needs (autonomy, competence, and relatedness). In other words, Bhavsar et al. (2019) found support for a three-factor model, which is interesting as it also matches Lewin et al.'s (1939) tripartite view of leadership behaviors. However, to clearly support the superiority of this solution, alternative representations, dominated by the type of need, the type of behavior, or both, have to be considered.

For instance, it could be argued that supervisors' interpersonal behaviors can represent an underlying continuum ranging from need supportive to need thwarting behaviors, with need indifferent behaviors falling in between these two extremes (i.e., a one-factor structure). Alternatively, it is possible for qualitatively distinct types of behaviors that are not mutually exclusive to co-occur. For instance, a supervisor can be understanding with their subordinates (autonomy support) while also inducing guilt to make them act a certain way (autonomy thwarting) and failing to provide them with a clear rationale for task engagement (autonomy indifference). Yet, both options are not mutually exclusive, and this possibility can be tested by examining psychometric multidimensionality.

Psychometric Multidimensionality

In psychometric measurement, multidimensionality occurs when specific items tap into more than one construct (Morin et al., 2016a, 2016b). Two types of construct-relevant multidimensionality are common in multidimensional instruments such as the TMIB-S. The first implies the evaluation of co-existing global and specific facets of a construct. For instance, recent research has explored the dimensionality of need-related behaviors, revealing that ratings on the original TMIB-C (Bhavsar et al., 2019) and other measures of interpersonal behaviors (Interpersonal Behaviours Questionnaire; Tóth-Király et al., 2021) can be disaggregated into two independent components (global and specific). The first (global) reflects individuals' overarching perceptions of their supervisors' need-related behaviors across all dimensions. This global component thus captures the commonalities shared by the distinct need-related behaviors, irrespective of their positive or negative nature (Bhavsar et al., 2019[1]; Tóth-Király et al., 2021). This global factor reflects workers' general impression of their supervisor as a "rather good or bad leader". The second (specific) component reflects subscale-specific levels of need indifferent, thwarting, and supportive behaviors, and/or of behaviors related to the need for autonomy, competence and relatedness left unaccounted for by this global perception. This specific component reflects what is unique to each type of behavior, and reflects deviations from employees' global

[1] Bhavsar et al. (2019) contrasted two final models, one including a global factor underpinning ratings to all items, and one without such a global factor. Although both models resulted in an equivalent level of model fit and although their global factor was well-defined, they decided to reject the model including the global factor based on the observation that, in this model, the specific need thwarting factor did not retain any specificity of its own. However, this observation simply indicates that these items mainly serve to define the global factor and that once this global variance is considered, they do not retain any residual specificity (suggesting that ratings of need thwarting behaviors seldom deviate from global perceptions of interpersonal behaviors in the sample under investigation). Thus, observing a weak specific factor is not a valid reason to reject a model including a global factor, as long as some of the other specific factors are found to retain specificity (Morin et al., 2020).

perception of their supervisors' need-related behaviors[2]. In other words, a supervisor might be perceived as generally nurturing, and yet, also engage in behaviors that thwart employees' need for autonomy or be indifferent to their need for competence.

A second form of multidimensionality involves cross-loadings, which depict reliable associations between items and more than one facet of a multidimensional construct. Indeed, workers' perceptions of need indifferent behaviors may affect their responses to items created to measure need thwarting behaviors. Such cross-loadings emerge because ratings are inherently imperfect, but also because supportive, indifferent, and thwarting behaviors are conceptually intertwined (Bhavsar et al., 2019). Previous results (Bhavsar et al., 2019; Tóth-Király et al., 2021) have demonstrated the value of incorporating cross-loadings to achieve an accurate representation of need-related behaviors.

These two types of multidimensionality are neglected in typical confirmatory factor analyses (CFA) where items are assumed to reflect a single factor (Morin et al., 2013). This limitation can be overcome with a combination of bifactor models, which disaggregate S-factors from the global component (G-factor; Morin et al., 2016; Myers et al., 2014), and exploratory structural equation models (ESEM) which estimate cross-loadings between items and conceptually-related constructs based on a confirmatory specification of the main indicators of each factor (Morin et al., 2020). This combination, bifactor-ESEM, allows for the joint consideration of both forms of multidimensionality.

Ignoring either form of multidimensionality has important practical implications. On one hand, when neglecting the global/specific nature of employees' ratings of their supervisors' behaviors, one is likely to erroneously conclude that each type of behavior plays a similar role in prediction, which would in fact mainly reflect the role played by the unmodeled global component (Morin et al., 2016a). It would, therefore, be impossible to assess the unique effect of each behavior beyond the contribution of the global component (Tóth-Király et al., 2021). On the other hand, evidence has shown that neglecting cross-loadings may yield an erroneous assessment of the relations between a construct's dimensions (Asparouhov et al., 2015), but also of this construct's associations with other variables (Mai et al., 2018). This could explain why research based on the full-range model of leadership, which has typically ignored these two forms of multidimensionality, has shown that the behaviors assessed by the MLQ display similar levels of predictive validity across several criteria and tend to be highly correlated (Judge & Piccolo, 2004). In sum, overlooking construct-related multidimensionality may result in an inaccurate assessment of the psychometric properties of the measure, and of the reality under study. As such, the second goal of this research was to investigate the multidimensionality underlying employees' ratings of their supervisor's need-related behaviors.

Supervisors' Supportive, Thwarting, and Indifferent Behaviors and Employees' Functioning

Leadership studies have typically focused on the role played by isolated leadership behaviors (Piccolo et al., 2012). In doing so, these studies have failed to consider how much of employees' functioning can be explained by other behaviors, or how each specific type of behavior provides incremental predictive value, once the role of other types of behaviors is considered. In a meta-analysis of the MLQ, Judge and Piccolo (2004) noted that controlling for other leadership behaviors tended to undermine the incremental value of each specific type of behavior in a study. This is due, in part, to the high correlations observed among various leadership behaviors, which make it harder to detect unique effects. The adoption of a bifactor approach, allowing for the explicit disaggregation of employees' ratings into independent global and specific components, makes it possible to test this incremental contribution in a way that is not contaminated by inflated factor correlations.

The ability to jointly consider the relative contribution of these global and specific components has important theoretical and practical implications, especially when it comes to distinguishing between less desirable types of leadership behaviors. For instance, it is unclear whether authoritarian or passive types of leadership (i.e., need thwarting and indifferent behaviors) have clearly differentiated consequences. One could theoretically argue (Bhavsar et al., 2019) that indifferent behaviors may not be as adversely experienced as need thwarting behaviors. Some evidence even indicates that the consequences of these two types of behaviors may differ in nature (Cheon et al., 2019), with need indifferent behaviors being more likely to predict outcomes reflecting a disinterest in one's work (e.g., job boredom) and need

[2] It would be erroneous to see the specific (S-) factors as being in some small way unique factors sharing most of the shared variance among the indicators forming them. Rather, the S-factors are wholly made of what is uniquely left in these specific behaviors, beyond the shared variance captured by the global (G-) factor.

thwarting behaviors being more likely to associate with more adverse outcomes reflecting resource depletion (e.g., emotional exhaustion). Yet, these proposed differentiated effects remain to be clarified, which is the third and final objective of this research. More precisely, we sought to consider the unique effect of each form of supervisory behavior proposed by SDT (e.g., indifferent behaviors) while controlling for the specific and shared effects of the other two forms (e.g., thwarting and supportive behaviors). We also sought to control for the effects of alternative leadership behaviors proposed by other theoretical frameworks (abusive supervision, passive leadership, transformational leadership, and LMX), in order to examine the discriminant validity of the TMIB-S.

In doing so, this research also addresses a gap in the leadership literature, which has widely documented the consequences of supervisors' behaviors in terms of employee performance, but has generally overlooked the relationship between supervisors' behaviors and employees' well- and ill-being (Inceoglu et al., 2018). In the few studies in which subordinates' psychological health was considered, scholars mostly tested it as a mediator to help explain the leadership-performance relationship (e.g., Montano et al., 2017). In this research, we consider employees' psychological health as an end in and of itself, as opposed to a means to employee performance. Additionally, when considering employees' psychological health, leadership researchers have mostly looked at a very narrow set of outcomes (e.g., job satisfaction; see Inceoglu et al., 2018). Consequently, research has yet to document how supervisors' behaviors relate to a more diversified set of variables related to employees' well- and ill- being. This research addresses this gap by extending the nomological network associated with supervisory behaviors via the consideration of a wide array of outcomes.

Overview of Studies 1 to 3

This research examines (1) whether a recent SDT-based approach focused on need-related behaviors, developed in the sport context (Bhavsar et al., 2019), could provide an alternative theoretical perspective to guide our understanding of supervisors' behaviors, and (2) the validity of a questionnaire anchored in this theoretical approach in the work context. In doing so, we examine (3) the multidimensionality of subordinates' ratings of their supervisors' need-supportive, indifferent, and thwarting behaviors in order to better disentangle the global and specific components of these perceptions (Morin et al., 2016a). Finally, we also seek to fill a gap in leadership research (see Inceoglu et al., 2018) by (4) investigating the motivational processes and well-being consequences associated with these different components of supervisors' behaviors.

The present research addresses these objectives through three studies. Study 1 seeks to provide validity evidence for the TMIB-S in a sample of English-speaking workers. Study 2 tests this measure's validity in a sample of French-speaking workers and offers a first test of the criterion-related (need satisfaction and frustration, job boredom, work engagement, and emotional exhaustion) and discriminant (abusive supervision, passive leadership, LMX, and transformational leadership) validity of the TMIB-S. Finally, Study 3 replicates and extends the investigation of criterion-related (need satisfaction and frustration, job satisfaction, job boredom, and work-related rumination) and discriminant (abusive supervision, passive leadership, LMX, and transformational leadership) validity of the TMIB-S in a new independent sample of English-speaking employees.

Study 1

This study sought to provide a preliminary examination of the factor structure of the TMIB-S in a sample of English-speaking workers. More precisely, this study contrasts different representations of TMIB-S ratings to achieve a more accurate representation of this measure's multidimensionality.

Method

Procedure and Participants

This research (Studies 1 to 3) was exempt from ethical review, according to local regulations. The *Prolific Academic* crowdsourcing service was used to recruit participants. This online platform has been shown to provide quality data for researchers (Palan & Schitter, 2018; Peer et al., 2017). Participants were recruited based on several pre-screening criteria: (1) Being presently employed, (2) working part-time or full-time, (3) not working without pay nor being self-employed, (4) living and working in the USA (United States of America), Canada, or the United Kingdom (UK), and (5) speaking English as a first language. The general goal of the study was disclosed, and participants were assured of the anonymity of their responses. They were compensated £0.34 for completing a three-minute questionnaire, and provided written consent to participate before completing the survey.

Because participation was motivated by an external reward, we could not be confident that

participants would respond to the questionnaire in a fully autonomously driven and attentive manner (Ryan & Deci, 2017). Therefore, in line with prior organizational research conducted using *Prolific* and involving monetary rewards (e.g., Lagios et al., 2021), the trustworthiness of participants' responses was ensured through an attention check included midpoint through the survey (i.e., "It is important that you pay attention to our survey, please tick strongly agree"). Given the brevity of this survey (i.e., only 22 items, see below), only one attention check was required. Moreover, in line with prior *Prolific*-based research, a final control question asked participants whether they were presently employed by an organization (although *Prolific* allows to recruit participants based on specific criteria, sometimes their *Prolific* profile is not up to date, hence the necessity to ensure this criterion was met). They were guaranteed that this question only served scientific purposes and that their response would not change their compensation. Two participants reported not being currently employed and 14 failed the first attention check. These 16 participants were excluded.

A total of 350 participants (M_{age} = 38.66; *SD* = 11.61; 54.9% women) completed the survey. Participants lived and worked in the UK (66.9%), USA (26.9%), or Canada (6.3%), most of them had a permanent position (92%) and worked full time (77.4%), for an average of 35.99 hours per week (*SD* = 9.56). Participants' average job tenure was 5.53 years (*SD* = 5.29) and, in average, their supervisors had been supervising them for 3.57 years (*SD* = 3.51). Roughly a third (38%) of the participants held supervisory positions. Participants mainly worked in the private sector (66.9%).

Measures

Supervisor Interpersonal Behaviors were measured with the 22-item TMIB-S. In order to make the scale validated by Bhavsar et al. (2019) suitable for the work domain, we adjusted the items by changing the word "activities" to "tasks" or "assignments" and by replacing the stem "My coach…" to "My supervisor…" (see Appendix A at the beginning of the online supplements). Workers were requested to think of their interactions with their ongoing supervisor in order to report how much they agreed with each statement (1–*strongly disagree*; 7–*strongly agree*). Eight items measured need supportive behaviors (α = .95; e.g., autonomy support: " shows that he/she understands my perspective"; competence support: "recognizes my efforts and accomplishments"; and relatedness support: "shows care and concern"), eight items assessed need thwarting behaviors (α = .94; e.g., autonomy thwarting: "tries to control everything I do"; competence thwarting: "belittles my abilities"; and relatedness thwarting: "deliberately ignores me"), and six items measured need indifferent behaviors (α = .83; e.g., autonomy indifference: "is unresponsive to my opinions"; competence indifference: "can be disorganized" ; and relatedness indifference: "is indifferent to how I feel").

Analyses

Mplus 8 (Muthén & Muthén, 2018) and the Maximum Likelihood Robust (MLR) estimator were used in all analyses. The fit indices, parameter estimates, and standard errors, obtained via this estimator are robust non-normality. No missing responses were allowed in the online questionnaire. A sequence of a priori CFA and ESEM were conducted (see Table 1), in line with prior studies (e.g., Bhavsar et al., 2019; Tóth-Király et al., 2021). These models and the rationale underlying each of them are detailed in the Study 1 section of the online supplements. Model fit was examined using the Tucker-Lewis index (TLI), the comparative fit index (CFI), and the root mean square error of approximation (RMSEA) (Hu & Bentler, 1999). Adequate model fit is indicated by RMSEA values below .08, and TLI/CFI value above .90, whereas excellent model fit is indicated by RMSEA values below .06, and TLI/CFI values above .95. Although we also report the chi-square test of exact fit (χ^2), this last indicator is not interpreted given its high sensitivity to minor misspecifications and sample-size dependency (e.g., Marsh et al., 2005). Nonetheless, model fit is not a sufficient criterion to select the optimal measurement model in the context of comparisons between CFA, ESEM, and bifactor alternatives (Morin et al., 2020), which need to also consider parameter estimates. First, CFA and ESEM solutions are compared and, the ESEM solution should be retained when it results in well-defined factors and reduced factor correlations when compared to CFA (Asparouhov et al., 2015; Morin et al., 2020). Second, the retained alternative (CFA or ESEM) is then compared with its bifactor equivalent, which should be retained when it results in: (1) higher model fit; (2) a G-factor that is well-defined (i.e., moderate to strong loadings); and (3) a subset of well-defined S-factors. The observation that multiple cross-loadings > .10 or .20 in the ESEM solution are smaller in the bifactor-ESEM solution, also supports the bifactor-ESEM solution (Morin et al., 2020).

Results

When comparing CFA and ESEM solutions, model fit (reported in Table 1) and parameter estimates (reported in Table S1 of the online supplements) supported the superiority of the three-factor ESEM solution (M2). Moving to the bifactor solutions, model fit (reported in Table 1) and parameter estimates (reported in Table S2 of the online supplements) supported the superiority of this model's bifactor counterpart (i.e., bifactor-ESEM model with one G-factor and three S-factors, M10). We provide a more extensive discussion of the superiority of M2 and M10, when compared to other solutions, in the Study 1 section of the online supplements.

More specifically, the three-factor ESEM solution (M2) resulted in well-defined factors (λ = .362 to .998, M_λ = .717 for supportive behaviors; λ = .562 to .969, M_λ = .762 for thwarting behaviors; and λ = .396 to .779, M_λ = .602 for indifferent behaviors). Similarly, the bifactor-ESEM solution with one G-factor and three S-factors (M10) included a G-factor that was well-defined and reflected employees' global perceptions of their supervisor's need-related interpersonal behaviors, defined by negative loadings from the supportive behaviors items (λ = -.774 to -.633, M_λ = -.708), positive loadings from the thwarting behaviors (λ = .651 to .873, M_λ = .796), and slightly smaller positive loadings from the indifferent behaviors (λ = .344 to .859, M_λ = .566). Because of this specific pattern of loadings (positive for need thwarting and indifferent behaviors, and negative for need supportive behaviors) we hereafter refer to this G-factor as reflecting supervisors' global levels of need hampering behaviors. Moreover, although a few items reflected the G-factor more strongly than their S-factor, all S-factors maintained a meaningful amount of specificity (supportive: λ = .187 to .577, M_λ = .417; thwarting: λ = .055 to .441, M_λ = .264, and indifferent: $|\lambda|$ = .191 to .591, $M_{|\lambda|}$ = .381). Taken together, these results supported the bifactor-ESEM model with one G-factor and three S-factors (M10). Additional information on this solution is provided in Study 1 section of the Online Supplements.

Discussion

This study provided preliminary support for the ability of SDT (Ryan & Deci, 2017) to offer an alternative integrative understanding of leadership behaviors (Anderson & Sun, 2017). Specifically, we provided preliminary evidence supporting the factor validity of a measure of supervisors' need supportive, thwarting, and indifferent behaviors (the TMIB-S), adapted from the sport context (TMIB-C; Bhavsar et al., 2019), in a sample of English-speaking workers. In doing so, we expand upon prior instruments in the work setting (e.g., Baard et al., 2004; Moreau & Mageau, 2012), by offering a multidimensional measure encompassing not only autonomy-supportive and autonomy-thwarting (controlling) behaviors from supervisors, but also their supportive and thwarting behaviors toward the other psychological needs of their employees (relatedness and competence), together with their indifferent behaviors toward employees' psychological needs.

We investigated the multidimensionality of employees' ratings of their supervisors' behaviors and found support for a bifactor-ESEM representation. Although prior research has represented interpersonal behaviors as multidimensional (e.g., Rocchi et al., 2017a, 2017b; Tóth-Király et al., 2021) or as global (e.g., Bartholomew et al., 2011a; Gillet et al., 2012a) constructs, our study supports a third representation. This third option bridges the gap between the two previous ones: Interpersonal behaviors may be represented through a global entity (global levels of need hampering behaviors; G-factor) coexisting with three specific facets (need supportive, indifferent, and thwarting behaviors; S-factors). It should be emphasized that, though we labeled the G-factor as reflecting global levels of "need hampering behaviors" based on the valence of the factor loadings (negative for need supportive behaviors and positive for need indifferent and need thwarting behaviors), this factor still reflects the whole range of supervisors' positive and negative need-related interpersonal behaviors. As such, although higher scores on this G-factor reflect exposure to need hampering supervisors, lower scores reflect exposure to need nurturing supervisors. Moreover, it is important to keep in mind that the S-factors cannot be interpreted as one would interpret a first-order factor. Rather, one should keep in mind that these S-factors reflect the extent to which subordinates' perceptions of each interpersonal style (supportive, thwarting, and indifferent) deviate from their global perception of their supervisor's interpersonal behaviors. In other words, S-factors reflect what is unique to each interpersonal style, over and above employees' global perception of their supervisor's interpersonal behaviors.

Despite the superiority of this bifactor-ESEM solution, the three-factor ESEM solution was also, though to a lesser extent, satisfactory. This alternative model matched Bhavsar et al.'s (2019) results, suggesting that researchers and practitioners who require a more traditional representation of each type of behavior could rely on this alternative representation (M2).

Study 2

Although Study 1 provided validity evidence for the TMIB-S, this evidence was limited to an initial demonstration of factor validity in an English-Speaking sample. Yet, leadership is a global issue, requiring measures to be adaptable across linguistic populations (e.g., Millsap, 2011). Moreover, the universality of need-related behaviors across contexts (e.g., sports, work) and cultures is a key tenet of SDT (Vansteenkiste et al., 2020). As such, the ability to establish the validity of another linguistic version of the TMIB-S is critical to support cross-cultural comparisons based on this instrument. Study 2 examines the validity of a French version of the TMIB-S by verifying whether the bifactor-ESEM solution retained in Study 1 would be replicated in Study 2, and by documenting the invariance of this solution across samples of English- and French- speaking employees.

The ability to test for other forms of validity (i.e., discriminant and criterion-related) of employees' responses to the TMIB-S also constitutes a crucial step toward documenting the potential utility of this measure of supervisory behaviors. Study 2 addresses these issues. First, the capacity to demonstrate the added-value of a measure beyond that of already established ones represents a critical step toward the establishment of the measure's discriminant validity (Judge & Piccolo, 2004). Therefore, we examined the discriminant validity of the TMIB-S by controlling for four other well-established leadership behaviors: (1) Abusive supervision (i.e., "sustained display of hostile verbal and nonverbal behaviors, excluding physical contact"; Tepper, 2000, p. 178); (2) passive leadership (i.e., "a passive mode of reaction or the lack of response from the leader in the face of a variety of situations"; Chênevert et al., 2013, p. 278); (3) LMX (high quality supervisor-subordinate relationships, implying perceptions of support, guidance, and appreciation from one's supervisor; Graen & Uhl-Bien, 1995); and (4) transformational leadership (i.e., "the extent to which a leader is visionary, innovative, supportive, participative and worthy of respect"; Carless et al., 2000, p. 401). Showing that these established and widely studied leadership styles do not contribute beyond what can be explained by the supportive, thwarting, and indifferent styles measured by the TMIB-S would support the TMIB-S as a useful alternative to existing leadership measures. Showing that scores on the TMIB-S are equivalent, or even more effective, in prediction than other types of leadership behaviors would provide an opportunity to overcome the theoretical, methodological, and practical limitations associated with the tendency to measure positive, negative, and passive leadership with instruments developed from distinct theoretical frameworks (Klasmeier et al., 2021; Xu et al., 2015). These instruments rely on different types of items, instructions and response scales, and were created though distinct types of procedures. By using scales developed so differently, one risks measuring constructs that are hardly comparable or overlapping, ending up with a poor reflection of the reality under study.

