

**Leadership and Job Satisfaction:
Results from a Field Experiment**

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This research was supported by the Danish Council for Independent Research, project no. 1327-00015B

Abstract

The interaction between leaders and employees plays a key role in determining organizational outcomes and performance. Although previous literature posits positive effects of leadership behaviors on employee job satisfaction, the causal path between the two is unclear due to potential endogeneity issues inherent in this relationship. To address the issue, we first provide theoretical explanations about why and how transformational and transactional leadership behaviors would enhance employee job satisfaction. Second, we test the relationship between leadership behaviors and employee job satisfaction using panel data from a year-long field experiment that engaged leaders and employees from hundreds of public and private organizations in Denmark. Our key findings suggest that leadership-training induced changes in non-pecuniary leadership behaviors (transformational leadership and verbal rewards) are positively related to changes in employee job satisfaction, which, in turn, reduces turnover intention of employees.

Introduction

High quality human capital is essential in all organizations (Cho and Park 2011) regardless of sector or industry. Satisfied employees are more likely to be committed to their jobs and organizations, which should, in turn, lead to higher individual and organizational productivity (e.g. Fernandez 2008; Ostroff 1992). High levels of employee job satisfaction can also reduce the organizational costs associated with unexpected absenteeism, turnover intention, and actual turnover (Chen et al. 2011; Green 2010; Jung 2014a; Podsakoff, LePine, and LePine 2007; Tett and Meyer 1993). Previous studies have suggested an extensive list of individual and organizational factors that can influence levels of employee job satisfaction, such as interpersonal relationships with colleagues and leaders, leadership, performance-based rewards, recognition, feedback, consideration from leaders, autonomy, job security, goal ambiguity, personal traits, job characteristics, co-worker wages, job changes, personal-organizational fit, organizational environments or culture, non-pecuniary job amenities and utility gaps in past and expected future jobs (for more details see Boswell, Boudreau, and Tichy 2005; Böckerman, Ilmakunnas, and Johansson 2011; Clark, Kristensen, and Westergård-Nielsen 2009; Cornelissen;

Heywood, and Jirjahn 2011; Korte and Wynne 1996; Kristensen and Johansson 2008; Lévy-Garboua; Montmarquette, and Simonnet 2007; Muterera et al. 2015; Rainey 2003). The role of leaders can be considered as one of the most important determinants of job satisfaction not only because leaders can affect most of the aforementioned variables (except for personal traits), but also because positive interactions between leaders and employees can directly enhance job satisfaction (Madlock 2008, 65). The linkage of leadership to job satisfaction is consistent with a literature that contends that effective leadership is one of the most important characteristics commonly found in successful organizations (Bass et al. 2003).

The purpose of this article is to investigate in a field experiment how pecuniary (rewards) and non-pecuniary job (transformational leadership and verbal rewards) amenities generated by changes in leadership behaviors can affect employee job satisfaction. According to the most recent meta-analysis on job satisfaction correlates by Cantarelli, Belardinelli, and Belle (2016), the relationship between leadership and job satisfaction is one of the most studied topics in public management research.¹ Numerous studies find a positive relationship between leadership and job satisfaction (for more details see Cantarelli, Belardinelli, and Belle 2016; Judge and Piccolo 2004; Podsakoff et al. 2006). A common challenge that has often been lodged, but largely ignored in this line of research, is the failure to consider causality in order to account for potential endogeneity issues. Because the linkage between leadership and job satisfaction is so central to theories of leadership, motivation, and organizations, sorting out issues of causality is a major theoretical challenge. To address this concern, our analysis uses data from a year-long randomized field experiment that engaged leaders and their followers in public and private

¹ In Cantarelli, Belardinelli, and Belle (2016)'s study, one-third of their sample studies (33 articles out of 99) deal with the relationship between leadership and job satisfaction.

organizations in Denmark.

After a review of the literature on leadership and job satisfaction and a discussion concerning how leadership could affect job satisfaction, we address the potential causality and endogeneity issues on this topic. Using a classic experimental design in a field setting, we outline theoretical expectations and hypotheses linking leadership behavior and perceptions of leadership behaviors (by leaders and employees) to employee job satisfaction.² The study is able to experimentally induce changes in leadership and link those changes to changes in employee job satisfaction. To underscore the importance of our findings, we also show how enhanced job satisfaction in turn reduces the intent of employees to leave the organization. Finally, we discuss the implications of our research for both the literature on leadership and job satisfaction, as well as its implications for the practice of management.

Leadership

Although the literature on leadership is extensive and leaders can adopt myriad leadership styles, recent work has focused on the concepts of transactional and transformational leadership. Transactional leadership has roots in the early 20th century when studies on human motivation started to focus on incentives in organizations. Frederick Taylor's (1911) theory of scientific management held that scientifically well-designed incentive systems in organizations can motivate employees and enhance productivity of individuals and the organization. The focus on incentives generated a massive research literature that examined not just the monetary incentives advocated by Taylor but also the use of normative appeals, the solidary and social benefits of organizational membership and other factors (Argyris 1972; McGregor 1960; Roethlisberger and Dickson 1939). Leadership was to focus on creating systems of incentives that would induce

² In this paper, we use job satisfaction, employee satisfaction, employee job satisfaction interchangeably.

organizational members to make contributions to the organization and in the process blend their personal goals with the goals of the organization (Barnard 1938; Simon 1947). Although there were many different approaches to incentives-based leadership, Burns (1978) essentially grouped them as transactional leadership whereby leaders offer verbal or material rewards (or punishments) in exchange for good (or bad) performance. Transactional leadership was to serve as the base for Burns' advocacy of transformational leadership.

Transformational leadership goes beyond the notion of social exchanges (e.g. rewards or punishments) between leaders and followers (Bass et al. 2003) and focuses on inspiring, stimulating, and energizing employees to achieve challenging goals or visions beyond their capacity (Burns 1978; Bass 1985; Wright, Moynihan, and Pandey 2012, 2017). In seeking to tap into higher level psychological and social needs, transformational leadership tries to convince employees to adopt organizational goals as their own. In the process such leadership encourages employees to put extra effort into working toward higher level goals within the organization (Conger and Kanungo 1987). The current generic leadership literature distinguishes transformational leadership from earlier forms of charismatic leadership (for more details see Van Knippenberg and Sitkin 2013; Yukl 1999), noting that transformational leadership encompasses charismatic leadership but is broader in scope and application.

Although Burns (1978) argues that transformational leaders are distinct from transactional leaders, Bass (1985) claims they are not orthogonal to each other in that a leader can have both transformational and transactional leadership styles. Contemporary literature agrees with Bass's notion that the two leadership styles are not separate; and, in fact, transformational leadership can augment transactional leadership. Leaders, for example, can set constructive, but challenging, goals and then give certain types of rewards to employees upon the

achievements of these goals (Locke 1999; Vigoda-Gadot and Beerli 2012). Such behaviors can be combined with transformational efforts to focus on higher objectives. In reality, transformational leadership is unlikely to be effective if it is not buttressed by some consistent application of incentives by leaders (or in other words, transformational leadership requires a base level of transactional leadership to be effective). Given this overlap, we would argue that no matter which leadership style a leader adopts, leaders can have profound influence on both the pecuniary (rewards) and non-pecuniary job amenities and through that their employees' job satisfaction. The following section provides more detailed explanations of this relationship between leadership and job satisfaction.

