

# Time-lagged relationships between leadership behaviors and psychological distress after a workplace terrorist attack

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Received: 26 March 2015 / Accepted: 14 December 2015 / Published online: 26 December 2015  
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## Abstract

**Purpose** The impact of leadership practices on employee health may be especially evident after extreme events that have physical, psychological, or material consequences for the members of an organization. In this prospective study, we aimed to examine the association between leadership behavior and psychological distress in employees who had experienced a workplace terror attack.

**Methods** Ten and 22 months after the 2011 Oslo bombing attack targeting their workplace, ministerial employees ( $n = 2272$ ) responded to a questionnaire assessing fair, empowering, supportive, and laissez-faire leadership, as well as psychological distress. Cross-sectional and time-lagged associations between the constructs were tested using structural equation modeling.

**Results** Cross-sectionally, higher levels of supportive leadership were associated with lower levels of psychological distress. Longitudinally, negative relationships were found between psychological distress and subsequent ratings of fair and empowering leadership.

**Conclusions** Supportive leadership was associated with employees' psychological health after trauma, but seems not to have long-term effects on subsequent psychological distress. Rather, psychological distress may lead the

employees to perceive their leaders as more negative across time.

**Keywords** Leadership · Psychological distress · Cross-lagged panel design · Trauma · Terrorism

## Introduction

Because the workplace represents an important arena in life for most adults, a traumatic event occurring at the workplace may have profound consequences for the employees' psychological health. Exposure to a traumatic event may result in elevated levels of general psychological distress (Dewaraja and Kawamura 2006; Scott et al. 2013; Thapa and Hauff 2005). Psychological distress is defined as general symptoms of depression and anxiety and reflects both a stable trait component and a state component susceptible to changes after external events (Ormel and Schaufeli 1991). The way the workplace responds in the aftermath of a traumatic event may have a profound influence on psychological distress (Byron and Peterson 2002). For example, leadership behaviors may intensify or attenuate the consequences of traumatic events (Dynes et al. 1981; Hannah et al. 2009). The importance of leadership on employee health after a traumatic experience can be explained by the potential impact of leadership on the cognitive schemas of the world as a safe place. According to Janoff-Bulman's theory of shattered assumptions (Janoff-Bulman 1992), exposure to a traumatic event will shatters the target's basic cognitive schemas about the world, other people, and ourselves. Insofar as stability is needed in conceptual systems, abrupt changes in core schemas are deeply threatening and may result in traumatization and health problems. Positive and constructive forms of leadership may contribute to

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rebuilding a basic assumption of the world as a safe place and the work as meaningful, thereby reducing the duration and impact of the trauma.

Leadership can be described on a continuum from passive and destructive leadership behaviors to active and constructive leadership behaviors such as transformational, authentic leadership (Bass et al. 1996; Einarsen et al. 2007). Supportive, fair, and empowering leadership are examples of constructive leadership behaviors that may protect against and alleviate psychological distress (Amundsen and Martinsen 2014; Britt et al. 2004; Finne et al. 2014). In contrast, laissez-faire leadership may represent a form of destructive leadership that may be less adaptive after a traumatic incident. In general, laissez-faire leadership is associated with psychological distress (Skogstad et al. 2007). Hence, we hypothesize that after traumatic incidents, the employees may benefit from structure, relevant feedback, instrumental and emotional and agency support from supportive, fair, and empowering leaders. In contrast, lack of information from an absent or careless laissez-faire leader may result in subordinates experiencing higher levels of psychological distress.

Relationships between leaders and subordinates develop and change over time (Bluedorn and Jaussi 2008; Shamir 2011). Especially after traumatic events, employees tend to feel more vulnerable and are more willing to scrutinize their leaders (Hurst 1995). People may process the trauma in ways that lead to a sense of current threat, e.g., by appraising other people's reactions after the trauma in a negative way (Ehlers and Clark 2000). More specifically, posttraumatic psychological distress may lead to appraisals that others violate interpersonal rules that one is treated unfairly or that their leader is absent or does not care. In the work environment literature, this has been termed a "gloomy perception mechanism" (de Lange et al. 2005).