In addition, Study 2 investigates the criterion-related validity of the TMIB-S using several indicators of employees' well- (work engagement) and ill-being (emotional exhaustion and job boredom). In doing so, we aim to examine the unique implications of need indifferent, supportive, and thwarting behaviors in terms of employee functioning. Importantly, some have previously argued that passive leadership styles (e.g., need indifferent behaviors) could be as destructive as more actively negative types (e.g., need thwarting behaviors) of leadership (Skogstad et al., 2007). Others have shown that passive leadership behaviors were as important as other behaviors in predicting various outcome variables and called for more research on these passive forms of supervisory behaviors (Judge & Piccolo, 2004). Yet, empirical studies documenting the psychological health consequences of passive forms of leadership behaviors remain scarce. As such, organizations, supervisors, and researchers may remain unaware of the potentially devastating effects of such behaviors.

We chose to measure work engagement, emotional exhaustion and job boredom in this study, as they have been shown to share associations with supervisory behaviors (Breevart et al., 2016; Krasniqi et al., 2019; Whitman et al., 2014) and to have important consequences for organizations, including sickness absence, turnover, counterproductive work behaviors, job performance and service quality (Schaufeli & Salanova, 2014). Based on prior research, we expected that work engagement, a work-related indice of well-being that is characterized by vigor, dedication, and absorption (Schaufeli et al., 2019), would result more importantly from need supportive interpersonal behaviors (Bhavsar et al., 2019; Slemp et al., 2018). Emotional exhaustion being an intense state of fatigue and energy depletion, resulting from chronic exposure to work stressors such as work overload, emotional demands, and interpersonal conflict (Schaufeli & Salanova, 2014), we expected it to be best predicted by thwarting behaviors as they imply pressure, criticism, and rejection. Finally, job boredom also reflects an undesirable outcome,

yet not one that is as actively adverse as emotional exhaustion. Because job boredom is defined as "an unpleasant state of relatively low arousal and dissatisfaction" (Mikulas & Vodanovich, 1993, p. 3) resulting from a work environment that is not sufficiently stimulating and challenging (Schaufeli & Salanova, 2014), we expected it to be best predicted by need indifferent behaviors, which reflect an under-stimulating supervisory style.

Finally, we consider the psychological mechanisms that may explain these associations. On the basis of SDT (Bartholomew et al., 2011a), we propose that the relations between supervisory behaviors (supportive, thwarting, and indifferent) and employees' work engagement, job boredom and emotional exhaustion would be mediated by employees' need satisfaction and frustration. Based on prior research (Bhavsar et al., 2019; Gillet et al., 2012a), we anticipated that need supportive behaviors would best predict need satisfaction, which would itself associate more importantly with work engagement. Contrastingly, we hypothesized that need frustration would result more importantly from need thwarting behaviors, and to a lesser extent from need indifferent behaviors (Bhavsar et al., 2019), and in turn associate more strongly with emotional exhaustion and, to a lesser extent, job boredom.

Method

Procedure and Participants

Participants were recruited by trained research assistants across a variety of organizations located in France. Participants had to be employed, in France, and to have a supervisor. Eligible participants received an email clarifying the general goal of the research and offering them to take part in an online survey, while explaining that participation was voluntary. They were also guaranteed that their responses would remain anonymous and were asked to provide active written consent. Given that each of these participants was personally and carefully recruited by trained research assistants, and given that participation was most likely driven by autonomous motives, we were confident that participants would complete the questionnaire with attention (Ryan & Deci, 2017), and thus did not include any attention checks, in line with prior research on similar constructs (e.g., Bhavsar et al., 2019).

A total of 512 French participants (M_{age} = 31.12; *SD* = 11.74; 59.8% women) completed the survey. A majority of the participants had permanent positions (68.6%) and worked full-time (82.2%) for an average of 37.28 hours a week (*SD* = 10.19). Participants' average job tenure was 5.67 years (*SD* = 7.40) and they had been working under the management of their current supervisor for an average of 3.56 years (*SD* = 4.96). Roughly a fourth (22.1%) of the participants held supervisory positions. Participants mainly worked in the private sector (71.3%).

Measures

Through a translation back-translation procedure (Beaton et al., 2000), measures not available in French (need-related behaviors, abusive supervision, job boredom) were adapted from English.

Supervisor Interpersonal Behaviors were measured with the French adaptation (see Appendix B at the beginning of the online supplements) of the questionnaire described in Study 1 (need indifferent behaviors: α = .86; need thwarting behaviors: α = .92; and need supportive behaviors: α = .93).

Abusive supervision was measured with three items (α = .74; e.g., "Tells me my thoughts or feelings are stupid") adapted from Tepper (2000) by Detert et al. (2007). Participants indicated how frequently their current supervisor engaged in a series of behaviors (1–*never* to 5–*very often*).

Passive leadership was assessed with five items (α = .87) adapted in French (Chênevert et al., 2013). Participants were asked to think of their supervisor to rate their degree of agreement (e.g., "My direct supervisor avoids making decisions"; 1–*strongly disagree* to 7–*strongly agree*).

LMX was measured with seven items (α = .91; Graen & Uhl-Bien, 1995) adapted to French by Montani et al. (2017). Respondents were asked to think about their experience with their supervisor to reply using a five-point response scale, for which the anchors differed across items (e.g., "How well does your supervisor understand your job problems and needs?"; 1–*not a bit* to 5–*a great deal*).

Transformational leadership was assessed with seven items (α = .94; Carless et al., 2000) adapted to French (Gillet & Vandenberghe, 2014). Participants rated how frequently their supervisor displayed behaviors (e.g., "gives encouragement and recognition to staff"; 1–*never* to 5–*always*).

Need satisfaction was measured with a nine-item scale created in French by Gillet et al. (2008). Items were contextualized with the stem "At work...". Three 3-item subscales were used to measure the satisfaction of the need for autonomy (α = .76; e.g., "I have the opportunity to make decisions about the tasks that I have to perform"), competence (α = .72; e.g., "I feel like I am able to meet the demands of the tasks that I have to perform"), and relatedness (α = .83; e.g., "I get along well with the people whom

I interact with"). Items were rated from 1 (*strongly disagree*) to 7 (*strongly agree*).

Need frustration was evaluated with the original French nine-item scale created by Gillet et al. (2012b). Three 3-item subscales were used to measure the frustration of the need for autonomy (α = .82; e.g., "I feel forced to behave in a certain way"), competence (α = .78; e.g., "It happens that I hear things that make me feel incompetent"), and relatedness (α = .78; e.g., "I think other people hate me"). Participants rated their agreement with each statement (1–*strongly disagree* to 7–*strongly agree*).

Work engagement was measured via the three-item version of the Utrecht Work Engagement Scale (UWES-3: Schaufeli et al., 2019; α = .86; e.g., "At my work, I feel bursting with energy"). Participants indicated their response on a frequency scale (1–*never* to 7–*always*).

Job boredom was measured with six items (α = .83; e.g., "I feel bored at my job") from the Dutch Boredom Scale (DUBS; Reijseger et al., 2013), rated on a five-point scale (1–*never* to 5–*always*).

Emotional exhaustion was evaluated with a three-item subscale (α = .74; e.g., "I feel I am unable to be sensitive to the needs of coworkers and customers") from the French version of the Shirom-Melamed Burnout Measure (Sassi & Neveu, 2010), rated on a frequency scale (1–*never* to 7–*always*).

Analyses

Analyses were conducted using the same procedures as in Study 1. The same set of measurement models already described in Study 1 was first used to identify the optimal measurement structure for the TMIB-S. We then proceeded to test the invariance of this measurement model (Millsap, 2011) across samples from Studies 1 and 2 (more details can be found in the Study 2 section of the online supplements). Before moving to predictive models, we also contrasted a priori measurement models to identify the optimal structure for the measures of need fulfillment (need satisfaction and frustration), following a sequence of models described in Tóth-Király et al. (2018). These additional analyses appear in Study 2 section of the online supplements and replicated Tóth-Király et al.'s (2018) results, leading us to retain a bifactor-ESEM model encompassing one global need fulfillment G-factor and six S-factors (the frustration and satisfaction of the needs for relatedness, competence, and autonomy). Predictive analyses were then conducted, based on the model described in Figure 1: We contrasted a total mediation solution with a partial mediation alternative. We analyzed mediation by estimating the indirect effects of supervisors' behaviors on job boredom, work engagement, and emotional exhaustion, as mediated by employees' need fulfillment (Morin et al., 2013).

As a final step, the discriminant validity of the TMIB-S was examined relative to measures of passive leadership, abusive supervision, LMX, and transformational leadership. This final step was conducted by incorporating these variables to the final retained mediation model as additional predictors, and by contrasting four alternative models: (1) Null: The effects of these additional variables on the mediators and outcomes were constrained to be exactly 0; (2) partial mediation: The effects of these additional variables on the mediators and outcomes were freely estimated; (3) total mediation: The effects of these additional variables on the mediators, but not the outcomes, were freely estimated; and (4) direct: The effects of these additional variables on the outcomes, but not the mediators, were freely estimated. We conducted these analyses independently[3] for the four variables (passive leadership, abusive supervision, LMX, and transformational leadership) to limit possible multicollinearity due to their high correlations (r = .54 to .88). Latent correlations among all variables included in this study are presented in Table S4 of Study 2 section of the online supplements.

Results

The fit of the preliminary measurement models appears in the upper section of Table S3 in the online supplements. Additional details regarding these models are disclosed in the Study 2 section of the online supplements. These results reinforced Study 1's conclusions in supporting the superiority of the bifactor-ESEM solution with one G-factor and three S-factors (M10). This solution (M10) was therefore retained and tested for measurement invariance. Results from these analyses provided support for the invariance

[3] Upon request from a reviewer, we conducted additional analyses where (1) all alternative measures (passive leadership, LMX, transformational leadership, and abusive supervision) were added to analyses already including the TMIB-S; and (2) the TMIB-S was added to analyses already including all other measures. We contrasted the same four alternative models (i.e., null, partial mediation, total mediation, and direct). Results from these analyses are described in more details in the online supplements and showed that adding the other leadership scales did not add to prediction once the TMIB-S was considered, whereas the TMIB-S explained well- and ill-being outcomes beyond these existing measures.

(configural, weak, strong, partial strict, variance-covariance, and means) of this solution across the English (Study 1) and French (Study 2) respondents (see Table S3 of the online supplements, middle section). In the model of partial strict invariance, the uniquenesses of two items had to be allowed to be freely estimated across samples, indicating the presence of slightly higher measurement errors associated with these two items in the French questionnaire (i.e., Study 2).

Model fit from the different predictive models was satisfactory and similar for the partial and total mediation models, albeit slightly better for the former relative to the latter (see Table S3 of the online supplements, middle section). Statistically significant direct links between the predictors (supervisors' interpersonal behaviors) and the outcomes were also evidenced in the partial mediation model, which was thus retained for interpretation. Results from this model are detailed in Table 2 and in the Study 2 section of the online supplements (see Figure S1 for an illustration) and thoroughly examined in the following discussion section. Taken together, results suggested the presence of 18 potential indirect effects, which were all supported through tests of statistical significance, via bias-corrected bootstrap confidence intervals (see Table S8 of Study 2 section of the online supplements).

Results from the tests of discriminant validity are reported in the Study 2 section of the online supplements (also see Table S3, bottom section) and examined in detail in the following discussion.

Discussion

Study 2 provided replication evidence for the bifactor-ESEM factor structure of the TMIB-S identified in Study 1, showing that a similar structure appeared to provide an equally adequate representation of the underlying structure of the French version of this instrument. In doing so, Study 2 further supported the ability of SDT to be a valuable theoretical framework to understand leadership behaviors across countries and cultures (Vansteenkiste et al., 2020). Furthermore, and also supporting results from Study 1, the alternative three-factor ESEM structure (M2) also seemed to represent an acceptable alternative for researchers seeking to achieve a more traditional type of measurement.

Study 2 also provided preliminary support for the criterion-related validity of the TMIB-S. In this regard, our results showed that global levels of need hampering behaviors directly and indirectly (through global need fulfillment and specific autonomy satisfaction) predicted more emotional exhaustion and boredom, and less work engagement. Our results also revealed that, once the variance explained by global need hampering behaviors was considered, specific need supportive, thwarting, and indifferent behaviors also predicted various indicators of psychological functioning. More precisely, specific levels of imbalance in each of the supportive, thwarting, and indifferent behaviors, relative to all other types of behaviors, also explained unique variability in outcomes' levels, over and above that already explained by global level of need hampering behaviors. This has important implications for leadership researchers. Indeed, modeling the global/specific nature of subordinates' perceptions of their supervisors' need-related interpersonal behaviors makes it possible to capture the fact that the specificities inherent to each interpersonal style have distinct consequences. Interestingly, we observed that, whereas the effects of the specific levels of need supportive and thwarting behaviors on psychological functioning were indirect (mediated via global and specific levels of need fulfillment), those of need indifferent behaviors were direct.

On one hand, as expected, need supportive behaviors predicted higher global levels of need fulfillment and specific relatedness satisfaction, which in turn both predicted more work engagement and less emotional exhaustion and boredom. Likewise, need thwarting behaviors predicted lower global need fulfillment, which in turn led to less work engagement and more emotional exhaustion and boredom. On the other hand, need thwarting behaviors also unexpectedly predicted higher specific relatedness satisfaction, which was in turn related to more work engagement and less emotional exhaustion and boredom. This result could suggest that exposure to supervisors that are perceived as displaying a high level of need thwarting behaviors may encourage employees to seek fulfillment of their need for relatedness from other work-related sources, which may in turn protect and promote their psychological functioning. In addition, although need thwarting behaviors, as expected, were also related to higher levels of specific competence frustration, these levels were, in turn, surprisingly related to higher work engagement. This suggests that subordinates who feel that their need for competence is frustrated at work as a result of their supervisor's need thwarting behaviors might become more engaged at work. A possible explanation for these unexpected results could be that some subordinates may engage in effective coping strategies, such as directly confronting their supervisor about their thwarting behaviors (e.g., Frieder et al., 2015) or using ingratiation when interacting with their supervisor (Harvey

et al. 2007), as tactics to gain an increased sense of control over their work environment when facing need thwarting supervisors. Yet, such coping strategies require resource-mobilization (Frieder et al., 2015), which is why subordinates might still feel energized at work (i.e., work engagement). However, we did not consider these factors in the present study, and this hypothesis would need to be verified in future research. An alternative explanation for this unexpected result could be that employees who perceive their need for competence to be frustrated could engage more into their work as a way to compensate and increase their mastery. For instance, Sheldon and Gunz (2009) showed that the more individuals perceive their needs for competence and relatedness to be threatened, the more they desire to experience the satisfaction of these needs and orient their behaviors toward that goal. Other studies have provided support for this "need restoration" process (e.g., Radel et al, 2013), showing that the deprivation of specific needs does have a motivational force yielding behaviors aiming at restoring the deprived needs. Yet, because this need restoration process occurs over time (Radel et al., 2013), and because our study is cross-sectional, this explanation remains speculative. These possibilities thus require verification in future longitudinal studies.

Contrasting with these observations, need indifferent behaviors only had direct associations with the indicators of psychological functioning. Specifically, need indifferent behaviors were positively associated with employees' emotional exhaustion and job boredom, and negatively associated with their work engagement. These direct associations emphasize the value of considering this third type of supervisory behaviors when seeking to understand the drivers of employees' psychological functioning and reinforce the idea that a lack of leadership might be as harmful as the presence of inadequate leadership behaviors (Judge & Piccolo, 2004). Moreover, as expected, need indifferent behaviors were strongly associated with job boredom, thus supporting the idea that under-stimulating supervisory behaviors can predict "an unpleasant state of relatively low arousal and dissatisfaction" (Mikulas & Vodanovich, 1993, p. 3). Finally, results also supported the distinctive psychological implications of exposure to need thwarting *versus* indifferent behaviors in showing that, whereas the former had implications for employees' levels of psychological need fulfillment, the latter did not significantly predict this psychological mediator. This result thus suggests that need indifferent behaviors, rather than contribute to employees' need frustration or satisfaction, might rather be associated with a distinct need state. Indeed, recent research suggested that need unfulfillment (i.e., a negative psychological experience involving feelings of disconnection, dullness, and uncertainty), could be represented as a third and distinctive need state when examined together with employees' need frustration and satisfaction (Cheon et al., 2019; Huyghebaert-Zouaghi et al., 2021).

Finally, Study 2 provided preliminary support for the discriminant validity of the TMIB-S relative to ratings of abusive supervision, passive leadership, LMX, and transformational leadership, which did not share any statistically significant association with the outcomes once the effects of supervisors' interpersonal behaviors were taken into account. Passive leadership did share one statistically significant association with a mediator (i.e., autonomy satisfaction) which is not surprising because passive supervisors offer no structure, thus allowing employees to make decisions (too) autonomously. Yet, out of a total of 40 specified links between the four alternative leadership measures and the 10 mediator/outcome factors included in our study, only this one association turned out to be significant, whereas many significant associations were found between the behaviors measured by the TMIB-S and the mediators and outcomes. These results thus support the added-value of the TMIB-S, when compared to well-established measures of leadership, in predicting various outcomes of interest[4,5].

This parsimonious consideration of the differentiated effects of several forms of interpersonal behaviors, while controlling for other leadership behaviors (Piccolo et al., 2012), strongly supports the

[4] Our final model including only the TMIB-S and the alternative models (also including the other measures) resulted in comparable R^2 (Table S16 of the online supplements), showing that the other measures did not add to the prediction beyond what was explained by the TMIB-S. Similar results were found for Study 3.

[5] We conducted additional analyses to test whether the TMIB-S factors contributed to prediction beyond the role played by the other leadership measures. Results from these additional analyses are reported in Table S15 and S17 of the online supplements. These results showed that adding the TMIB-S resulted in a noteworthy increase in model fit, as well as in improvement in R^2 relative to a null model (in which the effects of the TMIB-S factors were set to be exactly zero while those of the other measures were freely estimated). These results indicate that the TMIB-S predicted well- and ill-being over existing measures. Similar results were found for Study 3.

discriminant and criterion-related validity of the TMIB-S. This study also extends our understanding of the consequences of passive types of leadership (Judge & Piccolo, 2004; Skogstad et al., 2007).

Study 3

Study 3 builds on Study 2, seeking to accomplish the following objectives: (1) provide replication evidence for the bifactor-ESEM factor structure of the TMIB-S among a new sample of English-speaking workers; (2) extend the nomological network of the TMIB-S via further analyses of its criterion-related validity; (3) provide further evidence for the discriminant validity of the TMIB-S.

In terms of criterion-related validity, we attempted to replicate findings from Study 2 by measuring need satisfaction and frustration using different measures (i.e., validated in a different culture and language) than those used in Study 2. Moreover, we retained job boredom given its less actively adverse nature on the ill-being continuum and its unique association with need indifferent behaviors identified in Study 2. In addition, to expand upon results from Study 2, we also considered employees' ratings of job satisfaction (as an alternative manifestation of well-being) and work-related rumination (as an alternative manifestation of ill-being). This decision is underpinned by the documented associations between various forms of supervisory behaviors and these outcomes (e.g., Gillet et al., 2012a; Pereira et al., 2015), and by the impact of these outcomes in terms of individual (e.g., problem-solving, impaired concentration) and organizational (e.g., job performance, organizational commitment) functioning (Lu et al., 2019; Lyubomirsky & Tkach, 2008). Based on prior research, we expected job satisfaction to be best predicted by need supportive behaviors through the mediation of need satisfaction (Gillet et al., 2012a). We also expected rumination (i.e., the experience of recurring and invasive thoughts about work-related matters in the absence of job demands necessitating these thoughts; Martin & Tesser, 1996), to be best predicted by need thwarting behaviors through the mediation of need frustration. Indeed, when employees face a supervisor who rejects, criticizes, and pressures them, they may experience feelings of exclusion, uselessness, and coercion, which could in turn spill over into their off-job hours in the form of ubiquitous thoughts. Finally, as in Study 2, we expected job boredom to share stronger and more direct associations with indifferent behaviors.

As in Study 2, discriminant validity was assessed in relation to measures of actively adverse (abusive supervision) and passive/neglecting (passive leadership) forms of leadership, as well as to more desirable forms of leadership captured by LMX and transformational leadership.

Method

Procedure and Participants

The *Prolific Academic* online platform was used to recruit participants (compensated £1.00 for completing a 10-minute questionnaire), relying on inclusion criteria and on a procedure identical to Study 1. Because participation was, as in Study 1, based on external rewards, the same attention check and control question used in Study 1 were included in Study 3. Given that this survey was longer than the one used in Study 1, an additional attention check was also included (i.e., "It is important that you pay attention to our survey, please tick strongly disagree"), allowing us to divide the survey into three sections of roughly the same length, each with their own attention check. This made it possible to control for participants' possible drop in attention in the last sections of the survey. Thirty participants failed the first check, 21 failed the second, and two reported not being currently employed. In total, 53 errors were made by 43 individuals who were excluded from the analyses.

The final sample included 449 participants (M_{age} = 38.91; *SD* = 10.95; 54.9% women). Participants lived and worked either in the UK (70.6%), US (26.5%), or Canada (2.9%), and most of them had permanent positions (92.9%) and worked full-time (100%) for an average of 36.04 hours per week (*SD* = 9.17). Respondents' job tenure was of 6.22 years in average (*SD* = 5.01), and they had been working for their supervisor for 4.18 years in average (*SD* = 3.85). Roughly half of the participants held supervisory positions (45.9%). Participants mainly worked in the private sector (62.4%).

Measures

Supervisor Interpersonal Behaviors were measured with the TMIB-S (need thwarting behaviors: α = .95; need indifferent behaviors: α = .79; and need supportive behaviors: α = .95).

Abusive supervision (α = .80), **passive leadership** (α = .81), **LMX** (α = .94), and **transformational leadership** (α = .96) were measured with the original English version of the questionnaires described in Study 2.