Leadership and Job Satisfaction

Regardless of leaders being transactional, transformational, or both, their key task is to develop a shared vision and overarching goals for their organizations (Bennis and Nanus 1985; Locke and Latham 1990) and to motivate followers to achieve those visions and goals. The link between leadership and job satisfaction is the leader's ability to generate pecuniary and non-pecuniary job amenities for the employees that will result in better organizational performance. The higher the level of amenities, the higher level of satisfaction, all things being equal (Lévy-Garboua; Montmarquette, and Simonnet 2007). In this perspective, transactional and/or transformational leaders are likely to enhance the pecuniary (rewards) and non-pecuniary job amenities and thus employees' job satisfaction through several different mechanisms (Bass 1985; Bass et al. 2003).

Under leaders with an effective transactional style, individual employees should become more satisfied with their jobs since this type of leaders clarifies their expectations and identifies the rewards for individual performance considerations (Podsakoff et al. 2006). Path-goal theory articulates this well; persons with authority in organizations should deal with organizational and

environmental uncertainty by offering clarification about ambiguous goals and tasks, thereby allowing subordinates to clearly understand the roles required to achieve shared goals (House 1996). Through the transactional leader's explicit instructions about the path to organizational goals, employees may get intrinsic satisfaction and also be advised about how to obtain extrinsic rewards (House 1996; Kim, Egan, and Moon 2014, 239-240). When employees are rewarded (that is, leaders consistently reward the behavior that they are seeking), they will be recognized by others and feel more valued, which should enhance job satisfaction (Pillai, Schriesheim, and Williams 1999). In short, with transactional leaders' provision of the connection between work effort and goal accomplishment, as well as between goal attainment and rewards (House 1996, 326), employees are more likely to be more satisfied with their jobs.

Transformational leadership also plays an important role in promoting employee job satisfaction because transformational leaders encourage their followers to achieve higher levels of human needs. Burns (1978) developed the idea of transformational leadership based on Maslow's theory of a hierarchy of needs where esteem and self-actualization constitute the two highest needs of humans (Herzberg 1966; Maslow 1943). This theory is directly applied to the perspectives on leadership and employee job satisfaction; because the job can now lead to employees attaining their own higher order needs, successful transformational leadership can improve job satisfaction as it improves organizational performance. Specifically, the key elements of transformational leadership – developing a clear vision, communicating with employees to share the vision, and encouraging individuals as a team to achieve the shared vision (Paarlberg and Laviga 2010; Wright, Moyinihan, and Pandey 2012; Wright and Pandey 2010) – can theoretically contribute to an employee's achievement of esteem and self-actualization needs. First, leaders who exert transformational skills tend to set higher goals, thereby providing

their employees with inspirational motivation to achieve these objectives. When employees succeed in attaining challenging tasks, they are more likely to fulfill higher levels of human needs (Judge et al. 2005; Jung 2014b). Second, leaders with transformational traits seek to gather followers' ideas as an effort to move forward and develop their organizations. In doing so, they stimulate employees to offer new perspectives to the organizations, which in turn helps the employees accomplish esteem and self-actualization needs (Judge and Piccolo 2004). Third, transformational leaders pay attention to individual employee's concerns and needs and incorporate those in setting organizational goals, which can motivate their followers to achieve the shared organizational goals and visions (Bass 1997; Bass et al. 2003). When the employees feel that their voices are heard, their chances of fulfilling higher types of human needs are greater (e.g. Kim 2002). In all aforementioned scenarios, employees are more likely to achieve higher levels of human needs, which in turn allow them to achieve higher satisfaction with their jobs in organizations.

Although the literature linking leadership to job satisfaction is extensive, virtually all of the work is cross-sectional and correlational.³ The logic behind the studies is that leadership behavior is perceived by employees, and then employees react to the leadership style and adjust their levels of job satisfaction. It is possible that job satisfaction is not strictly endogenous to leadership, especially given that the causal linkage goes through employee perceptions of leadership. An employee with a high level of job satisfaction might allow that satisfaction to color his or her assessment of the leader and rate that leader more favorably. Sorting out these two causal paths is not possible with nonexperimental cross-sectional data.

³ Seidle, Fernandez and Perry (2016) use experimental methods to assess the linkage between general leadership training and job performance.

The current study seeks to address at least some of the endogeneity issues in three ways. First, the experiment will exogenously seek to induce changes in the leadership and thus work as a shock in the level of pecuniary and non-pecuniary job amenities. Second, by taking advantage of a before and after design, the analysis can also apply panel analysis techniques to probe the endogeneity of perceptions of leadership related to pecuniary and non-pecuniary job amenities and job satisfaction. Third, based on the panel analysis results, a pseudo error correction model will be examined to illustrate that job satisfaction responds to both initial levels of leadership and to changes in leadership. The results are consistent with the theoretical notion that leadership is exogenous to job satisfaction.

The Experiment

Our field experiment was conducted in Denmark from March 2014 to October 2015. Invitations were sent to all leaders in the following organizations: primary and lower secondary schools in the public and private sectors, public upper secondary schools, public and private daycare centers, public tax offices, and private banks. The invitation letters stated that if leaders agree to participate in our experiment, they would have a 75 percent chance of receiving a full year of leadership training. To be eligible leaders could not participate in any other leadership training programs during the experiment; leaders who were already participating in any types of leadership programs were excluded from our sample. A total of 506 leaders agreed to participate in the experiment; they were randomly assigned to one of the three leadership training groups: transformational, transactional, and combined (both transformational and transactional) training, and a control group.

Experienced leadership instructors provided the participants with leadership training four times over a year, for a total of 28 hours. To increase accessibility and participation, leadership

training courses were offered in seven different locations in Denmark; participants attended in the training sessions held at the nearest location, where they had the same instructor for all four sessions. As a part of leadership training, the instructors covered total 600 pages of curricula, conducted various class activities, and provided feedback on the participants' leadership skills. Coursework was also assigned to leaders between the class sessions. The leadership training curriculum in our experiment is equivalent to an executive master level course in Danish education.

Analytical Approach

We use a variety of statistical methods to take advantage of both the experimental design and the panel nature of the data. The analysis starts with a difference-in-differences design to test how changes in leadership behaviors affect changes in employee job satisfaction before and after our leadership training. Because there are both individual and organizational level variables, we use clustered standard errors at the organizational level since the failure to account for the multilevel data structures can bias standard errors downward. We then investigate the endogeneity of the leadership-job satisfaction relationship using panel analysis versions of Granger causality.

Although the results suggest reciprocal causation, they clearly do not reject the hypothesis that leadership "causes" job satisfaction. We then probe the long and short term linkages between leadership and job satisfaction by showing that job satisfaction responds to both the existing level of leadership and changes in leadership. We then restrict the analysis to only those changes in leadership exogenously induced by the experiment itself. Finally, we extend the analysis to illustrate the practical relevance of our study by demonstrating that job satisfaction, in turn, reduces the employee's intent to quit the job or the organization.

Measures

Job Satisfaction

Many diverse definitions of job satisfaction have been adopted by different scholars based on different research designs and contexts (Locke 1969; Rainey 2003). Among these varied ones, we adopt Kalleberg's (1977: 126) definition of job satisfaction; "job satisfaction is an overall affective orientation on the part of individuals toward work roles which they are presently occupying." Using this definition we directly asked the subjects: "All in all on a scale from 0 to 10, how satisfied are you with your current job?" Higher values on the scale indicate employees are more satisfied with their jobs. We asked this question twice (before and after the employees' leaders received the leadership training) and only include survey respondents who answered both surveys (a total of 4,084 employees); by doing so, we could calculate the changes in employee job satisfaction before and after the training.

