

# **How Transformational Leadership Fosters Intrinsic Motivation and Public Service Motivation: The Mediating Role of Basic Need Satisfaction**

## **Abstract**

Motivating public service employees to greater effort is a key issue for managers and scholars. Transformational leadership concerns behaviors to develop, share, and sustain a vision for the organization and has been suggested as an important lever in this respect. However, we know little about the processes by which transformational leadership may stimulate work motivation. Integrating transformational leadership, public service motivation (PSM), and self-determination theory, this article sheds light on the psychological mechanisms underlying the motivational effects of transformational leadership. According to structural equation modeling, the relationships between transformational leadership and two types of autonomous work motivation – intrinsic motivation and PSM – are mediated by the satisfaction of the basic psychological needs for autonomy, competence, and relatedness. Our findings support the claim that the motivational effects of transformational leadership are mediated by need satisfaction, but also that satisfaction of individual needs is not equally important for intrinsic motivation and PSM, respectively.

# **How Transformational Leadership Fosters Intrinsic Motivation and Public Service**

## **Motivation: The Mediating Role of Basic Need Satisfaction**

### **Introduction**

Fostering work motivation is important because work motivation has been related to job satisfaction (Cantarelli, Belardinelli, & Bellé, 2015) and performance (Andersen, Heinesen, & Pedersen, 2014; Bellé, 2013). In times of scarce resources and continuous demands for higher performance, abilities to foster work motivation might prove to be an important way to reach organizational goals while keeping employees satisfied with their jobs. In the public administration literature, focus has centered on the concept of public service motivation (PSM) with transformational leadership increasingly recognized as an important antecedent of this altruistic motivation to engage in public service (see, e.g., Wright, Moynihan, & Pandey, 2012). Intended to raise employees' understanding of the significance and values associated with desired outcomes, the core argument is that transformational leadership instigates employees with higher levels of work motivation; in turn, enabling them to perform above and beyond expectations (Bass, 1985). However, whether transformational leadership also relates to other types of motivation than PSM, such as intrinsic motivation, and through which mechanisms transformational leadership stimulates motivational states remains unclear. A central expectation in transformational leadership theory is that transformational leaders "activate the higher-order needs of their employees" (Wright, Moynihan, & Pandey 2012, 207), but the expectation is only sparsely tested (see Hetland et al., 2011; Kovjanic, Schuh, & Jonas, 2012; Kovjanic et al., 2012), and it has not been investigated with motivation as a final outcome. Knowing whether public leaders raise the motivation of their employees by satisfying their psychological needs and whether the mechanisms are the same for different types of motivation is, nonetheless, important in several respects.

First, understanding the psychological mechanisms through which organizational leadership can foster or thwart employee work motivation is pivotal for managers. Ideally, managers can use such information in decisions on ways to motivate employees to achieve organizational goals. Second, motivation is a multi-faceted concept (Wise, 2004), and multiple types of work motivation may be beneficial for reaching desirable outcomes. Consequently, scholars can encompass this notion and provide a fuller picture of the motivational effects by including different types of work motivation simultaneously in empirical studies. Examining two distinct types of autonomous work motivation – intrinsic motivation and PSM – this article responds to such calls by offering a fuller picture on how to motivate employees through transformational leadership. Third and finally, integrating self-determination theory (SDT) on basic need satisfaction with theories of transformational leadership and PSM has the potential to shed light on ways that leadership can shape employee perceptions of external steering mechanisms such as monetary incentive schemes or command systems to avoid “crowding out” of intrinsic motivation and PSM (e.g., Frey, 1997; Jacobsen, Hvitved, & Andersen, 2014).

To strengthen our knowledge of the links between transformational leadership, need satisfaction, intrinsic motivation, and PSM, respectively, this article integrates insights from transformational leadership, self-determination, and PSM theory. SDT is particularly relevant because it discusses distinctions between different types of autonomous work motivation and because it introduces the importance of satisfying the needs for autonomy, competence, and relatedness when striving for motivational maintenance and growth (Deci & Ryan, 2000; Gagné & Deci, 2005). The article tests the relationships between these concepts on a dataset consisting of survey responses from 1,481 schoolteachers in Denmark and uses a structural equation modeling (SEM) technique. The article examines the direct and indirect pathways (through the satisfaction of

basic needs) between an aggregated measure of transformational leadership (at the organizational level) and individual employees' intrinsic motivation and PSM, respectively.

Before we argue how basic need satisfaction mediates the link between transformational leadership and motivation, we first conceptualize transformational leadership and offer a distinction between intrinsic motivation and PSM in a SDT perspective. We then discuss our research design, data, and methods before presenting our results. The article concludes with a discussion of the main findings, their implications for research and practice, and the limitations of our study.

## **Conceptualizing Transformational Leadership**

Transformational leadership, it is argued, entails behaviors that direct and inspire effort towards organizational goals by articulating a vision that raises employees' awareness of the importance of organizational values, mission, and outcomes (Wright, Moynihan, & Pandey, 2012, p. 207). Consequently, core to the theory on transformational leadership is a strong emphasis on the role of a collective vision or an idealized set of goals that the organization aspires to achieve one day (Carton, Murphy, & Clark, 2014, pp. 1544-1545). However, the visionary component has not only been core to the conceptualization of transformational leadership in contemporary management literature (e.g., Jung & Avolio, 2000) and public administration research (e.g., Paarlberg & Lavigna, 2010): It has also been suggested as the key feature making this kind of leadership particularly relevant in public and nonprofit organizations since such organizations rely on strong service- and community-oriented missions (Wright & Pandey, 2010, p. 77). In fact, transformational leadership has been linked to PSM in that "the more engaging, attractive and worthwhile the mission is to people, the more the agency will be able to attract support from those people [...] and motivate them to perform well in the agency" (Rainey & Steinbauer, 1999, p. 16). Given the strong emphasis

among management scholars (e.g., Jung & Avolio, 2000) and public administration researchers (e.g., Paarlberg & Lavigna, 2010; Wright, Moynihan, & Pandey, 2012) on visions as a key feature of transformational leadership, this article follows this notion by focusing on transformational leadership as a set of behaviors that involves *developing*, *sharing*, and *sustaining* an organizational vision.

Inspirational goals have long been considered an important driver of employee action and performance (see, e.g., Latham & Yukl, 1975), and transformational leaders therefore aim at developing a clear vision for their organization. Next, transformational leaders strive to communicate the vision to employees. This includes establishing a clear connection between vision and everyday work tasks to make individual employees understand how they contribute to designated outcomes of their organization. Finally, transformational leaders make an effort to sustain employees' attention to the vision in both the short and long run by encouraging employees to work toward the vision (Wright, Moynihan, & Pandey, 2012). These three behaviors are intertwined, and we thus see them as reflections of the same (latent) endeavor to transform employee motivation. As noted above, transformational leaders engage in such behaviors with the objective to make employees transcend their own self-interest in favor of organizational goals, and we therefore follow Jacobsen and Andersen to define transformational leadership as “behaviors seeking to develop, share, and sustain a vision intended to encourage employees to transcend their own self-interest and achieve organization goals” (2015, p. 832).