Longitudinal studies are necessary to explore how these processes unfold across time. In addition, longitudinal studies provide opportunities to test "reverse causality" hypotheses: that psychological health may influence how subordinates evaluate and perceive their work environment (Ford et al. 2014). The evidence of such a mechanism is mixed and inconclusive, with some studies findings support for (Barnes et al. 2013; Lang et al. 2011) and some weak or no (Elovainio et al. 2013; Ybema and Van den Bos 2010) evidence of a reverse effect of psychological distress on rating of leadership.

There is a shortage of time-lagged studies which can add to the knowledge about to what extent different forms of leadership may have an impact on levels of health problems among subordinates, especially after traumatic events. In addition, no studies have examined whether existing mental distress influences later perceptions of leadership.

In response to this lack of research, the main aim of this study was to determine bidirectional relationships between leadership and psychological distress in a sample of Norwegian ministerial employees exposed to the 2011 Oslo bombing attack. This was a politically motivated terror attack directed toward the Norwegian government. A car bomb explosion in the executive governmental quarter in the city center shattered the governmental buildings, killed eight people and injured 209 more people. All employees belonged to a group of people that were the target of the assailant's operation and were collectively confronted with an event that involved threatened death or injury, a threat to the physical integrity of self and others, as well as a destroyed workplace and work environment. Thus, all employees were confronted with a threatened violent death and serious injury, either to themselves or to close colleagues.

Based on the above literature review, we hypothesize that:

- (a) Perceptions of fair and empowering leadership are negatively related to both concurrent and subsequent psychological distress, and perceptions of laissez-faire leadership are positively related to both concurrent and subsequent psychological distress.
- (b) Psychological distress is negatively related to subsequent perceptions of fair and empowering leadership and positively related to subsequent laissez-faire leadership.

## Methods

### Sample and design

This prospective two-wave study with full-panel design used a sample of ministerial employees after the 2011 Oslo bombing attack. Data were collected ten and 22 months after the bombing attack, in April/May 2012 (T1) and in April/May 2013 (T2). All employees in 14 of the 17 Norwegian ministries were invited to participate in the research project "Mental health and work environment factors in the aftermath of the Oslo terrorist attack July 22nd, 2011" (Hansen et al. 2013). Of the 3520 eligible employees, 1972 (56 %) responded at T1 (838 men and 1134 women) and 1780 (51 %) at T2 (737 men and 1043 women). As some responded only at T1 and a few responded only at T2, the total sample consisted of 2283 employees. Strict procedures were followed to ensure confidentiality, and the study was approved by the Regional Committees for Medical and Health Research Ethics.

## Measures

Psychological distress was measured by the 10-item Hopkins Symptom Checklist (HSCL-10), which measures depression- and anxiety-related symptoms (Strand et al. 2003). The respondents indicated the relevance of each symptom from “have not experienced this symptom” (1) to “have experienced this symptom very much” (4). Cronbach’s alpha was .92 at both T1 and T2.

Supportive, fair, and empowering leadership were measured by scales from the General Nordic Questionnaire for psychological and social factors at work (QPS Nordic) (Dallner et al. 2000). Examples of the items include “If needed, can you get support and help with your work from your immediate superior?” (supportive leadership), “Does your immediate superior distribute the work fairly and impartially?” (fair leadership), and “Does your immediate superior encourage you to participate in important decisions?” (empowering leadership). The response categories ranged from “very seldom” (1) to very “often or always” (5). The internal consistencies for these scales were satisfactory (Cronbach’s alpha for supportive leadership: .87/.87; fair leadership: .80/.81; empowering leadership: .86/.85).

Laissez-faire leadership was measured by four items from the Multifactor Leadership Questionnaire (Bass and Avolio 1990; Hinkin and Schriesheim 2008). An example item is “Your superior avoids making decisions.” The response categories ranged from “very seldom” (1) to very “often or always” (5). Cronbach’s alpha was .72 and .75 at T1 and T2, respectively.