Leadership

Our key variables of interest are leadership behaviors — the use of transformational leadership, verbal rewards, and pecuniary rewards — perceived by employees and leaders. We distinguish between leaders' self-assessments of behavior and employee's assessments of leadership for two reasons. First, leaders are likely to overestimate their own leadership behaviors reflecting a general bias where by individuals tend to over rate themselves on desirable traits (Kruger 1999). Second, for changes in leadership-related pecuniary and non-pecuniary job amenities to affect job satisfaction, employees need to perceive that leadership-related pecuniary and non-pecuniary job amenities have actually changed. If the changes in leaders' behavior are too subtle to be observed and are not reflected in actual changes in job amenities, they are unlikely to affect

employees' job satisfaction. We use 5-point Likert scale (1=strongly disagree; and 5 strongly agree) survey items to measure the leadership behaviors. Both leaders and employees responded to a series of questions about supervisors' leadership before and after the experimental training.

Transformational leadership was measured with four survey items. Respondents were asked whether leaders 1) clarify organizational visions, 2) stress the need for employees to work together to achieve the visions, 3) work on making employees to accept common organizational goals, and 4) help employees contribute to the achievement of the organizational goals. All the four questions are loaded in one factor, respectively for employees and leaders, with correlations between 0.846 and 0.898 and a Cronbach's alpha of 0.894 (for employees) and correlations between 0.673 and 0.828 and a Cronbach's alpha of 0.738 (for leaders).

The measure for the use of verbal rewards was composed of three survey items that capture whether leaders 1) provide employees with positive feedback when they perform well, 2) show their appreciation of employees when they accomplish more than expected, and 3) give compliments to employees for their outstanding works. The three items for both leaders and employees positively loaded on one single factor. Factor loadings are between 0.929 and 0.95 with a Cronbach's alpha of 0.935 (for employees), and between 0.845 and 0.87 with a Cronbach's alpha of 0.821 (for leaders).

Three survey items measure the use of pecuniary rewards/job amenities. The items ask respondents whether leaders 1) clarify what rewards employees will receive when they meet the requirements, 2) reward employees when they meet the performance requirement, and 3) give rewards depending on the employees' performance. The three items loaded onto a single factor with correlations between 0.852 and 0.921 with a Cronbach's alpha of 0.876 (for employees) and

correlations between 0.768 and 0.879 with a Cronbach's alpha of 0.78 (for leaders).⁴

We use an additive measure of the survey items for each leadership behavior, adjust the measure so that it ranges between 0 and 100 (to allow comparisons across the scales that contain a different number of items), and then calculate the first difference of each leadership behavior before and after the leadership training, which can range between -100 and +100. The summary statistics of all variables used in our analyses and factor loadings are presented in Appendix.

Findings

Quality leadership whether transformational or transactional should specify clear goals, communicate expectations to employees, provide feedback on that performance, and contribute either extrinsic or intrinsic rewards to the employees. Such leadership quite logically then should have an impact on the pecuniary and non-pecuniary job amenities and, in turn, affect the employee's job satisfaction and the employee's willingness to continue with the organization. By providing leadership training, organizations seek to change leadership styles and, in turn, reap the downstream benefits of improved performance via increased job satisfaction (and associated motivation) with subsequent benefits for the organization. Model 1 in Table 1 shows the influence of leadership training and its impact on employee satisfaction. The results are striking. Assignment to leadership training appears to have no significant influence on employee job satisfaction, the changes in job satisfaction while small are actually negative.

[Table 1 About Here]

Assignment to leadership training, however, is not necessarily the same as changing a leadership style and the related pecuniary and non-pecuniary job amenities in the organization;

⁴ The employees' measures are all more consistent and reliable than the leaders' measures, a finding consistent with the notion that leaders' assessments are less objective and less reliable.

and one might expect that the impact of training would vary across individuals. Some individuals might not be affected by leadership training for a variety of reasons. The individual might perceive that the leadership style would not work or would not be allowed in their organization. The individual might reject the underlying assumptions in regard to motivation and leadership, or the individual might simply not understand the content of the training. Similar to a medical experiment involving changes in an individual's health regimen, there is substantial distance between the assignment to treatment and positive results from that treatment. Model 2 adds the changes in leadership style, as perceived by the employees, to the model for job satisfaction. Changes in transformational leadership and changes in the use of verbal rewards are now positively associated with changes in job satisfaction. Accordingly, if the employees observe a positive change in the non-pecuniary job amenities (Δ Transformational Leadership and Δ Verbal Rewards), they have a higher level of job satisfaction. The relationship for pecuniary rewards/job amenities is positive but does not meet traditional standards of statistical significance ($t=1.61$). Changes in transformational leadership and changes in verbal rewards both have approximately the level of influence on changes in job satisfaction.⁵ The coefficients for the training when controlling for leadership changes remain negative, and in the case of transactional leadership training is actually statistically significant (though only on a 90% level of confidence). The pattern of results suggests that if leaders are assigned to training, but do not change their leadership style, then employees will respond negatively.⁶

⁵The coefficient for changes in pecuniary rewards is significantly different statistically from the other two leadership coefficients. The coefficients for transformational leadership and the use of verbal rewards are not statistically different from each other.

⁶Except for transactional leadership, these influences are not statistically significant and thus any conclusions are speculative. To the extent that employees know that leaders are undergoing training, employees may expect changes in leadership. If such changes in leadership are not forthcoming, then a down-grading of the assessment of such a leader is fairly rational.

As noted above, the absence of a training impact might also be the equivalent of a medical trial where the patient does not actually take the prescribed medicine. Model 3 controls for absences (2 or more) as well as the preexisting levels of perceived leadership.⁷ Being absent from the training has a strong negative impact on job satisfaction, and the independent impact of the transactional leadership training is no longer statistically significant. Initial levels of job satisfaction are also negative, as expected. The relative gains from leadership training decline when leaders have already adopted and are implementing the prescriptions of the leadership training. Even with these controls, the relative influence of changes in leadership on job satisfaction are not affected. All are positive, and both transformational leadership and the use of verbal rewards are statistically significant.

Table 2 probes the findings for robustness and generalizability. Model 4 shows that the result are not influenced by sector; the coefficient for public sector organizations is not statistically significant and controlling for public organizations has no impact on the relationships found in Table 1. Similarly, model 5 controls for the industry of the leaders with dummy variables for daycare centers and financial organizations (the excluded category is schools). Again the industry variables are not statistically significant, and the existing relationships are not affected by including these controls.

[Table 2 About Here]

The analysis thus far has relied on employee perceptions of leadership and ignored leaders' self-perceptions of leadership and the related pecuniary and non-pecuniary job amenities. We do so for strong methodological reasons. A large literature finds that leaders over rate their own leadership style, a specific case of a general phenomenon that individuals tend to

⁷ Missing a single leadership training session does not appear to have much impact whereas two or more generates the negative results.

over rate themselves in regard to positive characteristics (see Brown 2012; Fleenor et al. 2010). For this reason and consistent with much of the literature on leadership, we rely on employee assessments of leadership behaviors.