Next, the article draws on SDT to distinguish between different types of work motivation and to argue how satisfaction of the needs for autonomy, competence, and relatedness mediate the link between transformational leadership and two types of motivation – intrinsic motivation and PSM, respectively.

## **Intrinsic Motivation and PSM in a Self-Determination Perspective**

According to SDT, people not only differ in terms of *how much* motivation they have for performing an activity, but also in terms of *the type* of motivation behind the action (Ryan & Deci, 2000b, p. 54). A basic distinction within the theory is between autonomous motivation and controlled motivation. The distinction concerns whether the motivation to do something involves “a sense of volition and having the experience of choice” or “a sense of pressure and having to engage in actions” (Gagné & Deci, 2005, p. 334). The two types of motivation can be seen as part of a motivational continuum. On the continuum, the most controlled type of motivation (external regulation) depends solely on “the perception of a contingency between the behavior and a desired consequence such as implicit approval or tangible rewards” (Gagné & Deci, 2005, p. 334) whereas the most autonomous type of motivation (intrinsic motivation) refers to whether or not activities are seen as inherently interesting or enjoyable (Ryan & Deci, 2000a). In-between the poles are various types of more or less controlled and autonomous types of motivation. While controlled motivation is based on external motivational factors (Jacobsen, Hvitved, & Andersen, 2014), autonomous types of motivation can originate from both external and internal sources (Vandenabeele, 2014, p. 156). Defined as “an individual’s orientation to delivering service to people with the purpose of doing good for others and society” (Hondeghem & Perry, 2009, p. 6), PSM is, on one hand, based on the expected external outcome of a given activity and, on the other, autonomous in character as it does not involve an apparent tangible reward or punishment linked to the activity itself. Whereas intrinsic motivation is fully autonomous and egocentric in its focus on joy and interest, PSM is thus (less) autonomous and concentrated on prosocial, external outcomes (Jacobsen, Hvitved, & Andersen, 2014).

Decisive to moving the motivation of employees along the controlled-autonomous continuum is the concept of internalization of values, attitudes, and regulatory structures (Gagné & Deci, 2005, p. 334) that are enhanced by the satisfaction of an individual's basic psychological needs for autonomy, competence, and relatedness (Deci & Ryan, 2000; Gagné & Deci, 2005). Indeed, need satisfaction has been considered a core feature of transformational leadership (Podsakoff, MacKenzie, & Bommer, 2006). In fact, it is by "appreciating and addressing needs that transformational leaders develop the potential of their followers and foster their commitment to and effort for the collective" (Kovjanic et al., 2012, p. 1032). This argument is echoed by Wright and Pandey, who state that "to direct and inspire individual effort, these [transformational] leaders transform their followers by raising their awareness of the importance of organizational outcomes, thereby *activating their higher ordered needs* and inducing them to transcend their own self-interest for the sake of the organization" (2010, p. 76, italics added). We therefore argue that SDT and needs satisfaction are important to integrate with transformational leadership theory to understand how transformational leadership stimulates intrinsic motivation and PSM, respectively. This is topic for the next section.

## **Transformational Leadership and Autonomous Motivation: The Mediating Role of Basic Need Satisfaction**

The need for autonomy concerns experiencing choice and feeling like the initiator of one's own actions (Baard, Deci, & Ryan, 2004, p. 2046). Transformational leadership, it is argued, strives to clarify the purpose of employees' work tasks; in turn, making employees' experience their work as meaningful (Kovjanic et al., 2012, p. 1034). Establishing the broader organizational goals and objectives in the context of a vision, employees of transformational leaders do not require

continuous guidance as to whether actions are supportive of the organization's purpose. Moreover, transformational leadership distinguishes itself from leadership behaviors focusing on close monitoring of employee actions (e.g., in order to reward or punish employees) by an absence of 'micromanagement' to ensure that employees do not pursue other agendas. The few existing studies corroborate this perspective demonstrating positive correlations between transformational leadership and satisfaction of the need for autonomy (Hetland et al., 2011; Kovjanic et al., 2012; Kovjanic, Schuh, & Jonas, 2013). Transformational leaders thus instigate a sense of satisfaction of the need for autonomy by 1) clearly establishing the broader purpose of the organization, allowing employees to initiate everyday tasks that contribute to designated outcomes, and 2) straying away from micromanagement such as close monitoring of employee actions or setting very specific goals to direct the everyday tasks and effort of individual employees. We therefore expect transformational leadership to enhance employees' satisfaction of the need for autonomy.

Second, the need for competence concerns succeeding at challenging tasks, being able to attain desired outcomes, and the feeling of generally being effective (Baard et al., 2004, p. 2046; Leary & Tangney, 2003). Articulating and communicating desirable future end states of the organization (vision) and establishing how the work of employees contributes to achieving designated outcomes, transformational leaders set desirable goals and express confidence that these goals can be achieved by the employees through their work. This is central to the feeling of competence among the employees (Latham & Yukl, 1975; Locke & Latham, 2002), something that is closely linked to feeling self-efficacious in the workplace.

Third, the need for relatedness refers to the desire to feel connected to others, that is, to "establish a sense of mutual respect and reliance with others" (Baard, Deci, & Ryan, 2004, p. 2046). Encouraging employees to "pull" in the same direction to achieve designated outcomes linked to the organization's purpose, transformational leaders distinguish the organization – and its members



– from other groups (Burns, 1978). This is in turn expected to evoke an in-group feeling and a sense of being connected to others in the work. For this reason, transformational leadership is expected to enhance employees’ satisfaction of the need for relatedness. In sum, the article thus argues that transformational leaders prompt a sense of satisfaction of the basic psychological needs for autonomy, competence, and relatedness among employees.