Need satisfaction. The 18-item scale validated by Van den Broeck et al. (2010) was used. Three 6-item subscales were used to measure the satisfaction of the need for autonomy (α = .81; e.g., "I feel free

to do my job the way I think it could best be done"), competence (α = .90; e.g., "I feel competent at my job"), and relatedness (α = .90; e.g., "At work, I feel part of a group"), on a Likert scale (1–*strongly disagree*; 7–*strongly agree*).

Need frustration. The 12-item scale developed by Bartholomew et al. (2011b) was here used and contextualized with the stem "At work ...". Three four-item subscales respectively assessed the frustration of the needs for competence (α = .89; e.g., "There are situations where I am made to feel inadequate"), autonomy (α = .89; e.g., "I feel prevented from making choices with regards to the way I work"), and relatedness (α = .84; e.g., "I feel I am rejected by those around me"), on a Likert scale (1–*strongly disagree*; 7–*strongly agree*).

Job satisfaction. Participants were asked to rate their degree of satisfaction with their present job (1–*dissatisfied* to 4–*satisfied*) on a single item measure (Huyghebaert-Zouaghi et al., 2021).

Job boredom was measured as in Study 2 using the DUBS (Reijseger et al., 2013; α = .87).

Work-related rumination was measured via two items (α = .83; e.g., "I worry about things that have to be done at work"; de Bloom et al., 2014) asking employees to indicate how much they agreed with both statements (1–*strongly disagree*; 5–*strongly agree*).

Analyses

Analyses were conducted using the same procedure as in Studies 1 and 2 (measurement models, invariance, predictive analyses, and discriminant validity). The details of these analyses are disclosed in the online supplements (Study 3 section), while the model tested in the predictive analyses is also illustrated in Figure 1 (correlations are reported in Table S10 of the online supplements).

Results

Table S9 of the online supplements (upper section) details the model fit from the measurement models used to investigate the optimal structure for the TMIB-S and its invariance across samples. Additional details regarding these models are disclosed in the Study 3 section of the online supplements. These results corroborated the conclusions from Studies 1 and 2, leading us to retain M10 (i.e., the bifactor-ESEM solution encompassing one G-factor and three S-factors). Measurement invariance was thus examined based on this solution (M10). This solution demonstrated complete invariance across the samples of English-respondents used in Studies 1 and 3.

The fit of the predictive models is reported in Table S9 of the online supplements (middle section). These results revealed that the total mediation model was unable to achieve acceptable levels of fit based on the TLI value, whereas the partial mediation model was able to do so. Examination of the parameter estimates from these models revealed statistically significant direct effects of the predictors (supervisors' interpersonal behaviors) on the outcomes. The partial mediation model was therefore selected for interpretation. Results from this model are detailed in Table 3 (for a more extensive presentation, see Study 2 section of the online supplements and Figure S2 for an illustration) and thoroughly examined in the following discussion section. These results suggested the presence of 19 potential indirect effects, which were all supported through tests of statistical significance, via bias-corrected bootstrap confidence intervals (see Table S14 of Study 3 section of the online supplements).

Results from the tests of discriminant validity are reported in the Study 3 section of the online supplements (also see Table S9, bottom section) and examined in detail in the following discussion.

Discussion

Study 3 replicated the bifactor-ESEM structure of the TMIB-S demonstrated in Study 1 and 2, and further established the adequacy of the English version of this instrument. In addition, as in Studies 1 and 2, Study 3 showed the adequacy of the alternative three-factor ESEM structure (M2) retained by Bhavsar et al. (2019). Study 3 also extended the nomological network of the TMIB-S, revealing (as in Study 2), that all four factors shared well-differentiated relations with the covariates. These results supported the idea that need hampering behaviors exert their effects on the least desirable outcome (i.e., work-related rumination) in part through "the darker side" of psychological needs (i.e., need frustration; Bartholomew et al., 2011a, 2011b). Importantly, results also showed that, once the contribution of global need hampering behaviors was considered, specific need supportive, indifferent, and thwarting behaviors also meaningfully predicted various indicators of psychological functioning.

As expected, need supportive behaviors indirectly predicted lower levels of rumination and job boredom, and higher levels of job satisfaction, through global need fulfillment. The effects of need supportive behaviors on job satisfaction and boredom were also explained by employees' specific autonomy satisfaction, thus highlighting the unique role played by the need for autonomy in explaining

the beneficial effect of positive contextual factors (supportive behaviors). Specific need supportive behaviors also directly predicted lower levels of rumination and, unexpectedly, shared direct positive associations with higher levels of job boredom. This surprising result thus suggests that too much support might directly predict boredom. Keeping in mind the bifactor nature of the measurement model underpinning TMIB-S ratings, this result may suggest that supportive behaviors alone do not suffice to prevent maladaptive functioning. Rather, they may need to be complemented with low levels of indifferent and thwarting behaviors, as reflected by low global levels of need hampering behaviors. In other words, this result could indicate that supervisors who wish to prevent job boredom among their subordinates should not only try to enact more need supportive behaviors, but should simultaneously make an effort to reduce their need thwarting and indifferent behaviors, to help subordinates to perceive them as globally displaying lower levels of need hampering behaviors. It also implies that researchers who wish to get a comprehensive understanding of the effects of supervisors' need-related behaviors should simultaneously measure all three types of behaviors.

Specific levels of need thwarting behaviors only indirectly related to more job satisfaction and less job boredom, via the mediating role of employees' specific relatedness satisfaction. This unexpected result replicates a similar association already identified in Study 2, suggesting that exposure to need thwarting supervisors may encourage employees to seek fulfillment of their need for relatedness from other work-related sources. Moreover, specific levels of thwarting behaviors also shared no statistically significant association with the most deleterious outcome considered in this study (work-related rumination). It may be that need thwarting behaviors need to combine with other facets of interpersonal behaviors (e.g., high levels of global need hampering and specific indifferent behaviors, and low levels of specific supportive behaviors) in order to create the most adverse consequences, a hypothesis which we further address in the General Discussion.

Specific need indifferent behaviors were indirectly linked to more job boredom and rumination and less job satisfaction through the mediating role of need fulfillment. Although no evidence for such an indirect effect was found in Study 2, Study 3 suggests that, at least in some circumstances, the effect of need indifferent behaviors on employees' psychological functioning may be explained by employees' psychological need frustration and satisfaction. Yet, and supporting results from Study 2, specific need indifferent behaviors were also directly associated with higher levels of job boredom. These results highlight how predictive this passive leadership style can be (Skogstad et al., 2007).

Finally, adding support for the TMIB-S' discriminant validity, LMX, transformational leadership, abusive supervision, and passive leadership did not relate to any of the outcome variables once the effects of supervisors' interpersonal behaviors were taken into account. However, LMX did share two associations with the mediators, namely, higher global need fulfillment and specific competence satisfaction. Similarly, transformational leadership was associated with higher specific levels of competence satisfaction and lower specific levels of competence frustration. These results are neither surprising, nor concerning, as: (1) they are consistent with prior research showing LMX and transformational leadership to positively associate with need satisfaction (Kojvanic et al., 2013; Lian et al., 2012); (2) LMX and transformational leadership did not significantly predict any of the outcomes included in our study (job satisfaction, job boredom, and work-related rumination); and (3) out of a total of 40 specified links between the four alternative leadership measures and the 10 mediator/outcome factors included in our study, only four associations turned out to be significant, while numerous significant associations were found between the supervisory behaviors measured by the TMIB-S and those same mediator/outcome factors. Taken together, these results thus show that the TMIB-S competes well with other measures of leadership in predicting various outcomes.

General Discussion

The present work aimed to replicate recent conceptual and methodological developments from the sport context (Bhavsar et al., 2019) to offer a first-in-the-literature work-specific instrument, anchored in SDT (Ryan & Deci, 2017), allowing to simultaneously measure perceived supervisors' supportive, indifferent, and thwarting behaviors toward their employees' psychological needs.

A Tripartite Approach of Supervisory Behaviors

Through three studies, this research demonstrated SDT (Ryan & Deci, 2017) to be a valuable framework to provide an alternative integrative perspective on leadership behaviors (Anderson & Sun, 2017). Indeed, we provided the first demonstration, in the work context that supervisors' indifferent behaviors toward their subordinates' basic psychological needs can be modeled as a distinctive category

of supervisory behaviors when tested alongside supervisors' need supportive and thwarting behaviors. In doing so, our research extends work-related SDT research by showing that supervisors' behaviors are not dichotomous or extreme in nature (i.e., adverse thwarting behaviors and beneficial supportive behaviors; e.g., Gillet et al., 2012a). Rather, workers may also experience more passive and nuanced negative behaviors from their supervisors in the form of need indifferent behaviors. Moreover, we showed that the TMIB-S constitutes a valuable tool for researchers and practitioners from English- and French-speaking countries to jointly assess those three forms of supervisory behaviors (see Appendices A and B, in the Online Supplements).

Multidimensionality of Supervisory Behaviors

Our research supported both a bifactor-ESEM (one G-factor and three S-factors) and an ESEM (three factors) representation of ratings on the TMIB-S, thus highlighting the multidimensionality of ratings on this instrument. Both these solutions are consistent with the idea that employees' ratings of their supervisors' need-related interpersonal behaviors are dominated by the type of behavior considered (supportive, thwarting, and indifferent) rather than the type of need (competence, relatedness, autonomy). In other words, our results emphasize the importance of supervisors' interpersonal styles toward subordinates' psychological needs as a whole. This conclusion aligns well with a premise of SDT emphasizing that subordinates' psychological needs for autonomy, competence and relatedness represent equally important psychological nutriments for psychological functioning (Ryan & Deci, 2017). Just like plants need water, sunlight and soil to grow, SDT suggests that individuals require the satisfaction of all of their three needs for autonomy, competence, and relatedness to experience healthy development, integrity, and well-being (Deci & Ryan, 2000). This equal and additive importance of the three psychological needs has been demonstrated throughout decades of SDT research (e.g., Sheldon & Filak, 2008; Vansteenkiste et al., 2020). Hence, we advocate that it is the general need supportive, thwarting, or indifferent experience that matters most, rather than how each individual need is supported, thwarted, or neglected. This conclusion has important implications for supervisors and practitioners as it encourages them to consider all three needs as equally important when interacting with subordinates. Moreover, this tripartite structure is also in line with prior research conducted in the sport area (Bhavsar et al., 2019), and is consistent with Lewin et al.'s (1939) seminal proposition regarding the tripartite nature of leadership behaviors.

When considering the bifactor-ESEM solution, our results suggest the presence of a G-factor reflecting commonalities among all leadership behaviors, but also indicate that the three behavioral dimensions retain some meaningful specificity over and above this G-factor. This implies that the G-factor is not sufficient to capture all information provided by employees' TMIB-S ratings (as indicated by the poor fit of the single factor model). This global-specific distinction is purely statistical rather than perceptual: Employees are not asked to report on their general impression of their supervisor's behaviors separately from their specific impressions of their supervisors' behaviors. They are simply asked to rate a series of items reflecting various behaviors. These ratings are then used to statistically distinguish between everything that is common to all of these ratings (G-factor) and what is unique to ratings of each specific type of behavior (S-factors) once the G-factor is accounted for. More precisely, when a supervisor's behavior is witnessed by their follower, this behavior contributes to both the follower's global impression of their supervisor as a "rather good or bad" leader and to their specific perceptions of their supervisor reliance on specific types of behavior in a way that deviates from their global impression. In a traditional first order factor model, this global perception would be ignored, and employees' perceptions of need supportive, indifferent or thwarting behaviors would overlap substantially because they would also reflect their unmodeled global perceptions, making it hard to clearly understand the unique role played by these different behaviors. In a bifactor model, rather than directly estimating employees' perceptions of the extent to which supervisors rely on each type of behavior, we statistically separate these perceptions from their global impression.

This bifactor representation has implications for leadership research. Indeed, by providing separate estimates of shared versus unique effects, this approach overcomes prior studies' difficulty to clarify which of the less desirable forms of leadership (e.g., transactional and laissez-faire) have the most detrimental effects (Judge & Piccolo, 2004; Skogstad et al., 2007), and sheds light on the distinct effects of supervisors' need thwarting and indifferent behaviors. Practitioners could consider this global-specific distinction by acknowledging that supervisors should first focus on their overall mode of functioning, as employees' global perceptions of this mode of functioning played the strongest role in prediction.

Yet, this globally positive impression does not preclude their occasional reliance on need indifferent or thwarting behaviors to result in undesirable effects and should not be overlooked.

Still, because this novel approach remains under-documented and statistically more complex, some researchers and practitioners may prefer to resort to the more traditional ESEM approach advocated by Bhavsar et al. (2019). Our research shows that both the B-ESEM (one G-factor and three S-factors) and the ESEM (three factors, identical to those identified by Bhavsar et al., 2019) approaches are adequate and may be used by researchers and practitioners to represent ratings on the TMIB-S.

Consequences of Supervisory Behaviors

The TMIB-S: A Useful Alternative to Existing Approaches and Measures

Our conceptual perspective is anchored in SDT (Ryan & Deci, 2017), which depicts leadership as a way to promote subordinates' self-determined motivation and well-being. In contrast, most research has so far approached leadership as a way to influence subordinates' behaviors and performance (e.g., Avolio & Bass, 1991). It is true that some other conceptualizations also approach leadership behaviors through their possible link with subordinates' well-being, but these approaches typically do so only by examining isolated negative or positive leadership behaviors (e.g., engaging leadership; Schaufeli, 2015), rather than by considering the whole range of positive and negative interpersonal behaviors available to supervisors. Our results also supported the value of the TMIB-S as a solid alternative to existing leadership measures, given that transformational leadership, LMX, passive leadership, and abusive supervision did not share any association with a wide array of well- and ill-being variables (i.e., work engagement, job satisfaction, job boredom, work-related rumination, exhaustion), once the effects of supervisors' need supportive, -indifferent, and -thwarting behaviors were accounted for.

These results position the TMIB-S as a viable alternative for researchers and practitioners who wish to explore the managerial antecedents of workers' psychological health. The TMIB-S not only accounts for a significant amount of variance in a wide array of well- and ill-being indicators, it also has the advantage of simultaneously measuring the positive (supportive behaviors), negative (thwarting behaviors), and passive (indifferent behaviors) forms of supervisory behaviors, based on a single theoretical framework (SDT; Ryan & Deci, 2017) and measure. In contrast, by focusing on isolated leadership behaviors, existing instruments –such as those measuring LMX, passive leadership, and abusive supervision– lose some of their empirical and theoretical comparability (Avolio et al., 1999; Graen & Uhl-Bien, 1995; Tepper, 2000). As such, researchers and practitioners seeking to simultaneously capture positive, negative, and passive supervisory behaviors, when picking scales stemming from distinct conceptual frameworks, risk measuring overlapping or hardly comparable realities. The TMIB-S provides a solid alternative to this suboptimal situation by offering a valid integrative measure, based on a single, well-established, theoretical framework (Ryan & Deci, 2017).

Differentiated Consequences of Supervisory Behaviors Measured by the TMIB-S

By jointly considering the shared and specific effects of need supportive, thwarting, and indifferent behaviors, results from Studies 2 and 3 highlighted the well-differentiated consequences of these three interpersonal styles for subordinates. Importantly, we showed that actively negative and passive-neglectful forms of leadership had clearly distinct consequences for employees' functioning, which remained unclear in the leadership literature (Judge & Piccolo, 2004). Results even showed that specific need indifferent behaviors may be more problematic than specific need thwarting behaviors. Indeed, specific need indifferent behaviors were directly and positively associated with the most problematic indicators of ill-being (i.e., emotional exhaustion and work-related rumination), whereas specific need thwarting behaviors had no direct associations with these outcomes. Specific need thwarting behaviors were even associated with some positive consequences (higher specific levels of relatedness satisfaction and of work engagement). These results reinforce the distinct implications of exposure to need indifferent versus thwarting behaviors from supervisors: Whereas the former results in the most detrimental consequences, the latter results in more varied psychological experiences.

Indeed, when facing a supervisor who threatens their psychological needs, subordinates could engage in need crafting (de Bloom et al., 2020) by seeking other sources of need support (e.g., colleagues; Moreau & Mageau, 2012) or could rely on other effective coping strategies (e.g., ingratiation; Harvey et al., 2007). This interpretation is consistent with the idea that individuals do not passively react to threatening social environments, but can also proactively change the characteristics of their environment (Bakker & Demerouti, 2017; Lazarus & Folkman, 1984) in order to make their experiences more aligned with their needs and preferences. Research stemming from various theoretical frameworks has

consensually indicated that such coping strategies can take the form of seeking social support from various sources (Bakker & Demerouti, 2017; de Bloom et al., 2020; Lazarus & Folkman, 1984). In sum, we suggest that the consequences of need thwarting behaviors may depend on whether subordinates yield to these actively adverse behaviors or decide to proactively attempt to overcome them. It should still be noted that such coping strategies may not be indefinitely protective as they require the investment of resources, and may thus progressively take a toll on employees. More research into the temporal dynamics of employees' need-related experiences, need states, and need crafting behaviors is clearly needed to better understand these issues.

In contrast, need indifferent behaviors seemed to be more consistently harmful than need thwarting behaviors, which adds to the proposal that passive and neglectful forms of leadership may be more destructive than actively adverse ones (Skogstad et al., 2007). An explanation for this may be that, by conveying uncertainty, chaos, and alienation, need indifferent supervisors create a climate of ambiguity, which is known to be particularly problematic for individuals' psychological functioning (see Skogstad et al., 2014). As a result of this general ambiguity and lack of clarity provided by their supervisor, subordinates may experience vulnerability (Lapidot et al., 2007), thus resulting in ill-being (Chênevert et al., 2013; Skogstad et al., 2014). Moreover, need indifferent behaviors may leave subordinates unable to categorize their supervisor's behaviors and create unpredictability in their social interactions. Indeed, the social identity theory of leadership suggests that leadership and its beneficial consequences derive from social identity-based perceptions of the leader as a group member (Steffens et al., 2021). Yet, need indifferent behaviors make it impossible for subordinates to categorize their leader either as an in- or out-group member, which could explain their adverse consequences.

Indeed, uncertainty can create anxiety for some individuals who will then become motivated to attempt to reduce this psychological discomfort in order to return to a state of homeostasis (Hirsh et al., 2012). As such, when finding themselves in a state of uncertainty (lacking direct and explicit information) about their supervisor, subordinates will be motivated to reduce this experience to a manageable level, and will thus activate a search for information to regain a sense of predictability in their relationship with their supervisor (Strom et al., 2014). Yet, these uncertainty reduction efforts are demanding in terms of resources and not always successful. As a result, they can place significant strain on employees, resulting in detrimental consequences. More generally, the adverse consequences of indifferent behaviors stress how important it is to take this neglectful form of supervisory behaviors into consideration (Chénard-Poirier et al., 2022). Although these neglectful behaviors may be trivialized in organizations, where they are often seen as less problematic than need thwarting behaviors, our results suggest that it might be critical for organizations to prevent them, as they have the power to produce even more detrimental consequences than need thwarting behaviors.

Unsurprisingly, our results showed that supervisors' supportive behaviors promote the most positive consequences for subordinates (e.g., higher need fulfillment and work engagement) and protect from the most detrimental ones (e.g., lower work-related rumination). These results are in line with prior research (e.g., Gillet et al., 2012a), and more generally with SDT (Ryan & Deci, 2017), and encourage organizations to search for, nurture, and promote such supportive managerial behaviors.

More generally, the strong direct associations found between specific need indifferent behaviors and job boredom in our research suggest the existence of a passively deleterious pathway underpinning the effects of need indifferent behaviors. This *health eroding process* might complement the two processes established by the JD-R (job demands-resources; Bakker & Demerouti, 2017) model, with the *health impairment process* underpinning the effects of need thwarting behaviors and the *motivational process* underpinning those of the need supporting behaviors.

Limitations and Research Perspectives

This research presents limitations worth considering in the interpretation of results. First, because our research included three samples of Western employees, it is unknown whether our results would be replicated in additional linguistic and cultural groups. This question is of particular relevance, for need supports' universality is one of SDT's fundamental tenets (Vansteenkiste et al., 2020). Second, because we used self-reported measures, social desirability and self-report biases could have influenced participants' responses. The use of more objective physiological indices of individual functioning (e.g., Bartholomew et al., 2011a) could allow to address this limitation. Third, we only considered the role of supervisors' need-related behaviors in relation to psychological needs and psychological health indicators. It would be interesting for future research to study the motivational (i.e., work motivation,

Gagné et al., 2015) and behavioral (e.g., counterproductive behaviors; Detert et al., 2007) consequences of these behaviors, as well as their impact on the work-family interface (e.g., work-family conflict; Huyghebaert et al., 2018). This would allow for a broader understanding of the role played by these behaviors in relation to a wider array of consequences. Future research could also investigate how supervisors' need indifferent behaviors relate to subordinates' need unfulfillment, alongside their need frustration and satisfaction (Huyghebaert-Zouaghi et al., 2021).

Fourth, we did not examine how individual orientations could moderate the relations between supervisors' interpersonal behaviors and consequences for subordinates. For instance, individuals who are characterized by a very strong autonomy orientation (i.e., seeking self-initiation and activities that are interesting and challenging) may be less vulnerable to the adverse effects of need indifferent behaviors from their supervisor than workers with a more controlled orientation (i.e., individuals who prefer being controlled by rewards, deadlines, structures, and the directives of others; Ryan & Deci, 2017). Future research could further explore the fit between individual preferences and supervisors' interpersonal behaviors. Fifth, we solely considered outcomes of supervisors' need-related behaviors. It would be interesting to also consider their organizational antecedents: Scholars could examine how organizations create the conditions to develop optimal supervisory behaviors (need supportive) and prevent undesirable ones (need thwarting and indifferent). Based on the trickle-down effect (Eisenberger & Stinglhamber, 2011), perceived organizational support may convey a norm according to which every employee is expected to show support to others, and spread in the form of need supportive behaviors. Conversely, organizational dehumanization (Lagios et al., 2021) may convey a norm of mistreatment tolerance and allow for need thwarting and indifferent behaviors to occur.

