

Does training managers enhance the effects of implementing team-working? A longitudinal, mixed methods field study

human relations
63(11) 1719–1741
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co.uk/journalsPermissions.nav
DOI: 10.1177/0018726710365004
hum.sagepub.com


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Abstract

The introduction of team-working often has positive effects on team members but places significant new demands on managers. Unfortunately, little research has examined whether the impact of the intervention may be enhanced by providing managers with training during the change process. To test this possibility we carried out a longitudinal intervention study (with a 'no training' comparison group) in a part of the Danish elderly care sector that was implementing teamwork. Kirkpatrick's (1998) training evaluation model was used to examine the effects of training team managers in issues such as teamwork, transformational leadership and change management on the outcomes of team implementation. We used a combination of quantitative and qualitative research methods to isolate the impact of manager training on the success of the teamwork intervention. The results identified some significant, but modest, incremental positive effects that could be attributed to the manager training. The results also showed that significant organizational changes during the intervention had an impact on both the team intervention and the transfer of manager training.

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Keywords

evaluation, intervention, job redesign, longitudinal, manager training, mixed methods, psychology, teamwork

Introduction

There is little doubt that implementing teams can bring good results in terms of increased autonomy, improved social climate, job satisfaction and effectiveness, but many studies fail to find positive effects (for a review, see Bambra et al., 2007). When teamwork fails to deliver positive outcomes it may be owing to poor implementation practices and negative concurrent events (Bambra et al., 2007). Managers are often defined as drivers of change and as such they experience new demands for which they may not be equipped (Becker-Reims, 1994). It has yet to be explored whether the impact of team implementation is enhanced by training team managers to help them respond to the demands of the changes in their role that occur with team implementation. This article presents a longitudinal field study of the impact of manager training that was delivered during the implementation of teamwork. A mixed methods approach was used employing both qualitative and quantitative methods for different inquiry components (Bryman, 2006, 2007). The study explored both the processes and outcomes of the training intervention within the four levels of Kirkpatrick's model of training evaluation (Kirkpatrick, 1998). Qualitative methods were also used to gather important data about the transferability of training within the organizational context.

Training managers during team implementation

Without knowing the conditions associated with the success (or otherwise) of implementing teamwork, it is difficult to export effective interventions to other settings (Harachi et al., 1999; Semmer, 2003, 2006). Team manager behaviour is likely to have a major influence on the success of teamwork interventions because managers are often given the role of driving the change process (Becker-Reims, 1994; Parker and Williams, 2001). In one of the few studies to examine directly problems in team implementation, Parker and Williams (2001) found that one of the main barriers for effective teams was associated with managerial behaviours (a non-participatory leadership style and a lack of detailed feedback on performance). More recently, the importance of managers as drivers of change was confirmed in a study by Nielsen and Randall (2009). Here it was found that the active support for team implementation by middle managers mediated intervention outcomes. Taking on the role of drivers of change may place additional demands on managers. It may require them to develop and use new knowledge and skills and change their attitudes towards teamwork. Managers have key roles to play in: the development of a clear vision and coherent strategy for the change; securing support for the intervention at all levels; managing expectations about the change; securing sufficient time and resources for the implementation process; and controlling the pace of change (Becker-Reims, 1994; Parker and Williams, 2001). Team managers are also likely to play a key role in processing the wealth of new information that accompanies the implementation of teams. Guth and McMillan (1986) describe the middle manager as the team's central nervous system (receiving information, facilitating communication and integrating the information coming into the team). Creating a shared vision for the team also comes to the fore (Bass, 1999).

It has also been found that through the implementation of teams, followers become more empowered, skilled, feel more responsible for their work and they interact with team managers at a more equal level (Trist et al., 1977). This can mean that managers feel threatened by empowered employees and make them reluctant to pass on the necessary skills to them and delegate tasks to team members (Becker-Reims, 1994; Parker & Williams, 2001).