According to SDT literature, the satisfaction of basic psychological needs is important to both intrinsic motivation and the internalization of extrinsic motivation (Gagné & Deci, 2005). Although intrinsic motivation is based on inherent interests, individuals cannot pursue all interests or natural inclinations. Rather, intrinsic motivation for performing a given activity will be nourished or thwarted depending on the experience of feeling autonomous, competent, and related to others while performing the activity (Gagné & Deci, 2005, pp. 336-337). Since PSM can also be characterized as autonomous motivation and involves a sense of volition, it seems likely that individuals’ PSM also depends on need satisfaction. PSM is based on a consideration for others and a fundamental willingness to set one’s own needs aside for others and society (self-sacrifice) (Perry & Wise, 1990; Perry, 1996). Employees’ PSM can therefore be thwarted if they feel commanded to perform an activity since this reduces the individual’s perception of her own sacrifice associated with the activity (Jacobsen, Hvitved, & Andersen, 2014). Furthermore, feeling incapable or inefficacious in reaching goals that are deemed important might give rise to frustration and ultimately cause people to “give up”. Satisfaction of the need for competence can therefore also be expected to relate to PSM. The argument is supported by research on goal setting and goal commitment, which shows that individuals are likely to become more motivated when goals are difficult but attainable and when individuals feel capable or efficacious in reaching the goals (Wright, 2001, p. 578). Finally, on the need to feel connected to others, studies on the importance of work climate shows that individuals’ perceptions of their work environment (including work group

characteristics such as cooperation, pride, and warmth) are positively related to work attitudes, motivation, and performance (Parker et al., 2003). In line with this research, the article expects that employees who experience a satisfaction of the need for relatedness with people at the workplace are willing to invest greater energy in work aimed at increasing the welfare of others.

In the field of public administration, one prior study deals with the interplay between transformational leadership, PSM, and the satisfaction of basic needs (Vandenabeele, 2014). Looking at 3,506 Belgian civil servants, Vandenabeele shows that the relationship between transformational leadership and PSM depends on satisfaction of the basic needs for autonomy and competence (2014, pp. 162-165). This illustrates the importance of understanding the links between transformational leadership, basic need satisfaction, and PSM, but it does not offer any insight into the question of whether transformational leaders can influence need satisfaction in order to stimulate employee work motivation. The former link – between transformational leadership and basic need satisfaction – is discussed in SDT (Gagné & Deci, 2005) and has been empirically validated (e.g., Hetland et al., 2011; Kovjanic et al., 2012, Kovjanic, Schuh, & Jonas, 2013). The study by Kovjanic, Schuh, and Jonas (2013) even shows that employees provide higher ratings of need satisfaction when they are (randomly) assigned to transformational leadership vignettes compared to employees receiving non-transformational vignettes. However, no study has, to our knowledge, examined whether transformational leadership stimulates PSM and intrinsic motivation through satisfaction of the basic psychological needs for autonomy, competence, and relatedness. To help close this gap, the article tests the following hypothesis:

*Satisfaction of the needs for autonomy, competence, and relatedness mediates the relationships between transformational leadership and intrinsic motivation and between transformational leadership and public service motivation.*

## **Research Design and Data**

The article draws on a cross-sectional research design with data on 1,481 schoolteachers distributed on 129 private and public schools in Denmark. Danish schools constitute an appropriate research setting in our case for at least three reasons. First, schools resemble “classic” organizations in the sense that conceptions of what is conceived as desirable to pursue in this setting are fairly homogenous. Public service organizations are multi-faceted and serve a number of (sometimes conflicting) goals (Meier & Krause, 2005, p. 15). Schools are no exception, but it still seems reasonable to expect that leaders (principals) and employees (teachers) share a core focus on educating and academically preparing students. Second, school principals in Denmark enjoy considerable managerial autonomy. For example, school principals in public schools are provided discretion to allocate the time teachers spend on various job tasks (e.g., preparations and actual teaching in the class rooms), and we expect that principals will use their managerial autonomy to motivate teachers in different ways. One way to do so is to attend to internal management and exert core leadership behaviors. In a recent study of Danish secondary schools, Jacobsen and Andersen (2015) reported the use of transformational leadership behaviors to varying degrees. This indicates that transformational leadership is likely to represent relevant leadership behaviors in the educational sectors. In fact, transformational leadership may be particularly relevant in public service organizations because such organizations have strong service- and community-oriented visions (Wright, Moynihan, & Pandey, 2012, p. 207). Schools are a prime example of such organizations because of their educational purpose (Andersen, Heinesen, & Pedersen, 2014), and this suggests that (Danish) schools constitute an empirical research setting that provides favorable conditions for testing the correlates of transformational leadership. Third, and related, teaching

essentially concerns doing good for the students and society, and existing studies have found public service to be a relevant motivator among schoolteachers (Andersen, Heinesen, & Pedersen, 2014). Jacobsen, Hvitved, and Andersen (2014) complement these findings, showing that schoolteachers also express great interest and excitement in their job in its own right. We therefore expect excitement in one's job tasks to represent a relevant motive for teachers to engage in service delivery. For these reasons, (Danish) schools offer a very well-suited research setting for testing the relationships between transformational leadership, basic need satisfaction, PSM, and intrinsic motivation.

Data was collected as a nationwide questionnaire survey distributed to all school principals in Denmark (N=1,059). As most items originate from English, the items were translated to Danish and translated back to English by two language editors independently. Items were then pretested by a small group of professionals in the health care sector in Denmark. The questionnaire was distributed as an Internet-based survey in May-April 2014, and 482 school principals completed the questionnaire. 219 principals provided contact information on their 8,174 employees. A survey to the teachers – the basis for this study – was distributed in August-September 2014 and yielded 2,730 complete answers or a response rate of 33.4 per cent. One school was excluded because less than five teachers completed the questionnaire. Retaining only respondents with complete and valid answers for the items on our focal constructs and control variables (teacher gender, age, job tenure), 1,486 teachers distributed on 129 schools were retained for analysis of the structural model. 87 per cent of the teachers were employed in public schools, 71 per cent were female, and respondents were on average 46 years old with an average tenure in their current job position of approximately six years.

It is important to note that self-selection potentially limits the generalizability of our results. Self-selection associated with the sampling procedure renders it likely that the investigated

group of teachers differs in systematic ways from the population of Danish schoolteachers. This selection issue is attributed to the fact that only school principals who volunteered to participate in a free leadership training course were asked to provide contact information on the employees. This does not invalidate our coefficient estimates, but it does question whether we can generalize the specific results beyond the current sample. We discuss this issue and other limitations of our study in the discussion section.

### **Measurement and Validation**

To the extent possible, the article employs measures that have already been validated in previous studies. Appendix A-1 presents all questionnaire items and central descriptive statistics. Responses to all questionnaire items follow a 5-point Likert scale ranging from 1, “strongly disagree”, to 5, “strongly agree”. First, we present the measure of each theoretical construct and its psychometric properties based on confirmatory factor analysis. Second, we examine the validity of the overall measurement model. In this second step, all latent constructs are included simultaneously (see Gould-Williams, Mostafa, & Bottomley, 2015 for a similar approach).