Among the respondents of the study, 239 were present at work in the governmental district during the bomb attack and were coded as physically proximate to the bomb attack (1), whereas the other 2079 respondents were coded as not physically proximate (0).

## Statistical analyses

We used structural equation modeling (SEM) to analyze the relationships between leadership and psychological distress. SEM analyses were conducted in four steps. In the first step, we used confirmatory factor analyses to examine the measurement models as well as tested for dimensionality of the latent variables at each time point. In the second step, we investigated whether measurement invariance across time existed for each of the latent variables. Two types of measurement invariance were tested; configural and metric invariance. In line with recommendations (Finkel 1995; Little et al. 2007), residuals for the same items were allowed to correlate over time. In the third step, we specified and tested structural models designed to address directional patterns of effects such as the cross-lagged autoregressive model. By testing a cross-lagged

autoregressive model, we were able to contrast the two possible causal directions between leadership and psychological distress. Cross-lagged panel models also need to address effects of possible confounders. The causal agent may still be an unmeasured or omitted variable that causes the two variables to covary. In the present study, two possible confounders may be sex and proximity to the bomb attack. Therefore, sex and proximity to the bomb attack were modeled as direct effect on each latent construct, regardless of time of measurement (Little et al. 2007). This partials out the effects of sex and proximity from the latent constructs.

However, this design cannot rule out the possibility that the cross-lagged effects reflect an unmeasured third variable. To test this, a common factor model was tested and compared with the cross-lagged models. Though this design cannot prove causality, it provides opportunities to examine the predictive association between two variables across time, each controlling for effects at earlier time points.

All data modeling was performed with Mplus version 7.11 (Muthén and Muthén 1998–2013). To correct for the somewhat skewed distributions, maximum likelihood estimation with robust errors was applied. To determine model fit, Chi-squared ( $\chi^2$ ) test, root mean square error of approximation (RMSEA), and comparative fit index (CFI) were assessed. Values of RMSEA below 0.05 and values of CFI above 0.95 were considered to denote a well-fitting model (Browne and Cudeck 1992; Hu and Bentler 1999). To test differences between models, Satorra–Bentler Chi-square difference tests were used (Satorra and Bentler 2001).

## Missing data

The total sample consisted of 976 males and 1307 females, making the total  $N = 2283$ . Eleven did not respond to any of the relevant items, which means that the  $n = 2272$ . Complete data on all items across the two time points were provided by 446 of the males and 663 of the females. The percent of missing on item level ranged from 0 % (sex) to 29 % (leadership items at T2). Most of the missing data on item level seem to be explained by employees changing workplaces, which implies that their versions of the survey did not include leadership items.

Most of the missing data are due to wave nonresponse. To assess selective participation, participation at T2 was regressed on scores of psychological distress and leadership behaviors at T1 (one at a time). Logistic regression revealed that psychological distress but not leadership behaviors at T1 predicted missingness at T2. Thus, missing was related to one of the measured variables, which is consistent with a situation of missing at random (MAR).

**Table 1** Descriptive statistics and intercorrelation between leadership behaviors and psychological distress at 10 months (T1) and 2 years (T2) after the event

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
1. Fair leadership T1	–									
2. Empowering leadership T1	.62*	–								
3. Supportive leadership T1	.71*	.72*	–							
3. Laissez-faire leadership T1	–.56*	–.50*	–.62*	–						
4. Psychological distress T1	–.25*	–.25*	–.29*	.20*	–					
5. Fair leadership T2	.58*	.45*	.52*	–.41*	–.26*	–				
6. Empowering leadership T2	.45*	.63*	.51*	–.35*	–.23*	.64*	–			
7. Supportive leadership T2	.52*	.55*	.63*	–.44*	–.21*	.72*	.74*	–		
8. Laissez-faire leadership T2	–.39*	–.36*	–.39*	.51*	.17*	–.56*	–.49*	–.58*	–	
9. Psychological distress T2	–.26*	–.23*	–.26*	.17*	.73*	–.32	–.28*	–.30*	.24*	–
Means	4.06	3.48	3.92	2.25	1.33	4.04	3.47	3.94	2.23	1.32
Standard deviations	.78	.96	.87	.81	.48	.81	.94	.87	.82	.47