The changes in leaders' self-perceptions are only weakly related to changes in employee job satisfaction (models 1 and 2 in Table 3). In the initial models there is a slight positive relationship for changes in transformational leadership, but when the full model controls for absences and the initial level of employee perceived leadership, the relationships disappear. So while changes in leader-perceived leadership might have some indirect influence on job satisfaction, it is changes in how the employees actually perceived the changes in the pecuniary and non-pecuniary job amenities (what leaders are actually doing) that matters. Such findings are consistent with the logic that either leaders misperceive their own leadership style or that what leaders think they are doing may be at odds with their behavior as perceived by their employees.

[Table 3 About Here]

Thus far the analysis shows that changes in leadership and the related change in non-pecuniary job amenities are associated with changes in job satisfaction. Although the changes in leadership were experimentally induced and there is strong theory suggesting that leadership determines job satisfaction, it is possible that job satisfaction might also color perceptions in leadership. Adequate instrumental variables that theoretically determine leadership perceptions but not job satisfaction or job satisfaction but not leadership simply do not exist. The panel nature of the data, however, permit us to probe the potential causal linkage in three ways – by assessing Granger causality, by creating a pseudo error correction model to sort out short and long term influences of leadership on job satisfaction, and by limiting the leadership variable to *only* those changes induced experimentally.

Granger causality methods essentially try to sort out causality by taking advantage of time series data. A variable Y is predicted by past values of Y and past values of X. If past values of X have no ability to predict current values of Y statistically while controlling for past values of Y, then one concludes that X does not Granger cause Y. Similar assessments are then used to determine if Y Granger causes X. Table 4 presents the Granger equations for the relationship between the three types of leadership behavior (transformational, verbal rewards, and pecuniary rewards) and employee job satisfaction. In all three cases, the tests indicate that the relationship between perceived leadership behavior and job satisfaction is not strictly exogenous. The results are consistent with the notion of a reciprocal relationship.⁸

[Table 4 About Here]

The basic analysis that was presented in Table 1 is a classical difference in difference design that relates changes in one variable to changes in another. Such an analysis probes short-term relationships and assumes that it is the change in leadership and job amenities rather than the existing level of leadership that affects job satisfaction. From the perspective of the employee, such a myopic view might not be fully rational. Changes in leadership and job amenities, after all, might be ephemeral. One might even expect that positive changes in leadership might be framed in terms of past leadership/job amenities. If the quality of leadership has been high and there are positive changes, this should be a stronger signal to the employee than if the original level of leadership was poor and there were positive changes. In the latter

⁸ Patterns such as those found here could still exist if leadership were strictly exogenous to job satisfaction if the time length for the causal influence was less than the time between the measurements. That is, if the influence of leadership behavior on job satisfaction occurs faster than one year, then the Granger equations would not be able to distinguish which variable “caused” the other.

case, the employee might hold back changes in job satisfaction until he or she could determine if the leadership changes were permanent.

This short versus long-term response to changes in leadership behavior can be modeled via a pseudo error correction approach by including both changes in the leadership variables and levels in the leadership variables (at time 1, that is before the training) in the same equation predicting changes in job satisfaction while also controlling for job satisfaction at time 1. Table 5 presents this model. For both transformational leadership and for the use of verbal rewards, the results show that changes in job satisfaction respond to *both* initial levels of leadership and the related non-pecuniary job amenities and changes in these levels of leadership/job amenities. This evidence is consistent with the idea that assessments of job satisfaction are not myopic and take into consideration prior leadership patterns as well as changes in leadership. For pecuniary rewards/amenities only changes in leadership behavior appear to matter and those only weakly. The negative relationship with job satisfaction at time 1 again indicates the declining marginal returns in that high levels of job satisfaction are more difficult to improve than low levels.

Our final causality test involves limiting the changes in leadership scores to only those changes that result from individuals taking a specific training regimen. This involves interacting the leadership change variable by the exposure to the experimental condition and treating all other changes in leaders as noise. When this is done (see tables A4 through A8 in the appendix, the results are not only consistent with those presented in the text, but they are often stronger statistically. All three exogeneity tests are consistent with a theoretical notion that changes in leadership will result in changes in job satisfaction.

Two other robustness checks of the results are in order to consider the possibility of common source bias and selection effects. Common source bias is a potential problem given that

the study relies on employees to both assess the managers' leadership behaviors and to rate their own job satisfaction. Common source bias generates correlated measurement error, which can produce spurious results (see Meier and O'Toole 2013). Using changes in self-perceptions of leadership can eliminate the biases resulting from the individual respondent or the individual survey item asked (Favero and Bullock 2015).⁹ Our approach is to take the most stringent method of addressing common source bias. We take the full set of leadership variables and extract the first factor via factor analysis. This new factor should contain any biases common to the leadership variables; it will also contain substantial variation that reflects actual leadership behavior (Favero and Bullock 2015).¹⁰ We then rerun the analysis and include this variable as a control, thus, the leadership variables need to be able to explain job satisfaction independently of this common variance factor. The results in Table A9 of the appendix show that both changes in transformational leadership and changes in verbal rewards remain positively correlated with changes in job satisfaction. The relationship between leadership and job satisfaction, therefore, cannot be dismissed as resulting from common source bias.

A second robustness check concerns the changes in the sample from before the experiment to after the experiment. Some individuals did not fill out the second survey, and in some cases these individuals were no longer employed by the organization. It could well be the case that individuals who left the organization had lower levels of job satisfaction than those who remained (although the differencing adjusts for differences in levels). To determine if this might

⁹It does not eliminate any of the common source bias that might be unique to the individual time point as it interacts with either the respondents or the question. That is, changes in circumstances over the year between the surveys in this study could have generated biases in either the before or the after intervention responses but not both. If this occurred, then using change figures will not control for all the measurement error; and if different biases are generated at different time periods, the differenced measured will contain both sets of biases.

¹⁰ This first factor with an eigenvalue of 7.04 accounts for approximately 50% of the variance in both transformational leadership and verbal rewards items and about 25% of the variance in the pecuniary rewards items. The remaining unique variance for these items must then predict job satisfaction for significant results.

be a problem, we ran a Heckman selection bias correction model that predicted in the first stage whether or not the employee would remain in the study. The second stage of this model showed some modest selection bias, but the basic findings linking leadership and job satisfaction remained (see appendix table A10); in fact, with correction for selection bias, changes in pecuniary rewards now is positive and statistically significant.

[Table 5 About here]

One implication of the impact of leadership on job satisfaction is that leadership can improve organizational performance via changes in employee job satisfaction. Although performance data for our study are not currently available, we can provide a tentative assessment by looking at measures of intent to quit. Improving job satisfaction among employees should be related to lower levels of turnover and thus lower organizational maintenance costs (Coomber and Barriball 2007; Clark, Georgellis, and Sanfey 1998; Freeman 1978). Employee turnover, however, is sticky; employees might decide to leave the organization but not do so immediately because they do not have viable employment options. A large number of studies, as a result, focus on the employees' expression of an intent to quit. Although it is clear from the literature that intent to quit and turnover are two different phenomena (see Dalessio, Silverman, and Schuck 1986; Dalton, Johnson and Daily 1999, 1341-2; Rittenhouse et al. 2004; Jung 2014a), they are positively correlated (Chandrashekar et al. 2000; Cho and Lewis 2012, 14; Iverson and Pullman 2000; Podsakoff et al. 2007; Tett and Meyer 1993). Table 6 examines how changes in job satisfaction, changes in leadership style, and initial levels of job satisfaction affect considering leaving the job but remaining in the organization, and Table 7 does a parallel analysis for leaving the organization.¹¹ Because the intention to quit questions were only asked in

¹¹ Employees were asked to rate “how often do you consider to leave your job but remain in the organization?” (table 6) and “how often do you consider leaving your organization?” (table 7) on a five point Likert scale (1=never;

the post treatment survey, we cannot use a strict difference-in-differences design, hence we also include the initial levels of job satisfaction (which should also affect intent to quit) to assess how the changes in job satisfaction (as well as the changes in leadership) affect the intent to quit.