#### *Transformational Leadership*

We use a set of modified items, partly inspired by existing studies from the management literature (MacKenzie, Podsakoff, & Rich, 2001; Podsakoff, MacKenzie, & Bommer, 1996) and public management research (Moynihan, Pandey, & Wright, 2012), for two reasons. First, our measurement instrument should tap into the full set of transformational leadership behaviors (developing, sharing, and sustaining a vision for the organization) as conceptualized in the theoretical section, and the original items in the Multifactor Leadership Questionnaire (MLQ) do not encompass this. Second, the MLQ has been criticized for confounding operational terms with their proposed effects on employees and for poorly discriminating between its multidimensional

empirical bases (Van Knippenberg & Sitkin, 2013). This is a serious critique because we risk attributing transformational leadership with positive effects (e.g., raising employee motivation) per definition. For this reason, we used four-items inspired by existing studies and modified them to ensure that they do not confound the concepts with its effects (see Table A-1).

The four-item model taps into the full set of transformational leadership behaviors and, according to confirmatory factor analysis, replicates our data perfectly:  $\chi^2(2) = 3.10, p > 0.05$  (Comparative Fit Index, CFI = 1.00, Root Mean Square Error of Approximation, RMSEA = 0.02, and Standardized Root Mean Square Residual, SRMR = 0.01)<sup>1</sup> (Williams, Vandenberg, & Edwards, 2009). Standardized factor loadings ( $\lambda$ ) are all significant and high,  $\lambda_{\text{mean}} = 0.82, \lambda_{\text{low}} = 0.75$ . Reliability scores display high internal consistency with Cronbach's alpha of 0.89.

#### *Basic Need Satisfaction*

To measure basic need satisfaction, we draw on the "Basic Need Satisfaction at Work Scale" used by Deci et al. (2001) and a recent modification of these items (Vandenabeele, 2014). Based on the results of initial confirmatory factor analysis, six items are included to capture the satisfaction of the basic needs for autonomy, competence, and relatedness, respectively. The three subscales fit the data perfectly, as indicated by the chi-square test of exact fit and absolute fit indices:  $\chi^2(6) = 8.32, p > 0.05$  (CFI = 1.00, RMSEA = 0.01, SRMR = 0.01). The measurement model displays convergent validity with high standardized factor loadings, mean  $\lambda_{\text{autonomy}} = 0.88$ , mean  $\lambda_{\text{competence}} = 0.74$ , and mean  $\lambda_{\text{relatedness}} = 0.78$ , and internal consistency with Cronbach's alpha ranging from 0.70 to 0.87.

### *Intrinsic Motivation*

Intrinsic motivation is measured using three items based on Jacobsen, Hvitved, and Andersens' (2014) work on intrinsic motivation among teachers in Danish schools. Items tap into the enjoyment and excitement of performing one's job. Cronbach's alpha for the three-item scale is 0.84.

### *PSM*

PSM is measured using items that have proven valid and reliable in existing studies (e.g., Andersen, Heinesen, & Pedersen, 2014; Wright, Christensen, & Pandey, 2013). PSM can be seen as a second-order construct comprising of four first-order factors/dimensions: "compassion", "commitment to the public interest", "self-sacrifice", and "attraction to policymaking" (Perry, 1996; Kim & Vandenberg, 2010). This operationalization is consistent with the common conceptualization of PSM as resting on affective, normative, and instrumental motives for public service delivery (Perry & Wise, 1990). The four-factor model displays acceptable fit to our data:  $\chi^2(38) = 132.37$ ,  $p < 0.001$  (CFI = 0.95, RMSEA = 0.03, SRMR = 0.06). Standardized factor loadings are all significant and high,  $\lambda_{\text{mean}} = 0.71$ ,  $\lambda_{\text{low}} = 0.55$ . Cronbach's alpha for the four PSM dimensions range between 0.69<sup>2</sup> and 0.80. Since we do not have different expectations for the different dimensions of PSM, we focus on PSM as a single second-order construct. Hence, a composite PSM score is estimated for each respondent from the scores on the four first-order dimensions.

### *Full Measurement Model*

To examine the validity of the overall measurement model, we included all latent constructs simultaneously and correlated these with each other to assess discriminant properties of each construct. The overall measurement model displays convergent validity with high standardized factor loadings ( $\lambda_{\text{mean}} = 0.79$ ,  $\lambda_{\text{low}} = 0.57$ ) and acceptable fit to our data:  $\chi^2(216) = 573.96$ ,  $p <$

0.001; CFI = 0.92, RMSEA = 0.03, SRMR = 0.08. To demonstrate discriminant validity, the average variance extracted (average variance shared by indicators of the same latent construct) should be greater than the variance shared with other latent constructs (Fornell & Larcker, 1981). Comparing the average variance extracted with the squared construct inter-correlations in Table 1, we note that average variances extracted are indeed greater for all latent constructs, suggesting that discriminant validity is present.

[Table 1 here]

### **Estimation Procedures and Robustness Checks**

To estimate the complex mediation model, we use structural equation modeling (SEM). SEM has the distinct advantage of directly modeling measurement errors, which allows for stronger predictive power (Acock, 2013, p. 115). We model all latent constructs simultaneously and specify correlations between related factors and paths between independent and dependent variables.

A present challenge concerns the fact that all variables are measured in a single survey. Items on, for example, transformational leadership and PSM have positive connotations, and individual teachers may therefore answer in ways that conform to social norms rather than reflect their true attitudes (“social desirability bias”). Social desirability bias is one manifestation of a more general concern, namely bias due to the common source. Common source bias concerns a scenario where a non-random measurement error is shared among variables as a function of the same method – here, a single questionnaire (Richardson, Simmering, & Sturman, 2009). To mitigate this issue, we aggregate teachers’ perceptions of school principals’ transformational leadership behaviors by school. Although common source bias may still arise because teachers share contextual characteristics related to the school principal and the specific school (Favero & Bullock, 2015),



using the school mean for the independent variable reduces individual-level common source bias and, thus, the risk of generating false positives.

Finally, we check the robustness of our results with a series of multilevel random effects models. These models offer the advantage of modeling the variation nested in different hierarchical levels in our data; that is, individual-level teacher variation within schools and organizational-level variation between schools. The findings are referenced alongside the results in the next section and may be found in their full extents in Tables A-2 and A-3 in the appendices.

## Findings

First, we present the results for the direct path from transformational leadership to intrinsic motivation and PSM (denoted “c” in subsequent tables). Second, we proceed to each of the mediation terms; that is, the indirect paths from transformational leadership to need satisfaction (denoted “a”) and from need satisfaction to the two types of motivation (denoted “b”). Finally, we test for joint significance of the indirect paths to offer evidence of mediation. The structural model was tested using teachers’ gender, age, tenure in job position, and sector (indicator for private school) as control variables, and the structural model provides a good fit to our data:  $\chi^2(145) = 457.68, p < 0.001; CFI = 0.98, RMSEA = 0.04, SRMR = 0.03$ .

