Becoming a transformational and/or transactional leader

Leadership Training Effects on Employee Perceptions of Leadership

Abstract

Being an active leader, also in the eyes of the employees, is very important, and a key question is whether leadership training can contribute to this. This article presents the results of a large-scale field experiment where public and private leaders were randomly assigned to a control group or one of three leadership training modules aimed at affecting employee-perceived transformational and/or transactional leadership. The participating leaders are from different Danish organizations: Primary and secondary schools, daycare centers, and tax and bank units. All participating leaders and employees were surveyed before and after the training programs, providing us with panel data from 4,782 employees from 474 organizations. We find that the three leadership training programs significantly affected the level of employee-perceived leadership in the intended directions, indicating that leaders can actually be made.

Practitioner points:

- Leaders can be made and are not (only) born with skills relevant for public sector leadership.
- Leaders actually implement the specific tools they are taught during leadership training – also in the eyes of their employees.
- Leader training is worthwhile in the sense that employees afterwards see their leaders as more active in the intended directions.

Introduction

Despite substantial improvements in public leadership scholarship (as documented by for example Van Wart 2013), there are still gaps in our understanding of leadership in public organizations. Importantly, Seidle, Fernandez and Perry (2016:1) argue that a notable gap entails understanding of the impact of leadership training and development. The general understanding in the literature is that leadership can, at least to some degree, be learned (Van Wart 2013: 533; Avolio et al. 2009), but only few field experimental studies evaluate the effects of leadership training. The few field experiments that have been carried out all investigate the effect of transformational training and generally find positive effects of leadership training (e.g. Dvir et al. 2002). Several researchers have, however, called for additional research in different environments, groups, samples and settings (Day 2013; Fernandez 2005; Vandenabeele 2008; Trottier et al. 2008; Moynihan et al. 2012; Wright et al. 2012). This is highly relevant, especially given that Seidle, Fernandez and Perry (2016) have recently documented a positive effect of leadership training on organizational effectiveness in a U.S. Department of Defense installation. This article continues this important research by investigating whether leadership training has a positive effect on the employees' perception of their leader as more active in the intended direction. Does leadership training, in other words, work in the eyes of the employees?

Focusing on employee perception is very relevant, given that the leadership literature highlights the importance of distinguishing between a leader's self-reports and employees' reports about a leader's behavior (e.g. Bass and Yammarino 1991; Fleenor et al. 2010; Jacobsen & Andersen 2015). We agree with Seidle et al. (2016: 1) when they argue that it is critical that we learn more about the effectiveness of leadership training and development programs, and there are at least two arguments for measuring the effects of leadership training as perceived by leaders' employees. First, leaders overrate their use of socially

desirable leadership strategies, especially before they are trained. Second, if the employees do not perceive the leadership, it will hardly affect performance (Jacobsen and Andersen 2015).

Reporting results from a big Danish leadership field experiment, this article contributes with experimental evidence on how leadership training affects employee-perceived leadership. We report training effects of transformational leadership training, transactional leadership training and of a combined transactional and transformational leadership training program. The transactional leadership strategy is based on a *quid pro quo* logic, where leaders apply rewards contingent on effort and/or results; the transformational leadership strategy is the leaders' attempts to develop, share, and sustain a vision in order to motivate employees to transcend their own self-interest and achieve organization goals. We thus focus on leadership strategies with previously documented positive effects on organizational goal attainment and performance.

By including the transactional leadership strategy and a combination of transactional and transformational leadership strategy in our field experiment, we add a unique contribution to the existing literature as our field experimental evidence allows us to investigate the effect of the same type of training in *different* classic leadership strategies. Furthermore, our evidence is based on training of leaders from different organizations, which provide either welfare or financial services, allowing us to investigate whether the leadership training programs are applicable to leaders of different types of organizations.

More specifically, we invited Danish leaders from primary and secondary schools, daycare centers and tax and bank units[1] to participate in a leadership training program for

[1] All investigated organizations have one direct leader of the employees which is the reason for seeing them as separate units. All the organizations except the higher secondary schools are part of a bigger hierarchy. Primary and lower secondary schools (referred to as primary schools in the rest of the paper) in Denmark teach 6-15 year-olds. The schools referred to as secondary schools cover upper secondary school functions (typically teaching 15-19 year-olds).

free. The leaders were told that their participating in the field experiment meant that proximately ¾ would be attending one of the leadership training programs and ¼ would be assigned to the control group. A total of 506 leaders participated in the experiment to the end. 359 leaders were randomly assigned to one of three training modules, and the remaining 147 to the control group. We have pre- and post-training employee questionnaire answers from 474 of these organizations. This information about the employee-perceived leadership strategies allows us to investigate training effects in an experimental difference-in-difference design with a total of 4,782 employees, who replied in both surveys. Given that we want to isolate the training effect on employee perceptions of their leader, we focus on employees who participated in surveys both before and after the training took place. This allows us to controls for all time-invariant individual employee factors.

The article is structured as follows: We first go into depth with the investigated leadership strategies and then compare our training programs to previous experimental studies. After discussing recruitment, randomization and principles in our training programs, we formulate six hypotheses concerning the effect of the leadership training on employee-perceived leadership behavior. The next step is then to describe our measures of employee-perceived leadership strategies. After a presentation of the most important results and the key findings from a number of robustness tests, a concluding discussion closes the article.

Investigated Leadership Strategies

The classic distinction between “hard” leadership based on stick or carrot and “soft” leadership based on increasing the employees’ motivation to achieve organizational goals is often conceptualized using the transformational and transactional leadership approach (Bass, 1985). We focus on behavioral aspects of both transformational and transactional leadership and in line with public administration studies of transformational leadership we emphasize

the visionary element of transformational leadership (Wilson 1989; Wright 2007; Wright and Pandey 2010; Wright et al. 2012). Thus, we argue that transformational leadership entails three central aspects: The transformational leader 1) develops a vision of the core goals of the organization, 2) strives to share this vision with the employees, and 3) makes an effort to sustain the shared vision in the long term. We conceptualize transformational leadership as all three behaviors. According to this understanding, leadership is thus dependent on the leaders' actions, but not on the actual effects of the leadership strategy that may or may not occur. In sum, we define transformational leadership as "*behaviors seeking to develop, share, and sustain a vision intended to encourage that employees transcend their own self-interest and achieve organization goals"*.

While transformational leadership is focused on changing employees, transactional leadership is focused on directing employees. Thus, transactional leadership is the use of contingent rewards (and sanctions) in order to make employees pursue their own self-interest in a way that increases organizational goal attainment. When rewards (and sanctions) are contingent on employee efforts and/or results, employees' self-interest in obtaining the rewards or avoiding the sanctions is expected to make them more focused on these types of effort and/or results. This is, of course, under the assumption that they value the rewards and want to avoid sanctions. As House (1998) points out, a transaction may consist of an exchange of pecuniary/near-pecuniary rewards (e.g. bonuses), non-pecuniary rewards (e.g. praise) or sanctions for a certain pre-defined effort. We see the three types as *alternative ways* to conduct transactional leadership, but use of sanctions has not been shown to have positive effects, which makes it unethical to teach leaders to use sanctions as a general leadership strategy. No participant or organization should be made worse off from participating in the experiment, and we therefore only taught the participants to use leadership behaviors with documented positive effects. We

accordingly see transactional leadership strategies as *the use of contingent rewards and sanctions intended to create employee self-interest in achieving organization goals*, and the transactional training program therefore focuses on contingent rewards. Figure 1 shows our understanding of transformational leadership (right part of the figure) and transactional leadership.

[FIGURE 1 ABOUT HERE]

Originally, transformational and transactional leadership strategies were posited as conflicting (Burns 1978), but this is not necessarily true (Bass 1990; Waldman et al. 1990; Rainey 2009). Existing studies (Egger-Peitler et al. 2007; Gabris and Ihrke 2000; Rowold 2011; Hargis et al. 2011; O'Shea et al. 2009; Bass et al. 2003) actually suggest that combined transactional/transformational leadership leads to even higher performance than any of the leadership strategies separately, and this makes it highly relevant to also include a combined transformational/transactional training program.

This Field Experiment Compared to Existing Leadership Training Field Experiments

Although the literature on leadership training in public organizations is sparse (see Seidle et al. 2016 for an overview), there is a long tradition for studying leadership training in the generic management literature (Doh 2003). A recent meta-analysis identifies 62 experimental studies of leadership training and development, and the average training effects in these studies are reported to be predominantly positive, which indicates that leadership can to some extent be taught (Avolio et al. 2009). However, a great number of these studies are lab experiments, and these designs put few constraints on the leaders, limiting the external validity. We have identified only six field experimental studies (with randomization into control and treatment groups) that report measures on the effect of

leadership training (Barling et al. 1996; Kelloway et al. 2000; Dvir et al. 2002; Parry and Sinha 2005; Hassan et al. 2010; Hardy et al. 2010), and they all investigate the effect of transformational training.

The findings are relatively consistent. All studies report significant increases in the transformational leadership strategies employed by participants (Barling et al. 1996; Kelloway et al. 2000; Parry and Sinha 2005; Hassan et al. 2010) and/or significant effects on performance through the enhancement of transformational strategies (Kelloway et al. 2000; Dvir et al. 2002). Transformational leadership training has also proven to affect employee attitudes and behaviors such as employee commitment (Barling et al. 1996), employee development (Dvir et al. 2002), satisfaction with leadership (Parry and Sinha 2005; Hassan et al. 2010) and employee effort (Parry and Sinha 2005)). In sum, there is some evidence that leaders can be taught to exert more active leadership. However, field experimental evidence on training effects of transactional leadership and combinations of transactional and transformational leadership is needed.