[Tables 6 and 7 About Here]

The results are highly consistent across the two tables.¹² Intent to leave the job but remain in the organization is affected by the same factors as the intent to leave the organization. Both appear to be indicators of potential turnover. An employee's initial job satisfaction (from a year earlier) is the strongest determinant of intent to quit in both equations. Changes in job satisfaction provide additional explanation. A positive increase in job satisfaction is associated with a decline in the intent to quit in both equations. The effect size for the change in job satisfaction is approximately three-fourths the size of the effect size for initial job satisfaction, thus suggesting the short-term impact of job satisfaction on turnover intent can have a significant impact on more long-term negative feelings about the job. The direct impact of leadership changes on intent to quit is very modest. Changes in verbal rewards/amenities have a modest negative relationship (that is greater use of verbal rewards reduces intent to quit all other things being equal), but neither transformational leadership nor pecuniary leadership/amenities have any direct impact. This finding does not mean that leadership and leadership change have no impact on employees' intent to quit. The impact is indirect through leadership's impact on job satisfaction. Improved leadership is positively associated with greater job satisfaction which in turn is associated with declines in the intent to quit.

5=always). Models in Tables 6 and 7 are estimated via OLS regression analyses. Analysis using ordered logit show results highly consistent with the ones presented in the tables.

¹²The correlation between the two intent to quit measures is .53.

Conclusions

Employees with high levels of job satisfaction should bring about positive outcomes for themselves, as well as for the entire organization; they are more likely to become committed to their jobs and increase both individual-level productivity and organizational-level performance. Higher employee job satisfaction also decreases employees' intention to quit, thereby preventing the organization from facing unnecessary costs associated with the loss of human and financial resources. Among other things, leadership has long been studied as one of the most important factors that affects employee job satisfaction. This study investigates the relationship between exogenously-induced changes in leadership behaviors, the associated perceived changes on pecuniary and non-pecuniary job amenities and employee job satisfaction using the data collected from a field experiment in Denmark. We provide rigorous empirical evidence how changes in leadership behaviors would increase employee job satisfaction and, in turn, how improved job satisfaction can potentially reduce employee turnover intention.

Specifically, we test whether and how the use of transformational leadership, verbal rewards, and pecuniary rewards enhance employee job satisfaction. Our findings suggest that leaders being assigned to the leadership training are not associated with an increase in employee job satisfaction. Rather, what matters in improving employees' satisfaction with their jobs is their perception of the non-pecuniary job amenities associated with a change in the leaders' behaviors. When employees perceive that their leaders use more verbal rewards or become a more transformational leader, for example, they are more likely to increase their satisfaction with their job. No matter whether leaders exercise improved leadership behaviors after the training, if employees do not think that there were improvements on the leadership skills and thus the job

amenities, their job satisfaction does not increase. In other words, leadership training has an indirect impact on employee job satisfaction, which can be channeled through the employee's perception of leadership behaviors.

The aforementioned findings hold consistently regardless of the sector (public and private) as well as the industry (education, daycare centers, and finance in our sample). Thus, we would argue that the relationship between leadership behavior induced changes on the non-pecuniary job amenities and employee job satisfaction do not much differ across sector or industry. Indeed, quality leadership (in the cases of transactional, transformational, or both types of leadership) is important in improving employee job satisfaction in any kind of organization. We, however, find no statistically significant relationship between changes in the use of pecuniary rewards/job amenities and changes in employee job satisfaction (but see appendix table 4). Although we have our theoretical expectations about how the use of pecuniary rewards is related to job satisfaction, it is possible that such leadership behavior might be related to employees' satisfaction with pay rather than their satisfaction with jobs. We also have no data on the size of the pecuniary rewards, and they might be too modest to affect job satisfaction.

We also address important potential causality and endogeneity issues that have been largely ignored in this line of research. The results from the Granger causality test show the potential reciprocal relationship between employee job satisfaction and leadership behaviors. As a result, it is possible that we have overestimated the influence of leadership behavior on job satisfaction. We remain confident that there is a causal relationship between leadership behavior and job satisfaction because the Granger tests do not reject the hypothesis that leadership Granger causes job satisfaction. The estimates from the pseudo error correction model also suggest that the short and long-term effects of leadership behaviors clearly do not go to zero. It is

both the preexisting level of leadership as well as the change in leadership that are associated with greater job satisfaction. In addition, we limited the analysis to only those leadership changes that were directly associated with leadership training so that the changes in leadership were all exogenously induced. These results also showed a strong relationship between leadership changes and changes in job satisfaction. While our panel data obtained from randomized field experiments help us better handle the issues of endogeneity and causality than previous studies have done, future researchers might want to further investigate this question in a lab setting or with longer time period with leadership behaviors measured more frequently.

Our last set of findings suggests that changes in transformational leadership and change in the use of verbal rewards can have direct and indirect impacts (although modest) on reducing employees' intention to quit. Highly satisfied employees are less likely to think of leaving the organization and more likely to stay in the organization. Since turnover intention often serves as a predictor of the actual employee turnover, which incurs extra costs in organizations and thereby negatively affect organizational performance, this finding offers implications for both scholars and practitioners. Future scholars can take a step further investigating how leadership behaviors would be related to organizational performance, in terms of organizational turnover or productivity.

Management theories assume that leadership can causally influence job satisfaction and then subsequently affect outcomes such as employee turnover and organizational productivity. The theory has spawned an extensive industry on leadership training with the belief that if organizations can change their leaders' behaviors, then employee job satisfaction will improve as will other organizational outcomes. The supporting evidence for this crucial theoretical assumption, however, is based primarily on cross-sectional and correlational evidence, thus, it is

possible that employee job satisfaction colors the employee's view of leadership and that designed changes in leadership will have little actual impact. This experimental study dealt directly with this challenge and addressed the exogeneity issue in four ways: by focusing on changes in leadership and job satisfaction via a difference-in-differences design, by establishing the temporal sequence via Granger causality, by demonstrating the job satisfaction responded to both initial levels of leadership as well as changes in leadership, and by limiting the analysis only to changes in leadership behavior that were experimentally induced. The results consistently provide support for the theoretical contention that changes in leadership can produce subsequent changes in job satisfaction.