Finally, we relied solely on variable-centered analyses, which ignore the possible existence of qualitatively distinct subpopulations of employees exposed to specific configurations of supervisory behaviors. Future research would benefit from a person-centered approach (Morin et al., 2018) to better examine the combined effects of supervisors' need-related interpersonal behaviors on employees' functioning by simultaneously considering all types of supervisory behaviors and their possible co-existence (e.g., Leo et al., 2022). Pursuing this avenue would more generally address the relative dearth of person-centered studies in the leadership literature (e.g., Chénard Poirier et al., 2017). Moreover, longitudinal designs could be used to allow for a more thorough examination of how different combinations of supervisory behaviors evolve and relate to workers' functioning over time. Indeed, longitudinal designs conducted over shorter (e.g., daily; Breevart et al., 2016) or longer (e.g., four months; Detert et al., 2007) time spans could allow for a better understanding of the temporal and dynamic nature of subordinates' perceptions of their supervisors' behaviors while making it possible to observe how distinct profiles of supervisors' need-related behaviors evolve and relate to subordinates' functioning over time. Indeed, over time, subordinates could see their supervisor as being supportive at times, and thwarting or indifferent at other times, which could produce transitions in profile membership and result in health-related or motivational changes for subordinates.

Conclusion

This research adds to leadership research by supporting the validity, in the work context, of an integrative theoretical and operational framework to guide the understanding and measurement of supervisors' need-related interpersonal behaviors, that may prove to be particularly useful for researchers interested in examining the psychological and motivational consequences of leadership. Indeed, rather than adding irrelevant details or an additional microscopic focus to an already overly saturated leadership field, we took a step back, and suggested a way to start anew, using a novel integrative perspective considering how leaders can act in relation to their subordinates' psychological needs. This perspective, anchored in the currently dominant theoretical framework on employee motivation and well-being (Ryan & Deci, 2017), can bring something new. Indeed, while research based on mainstream leadership theories has failed to document which of the less desirable forms of leadership are most deleterious for subordinates (Judge & Piccolo, 2004; Skogstad et al., 2007), our SDT-based approach provides strong evidence that need indifferent behaviors clearly have more detrimental effects on employees' psychological needs and well-being than need thwarting behaviors. In times that some refer to as a leadership talent crisis (Harter & Adkins, 2015), this perspective may help organizations to identify behaviors to eradicate in order to protect employee well-being.

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Figure 1

Predictive Models Tested in Study 2 and in Study 3

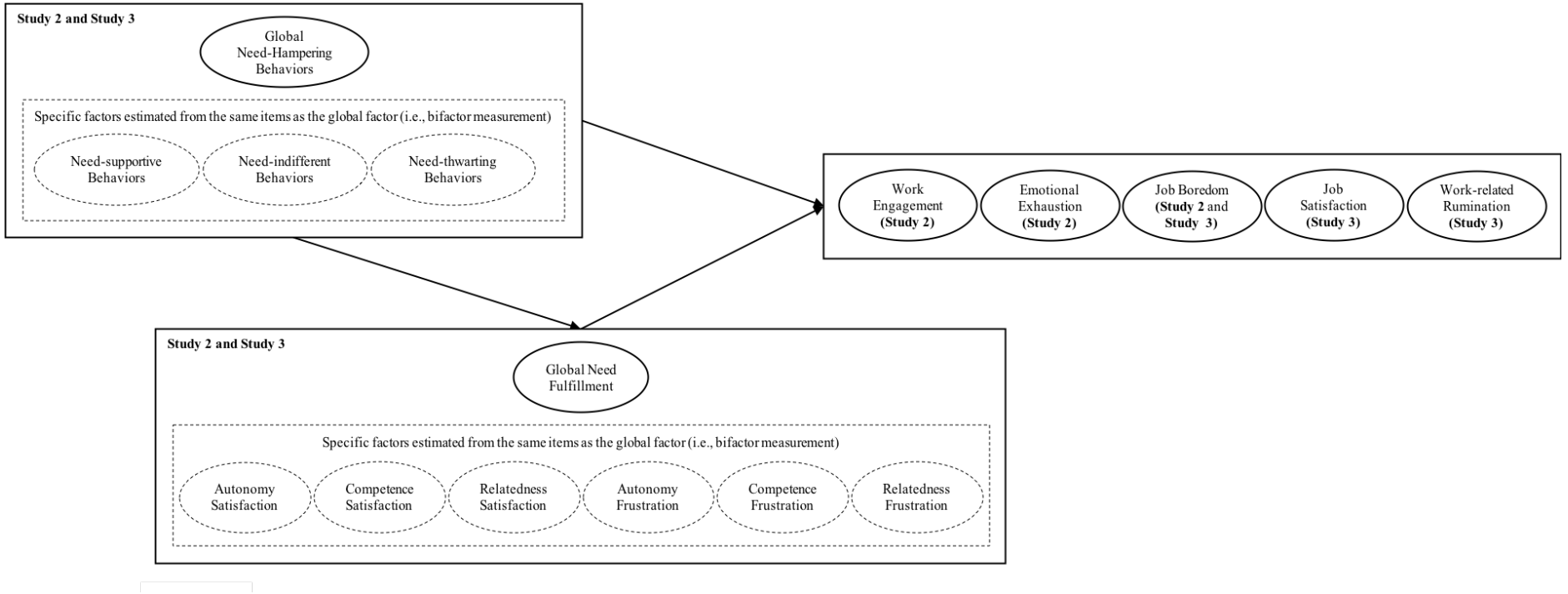


Table 1

Goodness-of-Fit Statistics for the Estimated Measurement Models (Study 1)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
M0. Single factor CFA	1250.573 (209)*	.777	.753	.119	[.113; .126]
M1a. Three-factor CFA (nS, nI, nT)	621.213 (206)*	.911	.900	.076	[.069; .083]
M1b. Three-factor CFA (a, c, r)	1261.484 (206)*	.774	.746	.121	[.115; .127]
M2. Three-factor ESEM (nS, nI, nT)	419.648 (168)*	.946	.926	.065	[.058; .073]
M3. Nine-correlated factors CFA	513.236 (173)*	.927	.903	.075	[.068; .082]
M4. Nine-correlated factors ESEM	92.110 (69)*	.995	.983	.031	[.009; .046]
M5. Bifactor-CFA (correlated three-G, nine-S)	561.052 (189)*	.920	.903	.075	[.068; .082]
M6. Bifactor-ESEM (correlated three-G, nine-S)	31.910 (44)	1.000	1.000	.000	[.000; .014]
M7. Bifactor-CFA (one-G, nine-S)	943.280 (192)*	.839	.806	.106	[.099; .113]
M8. Bifactor-ESEM (one-G, nine-S)	101.466 (56)*	.990	.960	.048	[.033; .063]
M9. Bifactor-CFA (one-G, three-S)	442.552 (187)*	.945	.932	.062	[.055; .070]
M10. Bifactor-ESEM (one-G, three-S)	346.227 (149)*	.958	.934	.061	[.053; .070]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; CFA: Confirmatory factor analysis; ESEM: Exploratory structural equation modeling; G-factor: Global factor estimated as part of a bifactor model; S-factor: Specific factor estimated as part of a bifactor model; nS: Need supportive behaviors; nI: Need indifferent behaviors; nT: Need thwarting behaviors; a: Need for autonomy; c: Need for competence; and r: Need for relatedness.

Table 2

Test of Predictive Validity: Results from the Partial Mediation Model (Study 2)

	Predictors											
	Global need hampering behaviors			Supportive behaviors			Thwarting behaviors			Indifferent behaviors		
Mediators and Outcomes	*B*	*SE*	β	*b*	*SE*	B	*b*	*SE*	β	*b*	*SE*	β
Relatedness need satisfaction	.045	.047	.053	.155[a]	.055**	.184	.168[a]	.050**	.198	-.045	.058	-.053
Autonomy need satisfaction	-.171	.046**	-.180	.048	.051	.051	.025	.048	.026	-.070	.074	-.074
Competence need satisfaction	.024	.044	.029	.140	.047**	.172	.093	.050	.114	.037	.050	.046
Relatedness need frustration	.059	.044	.072	.088	.053	.108	.096	.050	.118	.091	.054	.112
Autonomy need frustration	.162	.041**	.189	.033	.050	.038	-.069	.047	-.080	.108	.068	.126
Competence need frustration	.077	.047	.079	.037	.052	.037	.180	.053**	.184	-.045	.063	-.046
Global need fulfillment	-.579[a]	.045**	-.605	.181[b]	.058**	.190	-.138[c]	.051**	-.144	-.048	.063	-.050
Emotional exhaustion	.170[a]	.082*	.111	-.082	.081	-.054	.077	.078	.050	.252[a]	.093**	.164
Boredom	.171[a]	.082*	.141	.077	.074	.064	.001	.072	.001	.358[a]	.086**	.295
Work engagement	-.227[a]	.081**	-.167	.072	.075	.053	.186	.099	.137	-.358[a]	.089**	-.264
	Mediators											
	Autonomy need satisfaction			Competence need satisfaction			Relatedness need satisfaction			Global need fulfillment		
Outcomes	*B*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β
Emotional exhaustion	.016	.066	.010	-.071	.080	-.038	-.335[a]	.095**	-.185	-.899[b]	.106**	-.560
Boredom	-.131[a]	.063*	-.102	.042	.071	.028	-.223[a,b]	.071**	-.155	-.412[b]	.090**	-.325
Work engagement	.233[a,c]	.066**	.162	.144	.079	.086	.347[a,b]	.082**	.216	.458[b]	.086**	.323
	Mediators (continued)											
	Autonomy need frustration			Competence need frustration			Relatedness need frustration					
Outcomes	*B*	*SE*	β	*b*	*SE*	B	*b*	*SE*	β			
Emotional exhaustion	.015	.068	.009	.073	.079	.046	.370[c]	.084**	.196			
Boredom	.045	.064	.032	.004	.060	.003	-.108	.065	-.073			
Work engagement	-.073	.063	-.046	.276[c]	.075**	.166	.108	.058	.078			

Note. * $p < .05$; ** $p < .01$; *b*: unstandardized regression coefficient; *SE*: standard error of the coefficient; β: standardized regression coefficient. This table is divided into three horizontal parts: The upper part displays associations between predictors (on the top) and the mediators and outcomes (on the left); the middle and lower parts display associations between mediators (on the top) and the outcomes (on the left). The statistical significance of the differences in the size of the path coefficients for variables predicted in a statistically significant manner by more than one other variable from the same set (predictors or mediators) were tested using the Mplus Model Constraint Function. For any single line, coefficients with an identical superscript letter do not differ from one another in a statistically significant manner ($p \geq .05$), whereas those associated with a different superscript letter do ($p \leq .05$).

Table 3

Test of Predictive Validity: Results from the Partial Mediation Model (Study 3)

	Predictors											
	Global need hampering behaviors			Supportive behaviors			Thwarting behaviors			Indifferent behaviors		
Mediators and Outcomes	*B*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β
Relatedness need satisfaction	-.138[a]	.047**	-.150	.092	.064	.100	.305[b]	.066**	.332	.012	.056	.013
Autonomy need satisfaction	-.094	.047*	-.122	.192	.076*	.249	.080	.081	.104	.023	.060	.030
Competence need satisfaction	.069	.086	.072	-.118	.164	-.124	.203	.147	.213	.180	.098	.189
Relatedness need frustration	.139	.055*	.143	.171	.093	.176	-.020	.086	-.021	-.128	.069	-.132
Autonomy need frustration	.075	.049	.081	.003	.074	.004	-.008	.079	-.009	-.012	.060	-.013
Competence need frustration	.228	.051**	.272	.280	.145	.333	.050	.060	.060	-.053	.060	-.063
Global need fulfillment	-.630[a]	.040**	-.641	.130[b]	.065*	.133	-.113	.082	-.115	-.273[c]	.060**	-.278
Boredom	.238[a]	.112*	.149	.361[a,b]	.124**	.227	-.113	.103	-.071	.539[b]	.115**	.339
Rumination	-.092	.103	-.076	-.303	.096**	-.252	.227	.148	.188	-.053	.090	-.044
Job satisfaction	-.140	.046**	-.147	.024	.071	.025	.057	.069	.060	-.087	.054	-.090
	Mediators											
	Autonomy need satisfaction			Competence need satisfaction			Relatedness need satisfaction			Global need fulfillment		
Outcomes	*B*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β
Boredom	-.561[a]	.102**	-.272	-.160	.101	-.096	-.416[a]	.085**	-.241	-.636[a]	.105**	-.393
Rumination	.065	.094	.042	-.103	.103	-.081	.085	.089	.064	-.539[a]	.103**	-.439
Job satisfaction	.313[a]	.042**	.252	.095[b]	.048*	.094	.193[b]	.040**	.185	.536[c]	.046**	.550
	Mediators (continued)											
	Autonomy need frustration			Competence need frustration			Relatedness need frustration					
Outcomes	*B*	*SE*	β	*b*	*SE*	β	*b*	*SE*	β			
Boredom	.031	.068	.018	-.067	.116	-.035	-.072	.086	-.044			
Rumination	-.081	.069	-.062	.197[b]	.096*	.137	.187[b]	.084*	.151			
Job satisfaction	-.010	.036	-.010	.018	.054	.016	.039	.041	.040			

Note. * $p < .05$; ** $p < .01$; *b*: unstandardized regression coefficient; *SE*: standard error of the coefficient; and β: standardized regression coefficient. This table is divided into three horizontal parts: The upper part displays associations between predictors (on the top) and the mediators and outcomes (on the left); the middle and lower parts display associations between mediators (on the top) and the outcomes (on the left). The statistical significance of the differences in the size of the path coefficients for variables predicted in a statistically significant manner by more than one other variable from the same set (predictors or mediators) were tested using the Mplus Model Constraint Function. For any single line, coefficients with an identical superscript letter do not differ from one another in a statistically significant manner ($p \geq .05$), whereas those associated with a different superscript letter do ($p \leq .05$).

***Online Supplemental Material for*:**

Supervisors' Interpersonal Styles: An Integrative Perspective and a Measure Based on Self-Determination Theory

Appendix A

English Version of the TMIB-S

Stem: My supervisor …
Need Supportive Behaviors
…takes interest in my welfare (SBr1)
…shows that he/she understands my perspective (SBa1)
…ensures that tasks are suited to my skill level (SBc1)
…accepts me (SBr2)
…encourages me to take my own initiative (SBa2)
…recognizes my efforts and accomplishments (SBc2)
…shows care and concern (SBr3)
…explains the reasons when he/she asks me to do something (SBa3)
Need Thwarting Behaviors
…deliberately ignores me (TBr1)
…makes it clear that I have little to contribute (TBc1)
…tries to control everything I do (TBa1)
…makes it clear that he/she doesn't like me (TBr2)
…blames me when things don't go well (TBc2)
…dismisses my opinion (TBa2)
…uses guilt tactics to control what I do (TBa3)
…belittles my abilities (TBc3)
Need Indifferent Behaviors
…keeps to himself/herself (IBr1)
…is unresponsive to my opinions (IBa1)
…sets tasks that aren't challenging enough (IBc1)
…is indifferent to how I feel (IBr2)
…sets tasks that lack variety (IBa2)
…can be disorganized (IBc2)

Appendix B

French Version of the TMIB-S

Stem: Mon/Ma supérieur·e hiérarchique direct·e…
Comportements soutenant les besoins psychologiques
…se préoccupe de mon bien-être (SBr1)
…montre qu'il/elle comprend ma manière de voir les choses (SBa1)
…s'assure que mes tâches professionnelles soient adaptées à mon niveau de compétence (SBc1)
…m'accepte pour ce que je suis (SBr2)
…m'encourage à prendre des initiatives (SBa2)
…reconnaît mes efforts et mes accomplissements (SBc2)
…me montre du soutien et de l'intérêt (SBr3)
…explique les raisons pour lesquelles il/elle me demande de faire les choses (SBa3)
Comportements contrecarrant les besoins psychologiques
…m'ignore délibérément (TBr1)
…me fait bien comprendre que je n'ai pas grand-chose à apporter (TBc1)
…essaie de contrôler tout ce que je fais (TBa1)
…me fait bien comprendre qu'il/elle ne m'aime pas (TBr2)
…rejette la faute sur moi quand les choses ne se passent pas bien (TBc2)
…ne prend pas en considération mon opinion (TBa2)
…me fait culpabiliser pour contrôler ce que je fais (TBa3)
…dénigre mes compétences (TBc3)
Comportements indifférents à l'égard des besoins psychologiques
…reste toujours dans son coin (IBr1)
…ne réagit pas aux idées que je propose (IBa1)
…fixe des tâches qui ne sont pas assez stimulantes (IBc1)
…est indifférent·e à la manière dont je me sens (IBr2)
…fixe des tâches qui manquent de variété (IBa2)
…peut être désorganisé·e (IBc2)

Study 1 Supplements

Analyses

We first tested the possibility that ratings on the TMIB-S could reflect a single underlying continuum represented by a single factor (M0). Second, we tested alternative three-factor CFA solutions (M1a and M1b) to consider the possibility that ratings on the TMIB-S could either be represented by three factors reflecting the distinct need-related behaviors (supportive, indifferent, thwarting; M1a) or the needs for autonomy, competence, and relatedness (M1b). It was not possible to conduct the same comparison with ESEM given that these two alternative specifications (all based on the same items and the same number of factors with all cross-loadings estimated) form equivalent models (with the same degrees of freedom and the same level of fit to the data). As such, the best of those two solution was used as the basis of a three-factor ESEM solution (M2).Third, we tested nine-factor CFA (M3) and ESEM (M4) solutions to consider the possibility that ratings on the TMIB-S could be better modeled as a 3x3 representation encompassing nine types of need-related behaviors from supervisors (i.e., autonomy-supportive, competence-supportive, relatedness-supportive, autonomy-thwarting, competence-thwarting, relatedness-thwarting, autonomy-indifferent, competence-indifferent, relatedness-indifferent). Finally, we tested whether ratings on the TMIB-S could be best represented by bifactor solutions. We first considered bifactor CFA (M5) and bifactor ESEM (M6) solutions including nine S-factors (competence, autonomy, and relatedness supportive, thwarting, and indifferent behaviors) and three G-factors (reflecting global levels of supportive, thwarting, and indifferent behaviors across all three needs). We then considered bifactor CFA (M7) and bifactor ESEM (M8) solutions including nine S-factors (competence, autonomy, and relatedness supportive, thwarting, and indifferent behaviors) and one G-factor (reflecting a global continuum of need-related interpersonal behaviors). We finally considered bifactor CFA (M9) and bifactor ESEM (M10) solutions encompassing three S-factors (need supportive, need thwarting, and need indifferent behaviors) and one G-factor (reflecting a global continuum of need-related interpersonal behaviors).

In CFA, items were only associated with their corresponding factor, no cross-loadings were allowed, and factors were correlated. In ESEM, factors were specified using the same main indicators as in the CFA solutions, but cross-loadings were all allowed to be estimated freely through an oblique target rotation (a confirmatory form of rotation) procedure (Browne, 2001) in which they were assigned a target value of zero. In bifactor CFA, the S-factors were defined as in CFA, but specified as orthogonal, and all items were also used to define a G-factor. Correlations among G-factors were freely estimated in models including more than one G-factor. Finally, bifactor ESEM solutions matched their bifactor-CFA counterparts, but included cross-loadings among the S-factors. Bifactor ESEM solutions were estimated with an orthogonal bifactor target rotation (Reise, 2012), through which the cross-loadings were assigned a target value of zero. For CFA and bifactor-CFA solutions including nine (S-) factors, tau-equivalent constraints were imposed on all (S-) factors including only two indicators (i.e., the loadings of both indicators were constrained to equality) to achieve local identification (e.g., Little et al., 1999). This procedure was not required (or possible) for the ESEM and bifactor-ESEM solutions for which identification was achieved as part of the rotation procedure.

Detailed Results from the Measurement Models

The single factor model (M0) failed to fit the data and was not further considered. When comparing model fit and parameter estimates from the alternative three-factor CFA solutions, the results supported the superiority of the solution in which the factors reflected the distinct forms of behaviors (supportive, indifferent, and thwarting; M1a) relative to that in which they represented the specific needs (autonomy, competence, and relatedness; M1b). Three-factor models defined based on the nature of the specific needs were thus removed from further considerations. The remaining CFA and ESEM solutions all achieved acceptable levels of model fit, although the fit of the ESEM solutions was considerably higher. Moreover, the fit of the nine-factor ESEM and CFA solutions (M3 and M4) was also substantially higher than that of their three-factor counterparts (M1a and M2). Despite their higher level of fit, these two solutions resulted in factor correlations suggesting conceptual overlap among factors (M_r = .832 in M3), or in weakly defined factors (i.e., presenting low target loadings; e.g., M_λ = .260 for autonomy supportive behaviors in M4). These two solutions were thus excluded in favor of the more parsimonious three-factor solutions.

The parameter estimates from the two three-factor solutions (i.e., M1a and M2) supported the superiority of the ESEM solution (M2) and are reported in Table S1. First, factors appeared to be well-

defined in both solutions (ESEM: λ = .362 to .998, M_λ = .717 for need-supportive behaviors; λ = .562 to .969, M_λ = .762 for need-thwarting behaviors; and λ = .396 to .779, M_λ = .602 for need-indifferent behaviors; CFA: λ = .655 to .928, M_λ = .825 for need-supportive behaviors; λ = .733 to .903, M_λ = .583 for need-thwarting behaviors; and λ = .396 to .928, M_λ = .656 for need-indifferent behaviors). Second, even though the ESEM solution displayed several statistically significant cross-loadings, none of them was high enough to call into question the factor definitions (|λ| = .008 to .349, $M_{|\lambda|}$ = .104), or higher than their target loading. Moreover, ESEM factor correlations (|*r*| = .645 to .720, $M_{|r|}$ = .672) were substantially reduced relative to CFA correlations (|*r*| = .771 to .846, $M_{|r|}$ = .817).