New experimental evidence is especially useful if it is based on treatments that can at least match existing experimental studies in terms of intensity and scope. In relation to intensity, Parry and Sinha (2005) have the strongest treatment with a three-month program consisting of four days of intervention. Dvir et al. (2002) have a three-days leadership workshop, while Barling et al. (1996) and Kelloway et al. (2000) both have a one day workshop, four follow up sessions (Barling et al. 1996) and/or a 1 hour counselling session (Kelloway et al. 2000) respectively. Hassan et al. (2010) report four sessions but give no information about total training time. In relation to scope, the existing studies include no more than 54 leaders (32 for treatment group and 22 for control group) (Dvir et al. 2002) with no more than 50 leaders receiving training (all participating leaders, no control group) (Parry and Sinha 2005). In contrast, the

experiment presented in this article includes 506 leaders who were invited to participate in the project and randomly assigned to either a training program or the control group. Potential participants were informed that volunteering presented a 75 percent chance of receiving one year's leadership training, equal to 28 hours leadership training combined with a 600-page curriculum and coursework between meetings. Additional details about the experiment and the training programs are provided below.

Recruitment, Randomization and Principles in Training Programs

Recruitment

For primary and secondary schools and day care (public as well as private), we invited all relevant leaders in Denmark, whereas leaders from banks and tax were invited through their HR departments. Table 1 details the number of leaders invited and the number of leaders who signed up. The leaders were required to fill out a pre-training survey before signing up for the experiment, and there was quite a bit of variation in the subtypes of investigated leaders in terms of the percentage who replied to the pre-training survey and the percentage who subsequently signed up for the experiment. The tendency is that higher percentages of hierarchically higher placed leaders (where leadership tasks take up more of their time) replied and signed up. The leaders were only allowed to sign up if they had not already completed or signed up elsewhere for similar leadership training, and they were not allowed to enroll in other leadership training programs during the experiment period. This also applied to the leaders who ended up in the control group.

We successfully recruited the intended number of participants from primary schools, tax units and daycare centers. For secondary schools and banks we only managed to recruit 41 and 45 participants, respectively. Many leaders of secondary schools had already completed similar leadership training (many at Master's level), and the banks'

HR departments were unexpectedly skeptical due to a preference for internal training programs. The high participation rates among leaders in banks and tax who had answered the questionnaire reflect that leaders were selected for the project by HR departments in their organization.

[TABLE 1 ABOUT HERE]

Table 1 also shows that 506 of the 672 leaders who first signed up for experiment continued in the project until the end. There was no systematic difference in dropout percentages between the control group and in the three training programs. Among the 166 leaders who dropped out during the training period, 33 percent left due to involuntary causes. This was for example personal problems (6 percent of the 166 leaders who dropped out), disease (also 6 percent) and job switches to other sectors (21 percent). The remaining 67 percent left for other reasons such as training-related matters (9 percent of the 166 leaders who dropped out), busyness (28 percent), and unspecified cancellations (31 percent).

Primary schools went through a major government-initiated reform during the training program, and while this made the leadership training highly useful for the school principals, many of them changed jobs or had too little time to participate. Major changes also happened in some of the other participating organizations. Tax was for example under intense political and public pressure during the experimental period, and many daycare leaders experienced structural changes in their municipalities.

Randomization and Assignment to Classes and Teachers

After the leaders signed up, we used a stratified random sampling method to assign participants to training programs and control group. We used strata to ensure an even representation of leaders from all areas in training programs and control group, and we

used random assignment within areas to avoid selection bias (Angrist and Pischke 2009: 15). This random assignment ensures that participants were initially distributed on the different groups independently of potential outcomes. The participating leaders were first stratified into the nine subtypes of leaders studied in the project (cf. table 1). Within each subtype, random numbers (drawn from the website random.org) were assigned to all leaders, and this randomly ordered list was merged with a list containing equal shares of integer numbers from 1-4 (1: transformational, 2: combination 3: transactional, and 4: control) in random order.

Based on participants' geographical workplace location, the leaders in each training program were distributed to seven classes with 15-25 participants (resulting in a total of 21 classes). Four teachers (professors in economics, organizational behavior, or public administration) performed the training (the same teacher taught all lessons for a given class). Each teacher taught classes from all programs and was randomly assigned to specific classes (as shown in Table A9 in the Appendix). During the training period, the teachers noted a few inconsistent differences between classes (probably due to social group mechanisms and maybe also practical problems, for example with the room in which teaching took place). The teachers also experienced that class room dynamics functioned better in some classes than others, but having "only" 21 classes makes it difficult to differentiate between random variation at the class level and teacher effects. Most importantly, the training effects do not differ systematically between teachers.

The experimental period started after the initial employee survey (which took place between August 25 and September 16 2014) and stopped before the second employee survey (which was open between August 25 and September 16 2015). Participating leaders who were unable to participate in a given session were offered (in order of priority) to participate in another class in the given program taught by the same

teacher, another class in the program taught by another teacher or seeing a recording of the training session combined with a subsequent discussion with the teacher. Since some leaders in the different training programs are colleagues of leaders in the control group, there is a potential spillover effect to leaders in the control group or to leaders in different training programs. This makes the test more conservative since results would be even stronger without spillover.

Principles in training programs

The training programs were developed based on existing literature on leadership training and development and are very much in line with the principles used in the leadership training studied by Seidle et al. (2016), namely a combination of coaching, classroom instruction, feedback, and experiential training. Holten, Bøllingtoft and Wilms (2015) discuss how the teaching and learning principles in the experiment are based on experiential learning theory (Guthrie and Jones 2012), action learning (Curry 2012), combining learning formats (Curry 2012), alignment of leadership development with business strategy (Thomas et al. 2012), multiple source feedback (Bailey and Fletcher 2002), structured and supported activities (Guthrie and Jones 2012) and role modelling.

To strengthen skill building and application of the training modules, we supplemented lectures and group discussion during the training sessions with network groups and individual action plans. On average, network groups consisted of five members with leaders from at least three different types of organizations. Mixing leaders with different experience facilitated that the leaders discussed their challenges and attempted solutions with leaders of very different organizations. The participants also worked on individual action plans in which they reflected on how to implement tools presented in the training program. The action plans were submitted to the teacher before

each of the four sessions, and each action plan was given individual feedback from the teacher and from the network group participants. Finally, the participants received leadership stimuli via text messages (reminding them to think about and use the relevant type of leadership tools) between sessions.

A field experiment has multiple ethical dilemmas such as how much the participants should know about the experiment, and how to handle dropouts and requests for changing training programs. Concerning the information to the participants, we informed them that the training would teach them to employ tools that improve organizational goal attainment, while we did not tell them about our theoretical hypotheses. Participation was voluntary, without reporting of their participation to their superiors and they were allowed to withdraw from the project at any time.

Teaching materials were developed by all four teachers and a fifth researcher with experience from a previous leadership intervention. Teaching material (e.g. curriculum, information material, PowerPoint presentations and exercises), structure (e.g. timing of lectures and group works) and written communication were identical among classes within a training program, and only the substantial content varied between programs. Prior to the actual training all teaching was calibrated in the presence of all teachers.

Expected Effects on Employee-Perceived Leadership

The training programs are aimed at enabling the leaders to motivate their employees to work towards goal attainment, and increased performance is therefore the ultimate goal. The three leadership strategies represent different ways to achieve this higher goal attainment, and this article tests whether the training succeeded in affecting the leaders to increase their use of the strategy taught in their program. This is done by comparing how employees evaluate their leader's leadership strategy before and after the training –

relative to the control group. We follow the tradition of using employee ratings of leadership to measure leadership (Antonakis and House 2014; Trottier et al. 2008; Wright et al. 2012), because the self-other leadership assessment literature (e.g. Fleenor et al. 2010; Jacobsen and Andersen 2015) shows that leaders tend to overrate their use of socially desirable leadership strategies, especially before they are trained.

The transformational program focused on improving the leaders' knowledge of and ability to use visions to motivate and direct employees. Given that this program did not focus on rewards, we only expect a training effect on perceived transformational leadership:

H1: The transformational leadership training program positively affected employee-perceived transformational leadership.

The transactional leadership program was focused on improving the leaders' knowledge of and ability to use contingent rewards, and we expect positive effects on the employees' perception of whether their leader uses contingent rewards (both non-pecuniary and pecuniary contingent rewards as specified in hypothesis 2 and 3).

H2: The transactional leadership training program positively affected employee-perceived use of contingent non-pecuniary rewards.

H3: The transactional leadership training program positively affected employee-perceived use of contingent pecuniary rewards.

The combined transformational/transactional training program focused on improving the leaders' use of both transformational and transactional leadership. Due to the combination of transformational and transactional leadership there was relatively more focus on non-pecuniary than on pecuniary contingent rewards because the link between vision and rewards will often be verbal. However, we still expect positive effects on both types of transactional leadership and on transformational leadership.

H4: The combined leadership training program positively affected employee-perceived use of transformational leadership.

H5: The combined leadership training program positively affected employee-perceived use of contingent non-pecuniary rewards.

H6: The combined leadership training program positively affected employee-perceived use of contingent pecuniary rewards.