\*\*\*  $p < .001$ **Table 2** Estimated mean differences in leadership behaviors and psychological distress across time

	T1		T2		Wald test $p$ value
	Mean (SE)	Variance (SE)	Mean (SE)	Variance (SE)	
Fair leadership	0.00 (.00)	0.52 (.03)	–0.03 (.02)	0.57 (.04)	.088 <sup>ns</sup>
Empowering leadership	0.00 (.00)	0.86 (.04)	–0.02 (.02)	0.82 (.04)	.427 <sup>ns</sup>
Supportive leadership	0.00 (.00)	0.73 (.03)	0.02 (.02)	0.73 (.03)	.378 <sup>ns</sup>
Laissez-faire leadership	0.00 (.00)	0.27 (.03)	–0.02 (.02)	0.28 (.03)	.487 <sup>ns</sup>
Psychological distress	0.00 (.00)	0.06 (.01)	–0.01 (.01)	0.06 (.01)	.380 <sup>ns</sup>

<sup>ns</sup> Not significant

Thus, the Mplus 7.11 inbuilt full-information maximum likelihood estimation with robust standard errors was used to handle missing data. This approach assumes data are missing at random (MAR), and all observed information is used to produce the maximum likelihood estimation of parameters. This is one of the best approaches currently available to handle missing data (Graham 2009).

### Preliminary confirmatory factor analyses and measurement invariance

To assess the measurement models and dimensionality of the latent variables leadership behaviors and psychological distress, a series of confirmatory factor analyses were conducted. For the leadership behaviors, a model with four correlated factors was superior to models with one, two, or three correlated factors at both time points. This resulted in good model fits both at T1 [ $\chi^2(56, N = 1798) = 312.953, p < .05, CFI = 0.974, RMSEA = 0.051$ ] and T2 [ $\chi^2(56, N = 1593) = 219.961, p < .05, CFI = 0.974, RMSEA = 0.043$ ].

Psychological distress was modeled as loading on a single factor, and this model provided acceptable model fit at T1 [ $\chi^2(32, N = 1922) = 216.422, p < .05, CFI = 0.967,$

$RMSEA = 0.055$ ] and T2 [ $\chi^2(32, N = 1744) = 187.429, p < .05, CFI = 0.965, RMSEA = 0.053$ ].

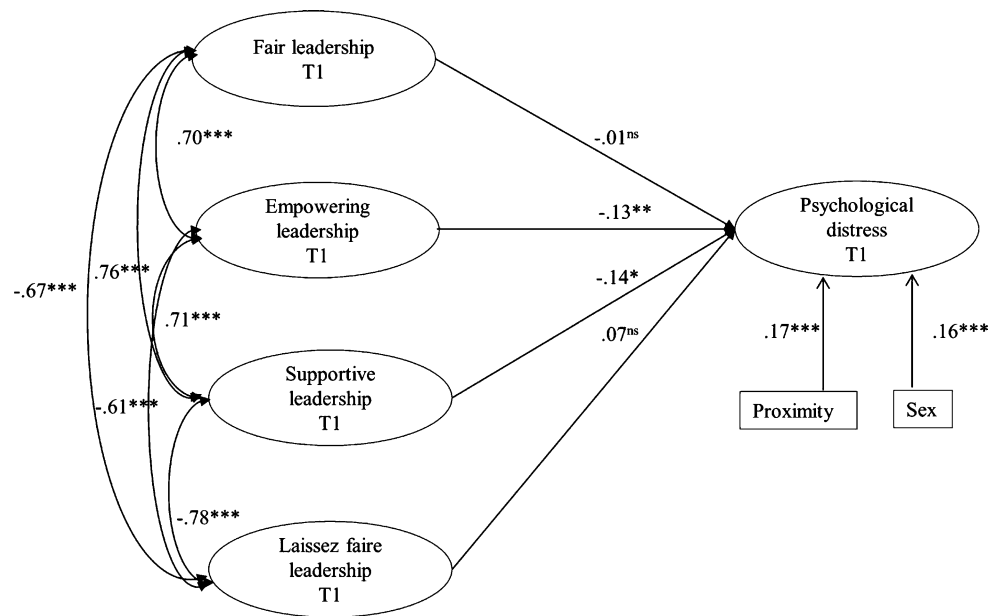
Furthermore, the model fit did not deteriorate significantly when constricting factor loadings of the items measuring leadership behaviors or psychological distress across time. Thus, for both leadership behaviors and psychological distress, we have evidence of metric invariance.