Table 2 presents the unstandardized path coefficients from the structural equation model with jackknifed standard errors to account for clustering by schools (Cameron & Miller, 2015). Turning to the individual direct paths from transformational leadership to intrinsic motivation and PSM (denoted “c” in Table 2), we note that our data offers partial support for direct paths from transformational leadership to the two types of autonomous work motivation. The mean teacher

perception of school principals' transformational leadership behaviors is positively and statistically significant with respect to intrinsic motivation ( $\beta = 0.097, p < 0.05$ ) but not with respect to PSM. These results indicate that teachers express greater enjoyment and excitement in their job as school principals increasingly rely on transformational leadership but that there is no direct association between transformational leadership and teachers' motivation to do good for others and society through their job.

[Table 2 here]

To assess whether transformational leadership is indirectly related to intrinsic motivation and PSM through satisfaction of the basic needs for autonomy, competence, and relatedness, we turn to the direct paths from transformational leadership and each of the mediators (denoted "a" in Table 2) and the direct paths from each mediator to intrinsic motivation and PSM (denoted "b" in Table 2), respectively. Prima facie evidence of mediation exists when *a* and *b* are statistically significant (Gould-Williams, Mostafa, & Bottomley, 2015). First, we observe positive and statistically significant direct paths from transformational leadership to the satisfaction of each of three basic psychological needs; that is, autonomy ( $\beta = 0.327, p < 0.001$ ), competence ( $\beta = 0.077, p < 0.05$ ), and relatedness ( $\beta = 0.084, p < 0.05$ ). The results thus indicate that transformational leadership may offer one way for leaders to satisfy employees' basic psychological needs in the workplace.

For the second part of the mediation term, we find statistically significant direct paths from the satisfaction of the need for autonomy to intrinsic motivation ( $\beta = 0.164, p < 0.001$ ), from the satisfaction of the need for competence to intrinsic motivation ( $\beta = 0.959, p < 0.001$ ) and PSM ( $\beta = 0.145, p < 0.001$ ) and from the satisfaction of the need for relatedness to PSM ( $\beta = 0.149, p < 0.001$ ). Taken together, these results provide partial support for our argument that the relationship between transformational leadership and autonomous work motivation is mediated by the

satisfaction of the basic needs for autonomy, competence, and relatedness.<sup>3</sup> However, the results also hint that satisfying the needs for autonomy, competence, and relatedness are not necessarily equally important for intrinsic motivation and PSM, respectively. We return to this observation in the discussion section below.

To evaluate the individual mediating paths, Table 3 reports the coefficient estimates associated with the indirect paths ( $a \times b$ ) and their corresponding Sobel test score for statistical significance. Consistent with the evidence from Table 2, we find four statistically significant indirect pathways. Specifically, we observe that the relationship between transformational leadership and intrinsic motivation is mediated by the satisfaction of the needs for autonomy and competence but not the need for relatedness. 35.8 and 43.3 per cent of the total variance in intrinsic motivation explained by transformational leadership was accounted for by the satisfaction of the needs for autonomy and competence, suggesting that other important mediators need to be examined in future work. As regards PSM, the relationship between transformational leadership and this type of autonomous work motivation is mediated by the satisfaction of the needs for competence and relatedness. The proportion of mediation<sup>4</sup> in these cases are greater than 0.5, indicating that the satisfaction of the needs for competence and relatedness is likely to be very important for understanding the link between transformational leadership and PSM.

[Table 3 here]

## **Discussion and Conclusion**

This article set out to examine whether transformational leadership can foster autonomous work motivation – intrinsic motivation and PSM – of public service providers by satisfying basic

psychological needs for autonomy, competence, and relatedness in the workplace. Our empirical analysis reveals several interesting results. First, positive correlations are demonstrated between 1) transformational leadership and the satisfaction of the needs for autonomy and competence, and 2) the satisfaction of the two needs and intrinsic motivation. The mediation effect is statistically significant, indicating that transformational leadership indeed seems to offer one way for managers to foster public service employees' intrinsic motivation. Our results corroborate the notion within SDT that the satisfaction of the needs for autonomy (i.e., feeling like the initiator of one's own actions) and competence are pivotal for experiencing choice and a sense of volition in work activities (Deci & Ryan, 2000) and, thus, stimulating intrinsic motivation. On the other hand, SDT has ascribed little importance to the satisfaction of the need for relatedness for stimulating intrinsic motivation (Ryan & Deci, 2000a). In line with this, our findings do not offer empirical support for the satisfaction of the need for relatedness as a mediator between transformational leadership and intrinsic motivation. Hence, we show that managers may instigate a sense of satisfaction of the basic needs for autonomy and competence and foster employees' inherent excitement in their job by attending to core transformational leadership behaviors; that is, developing, sharing, and sustaining an organizational vision.

Second, the article indicates that the relationship between transformational leadership and PSM is mediated by the basic needs for competence and relatedness – not autonomy; the latter finding squares with previous research, which has not been able to show a positive association between the satisfaction of the need to feel autonomous in the workplace and PSM (in fact, Vandenberghe, 2013 finds a negative association in his study of Belgian civil servants). This is interesting because it points to the central characteristic of PSM. PSM is not necessarily thwarted in the absence of autonomy because it is essentially concerned with objects external to the individual; that is, doing good for others and society. In other words, the PSM of individual employees does

not rely on a feeling of self-determination in work activities but on a clear and visible sense of the social impact of work activities. In line with this perspective, recent studies have emphasized the importance of a connection to and awareness of beneficiaries of services for pro-social motivation (Grant, 2008; 2012) and PSM in particular (Bellé, 2014), arguing that employees' perception of the societal impact of their job is crucial to fuel these other-regarding motivations.

Taken together, our findings reveal another interesting observation. Satisfying the basic psychological needs for autonomy, competence, and relatedness is not necessarily equally important for intrinsic motivation and PSM. This suggests that transformational leaders may give weight to promoting the satisfaction of employees' needs to feel autonomous, efficacious, or connected to significant others in the workplace, depending on the desire to foster employee intrinsic motivation or PSM. Importantly, however, in our study, transformational leadership seems to further the satisfaction of each of the three basic psychological needs, and it therefore offers a useful tool for managers to foster both intrinsic motivation and PSM.