To ensure the robustness of the training effects, we have analyzed whether the training programs have heterogeneous effects depending on three factors. First, the leaders come from very different areas, and the training programs may work differently for organizations working with finance, education, and daycare. Second, the leaders have participated to varying degrees. Most participants attended all sessions; some only one or two. The leadership training programs might only have the expected effects when the leaders have participated in all or almost all sessions. Finally, the teachers come from different academic backgrounds, and the leadership training programs may work differently depending on the teachers' backgrounds in economics, organizational behavior, or public administration.

Measuring the Leaders' Use of the Leadership Strategies: Employee-Perceived Leadership

Employees in control and treatment groups were treated in exactly the same way by the researchers in the project, and we also measured leadership behavior both before and after the leadership training in both groups in order to make sure that an identified effect is not due to the fact that exposure to a test can affect scores on subsequent exposures (Shadish Cook, Campbell, 2002). The employees' perceptions of their leader's use of transformational and transactional leadership strategies are thus measured by similar

Likert-scale questions, which were sent in questionnaires to the participating leaders' employees before and after the training programs. To capture leader behavior we include questions about the use of specific contingent pecuniary and non-pecuniary reward and sanction systems (transactional leadership) and about how leaders seek to develop, share and sustain a vision (transformational leadership). See table A1 in the appendix for specific items. Confirmatory factor analysis (table A2) shows that our measurement instruments perform well. All items show significant and high loadings on their respective factors and display good convergent validity with mean lambdas ranging between .75 and .93. Fit indicators also show strong fit for our measurement model (e.g. RMSEA = .032 (pre and post), CFI = 0.96 (pre) and 0.95 (post), and TLI = .94 (pre and post)). One challenge to the measurement model, which also has theoretical implications, is the interfactor correlation between contingent non-pecuniary rewards and transformational leadership factor, which is quite high. We believe that this reflects social desirability bias, which could be particularly strong for these two dimensions given that they are the most positively framed dimensions. However, since we use these measures as dependent variables in this study and control for the same individuals' answers to the same items a year before, we believe that this will not pose a challenge here.

Of the 506 leaders who participated until the post-treatment survey was completed, we have employee survey data from 474 leaders. Some leaders who finished the training program opted out of the employee survey due to organizational concerns, had no employees or no employees responded to the survey. Before signing up for the experiment the leaders were informed that we would survey their employees, and they provided us with relevant contact information. This allowed us to send individual invitations by email to 19,552 employees on August 25 2014. The survey was closed September 16 right before the training programs started. On August 25 2015 (when the

training programs were completed) we contacted the 15,226 employees in the remaining organizations (including new employees according to updated lists provided by the leaders). Employees with an email address received an email invitation (88 percent of the employees in 2014 and 89 percent of the employees in 2015). The rest received closed envelopes with individual codes for survey access. To control for all time-invariant factors, we use a balanced panel with 4,782 employees from 474 organizations. These employees responded in both rounds, and this allows us to estimate changes in perceived leadership during the experimental period very robustly. The panel corresponds to 38.3 percent of the employees who were employed in both rounds. New employees since August 2014 and retirees and job-shifters (between 2014 and 2015) are not included in the analyses in this article, because inclusion of these groups would have prevented us from controlling for (unobserved) individual employee characteristics. Attrition on the organizational level was surprisingly small (only 25 percent), but a few leaders in the transformational training program expressed that they had had similar training in lower level leadership courses and therefore opted out of the project. This potentially explains the slightly lower pre-training level of all leadership dimensions for the leaders who finished the transformational training program compared to the leaders in the other groups (Table A11). This is handled by focusing on *changes* in employee-perceived leadership.

Descriptives and correlations for all variables used in this article can be seen in Table A10 in the Appendix. Given that high initial level of a given leadership strategy is associated with less change in this leadership strategy, we present robustness tests that control for such floor and ceiling effects in the Appendix. High absence and service area are also potentially correlated with perceived leadership (before and after the experimental period), and the robustness tests controlling for this is presented in Table A4 to A8. Given that the results from the main analyses and the robustness tests are quite

similar, the discussion below focuses on the experimentally identified overall effects of leadership training.

Effects of Leadership Training on Employee-Perceived Leadership

To investigate the training effects, we compare changes in perceived leadership between the three training programs and the control group. The logic in this approach is to see whether the difference between before and after varies between employees with leaders who were assigned to a training program and employees with leaders who were not.

Table 2 shows the average training effects in a difference-in-difference analysis (before and after the experimental period, Time = 0 for August 2014 and Time = 1 for August 2015). The analysis includes interaction terms between time and training programs (Time*TFT, Time*CBT and Time*TAT), and the control group is reference category. The coefficient for the Time variable is therefore the change for the control group during the experimental period. This time trend is negative for all three employee perceived leadership strategies, meaning that the employees in the control group perceived less active leadership in August 2015 than in August 2014. We will return to the interpretation of this negative time trend later.

Table 2 indicates that there were no significant differences between the treatment groups and the control group before the training was initiated: Given the inclusion of Time*TFT, Time*CBT and Time*TAT, the three training program variables (TFT, CBT and TAT) estimate differences between the relevant group and the control group when Time = 0, and none of these coefficients are statistically different from zero.

[TABLE 2 ABOUT HERE]

So did it matter whether the leaders received leadership training? The short answer is clearly ‘yes’. All three leadership training programs significantly affected the level of employee-perceived leadership. In accordance with hypothesis 1, model 2.1 in Table 2 shows that the transformational leadership training program led to a positive development in employee-perceived transformational leadership. The positive coefficient for Time*TFT (3.676) is thus approximately twice as large as the negative time trend for the control group, meaning that the transformational leadership training program not only neutralized the negative time trend, it actually increased the level of transformational leadership perceived by the employees.

Turning to the transactional leadership training, hypothesis 2 and 3 expect that transactional leadership training positively affects employee-perceived use of contingent non-pecuniary and pecuniary rewards. While model 2.2 gives some support to hypothesis 2, since the coefficient for Time*TAT is statistically significant in the analysis of employee-perceived contingent non-pecuniary rewards, it should be noted that this only just neutralizes the negative trend in the control group. While it is important knowledge, the support to hypothesis 3 in model 2.3 is stronger, since there is a large and statistically significant effect on employee-perceived contingent pecuniary rewards from transactional leadership training (the coefficient for Time*TAT is 4.377).

We expected that the combined leadership training program would positively affect the use of transformational leadership (hypothesis 4), contingent non-pecuniary rewards (hypothesis 5) and contingent pecuniary rewards (hypothesis 6). As expected in hypothesis 4, model 2.1 in Table 2 shows that the combined training program affected employee-perceived transformational leadership positively. The effect seems to be a little smaller than for the transformational training program, but it is still substantially larger than for the transactional

training program (this effect can be explained by the fact that all training programs emphasized the importance of organizational goals).

Hypothesis 5 (concerning effect of the combined training on employee-perceived contingent non-pecuniary rewards) also receives some support in model 2.2 (Table 2). The positive and statistically significant coefficient for Time*CBT is bigger than for Time*TAT (and Time*TFT), but this effect again only neutralizes the negative time trend in employee-perceived contingent non-pecuniary rewards for the control group, so it is more correct to say that the combined training program prevented a reduction in the use of contingent non-pecuniary rewards.

The positive coefficient in model 2.3 in Table 2 for Time*CBT indicates that the combined training positively affected employee-perceived contingent pecuniary rewards (as expected in hypothesis 6), but the effect is smaller for the combined training program than for the pure transactional training program, and the coefficient for Time*CBT on contingent pecuniary rewards is not statistically significant. This means that the change in employee-perceived contingent pecuniary rewards in the combination group is not statistically different from the development in the control group.

In sum, there is a positive difference between treatment and control group for all three training programs, but it varies whether the training just counteracted a negative trend or actually increased the level of employee perceived active leadership over time. The marginal plots for each training program before and after training period in Figures 2 to 4 below illustrate this. First, regarding the development in the training period in perceived transformational leadership, the negative trend in the control group is shown by the solid line in Figure 2. We see that the training effect on transformational leadership is positive for all three training programs and more than offsets the negative time trend.

[FIGURES 2-4 ABOUT HERE]

Our interpretation is that the negative time trend in the control group is due to the fact that these leaders did not develop their leadership skills during the period. Although it is possible that the control group leaders' disappointment (because they did not get the free leadership training) affected their employees, it is implausible for three reasons. First, all participating leaders knew that they had only 75 percent chance of receiving leadership training. Second, leadership is measured among employees who probably did not even know that their leader had been offered a chance to receive leadership training. Third, the participating organizations were – similar to many other public and private organizations in this period – under intense external pressure, making it plausible that the employees perceived less visible leadership unless the leader actually developed his/her leadership in a training program.

Regarding contingent non-pecuniary rewards (Figure 3), there is also a strong negative development over time in the control group, whereas the employee-perceived use of this leadership strategy is maintained at the same level in the training groups with a small increase in the combined training group. For contingent pecuniary rewards, Figure 4 illustrates decreased use in the control group, whereas levels are maintained in the transformational and combination groups, but strongly increased in the transactional training group.