Overall, the implementation of teams brings about a shift in the role of a manager from a transactional one to a transformational one (Butler et al., 1999; Gillespie and Mann, 2000; Pearce and Sims, 2002; Pillai and Williams, 2004). The importance of this shift is evident in studies that have shown how transformational leadership behaviours help to support healthy change processes (Nemanich and Keller, 2007). Perhaps most importantly there is good evidence to suggest that transformational leadership behaviours can be trained and the results of this training have a significant positive impact on team members. Studies by Barling et al. (1996) and Parry and Sinha (2005) found that employees reported their managers exerted more transformational leadership behaviours after training and, crucially, employees were found to be more engaged and exerting greater effort.

Therefore, it may be that training managers to understand the concept of teamwork, how teams function, how teams may be effectively implemented (including developing a structured implementation strategy), and to exhibit transformational leadership behaviours helps them to meet the new challenges they face as a result of teamwork implementation, and enables them to actively facilitate and strengthen team implementation. Based on the existing literature we developed three interdependent hypotheses. The first hypothesis serves as the baseline that allows us to indentify the incremental changes of team manager training:

Hypothesis 1: Implementing teams will bring about improvements in employees' perceptions of task design (increased team interdependence and autonomy) and team processes (increased motivation and improved social climate). Because of the change in the role of the manager brought about by the change we predict that employees will also rate their manager as exerting more transformational leadership behaviours. In addition, organizational and individual outcome measures will improve (for example, perceptions of increased team effectiveness, employee involvement and job satisfaction).

Based on the role of the manager in implementing successful teams, we developed a second hypothesis regarding whether middle managers that receive training in how to implement teamwork and respond to the new demands of their role will enhance the effects of team implementation.

Hypothesis 2: Training team managers will bring about incremental positive changes when implementing teams.

However, the training transfer literature highlights the importance of trainees being positive about training, and a supportive environment ensuring trainees apply skills learned at the training course in their daily working life (Burke and Hutchins, 2007). The impact of training is mediated by the transfer of training, and the extent of the transfer of training is dependent upon the organizational context (Alvarez et al., 2004;

Burke and Hutchins, 2007). Important factors include those of a climate supportive of transfer (Rouiller and Goldstein, 1993) and the opportunity to perform newly acquired skills (Clarke, 2002; Lim and Johnson, 2002).

Hypothesis 3: Managers' evaluation of the training itself (i.e. their perceptions of the quality and usability of the training course) and the extent to which it transferred to the work setting will be significantly related to the effectiveness of the team implementation.

In order to properly test hypotheses 2 and 3, a qualitative process evaluation was used to examine the impact of contextual factors on the effects of the team manager training course (Alvarez et al., 2004; Baldwin and Ford, 1988; Burke and Hutchins, 2007; Nielsen et al., 2006). This qualitative process evaluation was also used to examine the impact of the organizational context on the implementation of teams in both the comparison and intervention group. This allowed the incremental impact of the manager training to be isolated better by identifying any contextual influences on either (or both) the comparison and intervention groups.

In summary, we propose that the teams experiencing the most positive changes will be those with managers who were trained (and who reported a positive view of the training they received), and where the work context was favourable (i.e. it allowed managers to use the knowledge and skills acquired during training, and did not disrupt the implementation of the team intervention). Table 1 shows an overview of the methods used in the study including how each method contributes to evaluating team implementation, the manager training and the influence of the organizational context.

Table 1 Overview of research methods

Focus	Quantitative		Qualitative			
	Survey	Module evaluation	Internal reference evaluation	Observations	Action plans	Interviews
Team implementation	x					x
Level 1*		x		x		
Managers' reaction to the training course						
Level 2			x	x		x
Managers' changes in knowledge and attitudes						
Level 3	x					x
Changes in managers' behaviours						
Level 4	x				x	x
Changes in team members						
Context						x
Opportunities for transfer of training						

*The four levels were adapted from Kirkpatrick's training evaluation model (1998)

The present study

To adequately test the impact of manager training during the implementation of teams, we collected both qualitative and quantitative data in an 18-month longitudinal quasi-experimental study of the implementation of teamwork. An intervention group (teams with managers who received training) was compared with a comparison group (teams with managers who did not receive training). A combination of both process and effect evaluation was carried out using a mixed methods approach (Bryman, 2007). This approach has been identified as a powerful method of strengthening experimental designs through the triangulation of data from different methods (Bryman, 2006). This is especially important in the present study since the strongest designs are challenging to establish and maintain when using complex multi-faceted interventions within functioning organizations (Grant and Wall, 2009).