Finally, the direct relationships between transformational leadership and the two types of work motivation should be considered. Our findings show a positive correlation between transformational leadership and intrinsic motivation, but the result for PSM is not as straightforward. We do not find a positive direct path from transformational leadership to PSM, as has been suggested by other studies (e.g., Wright, Moynihan, & Pandey, 2012). This may appear somewhat surprising given the strong arguments in public administration literature on the motivational effects of transformational leadership. According to Rainey and Steinbauer, agencies will be able to motivate people to perform better when the mission is perceived as worthwhile (1999, p. 16), and this may be particularly relevant in public organizations characterized by strong service- and community-oriented visions (Wright, Moynihan, & Pandey, 2012, p. 207) and a

workforce motivated by public service (Perry & Wise, 1990). At least three potential explanations may account for this discrepancy.

First, endogeneity constitutes a concern. For example, leaders may choose to exercise transformational leadership behaviors in response to a workforce with low levels of PSM (for the very same reasons outlined above). Simultaneity could thus cancel out a positive direct association between transformational leadership and PSM. Moreover, potential selection biases may obscure this result. For example, highly transformational leaders may be allocated to turn around poor-performing schools (which are likely to have employees with lower levels of motivation as well), potentially cancelling out a positive direct relationship between transformational leadership and PSM. Second, studies on the relationship between transformational leadership and PSM have generally not taken contextual factors such as potential mediators or moderators into account. This is important, for example, because Krogsgaard, Thomsen, and Andersen (2014) recently showed that a relationship between transformational leadership and PSM only exists when managers and public service employees do not disagree on organizational values. Third and finally, the discrepancy between results could potentially be attributed to the measurement of transformational leadership. Existing studies (e.g., Wright, Moynihan, & Pandey, 2012) measure transformational leadership at the individual level whereas this study treats transformational leadership as an organization-level construct. The former approach may be reasonable because individuals are likely to perceive the leadership behaviors of the same leader differently (Jacobsen & Andersen, 2015). Indeed, research shows that variation in employee perceptions of transformational leadership between comparable organizations is much smaller compared to variation within organizations (Blinded reference), suggesting that much variation is purged from our data by aggregating individuals' perceptions of transformational leadership. Surely, this makes it *more* difficult to establish empirical relationships with PSM, which is an inherently individual-level phenomenon.

For PSM, this argument would imply that the direct motivational effect of transformational leadership strongly depends on employees' individual perceptions of their contribution to a society-oriented vision.<sup>5</sup> However, the use of individual perceptions of transformational leadership and PSM measured with survey data at a single point in time may confound results because of common source bias (Meier & O'Toole, 2012). In this article, we prioritize this concern by aggregating teachers' perceptions of school principals' transformational leadership behaviors by school and present the findings for transformational leadership as an organization-level variable. Although common source bias may still arise from teachers sharing contextual characteristics related to the school principal and the specific school (Favero & Bullock, 2015), aggregating on the independent variable reduces individual-level common source bias and, thus, the risk of generating false positives.

### **Limitations**

The study has some limitations that the reader should be attentive to. First, transformational leadership, basic need satisfaction, and the two types of motivation are all measured at one point in time, and this makes it difficult to clearly establish the temporal sequence of the variables empirically. The article thus relies on its theoretical account to offer arguments for the specified model. The argument that transformational leaders increase the satisfaction of the basic psychological needs of their followers is also corroborated by existing experimental studies (see Kovjanic, Schuh, & Jonas, 2013), but the link between the satisfaction of basic needs and motivation is more uncertain. Although SDT explicitly argues for the causal sequence proposed in this article by stating that "the satisfaction of basic psychological needs provides the nutrients for intrinsic motivation and internalization" (Gagné & Deci, 2005, p. 336), it is possible, for example, that highly motivated employees make a greater effort in their jobs, receive positive feedback, and, as consequence, experience their need to feel competent as fulfilled to a greater extent.

Second, the findings on the relationship between need satisfaction and the two types of motivation could be inflated because of common source bias. While the aggregation of transformational leadership decreases such bias in correlations between this concept and the endogenous variables (i.e., the satisfaction of the needs and the two types of motivation, respectively), both need satisfaction and motivation are psychological factors embedded within individuals and, therefore, inherently difficult to measure more objectively or through external data sources. Future studies could attempt to accommodate the problems of endogeneity, such as simultaneity or common source bias, by employing experimental designs. Such studies could attempt to manipulate the perceived need satisfaction by comparing levels of motivation between treated and non-treated groups. Still, it is important to note that the aim of this article is to strengthen our knowledge of the mechanisms between transformational leadership and the two types of motivation, and the results generally seem to support our theoretical expectations.

Third, the sample only consists of teachers whose leader (school principal) volunteered to participate in a free leadership training program. On one hand, a selection bias may exist in the sense that leaders who volunteer underperform compared to non-participants and are looking for ways to strengthen their leadership skills. On the other hand, it might be the case that leaders already exert higher levels of leadership or have more resources (e.g., time). Different types of self-selection potentially have different implications for employee motivation (i.e., lower or higher depending on existing leadership behaviors or organizational resources), and if both types of self-selection take place, their effects may cancel each other out. In the latter case, it will be less problematic for the generalizability of our findings to the population of Danish schools, but we cannot be sure that such selection biases exist and exactly how they look in the present case.

Another potential limitation on the generalizability of our findings concerns particular contextual factors. The article finds a positive correlation between transformational leadership and



satisfaction of the need for autonomy, but this finding may be ascribed to a systematic tendency for employees in our sample to agree with the vision espoused by their leader. In this way, employees might experience a thwarting of the feeling of autonomy if they disagree with the vision or even if they agree with the vision but feel that a previous self-determined will to work towards such ends is now imposed from above. In fact, one previous study of the relationship between transformational leadership and PSM (Krogsgaard, Thomsen, & Andersen, 2014) suggests that the relationship depends on the levels of value conflict between the leader and the employees. Specifically, the authors find a positive relationship between transformational leadership and PSM when there is little to no conflict on organizational values but no relationship when leaders and employees hold very different conceptions of what is desirable for the organization. Hence, an interesting and important area of future research points to the contextual factors, such as value or goal conflict, that affect the relationships between transformational leadership, basic need satisfaction, and employee motivation.

### **Implications**

Corroborating recent studies (e.g., Wright, Moynihan, & Pandey, 2012; Krogsgaard, Thomsen, & Andersen, 2014), this article points to the potential importance of transformational leadership for fostering autonomous work motivation in public service organizations. Specifically, the article sheds light on the psychological mechanisms that link transformational leadership, intrinsic motivation, and PSM, respectively, and suggests that transformational leaders may foster autonomous work motivation in public service organizations by targeting and satisfying employees' basic psychological needs for autonomy, competence, and relatedness. If managers aim at stimulating motivation based on inherent joy and excitement, our results indicate that it seems especially relevant for managers to focus on satisfying the need for autonomy. This could apply to work tasks that cannot easily be connected to a social purpose or social contribution. In cases where

work tasks are not necessarily inherently interesting or enjoyable to perform, motivating employees through transformational leadership and satisfaction of employees' needs to feel competent and related to others in their work may constitute viable levers.