Figure 2 to 4 also clearly show the mentioned lower initial level of employee-perceived leadership in the transformational training group among the organizations remaining in the project. To further control for this bias, we test the robustness of the results using a first-difference approach, which allows us to control statistically for initial level of employee-perceived leadership (for all three types of leadership strategies). In addition to allowing us to control for the initial level of perceived leadership, the first-difference approach also simplifies moderation analyses, which we use to test for heterogeneous effects. Given that none of these robustness tests substantially change the overall findings, they are

shown in the Appendix and only briefly commented on below. The dependent variable in first-difference analyses is the *change* in perceived leadership. In a two-period setup, it is equivalent to a difference-in-difference approach, and table A3 in the appendix therefore gives almost the same results as the difference-in-difference models shown in Table 2. Table A3 consistently shows that the initial level of the relevant leadership strategy is negatively associated with the size of the change in the leadership strategy over time, which can reflect a ceiling effect – there is more room for increasing the use of a leadership strategy if initial leadership was low and less room if initial leadership was high. This indicates that training effects are larger when the need for leadership is higher.

The robustness tests controlling for absence during training sessions (table A4) show higher training effects for leaders with low absence. There may, however, be some self-selection in participation, and the key result is thus that the moderated first-difference analysis where training effects are made dependent on absence (Table A4) shows even clearer results than Table 2.

Separate analyses for the four service areas in the project that are large enough for independent analysis also confirm the main findings. First-difference analyses of secondary schools, primary schools, daycare, and tax units are shown in Table A5-A8 in the Appendix thus show consistent results across areas. All effects are in the same direction and more or less equal in size, although the statistical significance is naturally lower due to fewer observations. When controlled for initial leadership strategy, the training effect on transformational leadership is strongest for the combined training program in all four areas, while the relative strength of the effects of the combined and transactional training programs on contingent non-pecuniary and pecuniary rewards varies a bit between areas.

Based on these analyses, the overall conclusion is that leadership training had the intended effects and that the transformational and combined training programs had the largest

effects on transformational leadership, while the transactional and combined training programs had the largest effect on contingent non-pecuniary and pecuniary rewards.

Concluding Discussion

Based on a large-scale field experiment with 506 leaders and their 4,782 employees, the article has investigated how leadership training affects employee perceptions of their leader's leadership strategy. If employee perceptions of leadership have been changed, it strongly suggests that the leaders have actually implemented the training they received.

The effects of the training programs are quite clear and overwhelmingly positive. Employee-perceived transformational leadership was affected positively in all three training programs. Unless we controlled for initial leadership, the effects were largest for leaders who participated in the transformational training program. Including control for initial leadership reveals that the combined training program consistently affects transformational leadership more when this is controlled for. The leaders who participated in the transactional training program triggered the smallest increase in their employees' perception of their use of transformational leadership, but the development was still significantly more positive than in the control group, which experienced a significant decrease in all three types of active leadership strategies.

All three training programs required that the leader to some extent clarified the goals in the organization, although it was done in different ways. The fact that the combined training program produced the largest increase in transformational leadership controlled for initial leadership strategy is in line with existing studies that argue that combinations of transformational and transactional leadership are the most effective leadership approach (Bass and Riggio 2006; Rowold 2011; Hargis et al. 2011; O'Shea et al. 2009; Bass et al. 2003).

Employee-perceived contingent rewards were also affected very systematically by the training programs. The combined leadership training program increased the perceived use of contingent non-pecuniary rewards most, whereas the transactional training program had a sizeable training effect on perceived use of contingent pecuniary rewards. These effects were in line with the content of the training programs, since the combined program offered a more cautious approach to the use of contingent pecuniary rewards than the transactional training program where leaders were trained more to use pecuniary rewards (given that the link to the organizational vision was not prioritized in the training). Controlling for training attendance only strengthens the results, and the training effects do not depend systematically on the leaders' service area. Thus, the training programs seem to be applicable to leaders of different types of organizations.

Although a field experimental design is very strong, the study has some limitations, which should be taken into account. In this article, where we investigate employee perceptions in fixed effect and first-difference regressions, and where we only manipulate the leaders experimentally (employees in control and training groups received exactly the same stimuli, except the indirect effect via their leader), a potential challenge is leader attrition. Although 75 percent of the leaders remained in the project we find differences in initial levels of active leadership between the transformational training program and the rest of the programs. This could have been a problem for internal validity, but we focus on the same individuals' changes in employee-perceived leadership and also present robustness tests that include the pre-training levels in the comparison to the control group. Since attrition is part of any actual leadership training program, it might even make the average results more externally valid in terms of the expected results if the training programs were offered as a standard leadership training program.

Focusing on employee perceptions of leadership is a very conscious choice, because individual employees will not react to changed leadership behavior unless they perceive it. Affecting employee perceptions is thus an important first step for estimating leadership effects on performance, because employee responses (in terms of motivation, engagement, and behavior) depend on their perceptions of the leadership. This article thus supports that leadership training and development programs are worthwhile investments for public organizations (Seidle et al. 2016), because the leaders' use of active leadership can actually be increased – also in the eyes of their employees.

References

Angrist, JD., and JS. Pischke. 2009. *Mostly harmless econometrics: an empiricist's companion*. Princeton: Princeton University Press.

Antonakis, J., BJ. Avolio, and N. Sivasubramaniam. 2003. Context and leadership: an examination of the nine-factor full-range leadership theory using the Multifactor Leadership Questionnaire. *The Leadership Quarterly* **14**:261–95.

Antonakis, J. & R.J. House (2014). Instrumental leadership: Measurement and extension of transformational–transactional leadership theory, *The Leadership Quarterly*, 25 (4): 746-771.

Avolio, B.J., R.J. Reichard, S.T. Hannah, F.O. Walumbwa, and A. Chan. 2009. A meta-analytic review of leadership impact research: experimental and quasi-experimental studies. *The Leadership Quarterly* **20** (5):764–84.

Barling, J., T. Weber, and EK. Kelloway. 1996. Effects of transformational leadership training on attitudinal and financial outcomes: a field experiment. *Journal of Applied Psychology* **81** (6):827–32.

Bailey, C., and C. Fletcher. 2002. The impact of multiple source feedback on management development: Findings from a longitudinal study. *Journal of Organizational Behavior* **23**:853–67.

Bass, BM. 1985. *Leadership and performance beyond expectations*. New York: The Free Press.

Bass, BM. 1990. From transactional to transformational leadership: learning to share the vision. *Organizational Dynamics* **18** (3):19–31.

Bass, BM, BJ. Avolio, DI. Jung, and Y. Berson. 2003. Predicting unit performance by assessing transformational and transactional leadership. *Journal of Applied Psychology* **88** (2):207–18.

Bass, BM. & R.E. Riggio (2006): *Transformational leadership,* 2nd ed. Mahwah, NJ: Lawrence Erlbaum Associates.

Bass, BM, FJ. Yammarino (1991): Congruence of self and others' leadership ratings of naval officers for understanding successful performance. *Applied Psychology: An International Review* **40** (4): 437-454.

Burns, JM. 1978. *Leadership*. New York: Harper & Row.

Curry, CD. 2012. Best practices in leadership development. In *The encyclopedia of human resource management: thematic essays*, eds. W.J. Rothwell and G.M. Benscoter, 3–22. New York: John Wiley & Sons, Inc.

Day, D.V. 2013. Training and developing leaders: theory and research. In *The oxford handbook of leadership*, ed. M.G. Rumsey, 76–93. Oxford: Oxford University Press.

Doh, JP. 2003. Can leadership be taught? Perspectives from management educators. *Academy of Management Learning and Education* **2** (1):54–67.

Dvir, T., D. Eden, BJ. Avolio, and B. Shamir. 2002. Impact of transformational leadership on follower development and performance: a field experiment. *The Academy of Management Journal* **45** (4):735–44.

Egger-Peitler, I., G. Hammerschmid, and R. Meyer. 2007. Motivation, identification, and incentive preferences as modernization and HR strategies in local government — first evidence from Austria. Paper presented at the Annual Conference of the European Group of Public Administration, Madrid, Spain, September 19–22.

Fernandez, S. 2005. Developing and testing an integrative framework of public sector leadership: evidence from the public education arena. *Journal of Public Administration Research and Theory* **15** (2):197–217.

Fleenor, JW., JW. Smither, LE. Atwater, PW. Braddy, and RE. Sturm. 2010. Self–other rating agreement in leadership: a review. *Leadership Quarterly* **21** (6):1005–34.

Gabris, GT., and DM. Ihrke. 2000. Improving employee acceptance toward performance appraisal and merit pay systems: the role of leadership credibility. *Review of Public Personnel Administration* **20** (1):41–53

Guthrie, KL. and TB. Jones. 2012. Teaching and learning: using experimental learning and reflection for leadership education. *New Directions for Student Services* **140**:53–63.

Hargis, MB., JD. Watt, and C. Piotrowski. 2011. Developing leaders: examining the role of transactional and transformational leadership across business contexts. *Organization Development Journal* **29** (3):51–66.

Hardy, L., CA. Arthur, G. Jones, A. Shariff, K. Munnoch, I. Isaacs, and AJ. Allsopp. 2010. The relationship between transformational leadership behaviors, psychological, and training outcomes in elite military recruits. *The Leadership Quarterly* **21**:20–32.

Hassan RA., BA. Fuwad, and AI. Rauf. 2010. Pre-training motivation and the effectiveness of transformational leadership training: an experiment. *Academy of Strategic Management Journal* **9** (2): 1-8.

Holten, AL., A. Bøllingtoft and I. Wilms. 2015. Leadership in a changing world: developing managers through a teaching and learning programme. *Management Decision* **53** (5):1107–24.

House, RJ. 1998. Appendix: measures and assessments for the charismatic leadership approach: scales, latent constructs loadings, Cronbach alphas, interclass correlations. In *Leadership: The Multiple-Level Approaches. Contemporary and Alternative*, eds. F. Dansereau and F. J. Yammarino, 23–30. London: JAI Press.