### Results

Table 1 presents intercorrelations, means, and standard deviations for the observed study variables. None of the estimated means changed significantly across time (see Table 2).

To determine the relative relationships between the leadership behaviors and psychological distress at baseline, the three leadership styles were regressed on psychological distress at T1, adjusted for sex and proximity. The model provided acceptable fit statistics [ $\chi^2(258, N = 1922) = 998.021, p < .05, CFI = 0.962, RMSEA = 0.039$ ]. This baseline model showed that when the leadership behaviors were adjusted for each other and for sex and proximity, empowering and supportive leadership were negatively associated with psychological distress,

**Fig. 1** Model of relationships between fair, empowering, supportive, and laissez-faire leadership, and psychological distress at T1, adjusted for proximity and sex, with standardized estimates. *ns* not significant, \**p* < .05; \*\**p* < .01; \*\*\**p* < .001



**Table 3** Structural model fit and model comparisons (*n* = 2272)

Model	$\chi^2$	<i>df</i>	Corr factor	RMSEA	CFI	$\Delta$ CFI	Model	$\Delta\chi^2$
M1. Stability model	2642.538	1022	1.2456	0.022	0.960			
M2. Reciprocal model	2564.687	1002	1.2455	0.022	0.962	0.002	M2-M1	77.744 (20)***
M3. Common factor model	2669.701	1029	1.2356	0.022	0.960	0.002	M3-M2	120.208 (27)***
							M3-M1	31.806 (7)***

Adjusted for sex and proximity  
 \*\*\* *p* < .001

whereas fair and laissez-faire leadership had no independent significant association with psychological distress (see Fig. 1).

Table 3 shows the model fit of structural models across time. In these models, items measured at both time points were allowed to correlate. First, we tested a stability model (M1) where psychological distress at T2 was regressed at psychological distress at T1, leadership behavior at T2 was regressed on leadership behavior at T1, and constructs measured simultaneously were assumed to be associated with each other. No cross-lagged paths were assumed in this model. To adjust for effects of sex and proximity, all constructs were regressed on these variables. The model fit of this model was acceptable. Cross-lagged and reciprocal paths (M2) added significantly to the model fit. Inspection of the estimates of the cross-lagged effects revealed that in addition to the stability paths, only three of the cross-lagged paths reached significance.

To test whether the associations between the variables could be better explained by a common factor, we specified a third model where all four variables loaded on a higher-order common factor (M3). The model fit of this model was