The study employs Kirkpatrick's (1998) training evaluation model to isolate the levels at which team manager training was effective, providing a detailed analysis of how training may have an effect on various intervention outcomes at the individual, team and organizational level. The model was chosen because it provides a framework for examining the linkages between trainees' experiences of the training itself (e.g. their reactions to it) and the impact of the training on team and organizational outcomes. This is a significant advantage over other models of training evaluation (e.g. Kraiger et al., 1993).

Quantitative evaluation was used with measures chosen based on the variables included in input-process-output models of teams (Yeatts and Hyten, 1998). Qualitative process evaluation was used in parallel with the quantitative effect evaluation for three reasons: i) to support data triangulation, ii) to identify the mechanisms behind any changes brought about by the training and the teamwork implementation and iii) to identify the impact of the intervention context on the processes and outcomes of change (Greene et al., 2001; Johnson et al., 2007; Nastasi et al., 2007). This use of mixed methods in quasi-experimental intervention studies is rare but adds important explanatory power when complex and multiple change mechanisms are being studied in complex organizational settings (Bryman, 2006).

Method

Design

All participants were from two almost identical elderly care centres in a large Danish local government organization (see Table 2). Employees in both centres were exposed to the implementation of teams with the goal being that all the resultant teams had some degree of self-management. Before implementing teamwork, the elderly care centres were randomly allocated status as intervention or comparison (control) group. The managers in the intervention group participated in a team manager training course developed in cooperation between the research team and occupational psychology consultants (see Intervention). The study took place over an 18-month period. Qualitative data were collected towards the end of the intervention period (15 months after the Time 1 quantitative data were collected) (see Table 2).

Table 2 Response rates and demographics at baseline

	Intervention group		Comparison group	
Pre-test	87%	177 out of 202	79%	277 out of 349
Post-test	65%	128 out of 198	49%	152 out of 310
Completed the questionnaire at both times	87		101	
Managers interviewed	11		17	
Teams (employees) interviewed	8 (49)		16 (39)	
Age (mean)	44,76		43,06	
Gender (% women)	94%		92%	
Healthcare assistants (%)	64%		61%	
Nurses	13%		12%	
Other healthcare related education	17%		19%	
No healthcare related education	8%		6%	

Participants

In Denmark, the elderly care sector is organized into units within each of which some staff provide care to elderly who are still in their own home (homecare) and others provide care in elderly care homes (together they form a care centre). The majority of participants were nurses or healthcare assistants who spent most of their working time delivering care to patients (see Table 2). Clients were primarily elderly people who had poor physical functioning. The main tasks, both in homecare and in the care homes, included providing personal care (aid getting out of bed in the morning and into bed in the evening, washing, feeding, aid to go to the toilet) to clients, and cleaning. Other tasks involved shopping and keeping an eye on medicine intake and changes in health. In this study, two units *each* containing both types of staff were included (in this sample half of the healthcare staff worked in homecare and the other half in the elderly care homes in each care centre). The two centres were both located in the centre of a large city, had similar client groups and dealt with similar tasks.

Before the implementation of teams, all study participants were organized in geographically-defined groups (e.g. homecare staff covering a geographical area or staff working in a nursing home). Each of these groups had a formal, external leader with managerial responsibilities: these were the managers who participated in the training course. Group sizes varied from two to 35. The mean group size was 15 at Time 1 and 12 at Time 2. At Time 2, the very large groups had been divided into smaller teams to help develop interdependency. Thus one manager could have up to three teams (e.g. two day-shift teams and a night-shift team). The intervention and comparison groups were not significantly different in terms of their demographics, nor did the composition of either differ significantly from the composition of the entire study population.