We thus retained an ESEM representation of ratings on the TMIB-S. An observation of the bifactor alternatives further supported this decision, as these alternatives also revealed that the bifactor ESEM solution was superior to the bifactor CFA solution. Importantly, in bifactor solutions, the item-level covariance is explained by two factors (G- and S-). For this reason, item loadings on these two factors are typically smaller than first-order factor loadings (Morin et al., 2020). Thus, when interpreting a bifactor solution, it is critical to examine whether the G-factor is able to reflect a sufficient amount of item-level covariance to be meaningful, and whether enough specificity remains in each subscale once the G-factor is taken into account, to result in a subset of well-defined S-factors (Morin et al., 2020).

Most bifactor solutions achieved acceptable model fit, with one exception. The bifactor CFA solution with one G-factor and nine S-factors (M7) failed to achieve satisfactory model fit. Moreover, the matching bifactor ESEM solution (M8) yielded an unclear factor structure, including multiple weakly defined factors (e.g., M_λ = .289 for autonomy thwarting behaviors, M_λ = .237 for relatedness indifferent behaviors) and multiple cross-loadings larger than their main loadings. Likewise, when looking at the two solutions including nine S-factors and three G-factors (M5 and M6), one of these solutions resulted in large estimates of G-factor correlations, suggesting a lack of discriminant validity (M5: |*r*| = .783 to .850, $M_{|r|}$ = .825), whereas the other one resulted in the estimation of three weakly defined G-factors (|λ| = .208 to .575, $M_{|\lambda|}$ = .306 for global need-supportive behaviors; |λ| = .052 to .366, $M_{|\lambda|}$ = .211 for global need-thwarting behaviors; and |λ| = .045 to .604, $M_{|\lambda|}$ = .292 for global need-indifferent behaviors). Thus, the four solutions including nine S-factors were rejected.

Considering the solutions including one G-factor and three S-factors, , the fit of the bifactor ESEM solution (M10) was higher (ΔCFI = +.013, ΔTLI = +.002, and ΔRMSEA = -.001) than that of the bifactor CFA solution (M9) and of the three-factor ESEM solution (M2: ΔCFI = +.012, ΔTLI = +.008, and ΔRMSEA = -.004). Comparisons of the parameter estimates associated with M9 and M10 (see Table S2) also supported M10. Specifically, both solutions included a G-factor that was well-defined and reflected a global continuum of need-related interpersonal behaviors defined by negative loadings from the supportive behaviors items (bifactor ESEM: λ = -.774 to -.633, M_λ = -.708; bifactor CFA: λ = -.780 to -.646, M_λ = -.728), positive loadings from the thwarting behaviors (bifactor ESEM: λ = .651 to .873, M_λ = .796; bifactor CFA: λ = .646 to .878, M_λ = .750), and slightly smaller positive loadings from the indifferent behaviors (bifactor ESEM: λ = .344 to .859, M_λ = .566; bifactor CFA: λ = .351 to .903, M_λ = .596). Moreover, although a few items reflected the global need-related interpersonal behaviors G-factor more strongly than their S-factor, all S-factors maintained a meaningful amount of specificity (bifactor ESEM: λ = .187 to .577, M_λ = .417 for specific need-supportive behaviors; λ = .055 to .441, M_λ = .264 for specific need-thwarting behaviors; and |λ| = .191 to .591, $M_{|\lambda|}$ = .381 for specific need-indifferent behaviors; bifactor CFA: λ = .174 to .585, M_λ = .385 for specific need-supportive behaviors; λ = .131 to .542, M_λ = .351 for specific need-thwarting behaviors; and λ = .132 to .629, M_λ = .341 for specific need-indifferent behaviors). Like in the three-factor ESEM solution (M2), several cross-loadings were statistically significant, even though their magnitude remained reasonable (|λ| = .002 to .254, $M_{|\lambda|}$ = .074) and did not detract from a meaningful interpretation of the factors. A single item (SBr1) displayed a cross-loading superior to its main loading on the indifferent behaviors S-factor, but not superior to its loading on the G-factor, and this cross-loading remained under .300. Moreover, composite reliability (McDonald, 1970) coefficients (omega) were also acceptable in this solution (global need-related interpersonal behaviors ω = .971, specific need supportive behaviors ω = .825, specific need thwarting behaviors ω = .688, and specific need indifferent behaviors ω = .660).

Table S1

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the Three-Factor CFA and ESEM Solutions (M1a and M2, Study 1)

	CFA				ESEM			
Items	Supportive (λ)	Thwarting (λ)	Indifferent (λ)	δ	Supportive (λ)	Thwarting (λ)	Indifferent (λ)	δ
Supportive								
SBr1	.912			.169	**.998**	*.013*	.089	.129
SBa1	.814			.337	**.579**	-.322	*.017*	.313
SBc1	.928			.139	**.926**	*.009*	*-.021*	.129
SBr2	.920			.154	**.946**	*.062*	*-.038*	.141
SBa2	.655			.571	**.362**	-.288	*-.097*	.546
SBc2	.793			.371	**.671**	*.027*	-.203	.364
SBr3	.722			.479	**.552**	*-.027*	-.207	.474
SBa3	.859			.262	**.704**	*-.110*	*-.096*	.270
Thwarting								
TBr1		.794		.369	*-.061*	**.562**	.264	.350
TBc1		.872		.240	*.029*	**.937**	*-.042*	.207
TBa1		.733		.462	*-.081*	**.658**	*.018*	.466
TBr2		.891		.207	*-.080*	**.650**	.250	.198
TBc2		.743		.448	*-.084*	**.669**	*.008*	.457
TBa2		.835		.302	*.031*	**.845**	*.032*	.289
TBa3		.847		.282	-.124	**.808**	*-.076*	.273
TBc3		.903		.184	.042	**.969**	*-.031*	.154
Indifferent								
IBr1			.396	.843	*-.159*	*-.134*	**.396**	.817
IBa1			.928	.139	-.299	.211	**.510**	.177
IBc1			.903	.185	-.140	.349	**.521**	.187
IBr2			.676	.543	*-.031*	*-.047*	**.766**	.428
IBa2			.511	.738	.212	*-.013*	**.779**	.572
IBc2			.521	.728	*-.025*	*-.091*	**.642**	.636
ω	.946	.946	.830		.708	.940	.823	

Variables	1	2	3	1	2	3
1. Supportive	-			-		
2. Thwarting	-.771	-		-.720	-	
3. Indifferent	-.833	.846	-	-.652	.645	-

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; target factor loadings are indicated in bold in the ESEM solution; non-significant parameters ($p \geq .05$) are marked in italics.

Table S2

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the Bifactor-CFA and Bifactor-ESEM Solutions (M9 and M10, Study 1)

Items	Global (G-λ)	Supportive (S-λ)	Thwarting (S-λ)	Indifferent (S-λ)	δ	Global (G-λ)	Supportive (S-λ)	Thwarting (S-λ)	Indifferent (S-λ)	δ
Supportive										
SBr1	-.729	.585			.126	**-.725**	**.587**	*.019*	*.055*	.127
SBa1	-.764	.295			.329	**-.725**	**.295**	*-.028*	*.063*	.309
SBc1	-.780	.511			.131	**-.633**	**.544**	*.017*	*-.016*	.130
SBr2	-.764	.519			.146	**-.774**	**.577**	*-.038*	*-.058*	.136
SBa2	-.646	.174			.553	**-.641**	**.187**	*-.055*	*-.038*	.549
SBc2	-.705	.353			.379	**-.744**	**.412**	*-.002*	-.145	.368
SBr3	-.664	.276			.483	**-.757**	**.326**	*.027*	-.124	.477
SBa3	-.769	.369			.272	**-.664**	**.410**	*-.034*	*-.060*	.273
Thwarting										
TBr1	.803		*.131*		.337	**.850**	*.084*	***-.121***	*.016*	.256
TBc1	.759		.437		.233	**.848**	.134	***.154***	-.161	.190
TBa1	.655		.323		.466	**.651**	*-.062*	**.441**	*.052*	.376
TBr2	.878		.202		.188	**.862**	*-.006*	**.171**	*.098*	.199
TBc2	.646		.388		.432	**.770**	*-.057*	**.409**	*.034*	.391
TBa2	.751		.354		.312	**.873**	.149	***.055***	-.131	.238
TBa3	.738		.432		.269	**.661**	*-.054*	**.429**	*-.058*	.216
TBc3	.766		.542		.120	**.850**	*.091*	***.330***	*-.082*	.154
Indifferent										
IBr1	.351			.169	.848	**.344**	*-.068*	-.254	***.191***	.776
IBa1	.876			.227	.180	**.859**	-.184	*.026*	**.306**	.181
IBc1	.903			.132	.167	**.408**	*-.057*	*-.013*	**.267**	.187
IBr2	.573			.602	.309	**.831**	-.102	*.098*	**.591**	.351
IBa2	.400			.629	.444	**.528**	*.086*	*-.045*	**.517**	.557
IBc2	.474			.284	.695	**.423**	*-.054*	*-.056*	**.414**	.644
ω	.970	.797	.770	.612		.971	.825	.688	.660	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; G: Global factor from the bifactor model; S: Specific factors from the bifactor model; target factor loadings are indicated in bold in the bifactor-ESEM solution; non-significant parameters ($p \geq .05$) are marked in italics.

Study 2 Supplements

Preliminary Measurement Models: Supervisor's Interpersonal Behaviors

The goodness-of-fit from the preliminary measurement models used to investigate the optimal measurement structure for the Tripartite Measure of Interpersonal Behaviors-Supervisor (TMIB-S) are reported in the upper section of Table S3. Like in Study 1, the single factor model (M0) and the three-factor CFA model defined based on the needs (M1b) failed to fit the data and were thus not further considered. On this basis, all further three-factor models were specified based on the type of behavior (supportive, indifferent, thwarting), rather than the type of need.

The remaining first-order CFA and ESEM alternative solutions were able to achieve an acceptable level of fit to the data, although the fit of the ESEM solutions was substantially higher than that of their CFA counterparts. In addition, the fit of the ESEM and CFA models including nine factors (M3 and M4) was also substantially higher than that of their three-factor counterparts (M1a and M2). Despite their higher level of fit, however, these two solutions resulted in factors correlations that were high enough to suggest conceptual redundancies among factors (M_r = .786 in M3), or in weakly defined factors (e.g., M_λ = .276 for relatedness indifferent behaviors in M4) which called into question the appropriateness of the solution. These two solutions were thus excluded in favor of the more parsimonious three-factor solutions. As in Study 1, the parameter estimates from the two three-factor solutions (i.e., M1a and M2) supported the superiority of the ESEM solution (M2). More precisely, this ESEM solution (see Table S5 of these online supplements) resulted in well-defined factors: (a) need-supportive behaviors: λ = .569 to .964, M_λ = .730; (b) need-thwarting behaviors: λ = .558 to .930, M_λ = .779; and (c) need-indifferent behaviors: λ = .304 to .996, M_λ = .566. Although this solution incorporated multiple statistically significant cross-loadings, none of these cross-loadings was large enough to suggest a problem in terms of factor definition ($|\lambda|$ = .001 to .350, $M_{|\lambda|}$ = .090). In addition, the factor correlations were substantially reduced in the ESEM ($|r|$ = .612 to .744, $M_{|r|}$ = .671) relative to the CFA ($|r|$ = .673 to .831, $M_{|r|}$ = .735) solution.

The decision was thus made to retain an ESEM representation of the data. This decision was also supported, as in Study 1, by an examination of the bifactor alternatives, which also supported the superiority of the bifactor ESEM relative to the bifactor CFA solution. First, most bifactor solutions achieved an acceptable level of fit to the data, with one exception. Indeed, as in Study 1, the bifactor-CFA solution with one G-factor and nine S-factors (M7) failed to achieve a satisfactory level of fit to the data, and the matching bifactor-ESEM solution (M8) resulted in an unclear factor structure, including multiple weakly defined factors (e.g., M_λ = .246 for relatedness supportive behaviors, M_λ = .151 for autonomy supportive behaviors) and multiple cross-loadings larger than their main loadings. Likewise, looking at the two solutions including nine S-factors and three G-factors (Models 5 and 6), one of these solutions resulted in estimates of G-factor correlations that were high enough to call into question the discriminant validity of the factors (M5: $|r|$ = .661 to .829, $M_{|r|}$ = .727), whereas the other one resulted in the estimation of three more weakly defined G-factors ($|\lambda|$ = .053 to .388, $M_{|\lambda|}$ = .152 for global need-supportive behaviors; λ = .380 to .669, M_λ = .519 for global need-thwarting behaviors; and λ = .274 to .573, M_λ = .415 for global need-indifferent behaviors). For these reasons, the four solutions including nine S-factors were rejected.

Finally, comparison of the parameter estimates associated with Models 9 and 10 also supported the superiority of the bifactor ESEM solution (M10), which also resulted in a noteworthy improvement in model fit (ΔCFI = +.011, ΔTLI = +.010, ΔRMSEA = -.004) relative to its first-order counterpart (i.e., M2). More precisely, this solution (see Table S5) revealed a well-defined G-factor, reflecting a global continuum of need-hampering behaviors with negative factor loadings associated with the need-supportive behaviors (λ = -.748 to -.576, M_λ = -.675) and positive factor loadings associated with the need-thwarting (λ = .498 to .719, M_λ = .593) and need-indifferent (λ = .564 to .921, M_λ = .709) behaviors. Similarly, with the exception of a few items which mainly reflected the global need-hampering behaviors G-factor rather than their own a priori S-factors, the S-factors also retained a meaningful degree of specificity over and above employees' global levels of need-hampering behaviors (λ = .306 to .545, M_λ = .395 for specific need-supportive behaviors; λ = .371 to .663, M_λ = .526 for specific need-thwarting behaviors; and $|\lambda|$ = .074 to .520, $M_{|\lambda|}$ = .255 for specific need-indifferent behaviors). As in the three-factor ESEM solution (M2), multiple cross-loadings were statistically significant, although they all remained reasonable in magnitude ($|\lambda|$ = .001 to .167, $M_{|\lambda|}$ = .074) and did not detract from a meaningful interpretation of the factors. In fact, only one cross-loading was higher than its target loading

for the Indifferent S-factor (IBr1) but not for the G-factor, and remained under .200. Finally, composite reliability coefficients were acceptable for this solution (global need hampering behaviors ω = .963, specific need supportive behaviors ω = .770, specific need thwarting behaviors ω = .861, and specific need indifferent behaviors ω = .514). Thus, as in Study 1, these results once again supported the superiority of the bifactor ESEM solution with one G-factor and three S-factors.

Invariance between Studies 1 and 2

We then proceeded to test the invariance of this measurement model (Millsap, 2011) across samples from Studies 1 and 2 in the following sequence: (1) configural; (2) weak (loadings); (3) strong (loadings and intercepts); (4) strict (loadings, intercepts, and uniquenesses); (5) latent variance-covariance (loadings, intercepts, uniquenesses, and latent variances and covariances); and (6) latent means (loadings, intercepts, uniquenesses, latent variances and covariances, and latent means). Changes (Δ) in model fit were used in tests of invariance: A ΔTLI/ΔCFI ≤.010, and a ΔRMSEA ≤.015 support the invariance (Chen, 2007; Cheung & Rensvold, 2002).

Preliminary Measurement Models: Employees' Need Satisfaction and Frustration

Following from Tóth-Király et al. (2018), we contrasted a series of a priori measurement models to identify the optimal measurement structure for the need fulfillment (need satisfaction and frustration) questionnaires. Thus, we first assessed a series of alternative CFA and ESEM models: (a) one factor CFA (M1) model (global need fulfillment); (b) two-factors CFA (M2) and ESEM (M3) models (global need satisfaction and frustration); (c) three-factors CFA (M4) and ESEM (M5) models (global fulfillment of the needs for autonomy, relatedness, and competence); (d) six-factors CFA (M6) and ESEM (M7) models (autonomy need satisfaction and frustration, competence need satisfaction and frustration, and relatedness need satisfaction and frustration). Then, bifactor counterparts were also estimated: (a) bifactor CFA (M8) and ESEM (M9) models including two S-factors (need satisfaction and frustration) and one G-factor (global need fulfillment); (b) bifactor CFA (M10) and ESEM (M11) models including three S-factors (autonomy, competence, and relatedness) and one G-factor (global need fulfillment); (c) bifactor CFA (M12) and ESEM (M13) models including three S-factors (autonomy, competence, and relatedness) and two correlated G-factors (global need satisfaction and frustration); (d) bifactor CFA (M14) and ESEM (M15) models including six S-factors (autonomy need satisfaction and frustration, competence need satisfaction and frustration, and relatedness need satisfaction and frustration) and one G-factor (global need fulfillment); (e) bifactor CFA (M16) and ESEM (M17) models including six S-factors (autonomy need satisfaction and frustration, competence need satisfaction and frustration, and relatedness need satisfaction and frustration) and two correlated G-factors (global need satisfaction and frustration).

The goodness-of-fit indices associated with each of these 17 measurement models are reported in Table S6. Starting with an examination of the first-order CFA and ESEM solutions, only the six-factor solutions were able to achieve an acceptable level of fit to the data. In addition, the goodness-of-fit associated with the ESEM solution (M7) appeared to be much higher (ΔCFI = +.057; ΔTLI = +.064; ΔRMSEA = -.030) than that of the CFA solution (M6). Both solutions resulted in well-defined factors (ESEM: λ = .391 to .989, M_{λ} = .690; CFA: λ = .562 to .883, M_{λ} = .743). Although the ESEM solution did incorporate multiple statistically significant cross-loadings, none of these cross-loadings was large enough to suggest a problem of factor definition (|λ| = .000 to .239, $M_{|\lambda|}$ = .064). In addition, factor correlations were substantially reduced in the ESEM (|*r*| = .110 to .609, $M_{|r|}$ = .398), relative to the CFA (|*r*| = .271 to .766, $M_{|r|}$ = .539) solutions, and appropriately positive among subscales of the same valence (satisfaction-satisfaction, frustration-frustration) and negative among subscales of distinct valence (satisfaction-frustration).

The decision was thus made to retain an ESEM representation of the data, a decision that was also supported by an examination of the bifactor alternatives, which also supported the superiority of the bifactor ESEM, relative to the bifactor CFA, solutions. In fact, with a single exception (M16), most of the bifactor CFA solutions failed to achieve an acceptable level of fit to the data according to at least one of the fit indices, and even M16 failed to achieve a level of fit comparable to that of the alternative bifactor ESEM solution. So, turning our attention to the bifactor ESEM solutions, it is interesting to note that many of them were able to achieve an acceptable level of fit to the data, although the solutions including six-S-factors (Models 15 and 17) achieved a level of fit that substantially exceeded that of their counterparts including three S-factors (M15 vs. 11: ΔCFI = +.067; ΔTLI = +.101; ΔRMSEA = -.034; M17 vs. 13: ΔCFI = +.039; ΔTLI = +.072; ΔRMSEA = -.042). Thus, the key question was whether

the model including two G-factors (reflecting distinct global dimensions of need frustration or satisfaction) was able to provide an improved representation of the data relative to the model including a single G-factor (reflecting a global continuum of need fulfillment), given that both models (15 and 17) achieved an excellent level of fit to the data. Here, an examination of the parameter estimates associated with all models including two G-factors is highly informative. First, when looking at the results from the bifactor CFA models including two G-factors (Models 12 and 16), it can be noted that the correlation observed between these two G-factors was so high so as to call into question the discriminant validity of these factors (-.635 for M12; -.758 for M16). The bifactor ESEM solutions including two G-factors (Models 13 and 17) revealed a weakly defined global satisfaction (|λ| = .010 to .805, $M_{|\lambda|}$ = .201) and frustration (|λ| = .168 to .332, $M_{|\lambda|}$ = .243) factors, arguing against the need to incorporate a second G-factor, and supporting the superiority of M15.

Examination of the parameter estimates associated with M15, which are reported in Table S7 of these online supplements, supports this conclusion. These results revealed a well-defined G-factor, reflecting a global underlying continuum of need fulfillment with positive factor loadings associated with the need satisfaction items (λ =.289 to .616, M_{λ} =.499) and negative factor loadings associated with the need frustration items (λ = -.326 to -.772, M_{λ} = -.568). Similarly, with the exception of a few items which mainly reflected the global need fulfillment G-factor rather than their own a priori S-factors (e.g., items 2 and 3 for competence need frustration), the S-factors also retained at least some degree of meaningful specificity over and above participants' global levels of need fulfillment (λ = .174 to .873, M_{λ} = .518). Interestingly, and contrary to the ESEM solution, cross-loadings remained small, and mainly non-significant (|λ| = .000 to .305, $M_{|\lambda|}$ = .071), supporting this bifactor operationalization. Composite reliability coefficients estimated from this model were satisfactory for most factors: G-Factor: ω = .933; autonomy satisfaction S-factor: ω = .672; relatedness satisfaction S-factor: ω = .705; competence satisfaction S-factor: ω = .634; autonomy frustration S-factor: ω = .680; relatedness frustration S-factor: ω = .703; and competence frustration S-factor: ω = .758. When examining these coefficients, one should remember that S-factors from a bifactor model typically display lower reliability (Morin et al., 2020), and that we rely on an analytical approach allowing for some level of control over measurement error.

Predictive Model

To be able to compare models of total (not including direct effects of supervisors' behaviors on the outcomes) and partial (including those effects) mediation, the ESEM-within-CFA methodology (Morin et al. (2013) was used to reproduce the optimal measurement structure. Bias-corrected bootstrap confidence intervals (CI; Cheung & Lau, 2008) were used to test the statistical significance of the indirect effects (5000 bootstrap samples were used).

Results from the partial mediation model showed that global need-hampering behaviors were related to lower global need fulfillment, and to lower specific autonomy satisfaction and higher autonomy frustration. Beyond these effects on the mediators, global need-hampering behaviors also presented direct positive associations with employees' boredom and emotional exhaustion, and direct negative associations with their levels of work engagement. Besides these effects of global need-hampering behaviors, specific need-supportive behaviors were related to higher global need fulfillment, and with higher specific competence and relatedness need satisfaction. Conversely, specific need-thwarting behaviors were associated with lower global need fulfillment, and with higher specific competence frustration. Specific need-thwarting behaviors unexpectedly predicted higher relatedness satisfaction, an unexpected result which we address in Study 2 discussion. No direct association was found between specific levels of need-supportive and need-thwarting behaviors and the outcomes. In contrast, specific need-indifferent behaviors shared no association with the mediators (global and specific need fulfillment), but shared direct positive associations with employees' emotional exhaustion and boredom, and direct negative associations with work engagement.