Jacobsen, Christian B., and Lotte B. Andersen. 2015. Is leadership in the eye of the beholder? A study of intended and perceived leadership practices and organizational performance. *Public Administration Review* **75** (6):829–41.

Kelloway, EK., J. Barling, and J. Helleur. 2000. Enhancing transformational leadership: the roles of training and feedback. *Leadership & Organization Development Journal* **21** (3):145–49.

Moynihan, DP., SK. Pandey, and BE. Wright. 2012. Setting the table: How transformational leadership fosters performance information use. *Journal of Public Administration Research and Theory* **22** (1):143–64.

O'Shea, PG., RJ. Foti, NMA. Hauenstein, and P. Bycio. 2009. Are the best leaders both transformational and transactional? A pattern-oriented analysis. *Leadership* **5** (2):237–259.

Parry, KW., and PN. Sinha. 2005. Researching the trainability of transformational organizational leadership. *Human Resource Development International* **8** (2):165–83.

Podsakoff, PM., WH. Bommer, NP. Podsakoff, and SB. MacKenzie. 2006. Relationships between leader reward and punishment behavior and subordinate attitudes, perceptions,

and behaviors: a meta-analytic review of existing and new research. *Organizational Behavior and Human Decision Processes* **99** (2):113–42.

Rainey, H. 2009. *Understanding and managing public organizations*. San Francisico: Jossey-Bass.

Rowold, J. 2011. Relationship between leadership behaviors and performance. The moderating role of a work team's level of age, gender, and cultural heterogeneity. *Leadership & Organization Development Journal* **32** (6):628–47.

Seidle, B., Fernandez, S. and Perry, J. L. 2016. Do Leadership Training and Development Make a Difference in the Public Sector? A Panel Study. *Public Administration Review*. doi: 10.1111/puar.12531 (early view).

Shadish, William R.; Thomas D. Cook, Donald T. Campbell. 2002. *Experimental and quasi-experimental designs for generalized causal inference*. Boston: Houghton Mifflin.

Thomas, RJ., C. Jules, and DA. Light. 2012. Making leadership development stick. *Organizational Dynamics* **41**:72–77.

Trottier, T., M. Van Wart, and XH Wang. 2008. Examining the nature and significance of leadership in government organizations. *Public Administration Review* **68** (2):319–33.

Van Wart, Montgomery. 2013. Administrative leadership theory: a reassessment after 10 years. *Public Administration* **91** (3):521–43.

Vandenabeele, W. 2008. Leadership promotion of public service values: transformational leadership as an institutional explanation for individual public service motivation. Paper presented at the International Research Society on Public Management XII Conference. Brisbane, 26–28 March.

Waldman, DA., BM. Bass, and FJ. Yammarino. 1990. Adding to contingent-reward behavior: the augmenting effect of charismatic leadership. *Group & Organization Management* **15**:381–394.

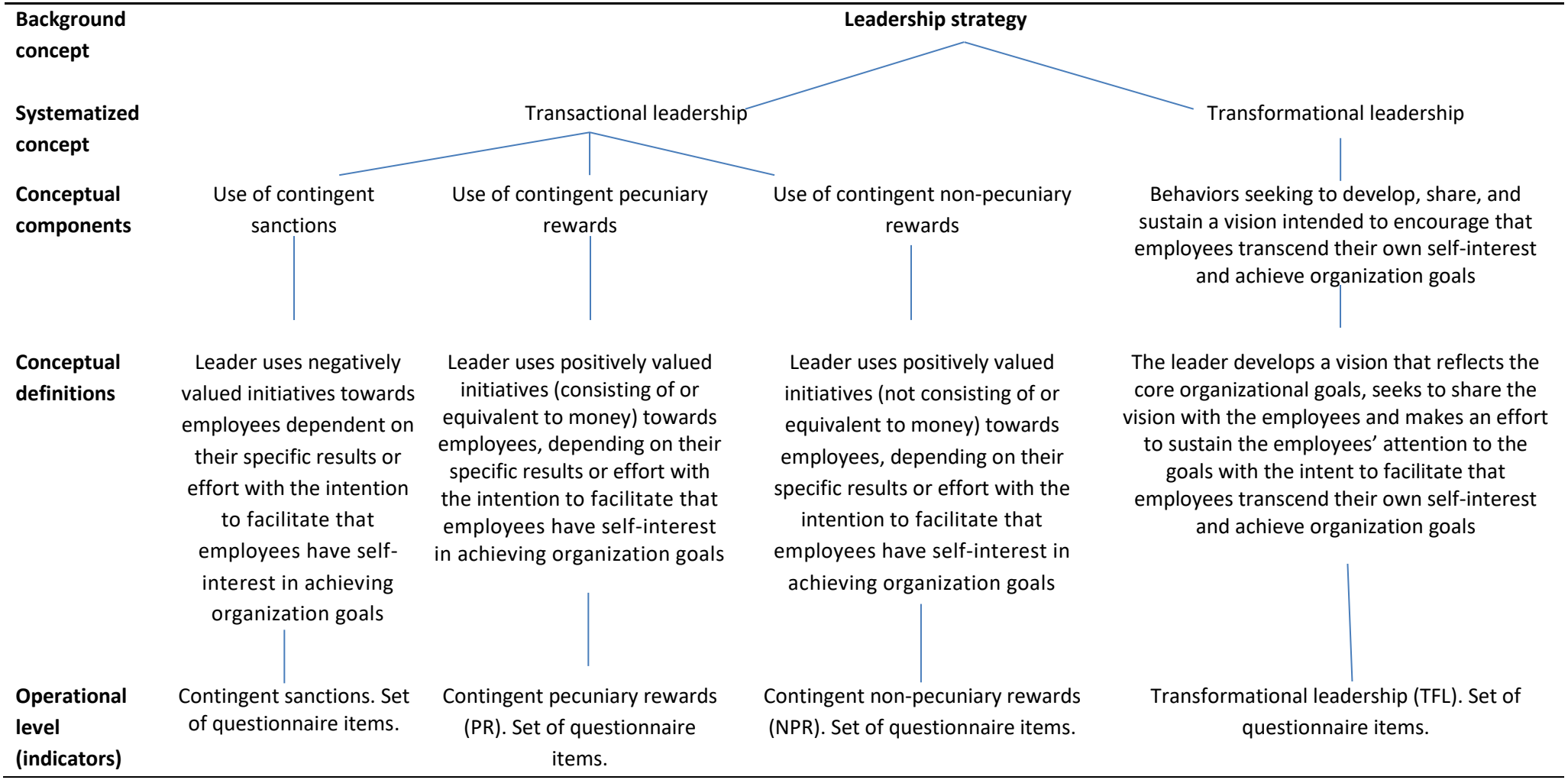
Wilson, JQ. 1989. *Bureaucracy. What government agencies do and why they do it*. City: Basic Books.

Wright, BE. 2007. Public service and motivation: Does mission matter? *Public Administration Review* **67** (1):54–64.

Wright, BE., DP. Moynihan, and SK. Pandey. 2012. Pulling the levers: transformational leadership, public service motivation, and mission valence. *Public Administration Review* **72** (2):206–15.

Wright, BE., and SK. Pandey. 2010. Transformational leadership in the public sector: Does structure matter? *Journal of Public Administration Research and Theory* **20** (1):75–89.

Figure 1. Transition from conceptual to operational level for transactional and transformational leadership



Note: Inspired by Frankfort-Nachmias and Nachmias, 1992, p. 34 and Adcock and Collier, 2001. Contingent sanctions are measured in the project, but are not part of this paper.

Figure 2. Marginal plot of levels of perceived transformational leadership before and after the experimental period (pre and post) by training program/control group