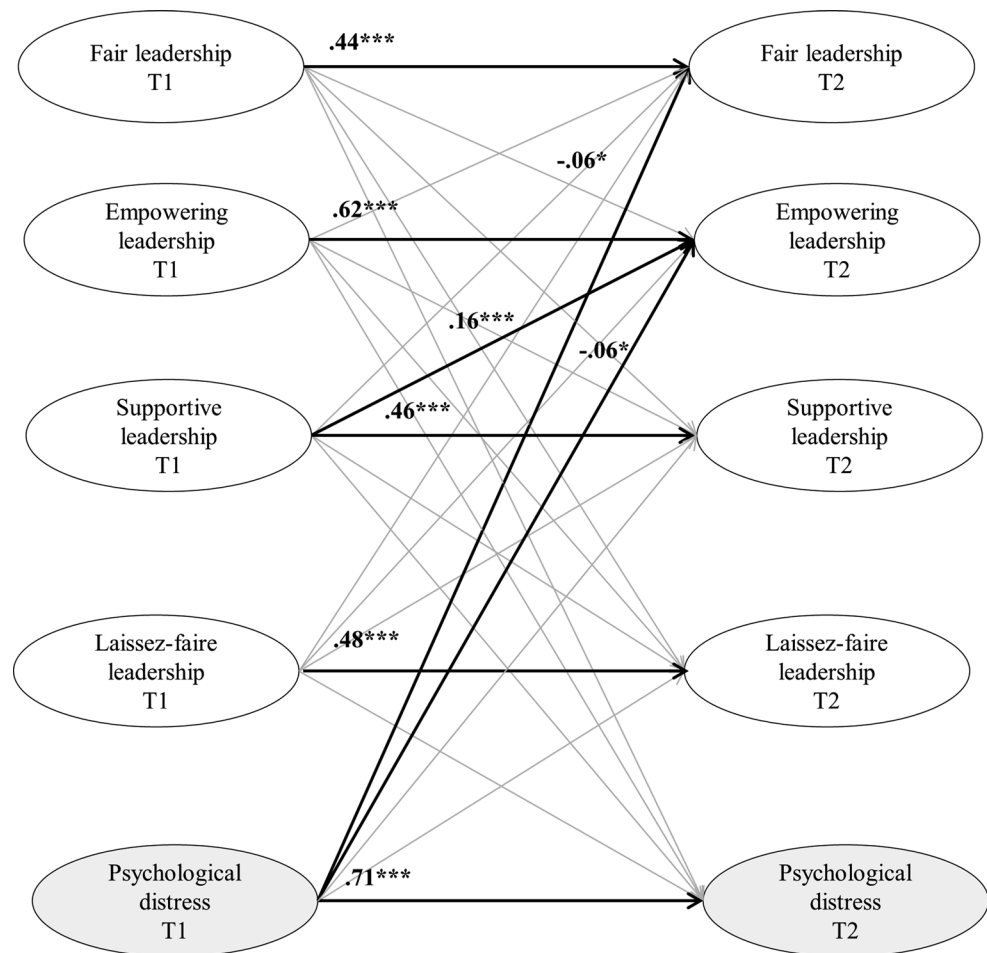
significantly poorer than the other models, which lead to the conclusion that M2 is the model that best describes the data.

The significant standardized estimates of the lagged relationships are shown in Fig. 2 (see Table 4 for all unstandardized and standardized estimates). The results indicate that perceptions of leadership behaviors are stable across time and that perceptions of leadership behavior are not associated with subsequent psychological distress when current perceptions of leadership behavior are taken into account. However, psychological distress at T1 was negatively associated with fair and empowering leadership at T2.

The analyses were also repeated in the smaller subsample of the 239 participants who were proximate to the bomb attack, and the estimates for the cross-lagged analyses are similar; for example, the standardized estimates of the relationships between psychological stress at T1 and fair and empowering leadership at T2 are both  $-.08$  (total sample:  $-.06$ , and significant). However, because this is a rather small effect and the sample is quite small, it does not reach significance in this subsample. Thus, it is reasonable



**Fig. 2** Model of relationships between fair, empowering, supportive, and laissez-faire leadership, and psychological distress at T1 and T2 with standardized estimates. Bold weighting indicates significant paths. All unstandardized and standardized estimates are shown in Table 4. \* $p < .05$ , \*\*\* $p < .001$



to believe that similar processes occur among both the proximate and the not proximate employees.

## Discussion

In the present study of ministerial employees in the aftermath of the 2011 Oslo bombing, supportive leadership was negatively associated with concurrent psychological distress. Over time, reverse negative relationships were found between psychological distress and fair as well as empowering leadership. While most theoretical models assume that leadership is a predictor of health and well-being among employees (Barlow and Iverson 2005; Judge and Piccolo 2004), the findings of the current study provided no indications of any impact of supportive, fair, empowering, or laissez-faire leadership on subsequent psychological distress. However, we found that psychological distress was negatively associated with subsequent fair and empowering leadership, suggesting that employees with high levels of distress experience their leader as less fair and empowering over time. The finding of a reverse causality association

concur with two studies in military contexts (Barnes et al. 2013; Lang et al. 2011), but contrasts with other studies (Elovainio et al. 2013; Ybema and Van den Bos 2010) that have found no or weak support for such a relationship. Most of the previous research has examined associations between work environment and psychological distress within general circumstances where most of the employees have relatively low probability of experiencing high psychological distress (e.g., Elovainio et al. 2013; Ybema and Van den Bos 2010). In contrast, employees experiencing a terror attack targeting their workplace may be more prone to psychological distress. The possibility of detecting a reverse causality association may be higher in a sample of employees who have experienced an extreme situation at the workplace.