Finally, the study draws perspectives to research on how managers can ensure that employees perceive other managerial tools such as pecuniary rewards or command systems as supportive of their work. Motivation crowding theory (Frey, 1997) argues that perceptions of monetary incentives (associated with transactional leadership) depend on the extent to which these tools satisfy employees' basic psychological needs for autonomy, competence, and relatedness. In light of our findings, transformational leaders may use visions to foster supportive perceptions of other managerial tools such as pecuniary incentive systems because visions illustrate how the more specific goals contribute to the organization's purpose and broader social contributions. This is in line with other scholars suggesting augmented effects of transformational and transactional leadership (e.g., Hater & Bass, 1988), but very little research has investigated whether the combination of transformational and transactional leadership indeed stimulates even higher levels of PSM and intrinsic motivation. Scholars are therefore strongly encouraged to pursue such questions in future endeavors.

## Notes

<sup>1</sup> Acceptable fit is demonstrated by a CFI of 0.90 or higher and a RMSEA of 0.08 or lower (Bentler 1990).

<sup>2</sup> Cronbach's alpha for the three compassion items falls just short of the recommended lower threshold value of 0.70. We assessed the internal consistency of this dimension using an alternative

reliability measure that is not sensitive to the number of items – Jöreskog’s Rho. Rho is 0.68 for the compassion dimension exceeding the lower recommended threshold value of 0.60, and we retain the dimension as specified in Table A-1.

<sup>3</sup> The results of the multilevel random effects model presented in Tables A-2 and A-3 generally corroborate the results based on structural equation modeling. One deviation between the results pertains to the relationship between the satisfaction of the need for relatedness and intrinsic motivation, which is negative and statistically significant in the multilevel model but not in the SEM model (see Models A-2.5 and A-2.6). The multilevel models cannot estimate multiple mediation models simultaneously, and the discrepancy potentially arises from shared variance between the three basic needs for autonomy, competence, and relatedness not picked up by these models.

<sup>4</sup> The relative magnitude of the indirect pathways to the total pathways can be calculated as a “proportion of mediation”:  $\frac{(a \times b)}{(a \times b) + c'}$  (Iacobucci, Saldanha, & Deng, 2007). The proportion of mediation indicates the proportion of the variance in the dependent variable explained by the main independent variable that can be attributed to the mediating variable.

<sup>5</sup> To examine this argument empirically, we reran our analysis using individual-level scores of teachers’ perceptions of transformational leadership. Consistent with existing studies, we find a positive and statistically significant ( $p < 0.05$ ) direct path from transformational leadership to PSM using this approach.

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**Table 1. Intercorrelations and Estimates for Discriminant Validity and Reliability**

	1	2	3	4	5	6	7	8	9
1. Transformational Leadership (TFL)	(.887)/(.875)	.028	.009	.010	.002	.000	.004	.000	.026
2. Autonomy (AUT)	.166 ***	(.868)/(.745)	.222	.062	.025	.017	.014	.003	.281
3. Competence (COMP)	.093 ***	.471 ***	(.701)/(.583)	.303	.078	.056	.013	.004	.476
4. Relatedness (RELATE)	.102 ***	.248 ***	.550 ***	(.755)/(.621)	.090	.092	.004	.007	.138
5. Commitment to the Public Interest (PSM)	.047 *	.159 ***	.280 ***	.300 ***	(.714)/(.491)	.415	.015	.166	.083
6. Compassion (PSM)	.011	.132 ***	.237 ***	.304 ***	.644 ***	(.685)/(.427)	.004	.087	.052
7. Attraction to Policy Making (PSM)	.060 *	.120 ***	.115 ***	.060 *	.123 ***	.065 *	(.715)/(.570)	.039	.020
8. Self-Sacrifice (PSM)	.001	.050	.067 *	.081 **	.407 ***	.295 ***	.198 ***	(.801)/(.582)	.013
9. Intrinsic Motivation (IM)	.162 ***	.530 ***	.690 ***	.372 ***	.287 ***	.228 ***	.141 ***	.113 ***	(.842)/(.690)

Note: Sub-diagonal entries are correlations between latent constructs, \*\*\* p<.001, \*\* p<.01, \* p<.05. Entries above diagonal are the squared correlation estimates (shared variance). The first entry on the diagonal is Cronbach's alpha for composite reliability. The second entry in the diagonal is the average variance extracted for each latent construct.

**Table 2. Transformational Leadership, Basic Need Satisfaction, Intrinsic Motivation/Public Service Motivation. Unstandardized path coefficients (SE)**

Direct Paths	TFL→BNS (a)	BNS→IM/PSM (b)	TFL→IM/PSM (c')
TFL→AUT	.327 (.090) ***		
TFL→COMP	.077 (.035) *		
TFL→RELATE	.084 (.035) *		
AUT→IM		.164 (.033) ***	
COMP→IM		.959 (.100) ***	
RELATE→IM		.005 (.070)	
AUT→PSM		-.002 (.013)	
COMP→PSM		.145 (.035) ***	
RELATE→PSM		.149 (.032) ***	
TFL→IM			.097 (.038) *
TFL→PSM			.004 (.019)

Note: \*\*\*  $p < .001$ , \*  $p < .05$ . For abbreviations, see Table 1. N = 1,481. Jackknife standard errors based on 129 clusters (schools) in data.

**Table 3. Mediation Test: Unstandardized Path Coefficients for Indirect Effects of Transformational Leadership on Intrinsic Motivation and Public Service Motivation Through Basic Need Satisfaction (SE).**

Indirect Paths	Unstandardized Path Coefficients (SE)	Ratio of Indirect to Total Effects	Sobel (Aroian) Test
TFL→AUT→IM	.054 (.020) **	.358	2.92
TFL→COMP→IM	.074 (.033) *	.433	2.19
TFL→RELATE→IM	.000 (.006)	—	NS
TFL→AUT→PSM	-.001 (.004)	—	NS
TFL→COMP→PSM	.011 (.005) *	.733	1.96
TFL→RELATE→PSM	.012 (.006) *	.750	2.03

Note: \*\*  $p < .01$ , \*  $p < .05$ . For abbreviations, see Table 1. Ratio of direct-to-total effects = 1 - Ratio of indirect-to-total effects.