Regarding the associations between mediators and outcomes, our results showed that participants' global need fulfillment and specific relatedness satisfaction were both associated with more work engagement and less emotional exhaustion and boredom among employees. Likewise, participants' specific autonomy satisfaction also predicted higher work engagement and lower boredom (but not emotional exhaustion) among employees. In contrast, participants' specific competence satisfaction and autonomy frustration did not share any statistically significant association with the outcomes, whereas specific relatedness frustration predicted higher emotional exhaustion. Finally, specific competence frustration unexpectedly predicted higher work engagement.

Taken together, these associations suggest the presence of 18 potential indirect effects. Table S8 displays the results of the tests of statistical significance (via bias-corrected bootstrap confidence intervals), which supported all of these indirect effects. More precisely, participants' exposure to global need-hampering behaviors and to specific need-supportive and need-thwarting behaviors from their supervisors were found to indirectly predict (in the expected direction) emotional exhaustion, boredom, and work engagement via the mediating role of global need fulfillment. Global need-hampering behaviors were also indirectly related (in the expected direction) to employees' boredom, and work engagement via the mediating role of their specific autonomy satisfaction. Likewise, specific need-supportive behaviors were also indirectly related (in the expected direction) to employees' emotional exhaustion, boredom, and work engagement via the mediating role of their specific relatedness satisfaction. Finally, specific need-thwarting behaviors were indirectly related to more emotional exhaustion and boredom, and to less work engagement via (unexpectedly, as suggested earlier) the mediating role of employees' specific relatedness satisfaction. Need-thwarting behaviors were also negatively associated with lower work engagement via the mediating role of employees' specific competence frustration, which was the only indirect effects involving specific levels of need frustration.

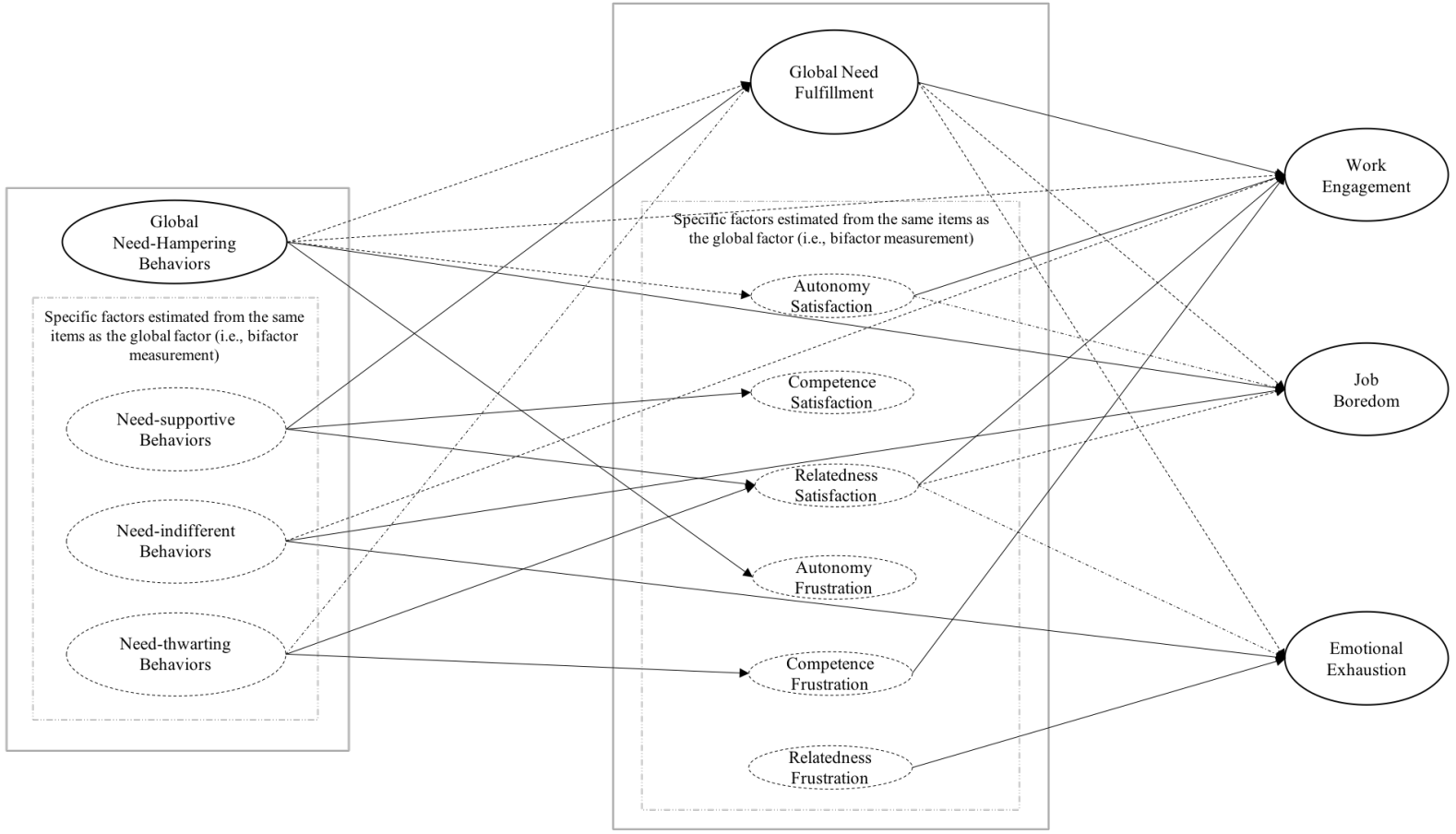
Discriminant Validity

For the models including abusive supervision, LMX, and transformational leadership, none of the alternative models (total mediation, partial mediation, and direct) showed any systematic improvement in fit relative to the null model, suggesting that abusive supervision, LMX, and transformational leadership did not have any effects on the mediators and outcomes once the effects of supervisors' interpersonal behaviors (as postulated by SDT) were taken into account. The parameter estimates of these models are consistent with this interpretation. For the models including passive leadership, the models of total and partial mediation, but not the direct model, indicated a slight increase in model fit when compared to the null model, suggesting that passive leadership might share some associations with the mediators, but not the outcomes, beyond the effects of supervisors' need-related behaviors. These alternative models' parameter estimates corroborate this interpretation, as they revealed that passive leadership had an additional positive effect on participants' specific levels of autonomy satisfaction (b = .187, s.e. = .083, $p \leq .05$, β = .198), beyond the effects of supervisors' interpersonal behaviors.

Upon request from a reviewer, we conducted additional analyses including all the alternative measures (passive leadership, LMX, transformational leadership, and abusive supervision) together with the TMIB-S. We contrasted the same four alternative models (i.e., null, partial mediation, total mediation, direct). Results from these analyses indicated that none of these alternative models provided acceptable fit for Study 2, thus showing that there is no added value in considering all the predictors all at once. We also tested alternative analyses where we added the TMIB-S to analyses already including all of the other measures (i.e., passive leadership, LMX, transformational leadership, and abusive supervision). Results from these analyses showed that the model including the TMIB-S showed improvement in fit and in R^2, relative to the null model (TMIB-S factors set to be exactly zero), showing that the TMIB-S explains well- and ill- being over and above these existing measures, even when all of them are simultaneously considered.

Figure S1

Results from the Partial Mediation Model (Study 2)



Note. Solid arrows represent significant positive relations. Dashed arrows reflect significant negative relations. Non-significant relations and coefficients are not reported for purposes of clarity and can be found in Table 2 of the main manuscript.

Table S3

Goodness-of-Fit Statistics for the Estimated Measurement and Predictive Models (Study 2)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
M0. Single factor CFA	1371.888 (209)*	.757	.732	.104	[.099; .110]
M1a. Three-factor CFA (nS, nI, nT)	541.263 (206)*	.930	.921	.056	[.051; .062]
M1b. Three-factor CFA (a, c, r)	1380.978 (206)*	.755	.725	.106	[.100; .111]
M2. Three-factor ESEM (nS, nI, nT)	385.908 (168)*	.955	.937	.050	[.044; .057]
M3. Nine-correlated factors CFA	402.803 (173)*	.952	.936	.051	[.044; .057]
M4. Nine-correlated factors ESEM	49.124 (69)	1.000	1.014	.000	[.000; .000]
M5. Bifactor CFA (correlated three-G, nine-S)	498.408 (189)*	.935	.921	.057	[.051; .063]
M6. Bifactor ESEM (correlated three-G, nine-S)	12.335 (44)	1.000	1.035	.000	[.000; .000]
M7. Bifactor CFA (one-G, nine-S)	1030.675 (192)*	.825	.789	.092	[.087; .098]
M8. Bifactor ESEM (one-G, nine-S)	52.977 (56)	1.000	1.003	.000	[.000; .025]
M9. Bifactor CFA (one-G, three-S)	373.908 (187)*	.961	.952	.044	[.038; .051]
M10. Bifactor ESEM (one-G, three-S)	313.580 (149)*	.966	.947	.046	[.039; .054]
Multi-Group Tests of Invariance (Model 10)					
I1. Configural invariance	655.650 (298)*	.962	.941	.053	[.047; .058]
I2. Weak invariance	814.243 (370)*	.953	.941	.053	[.048; .058]
I3. Strong invariance	918.103 (388)*	.944	.933	.056	[.052; .061]
I4. Strict invariance	1063.830 (410)*	.931	.922	.061	[.056; .065]
I4'. Partial strict invariance	1013.473 (408)*	.936	.928	.059	[.054; .063]
I5. Latent variance-covariance invariance	1089.407 (418)*	.929	.922	.061	[.057; .065]
I6. Latent means invariance	1156.184 (422)*	.923	.915	.063	[.059; .068]
Predictive Models (from Model 10)					
P1. Partial mediation	1246.725 (647)*	.932	.913	.043	[.039; .046]
P2. Total mediation	1307.053 (659)*	.926	.908	.044	[.040; .047]
Discriminant Validity (From Model P1): Passive Leadership					
D1. Null effects model	1689.497 (853)*	.919	.902	.044	[.041; .047]
D2. Partial mediation model	1606.520 (843)*	.926	.909	.042	[.039; .045]
D3. Total mediation model	1623.579 (846)*	.925	.908	.042	[.039; .045]
D4. Direct effects model	1674.620 (850)*	.920	.903	.044	[.040; .047]
Discriminant Validity (From Model P1): Leader-Member Exchange					
D1. Null effects model	1882.150 (944)*	.920	.904	.044	[.041; .047]
D2. Partial mediation model	1874.029 (934)*	.920	.903	.044	[.041; .047]
D3. Total mediation model	1873.904 (937)*	.920	.904	.044	[.041; .047]
D4. Direct effects model	1881.481 (941)*	.920	.904	.044	[.041; .047]
Discriminant Validity (From Model P1): Transformational Leadership					
D1. Null effects model	1820.205 (944)*	.927	.913	.043	[.040; .046]
D2. Partial mediation model	1828.890 (934)*	.925	.910	.043	[.040; .046]
D3. Total mediation model	1825.293 (937)*	.926	.911	.043	[.040; .046]
D4. Direct effects model	1820.252 (941)*	.927	.912	.043	[.040; .046]
Discriminant Validity (From Model P1): Abusive Supervision					
D1. Null effects model	1477.423 (766)*	.924	.906	.043	[.039; .046]
D2. Partial mediation model	1458.539 (756)*	.925	.906	.043	[.039; .046]
D3. Total mediation model	1467.534 (759)*	.924	.906	.043	[.039; .046]
D4. Direct effects model	1468.293 (763)*	.925	.907	.042	[.039; .046]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; ESEM: Exploratory structural equation modeling; G-factor: Global factor estimated as part of a bifactor model; S-factor: Specific factor estimated as part of a bifactor model; nS: Need supportive behaviors; nI: Need indifferent behaviors; nT: Need thwarting behaviors; a: Need for autonomy; c: Need for competence; and r: Need for relatedness.

Table S4

Latent Correlations Among All Variables Included in Study 2

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. G-Need-hampering behaviors	-																
2. S-Need supportive behaviors	.000	-															
3. S-Need thwarting behaviors	.000	.000	-														
4. S-Need indifferent behaviors	.000	.000	.000	-													
5. G-Need fulfillment	.736**	-.024	-.027	.043	-												
6. S-Autonomy satisfaction	-.125	.057	-.094	-.103	.000	-											
7. S-Competence satisfaction	.138	.357	-.130	-.044	.000	.000	-										
8. S-Relatedness satisfaction	.134	.318*	.115	-.036	.000	.000	.000	-									
9. S-Autonomy frustration	.076	.098	-.039	.103	.000	.000	.000	.000	-								
10. S-Competence frustration	.016	-.091	.367*	-.030	.000	.000	.000	.000	.000	-							
11. S-Relatedness frustration	-.132	-.105	.410**	.284	.000	.000	.000	.000	.000	.000	-						
12. Work engagement	-.369**	.139	.204	-.258	-.470**	.272**	.073	.276**	-.078	.136	.219**	-					
13. Emotional exhaustion	.437**	-.187	.140	.240**	.671**	-.050	-.065	-.235*	.033	.067	.265**	-.415**	-				
14. Job boredom	.321**	-.027	.020	.334*	.421**	-.242**	.056	-.179*	.090	.023	-.026	-.699**	.413	-			
15. Transformational leadership	-.828**	.278**	.056	-.098	.677**	.015	-.085	.009	.105	.055	.153*	.365**	-.433**	-.304**	-		
16. Leader-member exchange	-.860**	.332**	-.010	-.055	-.644**	.180	.050	.032	.000	-.050	.101	.400**	-.464**	-.318	.876**	-	
17. Abusive supervision	.696**	-.030	.446**	-.067	.563**	-.099	-.049	.178	-.014	.156	.193	-.170**	.343**	.190**	-.574**	-.608**	-
18. Passive leadership	.740**	-.106	.044	.109	.544**	-.001	.099	.007	.048	.118	-.051	.232**	.393**	.195**	-.722**	-.728**	.543**

Note. * $p < .05$; ** $p < .01$; G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; Factors taken from a bifactor model are orthogonal (thus not correlated with one another).

Table S5

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the Three-Factor ESEM and Bifactor-ESEM Solutions (Models 2 and 10, Study 2)

	ESEM				Bifactor-ESEM				
Items	Supportive (λ)	Thwarting (λ)	Indifferent (λ)	δ	Global (G-λ)	Supportive (S-λ)	Thwarting (S-λ)	Indifferent (S-λ)	δ
Supportive									
SBr1	**.743**	-.085	*-.050*	.297	**-.736**	**.390**	*-.072*	*.014*	.301
SBa1	**.569**	-.179	*-.026*	.484	**-.742**	**.306**	-.134	*.010*	.486
SBc1	**.964**	*.029*	*.041*	.159	**-.576**	**.537**	*-.021*	*.022*	.152
SBr2	**.774**	*-.030*	*-.065*	.293	**-.635**	**.390**	*-.024*	*.024*	.296
SBa2	**.592**	*-.035*	-.161	.455	**-.665**	**.312**	*-.027*	*-.062*	.455
SBc2	**.647**	*-.018*	*-.059*	.507	**-.680**	**.329**	*-.016*	*.012*	.508
SBr3	**.583**	*.067*	-.181	.539	**-.748**	**.347**	*.016*	-.129	.532
SBa3	**.964**	*.077*	*.071*	.249	**-.619**	**.545**	*.003*	*.021*	.239
Thwarting									
TBr1	*-.044*	**.686**	*.086*	.407	**.624**	*-.030*	**.451**	*.010*	.407
TBc1	.104	**.930**	*-.085*	.323	**.614**	*-.017*	**.663**	*.003*	.312
TBa1	*-.070*	**.558**	*.091*	.557	**.550**	*-.049*	**.371**	*.024*	.557
TBr2	*-.100*	**.653**	.131	.343	**.498**	*.001*	**.390**	*-.054*	.328
TBc2	*.055*	**.901**	*-.076*	.318	**.597**	*-.009*	**.619**	*-.045*	.318
TBa2	*-.001*	**.820**	*.020*	.308	**.719**	*-.038*	**.562**	*.010*	.306
TBa3	*.086*	**.823**	*.071*	.346	**.545**	*.029*	**.544**	*.008*	.347
TBc3	*-.036*	**.862**	*-.066*	.279	**.595**	-.070	**.604**	*-.018*	.276
Indifferent									
IBr1	-.187	*.100*	**.304**	.723	**.586**	*.060*	*-.055*	***-.076***	.644
IBa1	-.350	.187	**.360**	.371	**.921**	*-.126*	*.069*	***.074***	.367
IBc1	-.270	.168	**.437**	.397	**.710**	.167	-.118	***-.180***	*.076*
IBr2	*.024*	*.023*	**.835**	.309	**.779**	*-.018*	*-.022*	**.485**	.279
IBa2	.157	*-.020*	**.996**	.223	**.696**	*.090*	*-.089*	**.520**	.210
IBc2	-.171	*.011*	**.462**	.638	**.564**	*-.064*	*-.038*	**.195**	.638
ω	.919	.931	.812		.963	.770	.861	.514	

Variables	1	2	3
1. Supportive	-		
2. Thwarting	-.657	-	
3. Indifferent	-.706	.573	-

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; G: Global factor from the bifactor model; S: Specific factors from the bifactor model; target factor loadings are indicated in bold; non-significant parameters ($p \geq .05$) are marked in italics.

Table S6

Goodness-of-Fit Statistics for the Estimated Measurement Models (Need Fulfillment Study 2)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
1. One-factor CFA (Fu)	1215.343 (135)*	.625	.575	.125	[.119; .132]
2. Two-factor CFA (S, Fr)	872.072 (134)*	.744	.708	.104	[.097; .110]
3. Two-factor ESEM (S, Fr)	850.124 (118)*	.746	.671	.110	[.103; .117]
4. Three-factor CFA (A, C, R)	971.617 (132)*	.709	.662	.111	[.105; .118]
5. Three-factor ESEM (A, C, R)	445.242 (102)*	.881	.821	.081	[.073; .089]
6. Six-factor CFA (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr)	301.463 (120)*	.937	.920	.054	[.047; .062]
7. Six-factor ESEM (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr)	77.655 (60)	.994	.984	.024	[.000; .038]
8. B-CFA: Two S-factors (S, Fr) and one G-factor (Fu)	725.410 (117)*	.789	.724	.101	[.094; .108]
9. B-ESEM: Two S-factors (S, Fr) and one G-factor (Fu)	442.242 (102)*	.881	.821	.081	[.073; .089]
10. B-CFA: Three S-factors (A, C, R) and one G-factor (Fu)	627.499 (117)*	.823	.768	.092	[.085; .099]
11. B-ESEM: Three S-factors (A, C, R) and one G-factor (Fu)	312.202 (87)*	.922	.863	.071	[.063; .080]
12. B-CFA: Three S-factors (A, C, R) and two G-factors (S, Fr)	454.960 (116)*	.882	.845	.076	[.068; .083]
13. B-ESEM: Three S-factors (A, C, R) and two G-factors (S, Fr)	199.101 (83)*	.960	.926	.052	[.043; .062]
14. B-CFA: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and one G-factor (Fu)	347.241 (117)*	.920	.896	.062	[.055; .070]
15. B-ESEM: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and one G-factor (Fu)	80.923 (48)*	.989	.964	.037	[.022; .050]
16. B-CFA: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and two G-factor (S, Fr)	287.832 (116)*	.940	.921	.054	[.046; .062]
17. B-ESEM: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and two G-factor (S, Fr)	42.925 (41)	.999	.998	.010	[.000; .032]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; CFA = Confirmatory factor analysis; ESEM = Exploratory structural equation modeling; G-factor = Global factor estimated as part of a bifactor model; S-factor = Specific factor estimated as part of a bifactor model; Fu: Global need fulfillment; S: Need satisfaction; Fr: Need frustration; A: Need for autonomy; C: Need for competence; R: Need for relatedness.

Table S7

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the B-ESEM Solution (Need Fulfillment, M15, Study 2)

Items	Global (G-λ)	RNS (S-λ)	ANS (S-λ)	CNS (S-λ)	RNF (S-λ)	ANF (S-λ)	CNF (S-λ)	δ
Relatedness Need Satisfaction								
Item 1	**.473**	**.534**	*-.001*	*.012*	*-.068*	*-.003*	*.064*	.482
Item 2	**.582**	**.589**	*-.013*	*.079*	*-.075*	*.032*	*.079*	.296
Item 3	**.596**	**.510**	*.070*	*.149*	*-.103*	*.056*	*.089*	.336
Autonomy Need Satisfaction								
Item 1	**.578**	*.088*	**.327**	*.185*	*.060*	*-.103*	*.000*	.503
Item 2	**.565**	*-.062*	**.795**	*-.006*	*.014*	*-.036*	*.029*	*.044*
Item 3	**.434**	*.115*	**.419**	*.051*	*.098*	*.002*	*.015*	.610
Competence Need Satisfaction								
Item 1	***.289***	*.101*	*.097*	**.607**	.138	*.036*	*.065*	.504
Item 2	***.616***	*.060*	*.102*	***.492***	*.072*	*-.023*	*.060*	.355
Item 3	***.360***	*.081*	*-.068*	**.475**	*.192*	*.144*	*-.071*	.571
Relatedness Need Frustration								
Item 1	**-.575**	-.142	*.019*	*.062*	**.537**	*.085*	*.068*	.344
Item 2	**-.600**	*-.006*	*.072*	*.129*	**.482**	*-.028*	*.041*	.383
Item 3	**-.326**	*-.083*	*.042*	.180	**.640**	*.072*	*.006*	.438
Autonomy Need Frustration								
Item 1	**-.515**	*-.019*	*-.018*	*.045*	*.140*	**.456**	*.170*	.475
Item 2	**-.655**	*.073*	*-.017*	*.046*	*.028*	**.628**	*.071*	*.163*
Item 3	**-.534**	*.019*	*-.093*	*.065*	*-.007*	**.459**	*.088*	.483
Competence Need Frustration								
Item 1	***-.424***	*.022*	*.011*	*-.054*	*.066*	*.192*	**.873**	*.014*
Item 2	***-.772***	*.305*	*.046*	*.239*	*-.050*	*-.064*	**.321**	*.141*
Item 3	**-.709**	*.049*	*.028*	*.032*	*.106*	*.088*	***.174***	.444
Ω	.933	.705	.672	.634	.703	.680	.758	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; G: Global factor from the bifactor model representing need fulfillment; S: Specific factors from the bifactor model; RNS: Relatedness need satisfaction; ANS: Autonomy need satisfaction; CNS: Competence need satisfaction; RNF: Relatedness need frustration; ANF: Autonomy need frustration; CNF: Competence need frustration; target factor loadings are indicated in bold; non-significant parameters ($p \geq .05$) are marked in italics.