There may be several explanations for this reverse relationship. In the introduction of this study we highlighted the “gloomy perception mechanism” as a potential mechanism for how distress can influence perception of leadership (de Lange et al. 2005). Judgments about fairness are not rational. Rather, people use affect as a heuristic when making social judgments such as those involving leadership.

**Table 4** Unstandardized and standardized estimates of relationships between leadership behaviors and psychological distress (see Fig. 2)

	Unstandardized estimate (SE)	Standardized estimate (SE)
Fair leadership T1 → Fair leadership T2	.46*** (.06)	.44*** (.06)
Empowering leadership T1 → Fair leadership T2	.08 (.05)	.10 (.05)
Supportive leadership T1 → Fair leadership T2	.09 (.07)	.09 (.07)
Laissez-faire leadership T1 → Fair leadership T2	−.09 (.10)	−.05 (.06)
Psychological distress T1 → Fair leadership T2	−.21* (.11)	−.06* (.03)
Empowering leadership T1 → Empowering leadership T2	.61*** (.05)	.62*** (.05)
Fair leadership T1 → Empowering leadership T2	.08 (.07)	.07 (.06)
Supportive leadership T1 → Empowering leadership T2	.09 (.08)	.09 (.07)
Laissez-faire leadership T1 → Empowering leadership T2	.18 (.12)	.10 (.06)
Psychological distress T1 → Empowering leadership T2	−.24* (.11)	−.06* (.02)
Supportive leadership T1 → Supportive leadership T2	.47*** (.08)	.46*** (.07)
Fair leadership T1 → Supportive leadership T2	.11 (.07)	.10 (.06)
Empowering leadership T1 → Supportive leadership T2	.15*** (.04)	.16*** (.05)
Laissez-faire leadership T1 → Supportive leadership T2	.01 (.11)	.01 (.06)
Psychological distress T1 → Supportive leadership T2	−.01 (.09)	−.00 (.03)
Laissez-faire leadership T1 → Laissez-faire leadership T2	.49*** (.07)	.47*** (.07)
Fair leadership T1 → Laissez-faire leadership T2	−.07 (.04)	−.11 (.07)
Empowering leadership T1 → Laissez-faire leadership T2	−.03 (.03)	−.06 (.05)
Supportive leadership T1 → Laissez-faire leadership T2	.01 (.05)	.02 (.08)
Psychological distress T1 → Laissez-faire leadership T2	.12 (.07)	.06 (.03)
Psychological distress T1 → Psychological distress T2	.71*** (.03)	.73*** (.03)
Fair leadership T1 → Psychological distress T2	−.02 (.01)	−.08 (.05)
Empowering leadership T1 → Psychological distress T2	.00 (.01)	.01 (.04)
Supportive leadership T1 → Psychological distress T2	−.01 (.02)	−.02 (.06)
Laissez-faire leadership T1 → Psychological distress T2	−.03 (.02)	−.05 (.05)

Adjusted for sex and proximity

\*  $p < .05$ ; \*\*\*  $p < .001$ 

Affect may shape the context through which employees experience, appraise, and reach conclusions about factors such as justice (Barsky et al. 2011). Following this mechanism, employees with high levels of psychological distress have a lowered threshold for interpreting events at their workplace in a negative manner and distressed subordinates may therefore have a higher risk than others for experiencing their leader as unfair and disempowering. This mechanism may reflect a discrepancy between what the subordinate needs or wants and what the subordinate receives from their leader. Psychologically distressed subordinates may need or want higher levels of support from their leader and may interpret their leader's behavior in light of this.