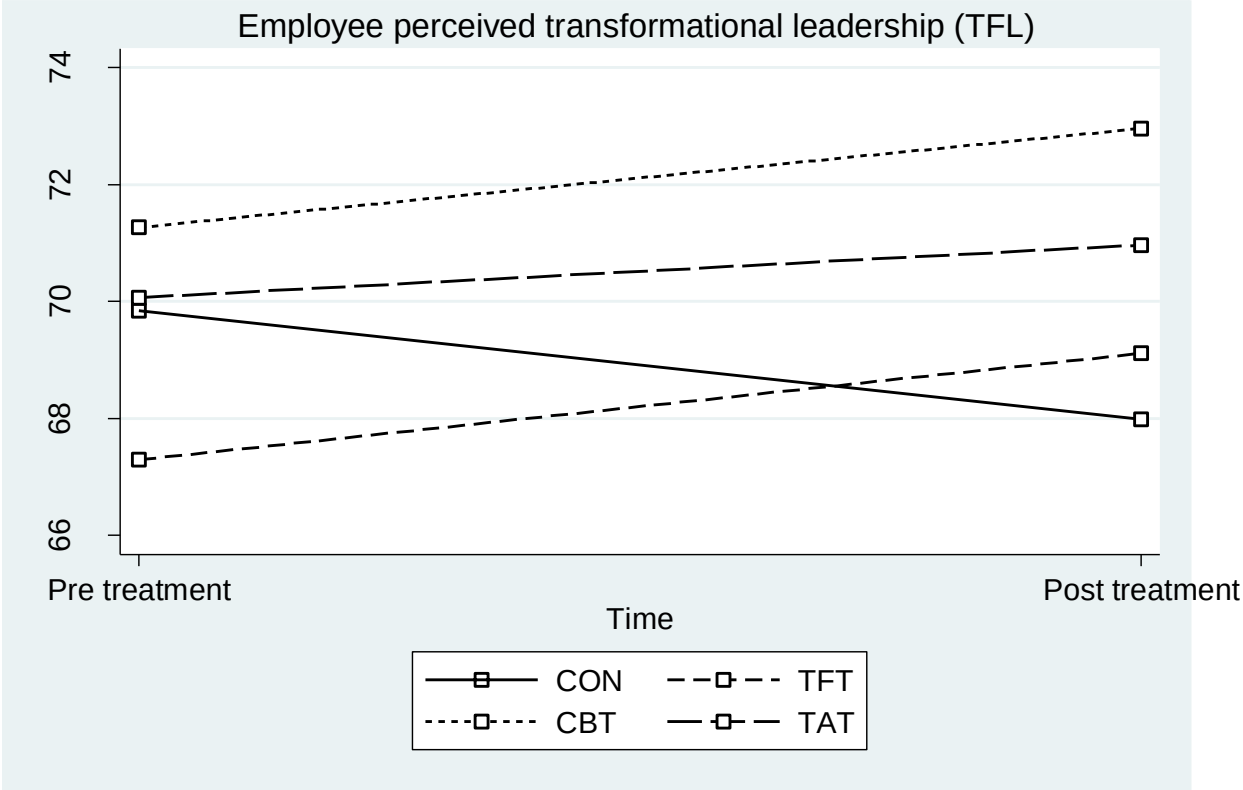


Figure 3. Marginal plot of levels of perceived use of contingent non-pecuniary rewards before and after the experimental period (pre and post) by training program/control group

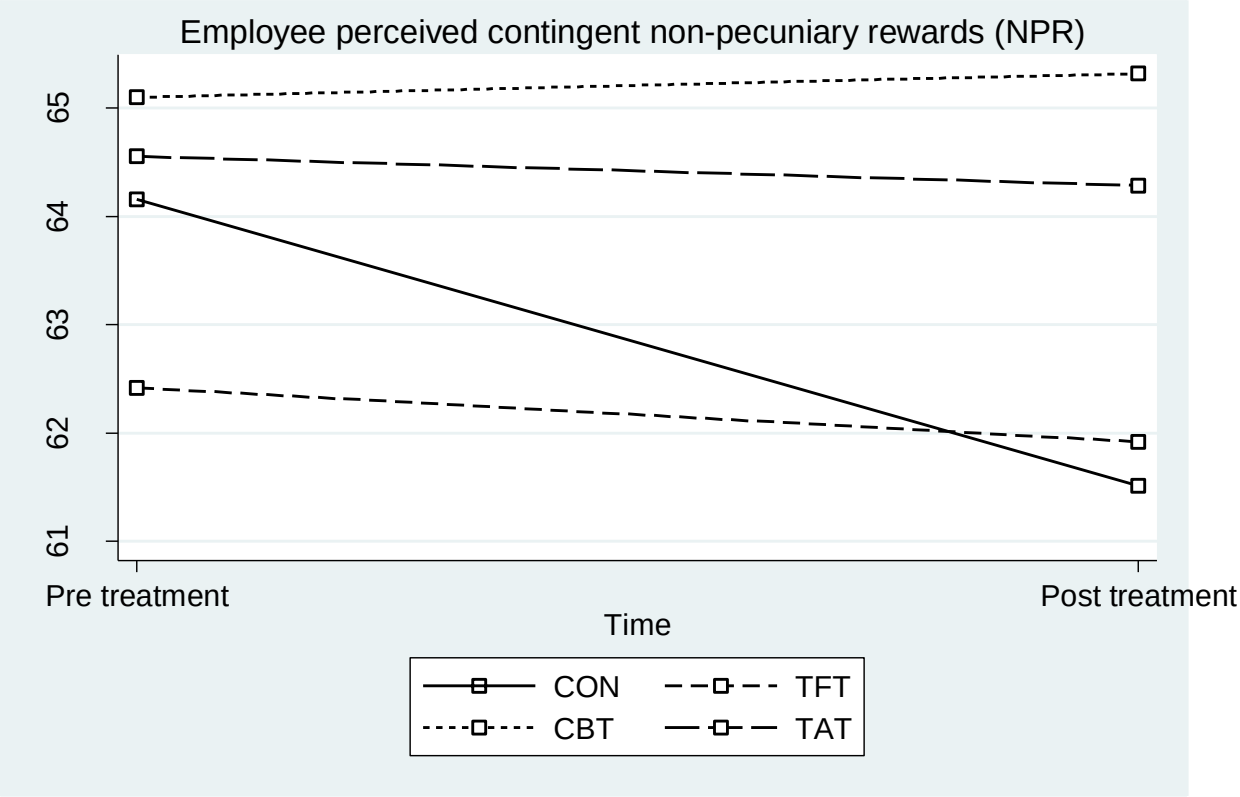


Figure 4. Marginal plot of levels of perceived use of contingent pecuniary rewards before and after the experimental period (pre and post) by training program/control group

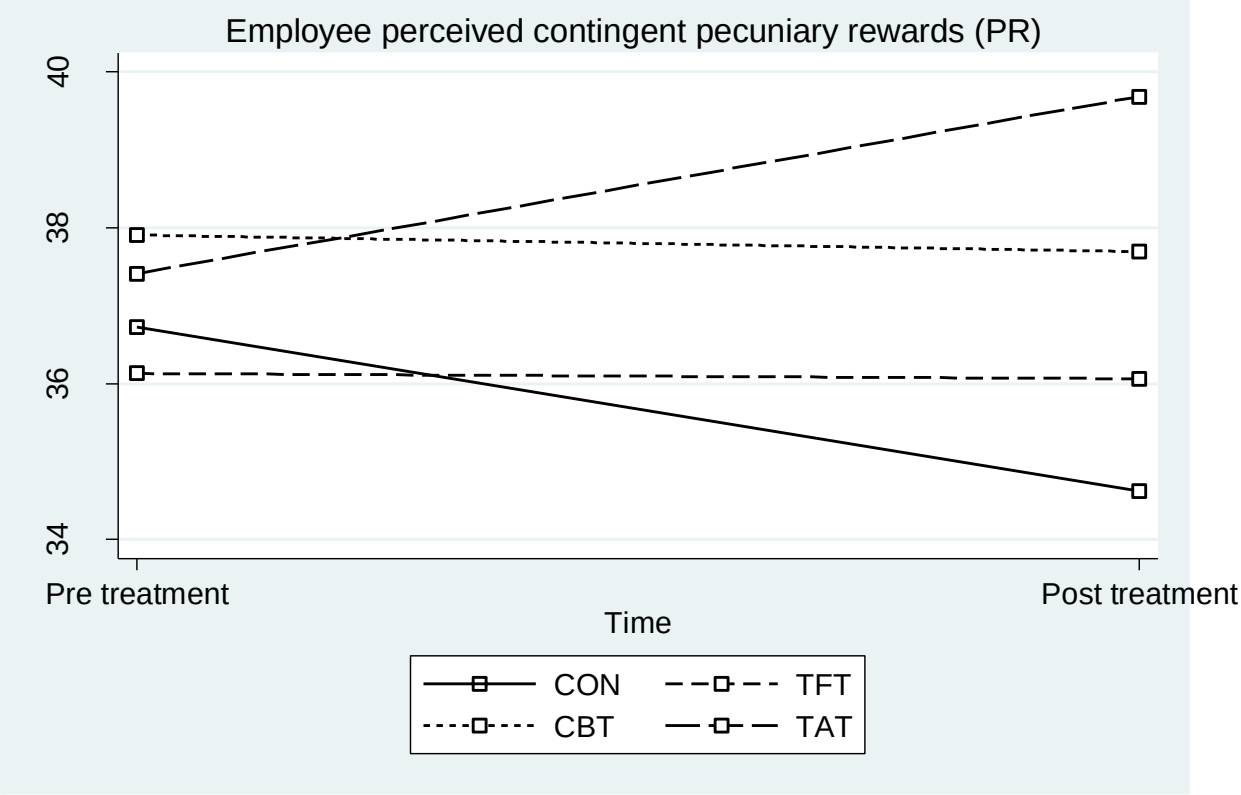


Table 1. Status for invitations, replies, signups, and completion across sectors

Area	Criteria for invitation	Invited	Replies (% of invited)	Signed up (% of replies)	Completed (% of signup)
1) Secondary schools	All principals*	308	186 (60.4 %)	41 (22.0 %)	37 (90.2 %)
2) Public primary schools	All principals*	787	344 (43.7 %)	119 (34.6 %)	83 (69.7 %)
3) Private primary schools	All principals*	278	134 (48.2 %)	44 (32.8 %)	31 (70.5 %)
4) Daycare, type 1	Pedagogues who lead pedagogue leaders of employees	416	191 (45.9 %)	84 (44.0 %)	61 (72.6 %)
5) Daycare, type 2	Pedagogue leaders of employees led by pedagogue leaders **	1,689	386 (22.9 %)	50 (13.0 %)	37 (74.0 %)
6) Daycare, type 3	Pedagogue leaders of employees led by non-pedagogue leaders **	1,092	261 (23.9 %)	83 (31.8 %)	60 (72.3 %)
7) Daycare, private	Leaders of daycare centers with private ownership **	394	154 (39.1 %)	62 (40.3 %)	40 (64.5 %)
8) Tax	Selected by Tax	153	150 (98.0 %)	144 (96.0 %)	130 (90.3 %)
9) Banks	Selected by two banks	51	47 (92.2 %)	45 (95.7 %)	27 (60.0 %)
Total		5.168	1,853 (35.9 %)	672 (36.3 %)	506 (75.3 %)

* Head of school if school is divided into independent school units.