Table S8

Summary of Indirect Effects Estimated in Study 2

Predictor	Mediator	Outcome	Indirect Effect	Confidence Interval
Global need-hampering behaviors	Autonomy need satisfaction	Boredom	.022	.001 to .057*
Global need-hampering behaviors	Autonomy need satisfaction	Work engagement	-.040	-.085 to -.014*
Global need-hampering behaviors	Global need fulfillment	Emotional exhaustion	.521	.358 to .652*
Global need-hampering behaviors	Global need fulfillment	Boredom	.238	.121 to .345*
Global need-hampering behaviors	Global need fulfillment	Work engagement	-.266	-.384 to -.153*
Specific need-supportive behaviors	Relatedness need satisfaction	Emotional exhaustion	-.052	-.111 to -.014*
Specific need-supportive behaviors	Relatedness need satisfaction	Boredom	-.035	-.078 to -.007*
Specific need-supportive behaviors	Relatedness need satisfaction	Work engagement	.054	.014 to .108*
Specific need-supportive behaviors	Global need fulfillment	Emotional exhaustion	-.163	-.324 to -.054*
Specific need-supportive behaviors	Global need fulfillment	Boredom	-.075	-.171 to -.025*
Specific need-supportive behaviors	Global need fulfillment	Work engagement	.083	.030 to .169*
Specific need-thwarting behaviors	Relatedness need satisfaction	Emotional exhaustion	-.056	-.116 to -.019*
Specific need-thwarting behaviors	Relatedness need satisfaction	Boredom	-.037	-.082 to -.010*
Specific need-thwarting behaviors	Relatedness need satisfaction	Work engagement	.058	.020 to .115*
Specific need-thwarting behaviors	Competence need frustration	Work engagement	.020	.001 to .054*
Specific need-thwarting behaviors	Global need fulfillment	Emotional exhaustion	.124	.035 to .249*
Specific need-thwarting behaviors	Global need fulfillment	Boredom	.057	.017 to .127*
Specific need-thwarting behaviors	Global need fulfillment	Work engagement	-.063	-.138 to -.020*

Note. * confidence interval excludes 0 (corresponding to $p < .05$).

Study 3 Supplements

Preliminary Measurement Models: Supervisor's Interpersonal Behaviors

The goodness-of-fit results from the preliminary measurement models used to investigate the optimal measurement structure for the TMIB-S are reported in the upper section of Table S9. Like in Studies 1 and 2, the single factor model (M0) and the three-factor CFA model defined based on the needs (M1b) failed to fit the data and were thus not further considered. On this basis, all further three-factor models were specified based on the type of behavior (supportive, indifferent, and thwarting), rather than the type of need.

Of the four remaining first-order CFA and ESEM solutions, three of these alternative solutions (three-factor CFA, three-factor-ESEM, and nine-factor CFA) achieved an acceptable level of fit to the data. In contrast, the nine-factor ESEM model failed to achieve a satisfactory level of fit to the data according to the TLI, in addition to resulting in weakly defined factors (e.g., M_λ = .249 for relatedness indifferent behaviors in M4). Among the three remaining solutions, the three-factor ESEM solution (M2) achieved the highest level of fit to the data, followed by the nine-factor CFA solution (M3) which, unfortunately, resulted in factors correlations that were high enough to suggest conceptual redundancies among factors (M_r = .827 in M3). The two nine-factor solutions (Models 3 and 4) were thus excluded in favor of the more parsimonious three-factor solutions (M1a and M2). As in Studies 1 and 2, the parameter estimates from these two solutions (i.e., M1a and M2) supported the superiority of the ESEM solution (M2). More precisely, this ESEM solution (see Table S11 of these online supplements) resulted in well-defined factors: (a) need-supportive behaviors: λ = .514 to .993, M_λ = .756; (b) need-thwarting behaviors: λ = .668 to .989, M_λ = .811; (c) need-indifferent behaviors: λ = .313 to .843, M_λ = .539. Although this solution incorporated multiple statistically significant cross-loadings, only two of these cross-loadings were higher than their target loadings (i.e., associated with items 2 and 3 of the need-indifferent factor), with most cross-loadings remaining small enough to support clear factor definitions (|λ| = .005 to .451, $M_{|\lambda|}$ = .103). In addition, the factor correlations were substantially reduced in the ESEM (|r| = .593 to .736, $M_{|r|}$ = .662) relative to the CFA (|r| = .769 to .876, $M_{|r|}$ = .816) solution.

The decision was thus made to retain an ESEM representation of the data. This decision was also supported, as in Studies 1 and 2, by an examination of the bifactor alternatives, which also supported the superiority of the bifactor ESEM relative to the bifactor CFA solution. First, most bifactor solutions achieved an acceptable level of fit to the data, with one exception. Indeed, as in Studies 1 and 2, the bifactor-CFA solution with one G-factor and nine S-factors (M7) failed to achieve a satisfactory level of fit to the data, and the matching bifactor-ESEM solution (M8) resulted in an unclear factor structure, including multiple weakly defined factors (e.g., M_λ = .047 for competence indifferent behaviors) and multiple cross-loadings larger than their main loadings. Likewise, when we look at the two solutions including nine S-factors and three G-factors (Models 5 and 6), one of these solutions resulted in estimates of G-factor correlations that were high enough to call into question the discriminant validity of the factors (M5: |r| = .793 to .883, $M_{|r|}$ = .833), whereas the other one resulted in the estimation of three more weakly defined G-factors (λ = .094 to .469, M_λ = .311 for global need-supportive behaviors; |λ| = .086 to .328, $M_{|\lambda|}$ = .174 for global need-thwarting behaviors; and λ = .018 to .452, M_λ = .234 for global need-indifferent behaviors). For these reasons, the four solutions including nine S-factors were rejected.

Finally, comparison of the parameter estimates associated with Models 9 and 10 also supports the superiority of the bifactor ESEM solution (M10), which also resulted in a noteworthy improvement in model fit (ΔCFI = +.010, ΔTLI = +.004, ΔRMSEA = -.002) relative to its first-order counterpart (i.e., M2). More precisely, this solution (see Table S11) revealed a well-defined G-factor, reflecting a global continuum of need-hampering behaviors with negative factor loadings associated with need-supportive behaviors (λ = -.810 to -.654, M_λ = -.744) and positive factor loadings associated with need-thwarting (λ = .631 to .869, M_λ = .738) and need-indifferent (λ = .166 to .811, M_λ = .464) behaviors. Similarly, with the exception of a few items which mainly reflected the global need-hampering behaviors G-factor rather than their own a priori S-factors, the S-factors also retained a meaningful degree of specificity over and above employees' global levels of need-hampering behaviors (λ = .204 to .491, M_λ = .368 for specific need-supportive behaviors; λ = .122 to .541, M_λ = .350 for specific need-thwarting behaviors; and λ = .193 to .586, M_λ = .366 for specific need-indifferent behaviors). As in the three-factor ESEM solution (M2), multiple cross-loadings were statistically significant, although they all remained reasonable in magnitude (|λ| = .000 to .216, $M_{|\lambda|}$ = .073), much smaller than in the ESEM solution, and

did not detract from a meaningful interpretation of the factors. A single one cross-loading was higher than its target loading for the Indifferent S-factor (Item 1) and remained under .200. Composite reliability coefficients were acceptable for this solution (global need hampering behaviors ω = .971, specific need supportive behaviors ω = .792, specific need thwarting behaviors ω = .819, and specific need indifferent behaviors ω = .620). Thus, as in Studies 1 and 2, these results once again supported the superiority of the bifactor ESEM solution with one G-factor and three S-factors.

Preliminary Measurement Models: Employees' Need Satisfaction and Frustration

Goodness-of-fit indices associated with each of these 17 measurement models are reported in Table S12 of these online supplements. Starting with an examination of the first-order CFA and ESEM solutions, only the six-factor solutions were able to achieve an acceptable level of fit to the data. In addition, the goodness-of-fit associated with the ESEM solution (M7) appeared to be much higher (ΔCFI = +.053; ΔTLI = +.050; ΔRMSEA = -.018) than that of the CFA solution (M6). Both solutions resulted in well-defined factors (ESEM: λ = .206 to .896, M_{λ} = .561; CFA: λ = .455 to .897, M_{λ} = .760). Though the ESEM solution did incorporate multiple statistically significant cross-loadings, none of these was large enough to suggest a problem of factor definition (|λ| = .001 to .378, $M_{|\lambda|}$ = .118). In addition, factor correlations were substantially reduced in the ESEM (|*r*| = .220 to .510, $M_{|r|}$ = .384), relative to the CFA (|*r*| = .298 to .917, $M_{|r|}$ = .649) solutions, and appropriately positive among subscales of the same valence (satisfaction-satisfaction, frustration-frustration) and negative among subscales of distinct valence (satisfaction-frustration).

The decision was thus made to retain an ESEM representation of the data, a decision that was also supported by an examination of the bifactor alternatives, which also supported the superiority of the bifactor ESEM solution, relative to the bifactor CFA. In fact, with two exceptions (Models 12 and 16), most of the bifactor CFA solutions failed to achieve an acceptable level of fit to the data according to at least one of the fit indices, and even these models failed to achieve a level of fit comparable to that of the alternative bifactor ESEM solution. So, turning our attention to the bifactor ESEM solutions, it is interesting to note that many of them were able to achieve an acceptable level of fit to the data, although the solutions including six-S-factors (Models 15 and 17) achieved a level of fit that substantially exceeded that of their counterparts including three S-factors (M15 vs. 11: ΔCFI = +.025; ΔTLI = +..029; ΔRMSEA = -.012; M17 vs. 13: ΔCFI = +.021; ΔTLI = +.023; ΔRMSEA = -.009). Therefore, the key question was whether the model including two G-factors (reflecting distinct global dimensions of need frustration or satisfaction) was able to provide an improved representation of the data relative to the model including a single G-factor (reflecting a global continuum of need fulfillment), given that both models (15 and 17) achieved an excellent level of fit to the data. Here, an examination of the parameter estimates associated with all models including two G-factors is highly informative. First, when looking at the results from the bifactor CFA models including two G-factors (Models 12 and 16), it can be noted that the correlation observed between these two G-factors was so high so as to call into question the discriminant validity of these factors (-.784 for M12; -.845 for M16). The bifactor ESEM solutions including two G-factors (Models 13 and 17) revealed weakly defined global satisfaction (|λ| = .017 to .573, $M_{|\lambda|}$ = .260) and frustration (|λ| = .011 to .464, $M_{|\lambda|}$ = .174) factors, arguing against the need to incorporate a second G-factor, and supporting the superiority of M15.

Examination of the parameter estimates associated with M15, which are reported in Table S13 of these online supplements, supports this conclusion. These results revealed a well-defined G-factor, reflecting a global underlying continuum of need fulfillment with positive factor loadings associated with the need satisfaction items (λ =.306 to .683, M_{λ} =.514) and negative factor loadings associated with the need frustration items (λ = -.439 to -.816, M_{λ} = -.743). Similarly, with the exception of a few items which mainly reflected the global need fulfillment G-factor rather than their own a priori S-factors (e.g., items 2 and 3 for autonomy need satisfaction), the S-factors also retained at least some degree of meaningful specificity over and above participants' global levels of need fulfillment (|λ| = .003 to .807, $M_{|\lambda|}$ = .397). Interestingly, and contrary to the ESEM solution, cross-loadings remained small, and mainly non-significant (|λ| = .001 to .279, $M_{|\lambda|}$ = .076), supporting this bifactor operationalization. Model-based coefficients of composite reliability estimated from this model were satisfactory for most factors: G-Factor: ω = .969; autonomy satisfaction S-factor: ω = .828; relatedness satisfaction S-factor: ω = .399; competence satisfaction S-factor: ω = .891; autonomy frustration S-factor: ω = .653; relatedness frustration S-factor: ω = .372; and competence frustration S-factor: ω = .457.

In sum, these results replicated Tóth-Király et al.'s (2018) and Study 2's results, leading us to retain

a bifactor-ESEM model encompassing one global need fulfillment G-factor and six S-factors.

Predictive Models

To avoid the problems identified by Koch et al. (2018) for models in which covariates (i.e., supervisors' interpersonal behaviors) are used to predict constructs represented by way of a bifactor operationalization (i.e., need fulfillment), we relied on factor scores reflecting the global and specific facets of need fulfillment. This approach allowed us to maintain a substantial degree of control for unreliability (Skrondal & Laake, 2001), to maintain the bifactor properties of the measure (Morin et al., 2016a, 2017), and to avoid the issues described by Koch et al. (2018). The outcome variables (job boredom, work engagement, and emotional exhaustion) were specified as fully latent factors.

Results from the partial mediation model first showed that global need-hampering behaviors were related to lower global need fulfillment and to lower specific relatedness and autonomy satisfaction, and with higher competence and relatedness frustration. Beyond these effects on the mediators, global need-hampering behaviors also directly and positively related to employees' boredom, and directly and negatively related to their job satisfaction. Specific need-supportive behaviors were linked to higher global need fulfillment, and to higher specific autonomy satisfaction. Specific need-supportive behaviors also shared a direct relation with lower levels of rumination, as well as an unexpected direct relation with higher levels of boredom. Another unexpected association was that of a positive association between specific need-thwarting behaviors and employees' specific relatedness need satisfaction. In contrast, specific need-thwarting behaviors did not share any other association with the remaining mediators, or the outcomes. Finally, specific-levels of need-indifferent behaviors were linked to lower global need fulfillment, and also directly related to higher levels of boredom.

Regarding the associations between mediators and outcomes, results showed that participants' global need fulfillment were associated with more job satisfaction, and less boredom and rumination. Likewise, participants' specific relatedness and autonomy satisfaction were also linked to more job satisfaction and less job boredom. In contrast, participants' specific competence satisfaction only predicted higher job satisfaction, whereas participants' specific autonomy frustration shared no association with the outcomes. Finally, participants' specific competence and relatedness frustration both predicted higher rumination.

Taken together, these associations suggest the presence of 19 potential indirect effects. Tests of statistical significance (via bias-corrected bootstrap confidence intervals) supported all of these indirect effects (see Table S14). Specifically, participants' exposure to global need-hampering behaviors and to specific need-supportive and need-indifferent behaviors from their supervisors were found to indirectly predict (in the expected direction) employees' levels of rumination, job satisfaction, and boredom via the mediation of their global need fulfillment. Global need-hampering behaviors were also indirectly related (in the expected direction) to employees' boredom and job satisfaction via the mediation of their specific relatedness and autonomy satisfaction. Likewise, these global need-hampering behaviors were also indirectly related (in the anticipated direction) to employees' rumination via the mediating role of their specific relatedness and competence frustration. Specific need-supportive behaviors were also indirectly related (in the expected direction) to employees' job satisfaction and boredom through the mediation of their specific autonomy satisfaction. Finally, and reflecting the previously described unexpected direct effects, specific need-thwarting behaviors were indirectly related to more job satisfaction, and to less job boredom via the mediation of employees' specific relatedness satisfaction. Although unexpected, this specific indirect pathway (need-thwarting behaviors via relatedness need satisfaction) was also identified in Study 2.

Discriminant Validity

For passive leadership, none of the alternative models (total mediation, partial mediation, and direct) showed any systematic improvement in fit relative to the null model, suggesting that abusive supervision did not have any effects on the mediators and outcomes once the effects of supervisors' interpersonal behaviors were taken into account. The parameter estimates from the various models are consistent with this interpretation, indicating that passive leadership was not associated with the mediators and outcomes, once the effects of supervisors' interpersonal behaviors were accounted for.

For LMX, the models of total and partial mediation, but not the direct model, indicated a slight increase in model fit when compared to the null model, suggesting that LMX might share some associations with the mediators, but not the outcomes beyond the effects of supervisors' interpersonal behaviors. These alternative models' parameter estimates corroborate this interpretation, as they

revealed LMX to have an additional positive effect on participants' specific levels of competence satisfaction (b = .589, s.e. = .200, $p \leq .01$, β = .619) and on their global levels of need fulfillment (b = .477, s.e. = .111, $p \leq .01$, β = .486), beyond the effects of supervisors' interpersonal behaviors.

For abusive supervision, the model of partial mediation, but not the direct effects or full mediation models, was associated with a slight increase in model fit when compared to the null effects model, suggesting that abusive supervision might share associations with some mediators and/or outcomes beyond the effects of supervisors' interpersonal behaviors. However, the parameter estimates from this alternative model did not corroborate this interpretation, and only revealed that abusive supervision had an additional positive but marginal effect on boredom (b = .985, s.e. = .563, p = .08, β = .594).

For transformational leadership, all models indicated a slight increase in model fit relative to the null model, suggesting that transformational leadership shares associations with the mediators and outcomes beyond the effects of supervisors' interpersonal behaviors. The parameter estimates from these models corroborated this interpretation, revealing transformational leadership to have an additional positive effect on participants' specific levels of competence satisfaction (b = .404, s.e. = .190, $p \leq .05$, β = .425) and an additional negative effect on their specific levels of competence frustration (b = -.295, s.e. = .149, $p \leq .05$, β = -.352) beyond the effects of supervisors' behaviors.

Upon request from a reviewer, we conducted additional analyses including all the alternative measures (passive leadership, LMX, transformational leadership, and abusive supervision) together with the TMIB-S. We contrasted the same four alternative models (i.e., null, partial mediation, total mediation, direct). Results from these analyses indicated that, although they provided acceptable fit to the data, none of the alternative models showed any systematic improvement in fit relative to the null model (where alternative measures were set to be 0), suggesting that adding alternative leadership scales did not have any added value once the TMIB-S was considered. We also tested alternative analyses: we added the TMIB-S to analyses already including all of the other measures (i.e., passive leadership, LMX, transformational leadership, and abusive supervision). Results from these analyses showed that the model including the TMIB-S showed improvement in fit and in R^2, relative to the null model (TMIB-S factors set to be exactly zero), showing that the TMIB-S explains well- and ill- being over and above these existing measures, even when all of them are simultaneously considered.

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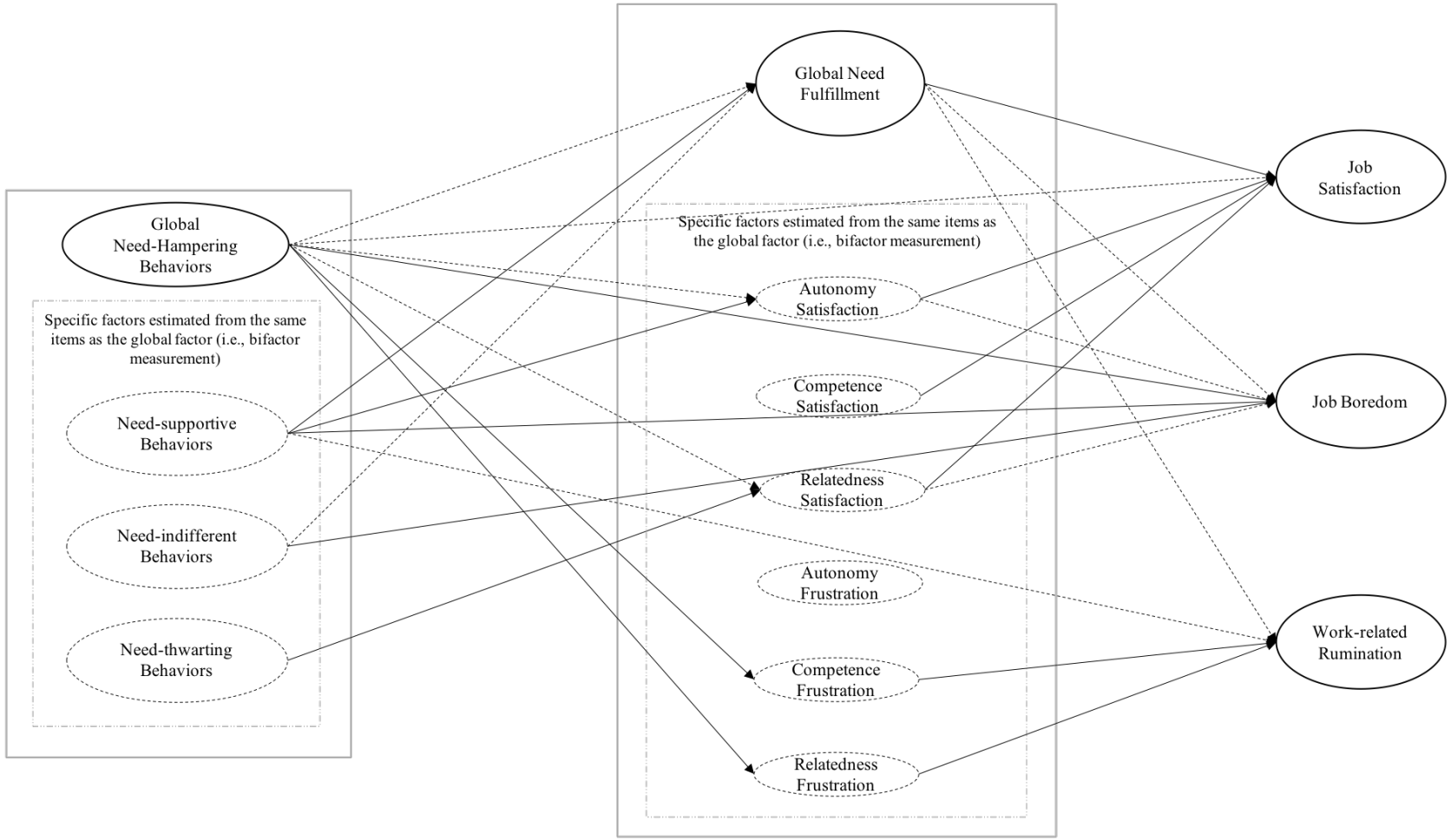
Figure S2
Results from the Partial Mediation Model (Study 3)



Note. Solid arrows represent significant positive relations. Dashed arrows reflect significant negative relations. Non-significant relations and coefficients are not reported for purposes of clarity and can be found in Table 3 of the main manuscript.