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Tables

Table 1: The effects of leadership training and behaviors on employee job satisfaction

| | Model 1 | Model 2 | Model 3 |
|--|-------------------|--------------------|---------------------|
| Transformational Leadership Training | -0.010 (0.103) | -0.063 (0.096) | -0.089 (0.089) |
| Combined Leadership Training | -0.057 (0.117) | -0.155 (0.120) | -0.029 (0.101) |
| Transactional Leadership Training | -0.062 (0.093) | -0.152+ (0.091) | -0.057 (0.082) |
| Δ Transformational Leadership | | 0.012** (0.002) | 0.010** (0.002) |
| Δ Verbal Rewards | | 0.011** (0.002) | 0.010** (0.002) |
| Δ Pecuniary Rewards | | 0.002 (0.001) | 0.002 (0.001) |
| Job Satisfaction t_1 | | | -0.448** (0.019) |
| High Absences (1=two or more absences) | | | -0.177+ (0.099) |
| Constant | 0.072 (0.063) | 0.136* (0.064) | 3.515** (0.168) |
| R-Squared | 0.0002 | 0.0477 | 0.2722 |
| N | 4084 | 3848 | 3848 |

Notes: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table 2: The effects of leadership training and behaviors on employee job satisfaction by sector and industry

| | Model 4 | Model 5 |
|--|---------------------|---------------------|
| Transformational Leadership Training | -0.092 (0.089) | -0.094 (0.089) |
| Combined Leadership Training | -0.028 (0.101) | -0.030 (0.101) |
| Transactional Leadership Training | -0.059 (0.083) | -0.057 (0.082) |
| Δ Transformational Leadership | 0.010** (0.002) | 0.010** (0.002) |
| Δ Verbal Rewards | 0.010** (0.002) | 0.010** (0.002) |
| Δ Pecuniary Rewards | 0.002 (0.001) | 0.002 (0.001) |
| Job Satisfaction t_1 | -0.449** (0.019) | -0.452** (0.019) |
| High Absences (1=two or more absences) | -0.178+ (0.099) | -0.183+ (0.099) |
| Public Organizations (Public=1) | -0.109 (0.085) | |
| Daycares (Daycares=1) | | 0.075 (0.075) |
| Finance (Tax office or banks=1) | | -0.037 (0.081) |
| Constant | 3.621** (0.180) | 3.534** (0.174) |
| R-Squared | 0.2725 | 0.2727 |
| N | 3848 | 3848 |

Notes: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table 3: Do changes in leadership behaviors perceived by leaders also affect employee job satisfaction?

| | Model 1 | Model 2 | Model 3 |
|--|--------------------|---------------------|---------------------|
| Δ Transformational Leadership (employees) | 0.012** (0.002) | 0.012** (0.002) | 0.010** (0.002) |
| Δ Verbal Rewards (employees) | 0.010** (0.002) | 0.010** (0.002) | 0.009** (0.002) |
| Δ Pecuniary Rewards (employees) | 0.002 (0.001) | 0.002 (0.001) | 0.002 (0.001) |
| Δ Transformational Leadership (leaders) | 0.006+ (0.003) | 0.007* (0.003) | 0.005 (0.003) |
| Δ Verbal Rewards (leaders) | -0.000 (0.003) | 0.000 (0.003) | -0.000 (0.002) |
| Δ Pecuniary Rewards (leaders) | 0.000 (0.002) | 0.001 (0.002) | 0.002 (0.001) |
| Transformational Leadership Training | | -0.091 (0.099) | -0.120 (0.090) |
| Combined Leadership Training | | -0.228+ (0.126) | -0.084 (0.106) |
| Transactional Leadership Training | | -0.247** (0.094) | -0.127 (0.083) |
| Job Satisfaction t_1 | | | -0.449** (0.020) |
| High Absences (1=two or more absences) | | | -0.196* (0.099) |
| Constant | 0.076 (0.046) | 0.224** (0.068) | 3.583** (0.168) |
| R-Squared | 0.0438 | 0.0466 | 0.2765 |
| N | 3570 | 3570 | 3570 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table 4: Leadership and Job Satisfaction: Granger Causality Tests

| Relationship | t-score | p-values |
|--|---------|----------|
| Transformational Leadership → Job Satisfaction | 5.90 | P < .001 |
| Job Satisfaction → Transformational Leadership | 6.65 | P < .001 |
| Verbal Rewards → Job Satisfaction | 3.98 | P < .001 |
| Job Satisfaction → Verbal Rewards | 5.49 | P < .001 |
| Pecuniary Rewards → Job Satisfaction | 2.90 | P < .004 |
| Job Satisfaction → Pecuniary Rewards | 3.92 | P < .001 |

Table 5: The short and long term effects of leadership behaviors on employee job satisfaction

| | Model 1 |
|--------------------------------------|---------------------|
| Δ Transformational Leadership | 0.016** (0.002) |
| Δ Verbal Rewards | 0.013** (0.002) |
| Δ Pecuniary Rewards | 0.002 (0.001) |
| Transformational Leadership t_1 | 0.013** (0.002) |
| Verbal Rewards t_1 | 0.006** (0.001) |
| Pecuniary Rewards t_1 | 0.001 (0.001) |
| Job Satisfaction t_1 | -0.519** (0.020) |
| Constant | 2.624** (0.168) |
| R-Squared | 0.3030 |
| N | 3848 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table 6: The effects of employee job satisfaction on intention to leave their job

| | Model 1 | Model 2 |
|--|---------------------|---------------------|
| Δ Job Satisfaction | -0.052** (0.011) | -0.178** (0.012) |
| Δ Transformational Leadership | -0.001 (0.001) | -0.001 (0.001) |
| Δ Verbal Rewards | -0.003** (0.001) | -0.002** (0.001) |
| Δ Pecuniary Rewards | -0.000 (0.001) | -0.000 (0.001) |
| Job Satisfaction t_1 | | -0.246** (0.010) |
| High Absences (1=two or more absences) | | -0.010 (0.043) |
| Constant | 1.984** (0.023) | 3.868** (0.089) |
| R-Squared | 0.0209 | 0.2162 |
| N | 3668 | 3668 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table 7: The effects of employee job satisfaction on intention to leave their organizations

| | Model 1 | Model 2 |
|--|---------------------|---------------------|
| Δ Job Satisfaction | -0.074** (0.011) | -0.244** (0.012) |
| Δ Transformational Leadership | -0.002 (0.001) | -0.001 (0.001) |
| Δ Verbal Rewards | -0.002* (0.001) | -0.001* (0.001) |
| Δ Pecuniary Rewards | -0.000 (0.001) | -0.000 (0.001) |
| Job Satisfaction t_1 | | -0.333** (0.008) |
| High Absences (1=two or more absences) | | 0.036 (0.042) |
| Constant | 2.215** (0.024) | 4.750** (0.065) |
| R-Squared | 0.0280 | 0.3615 |
| N | 3662 | 3662 |

Notes: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Appendix (supplemental material for publication on-line)