** Leaders of daycare centers with 3-6 year-olds or 0-6 year-olds were invited. Leaders were not invited if their own leader was part of the project.

Table 2. Difference-in-difference analysis of average training effects of leadership training programs on employee perceived leadership

	Transformational leadership (TFL) Model 2.1	Contingent non-pecuniary rewards (NPR) Model 2.2	Contingent pecuniary rewards (PR) Model 2.3
Time (1 = after experimental period)	-1.857*	-2.644**	-2.104**
	(-2.54)	(-3.25)	(-2.84)
Time*TFT training program	3.676**	2.145†	2.036†
	(3.23)	(1.69)	(1.86)
Time*CBT training program	3.548***	2.863*	1.890
	(3.43)	(2.33)	(1.53)
Time*TAT training program	2.756**	2.375*	4.377***
	(2.75)	(2.07)	(3.50)
TFT (transformational training program)	-2.549	-1.737	-0.599
	(-1.24)	(-0.67)	(-0.33)
CBT (combined training program)	1.426	0.942	1.179
	(0.77)	(0.44)	(0.65)
TAT (transactional training program)	0.226	0.398	0.682
	(0.12)	(0.19)	(0.38)
Constant	69.84***	64.16***	36.73***
	(55.75)	(40.67)	(27.54)
N observations	9,366	9,564	9,350
N individuals	4,683	4,782	4,675
R^2	0.006	0.003	0.004

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group is reference group. The variable Time differentiates between before the experimental period (Time = 0) and after this period (Time = 1).

Table A1. List of items in questionnaire measuring transformational and transactional leadership

	Transformational leadership (TFL) – My leader …	
1	Concretizes a clear vision for the [ORGANIZATION TYPES] future	Modified from Moynihan et al. 2012
2	Seeks to make employees accept common goals for the [ORGANIZATION TYPE]	Modified from MacKenzie et al., 2001
3	Strives to get the [ORGANIZATION TYPE] to work together in the direction of the vision	Modified from Podsakoff et al., 1996
4	Strives to clarify for the employees how they can contribute to achieving the [ORGANIZATION TYPES] goals	Own.
	Transactional leadership behavior	
	Contingent pecuniary rewards (PR) – My leader…	
1	Rewards the employees' performance when they live up to his/her requirements.	Modified from Jacobsen and Andersen, 2015
2	Rewards the employees dependent on how well they perform their jobs.	Jacobsen and Andersen, 2015
3	Lets employees' effort determine received rewards.	Modified from Rainey 2009
	Contingent non-pecuniary rewards (NPR) – My leader…	
1	Gives individual employees positive feedback when they perform well	Modified from House, 1998
2	Actively shows his/her appreciation of employees who do their jobs better than expected.	Modified from House, 1998
3	Generally does not acknowledge individual employees even though they perform as required (R)	Modified from House, 1998
	Contingent sanctions – My leader…	
1	Gives negative consequences to the employees if they perform worse than their colleagues	Own
2	Makes sure that it has consequences for the employees if they do not consistently perform as required.	Modified from Jacobsen and Andersen, 2015
3	Gives negative consequences to employees if they do not perform as required	Own

Table A2. Confirmatory factor analysis of transformational and transactional leadership (pre and post training surveys)

	Transformational leadership (TFL) – My leader …	Pre: Survey before experimental period	Post: Survey after experimental period
1	Concretizes a clear vision for the [ORGANIZATION TYPES] future	0.795	0.799
2	Seeks to make employees accept common goals for the [ORGANIZATION TYPE]	0.774	0.776
3	Strives to get the [ORGANIZATION TYPE] to work together in the direction of the vision	0.865	0.878
4	Strives to clarify for the employees how they can contribute to achieving the [ORGANIZATION TYPES] goals	0.855	0.851
	Transactional leadership behavior		
	Contingent pecuniary rewards (PR) – My leader…		
1	Rewards the employees' performance when they live up to his/herrequirements.	0.912	0.918
2	Rewards the employees dependent on how well they perform their jobs.	0.896	0.904
3	Lets employees' effort determine received rewards.	0.933	0.931
	Contingent non-pecuniary rewards (NPR) – My leader…		
1	Gives individual employees positive feedback when they perform well	0.905	0.910
2	Actively shows his/her appreciation of employees who do their jobs better than expected.	0.889	0874
3	Generally does not acknowledge individual employees' even though they perform as required (R)	0.748	0.753
	Contingent sanctions – My leader…		
1	Gives negative consequences to the employees if they perform worse than their colleagues	0.787	0.795
2	Makes sure that it has consequences for the employees if they do not consistently perform as required.	0.880	0.877
3	Gives negative consequences to employees if they do not perform as required	0.872	0.82

Note: RMSEA: 0.032 (pre and post), CFI: 0.957 (pre), 0.953 (post), TLI: 0.943 (pre), 0.937 (post)

Table A3. First-difference analysis of average training effects on *change* in employee perceived leadership from August 2014 to August 2015 (without and with control for initial leadership).

	Change in transformational leadership (ΔTFL)		Change in contingent non-pecuniary rewards (ΔNPR)		Change in contingent pecuniary rewards (ΔPR)	
TFT transformational training	3.807***	2.720*	2.079	1.462	2.110	1.774
	(3.34)	(2.30)	(1.64)	(1.06)	(1.95)	(1.49)
CBT combined training	3.917***	4.345***	3.310**	3.493**	2.166	2.616*
	(3.74)	(4.23)	(2.71)	(2.68)	(1.79)	(2.10)
TAT transactional training	3.181**	3.100**	2.522*	2.615*	4.525***	4.791***
	(3.16)	(2.90)	(2.21)	(2.02)	(3.67)	(3.66)
TFL initial		-0.405***				
		(-19.68)				
NPR initial				-0.369***		
				(-24.86)		
PR initial						-0.499***
						(-32.91)
Constant	-2.089**	26.31***	-2.776***	20.94***	-2.228**	16.16***
	(-2.79)	(15.59)	(-3.38)	(13.59)	(-3.08)	(16.72)
N	4,683	4,683	4,782	4,782	4,675	4,675
R^2	0.007	0.206	0.003	0.184	0.005	0.241
adj. R^2	0.006	0.206	0.002	0.183	0.004	0.241

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group is reference group.

Table A4. First-difference analysis of average training effects on change in employee-perceived leadership with moderated effects for high absence

	Change in transformational leadership (ΔTFL)		Change in contingent non-pecuniary rewards (ΔNPR)		Change in contingent pecuniary rewards (ΔPR)	
TFT transformational training	3.765**	3.123*	1.111	0.868	2.552*	2.265†
	(3.21)	(2.55)	(0.84)	(0.63)	(2.16)	(1.77)
CBT combined training	4.353***	5.047***	3.706**	4.182**	2.877*	3.440*
	(3.76)	(4.47)	(2.85)	(3.21)	(2.28)	(2.55)
TAT transactional training	3.555**	3.814***	2.490*	2.551†	5.241***	6.255***
	(3.27)	(3.41)	(2.03)	(1.90)	(3.98)	(4.61)
High absence	1.078	1.814	-1.801	-1.764	-2.614	-0.997
	(0.64)	(1.09)	(-0.66)	(-0.40)	(-1.28)	(-0.41)
TFT training*High absence	-0.374	-2.831	5.375	3.643	-0.671	-1.751
	(-0.12)	(-0.87)	(1.51)	(0.72)	(-0.24)	(-0.53)
CBT training*High absence	-2.585	-4.192†	-0.960	-2.368	-2.022	-3.357
	(-1.06)	(-1.75)	(-0.28)	(-0.49)	(-0.67)	(-1.11)
TAT training*High absence	-3.134	-5.931†	0.599	0.839	-4.935	-10.94***
	(-1.25)	(-1.82)	(0.18)	(0.18)	(-1.75)	(-3.54)
TFL initial		-0.408***				
		(-20.16)				
NPR initial				-0.369***		
				(-25.14)		
PR initial						-0.504***
						(-33.79)
Constant	-2.200**	26.28***	-2.588**	21.15***	-1.955*	16.44***
	(-2.71)	(15.45)	(-3.04)	(14.88)	(-2.57)	(16.10)
N	4,683	4,683	4,782	4,782	4,675	4,675
R^2	0.007	0.208	0.005	0.186	0.010	0.250

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group is reference group.

Table A5. First-difference analysis of average training effects on change in employee-perceived leadership, upper secondary schools

	Change in transformational leadership (ΔTFL)		Change in contingent non-pecuniary rewards (ΔNPR)		Change in contingent pecuniary rewards (ΔPR)	
TFT transf. training	1.911	0.990	4.548	3.543	3.690	0.377
	(0.76)	(0.31)	(1.47)	(1.20)	(1.62)	(0.16)
CBT combined training	3.971	4.892	5.333*	5.966**	1.964	1.417
	(1.90)	(1.88)	(2.26)	(2.88)	(0.76)	(0.53)
TAT transact. training	1.702	2.531	3.349	3.023	6.582*	4.405
	(0.87)	(1.06)	(1.76)	(1.52)	(2.48)	(1.79)
TFL initial		-0.361***				
		(-9.10)				
NPR initial				-0.378***		
				(-13.75)		
PR initial						-0.489***
						(-15.36)
Constant	-0.359	21.81***	-4.052**	17.97***	-1.489	17.66***
	(-0.23)	(6.02)	(-2.95)	(8.62)	(-1.18)	(8.44)
N	815	815	834	834	811	811
R^2	0.006	0.180	0.009	0.207	0.014	0.241

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group (CON) is reference group.