Table S9

Goodness-of-Fit Statistics for the Estimated Measurement and Predictive Models (Study 3)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
M0. Single factor CFA	1498.216 (209)*	.771	.746	.117	[.112; .123]
M1a. Three-factor CFA (nS, nI, nT)	679.142 (206)*	.916	.906	.072	[.066; .078]
M1b. Three-factor CFA (a, c, r)	1511.908 (206)*	.768	.739	.119	[.113; .124]
M2. Three-factor ESEM (nS, nI, nT)	494.093 (168)*	.941	.920	.066	[.059; .073]
M3. Nine-correlated factors CFA	525.444 (173)*	.937	.916	.067	[.061; .074]
M4. Nine-correlated factors ESEM	240.240 (69)*	.970	.898	.074	[.064; .085]
M5. Bifactor CFA (correlated three-G, nine-S)	557.740 (189)*	.934	.920	.066	[.060; .072]
M6. Bifactor ESEM (correlated three-G, nine-S)	50.557 (44)	.999	.994	.018	[.000; .038]
M7. Bifactor CFA (one-G, nine-S)	1505.797 (192)*	.860	.831	.123	[.118; .129]
M8. Bifactor ESEM (one-G, nine-S)	149.912 (56)*	.983	.931	.061	[.049; .073]
M9. Bifactor CFA (one-G, three-S)	542.297 (187)*	.937	.922	.065	[.059; .071]
M10. Bifactor ESEM (one-G, three-S)	424.262 (149)*	.951	.924	.064	[.057; .071]
Multi-Group Tests of Invariance (Model 10)					
I1. Configural invariance	773.925 (298)*	.954	.929	.063	[.058; .069]
I2. Weak invariance	780.447 (370)*	.960	.950	.053	[.048; .058]
I3. Strong invariance	807.991 (388)*	.959	.952	.052	[.047; .057]
I4. Strict invariance	810.499 (410)*	.961	.956	.049	[.044; .054]
I5. Latent variance-covariance invariance	809.949 (420)*	.962	.958	.048	[.043; .053]
I6. Latent means invariance	815.509 (424)*	.962	.959	.048	[.043; .053]
Predictive Models (from Model 10)					
P1. Partial mediation	1292.761 (535)*	.921	.901	.056	[.052; .060]
P2. Total mediation	1411.337 (547)*	.910	.884	.059	[.056; .063]
Discriminant Validity (From Model P1): Abusive Supervision					
D1. Null effects model	1459.854 (645)*	.921	.899	.053	[.049; .057]
D2. Partial mediation model	1437.477 (635)*	.922	.899	.053	[.049; .057]
D3. Total mediation model	1446.216 (638)*	.921	.899	.053	[.049; .057]
D4. Direct effects model	1451.086 (642)*	.921	.899	.053	[.049; .057]
Discriminant Validity (From Model P1): Transformational Leadership					
D1. Null effects model	1732.106 (811)*	.929	.914	.050	[.047; .054]
D2. Partial mediation model	1707.331 (801)*	.931	.914	.050	[.047; .051]
D3. Total mediation model	1714.331 (804)*	.930	.914	.050	[.047; .054]
D4. Direct effects model	1724.832 (808)*	.930	.914	.050	[.047; .054]
Discriminant Validity (From Model P1): Passive Leadership					
D1. Null effects model	1710.709 (726)*	.911	.889	.055	[.052; .058]
D2. Partial mediation model	1702.932 (716)*	.911	.888	.055	[.052; .059]
D3. Total mediation model	1706.867 (719)*	.911	.888	.055	[.052; .059]
D4. Direct effects model	1707.552 (723)*	.911	.889	.055	[.052; .058]
Discriminant Validity (From Model P1): Leader-Member Exchange					
D1. Null effects model	1863.870 (811)*	.917	.898	.054	[.051; .057]
D2. Partial mediation model	1791.388 (801)*	.922	.903	.052	[.049; .056]
D3. Total mediation model	1803.045 (804)*	.921	.903	.053	[.049; .056]
D4. Direct effects model	1861.366 (808)*	.917	.898	.054	[.051; .057]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; ESEM: Exploratory structural equation modeling; G-factor: Global factor estimated as part of a bifactor model; S-factor: Specific factor estimated as part of a bifactor model; nS: Need supportive behaviors; nI: Need indifferent behaviors; nT: Need thwarting behaviors; a: Need for autonomy; c: Need for competence; and r: Need for relatedness.

Table S10

Latent Correlations Among All Variables Included in Study 3

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. G-Need-hampering behaviors	-																
2. S-Need supportive behaviors	.000	-															
3. S-Need thwarting behaviors	.000	.000	-														
4. S-Need indifferent behaviors	.000	.000	.000	-													
5. G-Need fulfillment	-.703**	.015	-.059	-.311**	-												
6. S-Autonomy satisfaction	-.158	.356*	.003	.158	.000	-											
7. S-Competence satisfaction	.132	-.050	.180	.218*	.000	.000	-										
8. S-Relatedness satisfaction	-.053	.311**	.274*	.022	.000	.000	.000	-									
9. S-Autonomy frustration	-.181	-.359*	.299	.065	.000	.000	.000	.000	-								
10. S-Competence frustration	.108	-.134	.208	-.121	.000	.000	.000	.000	.000	-							
11. S-Relatedness frustration	.161	.134	.173	-.368**	.000	.000	.000	.000	.000	.000	-						
12. Job satisfaction	-.560**	.188	.087	-.211**	.769**	.272	.022	.152**	.175*	.190*	.219	-					
13. Work-related rumination	.240**	-.207**	.267*	.077	-.428**	.047	-.031	.066	.106	.238*	.023	-.245**	-				
14. Job boredom	.478**	.077	-.151	.397**	-.707**	-.152	.015	-.108	-.339**	-.348*	-.301*	-.728**	.156**	-			
15. Transformational leadership	-.790**	.435**	-.037	-.213**	.637**	.261**	-.131**	.161**	.064	-.134	.055	.595**	-.288**	-.404**	-		
16. Leader-member exchange	-.861**	.329**	-.015	-.129**	.711**	.310**	-.076	.173**	.048	-.182	-.076	.655**	-.315**	-.454**	.899**	-	
17. Abusive supervision	.805**	-.005	.495**	-.007	-.626**	-.189*	.220**	.149*	-.118	.206	.209*	-.446**	.343**	.376**	-.669**	-.693**	-
18. Passive leadership	.724**	-.200**	.094	.428**	-.642**	-.047	.193*	-.077	-.019	.143	-.016	-.486**	.347**	.449**	-.801**	-.759**	.618**

Note. * $p < .05$; ** $p < .01$; G: Global factor estimated as part of a bifactor model; S: Specific factor estimated as part of a bifactor model; Factors taken from a bifactor model are orthogonal (thus not correlated with one another).

Table S11

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the Three-Factor ESEM and Bifactor-ESEM Solutions (Models 2 and 10, Study 3)

	ESEM				Bifactor-ESEM				
Items	Supportive (λ)	Thwarting (λ)	Indifferent (λ)	δ	Global (G-λ)	Supportive (S-λ)	Thwarting (S-λ)	Indifferent (S-λ)	δ
Supportive									
SBr1	.993	*.047*	*.043*	.132	**-.790**	**.491**	*.046*	*.028*	.132
SBa1	**.622**	-.313	*.059*	.296	**-.788**	**.221**	-.034	*.088*	.286
SBc1	**.965**	*.033*	*.008*	.123	**-.654**	**.472**	*.051*	*.010*	.123
SBr2	**.866**	*-.008*	*-.045*	.187	**-.810**	**.438**	*.011*	*-.034*	.186
SBa2	**.514**	-.214	*-.035*	.495	**-.683**	**.204**	*-.021*	*.009*	.491
SBc2	**.648**	*.054*	-.240	.384	**-.775**	**.376**	*-.001*	-.186	.377
SBr3	**.636**	*-.017*	*-.125*	.457	**-.807**	**.329**	*.006*	*-.088*	.457
SBa3	**.803**	*-.014*	-.098	.224	**-.668**	**.415**	*.006*	-.070	.223
Thwarting									
TBr1	*-.111*	**.668**	.158	.258	**.874**	*.105*	***.122***	*.024*	.210
TBc1	*-.134*	**.789**	*-.040*	.247	**.851**	.132	***.156***	-.143	.182
TBa1	*-.047*	**.693**	*.087*	.386	**.691**	*-.054*	**.384**	*.052*	.369
TBr2	*-.035*	**.827**	.105	.153	**.869**	*.000*	**.396**	*.045*	.145
TBc2	*.005*	**.722**	*.093*	.396	**.743**	-.121	**.541**	.110	.282
TBa2	*.044*	**.912**	*.011*	.214	**.834**	.206	***.240***	-.100	.166
TBa3	*.056*	**.944**	*-.041*	.225	**.631**	*.038*	**.480**	*-.057*	.212
TBc3	*.058*	**.989**	*-.071*	.176	**.768**	*.059*	**.481**	*-.086*	.168
Indifferent									
IBr1	*-.102*	-.211	**.313**	.915	**.166**	*-.002*	-.216	**.193**	.889
IBa1	-.451	.135	**.396**	.233	**.792**	-.215	*.000*	**.256**	.230
IBc1	-.358	.255	**.346**	.285	**.406**	-.178	*.080*	**.226**	.284
IBr2	*.074*	*-.052*	**.843**	.410	**.811**	*-.040*	*-.021*	**.586**	.419
IBa2	.276	*.044*	**.812**	.533	**.486**	.131	*-.056*	**.534**	.530
IBc2	*-.051*	*.078*	**.524**	.628	**.452**	-.134	*.126*	**.401**	.602
ω	.941	.954	.777		.971	.792	.819	.620	

Variables	1	2	3
1. Supportive	-		
2. Thwarting	-.736	-	
3. Indifferent	-.657	.593	-

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; G: Global factor from the bifactor model; S: Specific factors from the bifactor model; target factor loadings are indicated in bold; non-significant parameters ($p \geq .05$) are marked in italics.

Table S12

Goodness-of-Fit Statistics for the Estimated Measurement Models (Need Fulfillment, Study 3)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
1. One-factor CFA (Fu)	2460.703 (377)*	.694	.646	.111	[.107; .115]
2. Two-factor CFA (S, Fr)	2056.371 (376)*	.753	.714	.100	[.096; .104]
3. Two-factor ESEM (S, Fr)	1569.377 (348)*	.820	.775	.088	[.084; .093]
4. Three-factor CFA (A, C, R)	2044.561 (374)*	.754	.714	.100	[.096; .104]
5. Three-factor ESEM (A, C, R)	1021.121 (320)*	.887	.860	.070	[.065; .075]
6. Six-factor CFA (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr)	885.924 (362)*	.923	.907	.057	[.052; .062]
7. Six-factor ESEM (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr)	405.389 (242)	.976	.957	.039	[.032; .045]
8. B-CFA: Two S-factors (S, Fr) and one G-factor (Fu)	1306.350 (347)*	.859	.823	.078	[.074; .083]
9. B-ESEM: Two S-factors (S, Fr) and one G-factor (Fu)	1021.121 (320)*	.897	.860	.070	[.065; .075]
10. B-CFA: Three S-factors (A, C, R) and one G-factor (Fu)	985.898 (347)*	.906	.882	.064	[.059; .069]
11. B-ESEM: Three S-factors (A, C, R) and one G-factor (Fu)	588.451 (293)*	.957	.935	.047	[.042; .053]
12. B-CFA: Three S-factors (A, C, R) and two G-factors (S, Fr)	816.169 (346)*	.931	.913	.055	[.050; .060]
13. B-ESEM: Three S-factors (A, C, R) and two G-factors (S, Fr)	556.597 (289)*	.961	.941	.045	[.040; .051]
14. B-CFA: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and one G-factor (Fu)	934.929 (347)*	.914	.892	.061	[.057; .066]
15. B-ESEM: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and one G-factor (Fu)	339.069 (218)*	.982	.964	.035	[.028; .042]
16. B-CFA: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and two G-factor (S, Fr)	875.492 (346)*	.922	.902	.058	[.054; .063]
17. B-ESEM: Six S-factors (A-S, A-Fr, C-S, C-Fr, R-S, R-Fr) and two G-factor (S, Fr)	330.620 (211)*	.982	.964	.036	[.028; .043]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval; CFA = Confirmatory factor analysis; ESEM = Exploratory structural equation modeling; G-factor = Global factor estimated as part of a bifactor model; S-factor = Specific factor estimated as part of a bifactor model; Fu: Global need fulfillment; S: Need satisfaction; Fr: Need frustration; A: Need for autonomy; C: Need for competence; R: Need for relatedness.

Table S13

Standardized Factor Loadings (λ) and Uniquenesses (δ) from the Bifactor-ESEM Solution (Need Fulfillment, M15, Study 3)

Items	Global (G-λ)	RNS (S-λ)	ANS (S-λ)	CNS (S-λ)	RNF (S-λ)	ANF (S-λ)	CNF (S-λ)	δ
RNS								
Item 1	**.596**	**.589**	*.086*	*.054*	*-.013*	*.026*	-.092	.279
Item 2	**.575**	**.542**	.208	*.046*	-.107	*-.003*	*-.068*	.315
Item 3	**.554**	**.616**	*-.075*	*.034*	-.090	*-.008*	-.082	.293
Item 4	**562**	**.478**	.159	*.019*	*.013*	*.055*	.160	.401
Item 5	**.633**	**.408**	*-.003*	.104	-.155	*-.044*	-.129	.380
Item 6	**.445**	**.557**	*-.036*	*.072*	.085	*.048*	.191	.439
ANS								
Item 1	**.577**	.279	**.334**	*.076*	*-.014*	.075	*.015*	.446
Item 2	**.533**	*-.089*	***.090***	*-.030*	.122	*.008*	*.005*	.684
Item 3	**.557**	*.053*	***.087***	*-.032*	*.073*	-.153	*.045*	.647
Item 4	**.479**	.220	**.360**	.095	.133	*-.027*	*.029*	.564
Item 5	**.660**	*.011*	**.405**	.157	*.014*	-.145	*-.016*	.355
Item 6	**.683**	*-.011*	**.176**	*-.048*	*.062*	*.031*	.109	.483
CNS								
Item 1	**.459**	*.067*	*-.126*	**.664**	*-.045*	*.027*	-.090	.317
Item 2	**.343**	.081	.126	**.716**	*.023*	*.028*	*-.002*	.345
Item 3	**.441**	*.035*	*-.074*	**.751**	*.028*	*.001*	*-.041*	.232
Item 4	**.363**	*-.019*	*-.146*	**.603**	-.084	*.008*	*.055*	.473
Item 5	**.306**	*.009*	.142	**.807**	*.011*	*.013*	*.008*	.234
Item 6	**.487**	.086	.256	**.517**	*.043*	*.001*	*-.057*	.417
RNF								
Item 1	**-.738**	-.153	*.055*	*-.031*	**.370**	*.068*	.243	.228
Item 2	**-.798**	*-.025*	*.045*	*-.017*	**.291**	*-.040*	.246	.214
Item 3	**-.699**	-.099	*.045*	*-.035*	**.699**	*-.051*	*-.054*	.004
Item 4	**-.439**	*.020*	*.097*	.228	**.128**	*-.011*	*.041*	.728
ANF								
Item 1	**-.801**	*.118*	*-.071*	.151	*-.091*	**.543**	*-.099*	.003
Item 2	**-.780**	*.042*	*.019*	.183	-.073	***.003***	*-.006*	.351
Item 3	**-.785**	.141	*-.028*	.133	-.127	***-.047***	-.092	.319
Item 4	**-.800**	.094	*.090*	.142	-.133	***-.152***	-.133	.265
CNF								
Item 1	**-.778**	.099	*.038*	-.185	.092	.107	**.252**	.267
Item 2	**-.782**	.098	*.007*	*-.065*	.159	-.098	**.330**	.230
Item 3	**-.816**	.109	*.053*	-.070	.150	-.090	**.307**	.190
Item 4	**-.703**	*-.003*	*.044*	*.061*	.076	*.037*	***.102***	.482
Ω	.969	.828	.399	.891	.653	.372	.457	

Note. λ: Factor loading; δ: Item uniqueness; ω: Omega coefficient of model-based composite reliability; G: Global factor from the bifactor model representing need fulfillment; S: Specific factors from the bifactor model; RNS: Relatedness need satisfaction; ANS: Autonomy need satisfaction; CNS: Competence need satisfaction; RNF: Relatedness need frustration; ANF: Autonomy need frustration; CNF: Competence need frustration; target factor loadings are indicated in bold; non-significant parameters ($p \geq .05$) are marked in italics.

Table S14

Summary of Indirect Effects Estimated in Study 3

Predictor	Mediator	Outcome	Indirect Effect	Confidence Interval
Global need-hampering behaviors	Autonomy need satisfaction	Boredom	.053	.003 to .112*
Global need-hampering behaviors	Autonomy need satisfaction	Job Satisfaction	-.029	-.059 to -.001*
Global need-hampering behaviors	Relatedness need satisfaction	Boredom	.058	.015 to .109*
Global need-hampering behaviors	Relatedness need satisfaction	Job Satisfaction	-.027	-.052 to -.008*
Global need-hampering behaviors	Global need fulfillment	Boredom	.401	.262 to .576*
Global need-hampering behaviors	Global need fulfillment	Job Satisfaction	-.337	-.424 to -.266*
Global need-hampering behaviors	Global need fulfillment	Rumination	.340	.191 to .480*
Global need-hampering behaviors	Competence need frustration	Rumination	.045	.008 to .182*
Global need-hampering behaviors	Relatedness need frustration	Rumination	.026	.006 to .116*
Specific need-supportive behaviors	Autonomy need satisfaction	Boredom	-.107	-.218 to -.007*
Specific need-supportive behaviors	Autonomy need satisfaction	Job Satisfaction	.060	.002 to .112*
Specific need-supportive behaviors	Global need fulfillment	Boredom	-.083	-.186 to -.001*
Specific need-supportive behaviors	Global need fulfillment	Job Satisfaction	.070	.001 to .147*
Specific need-supportive behaviors	Global need fulfillment	Rumination	-.070	-.164 to -.016*
Specific need-thwarting behaviors	Relatedness need satisfaction	Boredom	-.127	-.229 to -.070*
Specific need-thwarting behaviors	Relatedness need satisfaction	Job Satisfaction	.059	.032 to .110*
Specific need-indifferent behaviors	Global need fulfillment	Boredom	.174	.095 to .280*
Specific need-indifferent behaviors	Global need fulfillment	Job Satisfaction	-.146	-.221 to -.079*
Specific need-indifferent behaviors	Global need fulfillment	Rumination	.147	.065 to .247*

Note. * confidence interval excludes 0 (corresponding to $p < .05$).

Table S15

Additional Analyses to test the Added Predictive Value of the TMIB-S Factors (Studies 2 and 3)

Description	χ^2 (*df*)	CFI	TLI	RMSEA	90% CI
Study 2 Discriminant Validity: Passive Leadership					
S1. Passive leadership only	1840.582 (883)*	.907	.891	.046	[.043; .049]
S2. Passive leadership and TMIB-S factors	1606.520 (843)*	.926	.909	.042	[.039; .045]
Study 2 Discriminant Validity: Leader-Member Exchange					
S1. Leader-member exchange only	2051.045 (974)*	.908	.894	.046	[.044; .049]
S2. Leader-member exchange and TMIB-S factors	1874.029 (934)*	.920	.903	.044	[.041; .047]
Study 2 Discriminant Validity: Transformational Leadership					
S1. Transformational leadership only	2013.186 (974)*	.913	.899	.046	[.043; .048]
S2. Transformational leadership and TMIB-S factors	1828.890 (934)*	.925	.910	.043	[.040; .046]
Study 2 Discriminant Validity: Abusive Supervision					
S1. Abusive supervision only	1660.946 (796)*	.908	.890	.046	[.043; .049]
S2. Abusive supervision and TMIB-S factors	1458.539 (756)*	.925	.906	.043	[.039; .046]
Study 3 Discriminant Validity: Passive Leadership					
S1. Passive leadership only	2024.408 (756)*	.885	.863	.061	[.058; .064]
S2. Passive leadership and TMIB-S factors	1702.932 (716)*	.911	.888	.055	[.052; .059]
Study 3 Discriminant Validity: Leader-Member Exchange					
S1. Leader-member exchange only	2083.400 (841)*	.902	.884	.057	[.054; .060]
S2. Leader-member exchange and TMIB-S factors	1791.388 (801)*	.922	.903	.052	[.049; .056]
Study 3 Discriminant Validity: Transformational Leadership					
S1. Transformational leadership only	2030.016 (841)*	.909	.893	.056	[.053; .059]
S2. Transformational leadership and TMIB-S factors	1707.331 (801)*	.931	.914	.050	[.047; .051]
Study 3 Discriminant Validity: Abusive Supervision					
S1. Abusive supervision only	1741.042 (675)*	.896	.874	.059	[.056; .063]
S2. Abusive supervision and TMIB-S factors	1437.477 (635)*	.922	.899	.053	[.049; .057]

Note. * $p < .05$; χ^2: Scaled chi-square test of exact fit; *df*: Degrees of freedom; CFI: Comparative fit index; TLI: Tucker-Lewis index; RMSEA: Root mean square error of approximation; 90% CI: 90% confidence interval.