Table A1: Summary statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|---|-------|-------|-----------|------|-------|
| Employee job satisfaction t_1 | 4,084 | 7.63 | 1.97 | 0 | 10 |
| Employee job satisfaction t_2 | 4,084 | 7.59 | 2.00 | 0 | 10 |
| Δ Employee job satisfaction | 4,084 | 0.04 | 1.88 | -10 | 10 |
| Intention to quit (job)* | 3,668 | 1.98 | 0.96 | 1 | 5 |
| Intention to quit (organization)* | 3,662 | 2.21 | 0.99 | 1 | 5 |
| Transformational leadership score (perceived by employees) t_1 | 3,848 | 70.88 | 21.68 | 0 | 100 |
| Transformational leadership score (perceived by employees) t_2 | 3,848 | 70.31 | 21.44 | 0 | 100 |
| Δ Transformational leadership score (perceived by employees) | 3,848 | 0.57 | 19.29 | -100 | 100 |
| Verbal reward score (perceived by employees) t_1 | 3,848 | 64.03 | 26.34 | 0 | 100 |
| Verbal reward score (perceived by employees) t_2 | 3,848 | 64.72 | 26.36 | 0 | 100 |
| Δ Verbal reward score (perceived by employees) | 3,848 | -0.69 | 22.42 | -100 | 91.67 |
| Pecuniary reward score (perceived by employees) t_1 | 3,848 | 37.07 | 23.99 | 0 | 100 |
| Pecuniary reward score (perceived by employees) t_2 | 3,848 | 37.25 | 23.38 | 0 | 100 |
| Δ Pecuniary reward score (perceived by employees) | 3,848 | -0.18 | 23.59 | -100 | 100 |
| Transformational leadership score (perceived by leaders) t_1 | 3,570 | 81.97 | 11.67 | 50 | 100 |
| Transformational leadership score (perceived by leaders) t_2 | 3,570 | 82.01 | 11.70 | 50 | 100 |
| Δ Transformational leadership score (perceived by leaders) | 3,570 | -1.81 | 12.14 | -38 | 50 |
| Verbal reward score (perceived by leaders) t_1 | 3,570 | 79.80 | 15.06 | 0 | 100 |
| Verbal reward score (perceived by leaders) t_2 | 3,570 | 79.84 | 15.08 | 0 | 100 |
| Δ Verbal reward score (perceived by leaders) | 3,570 | -3.70 | 17.35 | -100 | 100 |
| Pecuniary reward score (perceived by leaders) t_1 | 3,570 | 48.16 | 20.96 | 0 | 91.67 |
| Pecuniary reward score (perceived by leaders) t_2 | 3,570 | 47.96 | 21.05 | 0 | 91.67 |
| Δ Pecuniary reward score (perceived by leaders) | 3,570 | 4.13 | 21.83 | -67 | 75 |
| Transformational leadership training | 4,084 | 0.25 | 0.43 | 0 | 1 |

| | | | | | |
|--|-------|------|------|---|---|
| Combined leadership training | 4,084 | 0.25 | 0.44 | 0 | 1 |
| Transactional leadership training | 4,084 | 0.26 | 0.44 | 0 | 1 |
| High absences (1=two or more absences) | 3,848 | 0.16 | 0.37 | 0 | 1 |
| Public Organizations (public=1) | 3,848 | 0.91 | 0.29 | 0 | 1 |
| School (school=1) | 3,848 | 0.44 | 0.50 | 0 | 1 |
| Daycare (Daycare=1) | 3,848 | 0.29 | 0.45 | 0 | 1 |
| Finance (tax offices or banks=1) | 3,848 | 0.28 | 0.45 | 0 | 1 |

Note: * variables will be introduced later in the result section.

Table A2: Factor loadings for employee perceived leadership behavior indicators

| Transformational Leadership Indicators | Loading |
|--|---------|
| [leader's name] concretizes a clear vision for the [organization's] future | 0.862 |
| [leader's name] seeks to make employees accept common goals for the [organization] | 0.846 |
| [leader's name] strives to get the [organization's] employees to work together in the direction of the vision | 0.898 |
| [leader's name] strives to clarify for the employees how they can contribute to achieving the [organization's] goals | 0.883 |
| Cronbach's alpha=0.894 | |
| Verbal Rewards Indicators | Loading |
| [leader's name] gives individual employees positive feedback when they perform well | 0.944 |
| [leader's name] actively shows his/her appreciation of employees who do their jobs better than expected | 0.925 |
| [leader's name] personally compliments employees when they do outstanding work | 0.95 |
| Cronbach's alpha=0.935 | |
| Pecuniary Rewards Indicators | Loading |
| [leader's name] rewards the employees' performance when they live up to his/her requirements | 0.921 |
| [leader's name] rewards the employees' dependent on how well they perform their jobs | 0.913 |
| [leader's name] points out what employees will receive if they do what is required | 0.852 |
| Cronbach's alpha=0.876 | |

Table A3: Factor loadings for leadership behavior indicators perceived by leaders

| Transformational Leadership Indicators | Loading |
|---|---------|
| I concretize a clear vision for the [organization's] future | 0.673 |
| I seek to make employees accept common goals for the [organization] | 0.762 |
| I strives to get the [organization's] employees to work together in the direction of the vision | 0.827 |
| I strive to clarify for the employees how they can contribute to achieving the [organization's] goals | 0.753 |
| Cronbach's alpha=0.738 | |
| Verbal Rewards Indicators | Loading |
| I give individual employees positive feedback when they perform well | 0.87 |
| I actively show his/her appreciation of employees who do their jobs better than expected | 0.844 |
| I personally compliment employees when they do outstanding work | 0.862 |
| Cronbach's alpha=0.821 | |
| Pecuniary Rewards Indicators | Loading |
| I reward the employees' performance when they live up to his/her requirements | 0.879 |
| I reward the employees' dependent on how well they perform their jobs | 0.851 |
| I point out what employees will receive if they do what is required | 0.768 |
| Cronbach's alpha=0.78 | |

Table A4: The effects of leadership training and behaviors on employee job satisfaction

| | Model 1 | Model 2 | Model 3 |
|---|-------------------|--------------------|---------------------|
| Transformational Leadership Training | -0.010 (0.103) | -0.005 (0.096) | -0.036 (0.091) |
| Combined Leadership Training | -0.057 (0.117) | -0.078 (0.121) | 0.039 (0.104) |
| Transactional Leadership Training | -0.062 (0.093) | -0.080 (0.094) | -0.000 (0.085) |
| Δ Transformational Leadership \times TF training | | 0.014** (0.005) | 0.010** (0.004) |
| Δ Verbal Rewards \times Transformational | | 0.017** (0.003) | 0.015** (0.003) |
| Δ Verbal Rewards \times Combined | | 0.013** (0.005) | 0.010** (0.004) |
| Δ Verbal Rewards \times Transactional | | 0.011** (0.003) | 0.008* (0.003) |
| Δ Pecuniary Rewards \times Transactional | | 0.001 (0.003) | 0.003 (0.002) |
| Job Satisfaction t_1 | | | -0.451** (0.019) |
| High Absences (1=two or more absences) | | | -0.193* (0.098) |
| Constant | 0.072 (0.063) | 0.081 (0.066) | 3.488** (0.169) |
| R-Squared | 0.0002 | 0.0326 | 0.2595 |
| N | 4084 | 3848 | 3848 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A5: The effects of leadership training and behaviors on employee job satisfaction by sector and industry

| | Model 4 | Model 5 |
|---|---------------------|---------------------|
| Transformational Leadership Training | -0.040 (0.091) | -0.041 (0.091) |
| Combined Leadership Training | 0.040 (0.104) | 0.039 (0.104) |
| Transactional Leadership Training | -0.002 (0.085) | -0.001 (0.085) |
| Δ Transformational Leadership \times TF training | 0.010** (0.004) | 0.010** (0.004) |
| Δ Verbal Rewards \times Transformational | 0.015** (0.003) | 0.015** (0.003) |
| Δ Verbal Rewards \times Combined | 0.010** (0.004) | 0.010** (0.004) |
| Δ Verbal Rewards \times Transactional | 0.008* (0.003) | 0.008** (0.003) |
| Δ Pecuniary Rewards \times Transactional | 0.003 (0.002) | 0.003 (0.002) |
| Job Satisfaction t_1 | -0.451** (0.019) | -0.454** (0.019) |
| High Absences (1=two or more absences) | -0.195* (0.098) | -0.196* (0.099) |
| Public Organization (public=1) | -0.103 (0.087) | |
| Daycare (daycare=1) | | 0.070 (0.076) |
| Finance (tax office or bank=1) | | -0.018 (0.083) |
| Constant | 3.588** (0.183) | 3.498** (0.176) |
| R-Squared | 0.2597 | 0.2598 |
| N | 3848 | 3848 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A6: Do changes in leadership behaviors perceived by leaders also affect employee job satisfaction?