## Appendices (supplementary materials to be published online)

**Table A-1. Descriptive Statistics and Standardized Factor Loadings**

Constructs and items	M	SD	Min	Max	$\lambda$
<b>Transformational Leadership</b>					
Concretizes a clear vision for the school's future	3.25	.494	1	5	.820
Seeks to make teachers accept common goals for the organization	3.68	.376	2.50	5	.760
Strives to get the teachers to work together in the direction of the vision	3.44	.475	2	5	.864
Strives to clarify for the teachers how they can contribute to achieve the school's goals	3.33	.451	1.75	5	.849
<b>Basic Need Satisfaction</b>					
<i>Autonomy</i>					
I feel I can make a great deal of input to deciding how my job gets done	3.90	1.01	1	5	.911
I have good opportunities to decide for myself how to go about my work	3.83	1.03	1	5	.831
<i>Competence</i>					
I feel very competent when I am at work	4.22	.703	1	5	.681
Most days, I feel a sense of accomplishment from working	4.22	.691	1	5	.831
<i>Relatedness</i>					
I really like the people I work with	4.39	.641	1	5	.811
I feel connected to the people I work with	4.13	.761	1	5	.760
<b>Public Service Motivation</b>					
<i>Compassion</i>					
It is difficult for me to contain my feelings when I see people in distress	4.27	.765	1	5	.615
For me, considering the welfare of others is very important	4.26	.693	1	5	.756
I am often reminded by daily events about how dependent we are on one another	4.06	.784	1	5	.552
<i>Commitment to the Public Interest</i>					
It is important for me to contribute to the common good	4.23	.641	1	5	.786
I consider public service my civic duty	3.91	.741	1	5	.678
Meaningful public service is very important to me	4.24	.674	1	5	.619
<i>Self-sacrifice</i>					
I believe in putting duty before self	3.06	.917	1	5	.672
I am willing to risk personal loss to help society	3.23	.924	1	5	.837
I am prepared to make sacrifices for the good of society	3.09	.936	1	5	.771
<i>Attraction to Policy Making</i>					
I generally associate politics with something positive	2.96	1.02	1	5	.675
I do not care much for politicians (reversed)	3.32	1.08	1	5	.847
<b>Intrinsic Motivation</b>					
I very much enjoy my daily work	3.97	.885	1	5	.864
My work is very exciting	4.15	.773	1	5	.836
I like performing most of my work processes	4.21	.698	1	5	.781

Note:  $\lambda$  = standardized factor loading from confirmatory factor analysis.

**Table A-2. Random Effects Regressions of Transformational Leadership, Basic Need Satisfaction, and Intrinsic Motivation. Unstandardized Regression Coefficients (SE)**

Independent Variable / Model	Dependent Variable					
	Autonomy	Competence	Relatedness	Intrinsic Motivation		
	A-2.1	A-2.2	A-2.3	A-2.4	A-2.5	A-2.6
Transformational Leadership (School Mean)	.259 *** (.054)	.060 ** (.022)	.085 ** (.028)	.209 *** (.038)		.102 *** (.023)
Autonomy					.169 *** (.018)	.156 *** (.018)
Competence					1.19 *** (.046)	1.20 *** (.047)
Relatedness					-.120 ** (.038)	-.131 ** (.039)
Gender	-.090 (.047)	-.091 *** (.024)	-.136 *** (.024)	-.114 ** (.037)	-.008 (.025)	-.008 (.025)
Age	.002 (.002)	.003 ** (.001)	.001 (.001)	.002 (.002)	-.002 (.001)	-.002 (.001)
Tenure (Job)	.007 (.004)	.004 * (.002)	.001 (.002)	.004 (.003)	-.004 (.002)	-.002 (.002)
School Size	-.001 (.001)	-.001 *** (.000)	-.001 ** (.000)	-.001 * (.000)	.000 (.000)	.000 (.000)
Sector (1 = Private)	.362 *** (.073)	.053 (.036)	.006 (.041)	.133 * (.057)	.012 (.031)	.014 (.031)
Constant	-.069 (.122)	-.085 (.063)	.027 (.056)	-.048 (.100)	.098 (.067)	.073 (.070)
N (Teachers)	1481	1481	1481	1481	1481	1481
(Schools)	129	129	129	129	129	129
R <sup>2</sup> Overall	.078	.045	.038	.049	.635	.641
R <sup>2</sup> Within	.004	.013	.018	.007	.571	.623
R <sup>2</sup> Between	.366	.196	.169	.292	.622	.613
Sigma_e	.736	.400	.435	.644	.418	.413
Sigma_u	.161	0	.088	0	.029	0
Rho	.046	0	.040	0	.005	0

Note: \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ . Bootstrap standard errors with 1,000 re-samplings to account for clustering on schools.

**Table A-3. Random Effects Regressions of Transformational Leadership, Basic Need Satisfaction, and Public Service Motivation. Unstandardized Regression Coefficients (SE)**

Independent Variable / Model	Dependent Variable					
	Autonomy	Competence	Relatedness	Public Service Motivation		
	A-2.1	A-2.2	A-2.3	A-2.4	A-2.5	A-2.6
Transformational Leadership (School Mean)	.259 *** (.054)	.060 ** (.022)	.085 ** (.028)	.084 (.088)		-.009 (.079)
Autonomy					.026 (.056)	.028 (.056)
Competence					.455 ** (.132)	.454 ** (.135)
Relatedness					.733 *** (.092)	.734 *** (.097)
Gender	-.090 (.047)	-.091 *** (.024)	-.136 *** (.024)	-.151 (.078)	-.005 (.070)	-.005 (.070)
Age	.002 (.002)	.003 ** (.001)	.001 (.001)	.020 *** (.004)	.018 *** (.004)	.018 *** (.004)
Tenure (Job)	.007 (.004)	.004 * (.002)	.001 (.002)	-.006 (.006)	-.009 (.006)	-.009 (.006)
School Size	-.001 (.001)	-.001 *** (.000)	-.001 ** (.000)	-.000 (.001)	.001 (.001)	.001 (.001)
Sector (1 = Private)	.362 *** (.073)	.053 (.036)	.006 (.041)	.267 * (.121)	.231 * (.114)	.231 (.121)
Constant	-.069 (.122)	-.085 (.063)	.027 (.056)	-.850 *** (.211)	-.830 *** (.181)	-.828 *** (.183)
N (Teachers)	1481	1481	1481	1481	1481	1481
(Schools)	129	129	129	129	129	129
R <sup>2</sup> Overall	.078	.045	.038	.028	.138	.138
R <sup>2</sup> Within	.004	.013	.018	.023	.128	.128
R <sup>2</sup> Between	.366	.196	.169	.066	.092	.092
Sigma_e	.736	.400	.435	1.40	1.34	1.34
Sigma_u	.161	0	.088	0	0	0
Rho	.046	0	.040	0	0	0

Note: \*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$ . Bootstrap standard errors with 1,000 re-samplings to account for clustering on schools.