However, in addition to perceptions, actual behavior can also explain the relationship between distress and leadership. That is, employees with certain dispositions, such as psychological distress, may behave in certain ways which influence their interaction with their leader. For instance, as distressed employees may underperform or lack concentration, they may be subjected to closer monitoring by

their leader or get delegated work task which they consider below their competence level. If the employee interprets such changes in a negative manner, it is possible that they also experience the leader as unfair or disempowering.

Evidence of a reverse causality mechanism does not disconfirm the importance of leadership for concurrent psychological health. According to Herzberg's motivation-hygiene theory (Herzberg 1969), variables that contribute to satisfaction are different from variables that contribute to dissatisfaction. Extrinsic factors such as supervision, salary, interpersonal relations with peers, subordinates and superiors as well as working conditions have a "hygiene" function that do not make people mentally healthy, but can prevent illness. These are factors that do not contribute to positive mental health, but a decrease would lead to negative mental health. They seem not to provide long-term effects that improve mental health, but are fundamental factors that provide a base for positive development in mental health. In addition, they can have a short-lived and temporary "analgesic" effect (Herzberg 1969). On the

other hand, intrinsic factors such as achievement, recognition, work itself, responsibility, and advancement improve mental health over time. From these propositions, it can be inferred that leadership may have a short-term protective effect of psychological health, but do not contribute to improving psychological health across time. Our findings indicated that leadership seems to be related to psychological distress measured simultaneously, but not to have long-term influence on psychological distress, which is consistent with these propositions.

When the workplace is the scene for the traumatic event, people may expect their workplace to take responsibility for their well-being (Byron and Peterson 2002). We are constantly monitoring feedback from our social systems that might signalize whether we are in danger of being excluded from important social groups (Leary and Baumeister 2000). In situations with low levels of information and high levels of uncertainty, affect may be used as a heuristic in this monitoring (Van den Bos 2003). Assessing fairness and autonomy may signalize the leader's assessments of the value of the employees' contributions to the workplace. Continuous autonomy support, clear information, and feedback from the leader may prevent employees from using affect heuristics when they assess how their work is valued.

The full-panel design across two waves made it possible to study directionality between perceptions of leadership behaviors and psychological distress after exposure to a potentially traumatic event. In addition, this study used structural equation modeling, which, in contrast to traditional analyses, can account for correlated measurement errors over time, estimate both directions of causation simultaneously, and control for method and third variable problems (De Lange\* et al. 2004). Limitations include the use of self-reported data which increase the risk of common method variance and response set tendencies. In addition, the data set does not contain detailed information about the extent the respondents that were not directly exposed experienced threatened death of one of their close colleagues/friends. Furthermore, the attrition analyses revealed that missingness at T2 was predicted by low levels of psychological distress at T1. Thus, the selective participation may bias the results of the analyses, especially prevalence of high psychological distress. Finally, because both psychological distress and leadership behavior were assessed after the traumatic event, we were not able to study whether the levels of these were affected or changed by the traumatic event.

In conclusion, our findings suggest that supportive and empowering leadership is associated with low levels of concurrent psychological distress after a traumatic incident. In addition, our findings indicate that distress can affect the way the individuals perceive their leaders'

behaviors. A theoretical implication of this finding is that models of leadership also must consider a reverse effect of psychological distress on leadership. To our knowledge, this kind of effect has not been included in any existing models on leadership. The finding of a reverse effect does also have significant practical implications. Organizations can benefit from taking responsibility for their employees' health, and contributing to lowering distress in their employees. For example, organizations which have well-functioning routines for acknowledging distress symptoms in their employees and can offer them access to health services may be more robust. This may be especially important in situations that may contribute to distress among employees.

The findings of this study also remind us of why we cannot infer directionality from cross-sectional data. Furthermore, future studies which include measures of employee behavior and perceptions as well as personality traits such as neuroticism in a time-lagged research design may contribute to further understanding of the mechanism underlying the reverse causality between psychological distress and leadership.

**Acknowledgments** This project has been financially supported by the Norwegian Council of Mental Health and the Norwegian Extra Foundation for Health and Rehabilitation through EXTRA funds.

#### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

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