Table A6. First-difference analysis of average training effects on change in employee-perceived leadership, primary schools

	Change in transformational leadership (ΔTFL)		Change in contingent non-pecuniary rewards (ΔNPR)		Change in contingent pecuniary rewards (ΔPR)	
TFT transf. training	4.217	1.922	3.629	1.337	3.184	2.695
	(1.63)	(0.79)	(1.61)	(0.52)	(1.50)	(1.36)
CBT combined training	3.624	3.998	4.468	3.779	3.014	3.575*
	(1.49)	(1.80)	(1.87)	(1.47)	(1.35)	(2.10)
TAT transact. training	4.086	2.849	5.085*	3.869	-0.162	1.752
	(1.56)	(1.03)	(2.20)	(1.49)	(-0.05)	(0.72)
TFL initial		-0.368***				
		(-9.42)				
NPR initial				-0.360***		
				(-11.51)		
PR initial						-0.617***
						(-21.19)
Constant	-3.390	21.59***	-4.800***	18.19***	-2.764	15.64***
	(-1.88)	(7.63)	(-3.52)	(5.63)	(-1.90)	(11.50)
N	1,323	1,323	1,338	1,338	1,310	1,310
R^2	0.007	0.164	0.007	0.176	0.004	0.309

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group (CON) is reference group.

Table A7. First-difference analysis of average training effects on change in employee-perceived leadership, daycare

	Change in transformational leadership (ΔTFL)		Change in contingent non-pecuniary rewards (ΔNPR)		Change in contingent pecuniary rewards (ΔPR)	
TFT transf. training	3.855	1.306	1.509	0.697	1.048	2.905
	(1.34)	(0.51)	(0.46)	(0.21)	(0.28)	(0.90)
CBT combined training	4.852*	4.368	3.449	1.621	2.269	4.470
	(2.01)	(1.97)	(1.23)	(0.55)	(0.70)	(1.60)
TAT transact. training	3.303	2.004	3.043	2.990	9.080*	8.488*
	(1.26)	(0.85)	(0.94)	(0.96)	(2.36)	(2.37)
TFL initial		-0.476***				
		(-9.66)				
NPR initial				-0.272***		
				(-6.92)		
PR initial						-0.557***
						(-14.10)
Constant	-3.150	35.27***	-5.464*	14.77***	-5.932*	12.64***
	(-1.57)	(7.67)	(-2.24)	(3.74)	(-2.28)	(5.18)
N	568	568	578	578	568	568
R^2	0.010	0.240	0.004	0.107	0.017	0.297

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group (CON) is reference group.

Table A8. First-difference analysis of average training effects on change in employee-perceived leadership, tax units

	Transformational leadership		Contingent non-pecuniary rewards		Contingent pecuniary rewards	
TFT transf. training	6.247**	5.784**	2.253	3.458	1.102	2.346
	(3.03)	(3.05)	(0.92)	(1.59)	(0.69)	(1.43)
CBT combined training	4.896**	6.099***	1.328	3.757	4.435*	4.652**
	(2.88)	(3.60)	(0.66)	(1.96)	(2.46)	(2.70)
TAT transact. training	4.204*	3.548	0.611	0.167	2.736	2.759
	(2.23)	(1.97)	(0.27)	(0.08)	(1.81)	(1.74)
TFL initial		-0.551***				
		(-16.05)				
NPR initial				-0.502***		
				(-17.00)		
PR initial						-0.522***
						(-18.79)
Constant	-1.610	36.80***	1.760	34.38***	-0.526	23.97***
	(-1.23)	(12.90)	(1.13)	(14.29)	(-0.46)	(12.89)
N	1,140	1,140	1,171	1,171	1,144	1,144
R^2	0.015	0.331	0.001	0.285	0.007	0.257

Note: *t* statistics in parentheses, † $p < 0.1$ * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. The control group (CON) is reference group.

Table A9. Number of classes after type of training program and teacher/teacher's academic background.

	Teacher 1	**Teacher 2**	**Teacher 3**	**Teacher 4**
Teacher academic background	Economics	Organizational behavior	Public administration	Public administration
Transformational training program	1	2	2	2
Combined training program	1	2	2	2
Transactional training program	2	1	2	2

Table A10. Descriptive statistics and correlations

		M	SD	Min	Max	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	TFL initial	68.53	22.04	0	100	1.000							
2	TFL post	69.80	22.02	0	100	0.592***	1.000						
3	TFL change	0.59	19.66	-100	100	-0.447***	0.456***	1.000					
4	NPR initial	62.71	26.63	0	100	0.525***	0.398***	-0.149***	1.000				
5	NPR post	62.34	27.03	0	100	0.419***	0.534***	0.124***	0.627***	1.000			
6	NPR change	-0.84	22.81	-100	100	-0.131***	0.153***	0.316***	-0.425***	0.438***	1.000		
7	PR initial	35.92	23.14	0	100	0.272***	0.221***	-0.065***	0.348***	0.288***	-0.083***	1.000	
8	PR post	36.83	23.86	0	100	0.211***	0.312***	0.101***	0.269***	0.421***	0.167***	0.489***	1.000
9	PR change	-0.07	23.74	-100	100	-0.066***	0.086***	0.167***	-0.081***	0.129***	0.245***	-0.486***	0.525***
10	High absence	0.23	0.42	0	1.00	-0.031**	-0.055***	0.001	-0.049***	-0.044***	0.001	-0.023	-0.068***
11	CON	0.26	0.44	0	1.00	-0.041***	-0.048***	0.033*	-0.035**	-0.047***	0.004	-0.016	-0.029*
12	TFT	0.25	0.43	0	1.00	0.030*	0.073***	0.036*	0.018	0.036**	0.034*	0.008	0.017
13	CBT	0.23	0.42	0	1.00	0.024*	0.038**	0.015	0.018	0.043***	0.015	0.029*	0.075***
14	TAT	0.27	0.44	0	1.00	-0.013	-0.060***	-0.081***	-0.001	-0.031*	-0.051***	-0.020	-0.060***
15	Sec. school	0.14	0.35	0	1.00	-0.128***	-0.114***	0.023	-0.083***	-0.081***	-0.001	0.005	0.037**
16	Pr. School	0.57	0.49	0	1.00	-0.196***	-0.194***	-0.039*	-0.175***	-0.204***	-0.046**	-0.244***	-0.276***
17	Daycare	0.19	0.39	0	1.00	0.208***	0.159***	-0.006	0.122***	0.062***	-0.056**	-0.057***	-0.084***
18	Tax	0.14	0.35	0	1.00	0.002	0.046***	0.042**	0.056***	0.130***	0.089***	0.238***	0.259***
19	Bank	0.01	0.12	0	1.00	0.055***	0.027*	-0.041**	0.090***	0.077***	-0.027	0.070***	0.056***

Note: TFL: Transformational leadership (emp. perceived), NPR Contingent non-pecuniary rewards (emp. perceived), PR: Contingent pecuniary rewards (emp. perceived), TFT: Transformational training, CBT: Combination training, TAT: Transactional training, CON: Control group; *: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$

Table A10. (continued)

		(9)	(10)	(11)	(12)	(13)	(14)
10	High absence	-0.067***	1.000				
11	CON	-0.001	0.115***	1.000			
12	TFT	0.000	0.075***		1.000		
13	CBT	0.057***	-0.011			1.000	
14	TAT	-0.055***	-0.176***				1.000
15	Sec. school	0.033*	-0.065***	-0.145***	0.028*	0.131***	-0.009
16	Pr. School	-0.022	0.179***	0.094***	0.000	-0.102***	-0.002
17	Daycare	-0.043*	0.030	-0.077***	0.067***	0.044***	-0.028*
18	Tax	0.037*	-0.155***	-0.032***	-0.022*	0.021*	0.033***
19	Bank	-0.011	-0.041***	0.048***	-0.062***	0.027**	-0.013

Table A11. Observed means of leadership strategies (0 = low degree, 100 = highest degree) in training programs and control group (standard errors in parentheses)

	Transformational leadership (TFL)		Contingent non-pecuniary rewards (NPR)		Contingent pecuniary rewards (PR)		n emp.	n leaders
	Pre	Post	Pre	Post	Pre	Post		
Transformational training program (TFT)	67.18***	68.98*	62.49*	61.68	35.99	36.19	1,161	114
	(0.69)	(0.69)	(0.83)	(0.83)	(0.70)	(0.72)		
Combination training program (CBT)	71.40***	73.02***	65.32	65.70**	37.62	37.93	1,146	155
	(0.64)	(0.61)	(0.78)	(0.79)	(0.70)	(0.69)		
Transactional training program (TAT)	70.18	71.06	64.96	64.57	37.84	40.02***	1,166	123
	(0.64)	(0.66)	(0.75)	(0.76)	(0.67)	(0.72)		
Control group (CON)	69.83	68.01***	63.09	61.78**	37.15	35.28***	1,244	147
	(0.63)	(0.65)	(0.80)	(0.80)	(0.67)	(0.69)		

Note: The significance tests are based on mean comparison t tests of each training program/control group compared with the three other groups, *: $p < 0.05$, **: $p < 0.01$, ***: $p < 0.001$