| | Model 1 | Model 2 | Model 3 |
|---|--------------------|--------------------|---------------------|
| Δ Transformational Leadership \times TF training | 0.014** (0.005) | 0.014** (0.005) | 0.010* (0.004) |
| Δ Verbal Rewards \times Transformational | 0.017** (0.004) | 0.017** (0.004) | 0.014** (0.003) |
| Δ Verbal Rewards \times Combined | 0.011* (0.005) | 0.011* (0.005) | 0.009* (0.004) |
| Δ Verbal Rewards \times Transactional | 0.011** (0.003) | 0.011** (0.003) | 0.008* (0.003) |
| Δ Pecuniary Rewards \times Transactional | 0.000 (0.003) | 0.001 (0.003) | 0.002 (0.002) |
| Δ Transformational Leadership (leader) | 0.006+ (0.003) | 0.007* (0.003) | 0.005 (0.003) |
| Δ Verbal Rewards (leader) | 0.001 (0.003) | 0.001 (0.002) | 0.001 (0.002) |
| Δ Pecuniary Rewards (leader) | 0.000 (0.002) | 0.000 (0.002) | 0.002 (0.002) |
| Transformational Leadership Training | | -0.037 (0.099) | -0.071 (0.093) |
| Combined Leadership Training | | -0.161 (0.129) | -0.025 (0.111) |
| Transactional Leadership Training | | -0.178+ (0.097) | -0.074 (0.086) |
| Job Satisfaction t_1 | | | -0.451** (0.020) |
| High Absences (1=two or more absences) | | | -0.213* (0.098) |
| Constant | 0.076 (0.047) | 0.175* (0.071) | 3.560** (0.170) |
| R-Squared | 0.0329 | 0.0345 | 0.2665 |
| N | 3570 | 3570 | 3570 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A7: The effects of employee job satisfaction on intention to leave their job

| | Model 1 | Model 2 |
|---|---------------------|---------------------|
| Δ Job Satisfaction | -0.055** (0.011) | -0.180** (0.012) |
| Δ Transformational Leadership \times TF training | 0.001 (0.002) | -0.000 (0.002) |
| Δ Verbal Rewards \times Transformational | -0.004** (0.002) | -0.003* (0.001) |
| Δ Verbal Rewards \times Combined | -0.003+ (0.001) | -0.002+ (0.001) |
| Δ Verbal Rewards \times Transactional | -0.002 (0.002) | -0.002+ (0.001) |
| Δ Pecuniary Rewards \times Transactional | -0.003* (0.001) | -0.002 (0.001) |
| Job Satisfaction t_1 | | -0.247** (0.010) |
| High Absences (1=two or more absences) | | -0.012 (0.043) |
| Constant | 1.986** (0.024) | 3.874** (0.089) |
| R-Squared | 0.0196 | 0.2158 |
| N | 3668 | 3668 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A8: The effects of employee job satisfaction on intention to leave their organizations

| | Model 1 | Model 2 |
|---|---------------------|---------------------|
| Δ Job Satisfaction | -0.079** (0.011) | -0.247** (0.012) |
| Δ Transformational Leadership \times TF training | -0.000 (0.002) | -0.002 (0.002) |
| Δ Verbal Rewards \times Transformational | -0.002 (0.002) | -0.000 (0.001) |
| Δ Verbal Rewards \times Combined | -0.001 (0.002) | -0.000 (0.001) |
| Δ Verbal Rewards \times Transactional | -0.002 (0.002) | -0.002+ (0.001) |
| Δ Pecuniary Rewards \times Transactional | -0.003* (0.001) | -0.001 (0.001) |
| Job Satisfaction t_1 | | -0.334** (0.008) |
| High Absences (1=two or more absences) | | 0.036 (0.042) |
| Constant | 2.217** (0.024) | 4.759** (0.065) |
| R-Squared | 0.0259 | 0.3610 |
| N | 3662 | 3662 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A9: Testing the effects of common variance of all leadership items on the job satisfaction model

| DV: Δ Job Satisfaction | Model 1 |
|---|---------------------|
| Δ Transformational Leadership (employee) | 0.005** (0.002) |
| Δ Verbal Rewards (employee) | 0.005** (0.002) |
| Δ Pecuniary Rewards (employee) | -0.001 (0.001) |
| Δ Transformational Leadership (leader) | 0.005 (0.003) |
| Δ Verbal Rewards (leader) | 0.003 (0.002) |
| Δ Pecuniary Rewards (leader) | 0.001 (0.001) |
| Transformational Leadership Training | -0.114 (0.089) |
| Combined Leadership Training | -0.182+ (0.107) |
| Transactional Leadership Training | -0.187* (0.080) |
| Job Satisfaction t_1 | -0.516** (0.020) |
| High Absences (1=two or more absences) | -0.177+ (0.096) |
| Public Organization (public=1) | -0.073 (0.093) |
| Finance (tax office or bank=1) | -0.277** (0.086) |
| Daycare (daycare=1) | -0.085 (0.082) |
| Common Variance Factor | 0.417** (0.039) |
| Constant | 4.276** (0.185) |
| R-Squared | 0.3112 |
| N | 3463 |

Note: + $p < 0.10$, * $p < 0.05$, ** $p < 0.01$; robust clustered standard errors in parentheses; two-tailed test.

Table A10: Heckman selection model predicting changes in job satisfaction among full sample

| Regression model: Δ Job Satisfaction | β | S.E. |
|--|---------|---------|
| Δ Transformational Leadership | 0.013* | (0.003) |
| Δ Verbal Rewards | 0.012* | (0.003) |
| Δ Pecuniary Rewards | 0.006* | (0.003) |
| Transformational Leadership Training | -0.162 | (0.213) |
| Combined Leadership Training | -0.131 | (0.213) |
| Transactional Leadership Training | -0.344 | (0.221) |
| High Absences (two or more absences=1) | -0.184 | (0.157) |
| Job Satisfaction t_1 | -0.573* | (0.047) |
| Public Organization (Public=1) | -0.126 | (0.197) |
| Finance (Tax offices or Bank=1) | -0.285 | (0.148) |
| Daycare (Daycare=1) | -0.005 | (0.141) |
| Constant | 7.958* | (1.047) |
| N (uncensored) | 3,848 | |
| Selection model: responding to both job satisfaction survey items in t_1 and t_2 | | |
| Job Satisfaction t_1 | 0.020* | (0.008) |
| Transformational Leadership Training | 0.025 | (0.046) |
| Combined Leadership Training | 0.020 | (0.046) |
| Transactional Leadership Training | 0.087 | (0.047) |
| Transformational Leadership t_1 | 0.002* | (0.001) |
| Verbal Rewards t_1 | 0.002* | (0.001) |
| Pecuniary Rewards t_1 | 0.003* | (0.001) |
| Constant | -0.023* | (0.075) |
| Mill's λ | -5.285* | (1.203) |
| N | 6,169 | |
| Wald χ^2 | 193.67 | |

Note: * $p < 0.05$; robust standard error; two-tailed test.