Team members responded to the questionnaire-based measures on two occasions pre- and post-intervention (with an 18-month interval between them). On both occasions, the questionnaire contained questions about their perceptions of their managers' leadership behaviours (level 3 outcomes), team organization and team functioning (level 4 outcomes) (see Table 3). Confirmatory factor analysis was used to test the factor structure. The

Table 3 Quantitative measures used in training evaluation

Evaluation	Scale	Items	Values	Cronbach's alpha	Source
Module evaluation: Level 1	None	'Have you learned anything today?' Can you use what you have learned in your daily work?	1 (to a very high extent) to 5 (not at all)	None	Developed for this study
Survey: Level 3*	Transformational leadership	7 items Example: 'My leader communicates a clear and positive vision of the future'	1 (to a very high extent) to 5 (not at all)	Time 1: .90 Time 2: .94	Global Transformational Leadership Scale Carless, Wearing and Mann (2000)
Questionnaire: Level 4	Team interdependence** (Team Performance Inventory (TPI)) Autonomy	4 items Example: 'To do the task, team members need to have a range of different skills'	1 (strongly disagree) 5 (strongly agree)	Time 1: .80 Time 2: .53 [‡]	Team Performance Inventory (TPI) West, Markiewicz and Dawson (2004)
		5 items Example: 'We decide as a team who will do what in the team'	1 (strongly disagree) 5 (strongly agree)	Time 1: .79 Time 2: .78	TPI West et al. (2004)
	Team motivation	5 items Example: 'Everyone in the team works hard to achieve the team's goals'	1 (strongly disagree) 5 (strongly agree)	Time 1: .87 Time 2: .89	TPI West et al. (2004)
	Social climate	5 items Example: 'We know we can rely each other in this team'	1 (strongly disagree) 5 (strongly agree)	Time 1: .91 Time 2: .92	TPI West et al. (2004)
	Team effectiveness	3 items Example: 'The team is consistently told that it achieves or exceeds its goals'	1 (strongly disagree) 5 (strongly agree)		TPI West et al. (2004)

(Continued)

Table 3 (Continued)

Evaluation	Scale	Items	Values	Cronbach's alpha	Source
Involvement		4 items Example: 'Do you feel your place of work is of great importance to you?'	1 (to a very high extent) to 5 (not at all)	Time 1: .71 Time 2: .85	Copenhagen Psychosocial Questionnaire (COPSOQ) Kristensen, Hannerz, Hogh, and Borg (2006) COPSOQ Kristensen et al. (2006)
		5 items Example: 'How satisfied are you with your job as a whole, everything taken into consideration?'	1 (very satisfied) to 4 (highly dissatisfied)	Time 1: .82 Time 2: .82	

* Level 3 and 4 were analyzed using multilevel analyses (Hox, 2002). Team baseline levels were controlled for in the analyses. Standardized difference between the change in the intervention teams and the change in the comparison teams were computed. As variables were measured on different scales, these were transformed to standardized scales so they ranged from 0-100 with 100 representing a high score on the construct. For scales with five response categories, responses were transformed such that 1 = 0, 2 = 25, 3 = 50, 4 = 75, 5 = 100. For scales with four response categories, responses were transformed such that 1 = 0, 2 = 33, 3 = 66 and 4 = 100. This was done to enhance clarity in the interpretation and meaning of the results.

**The measures drawn from the TPI were slightly adjusted.

†Intercorrelations between items and items and between items and the overall scale were all above .20 and .40 respectively.

measurement models for each of the input-process-output variables provided a good fit to the data (RMSEA $\leq .05$).

Team implementation

The overall objective of the team implementation intervention was to make full use of employees' competencies, ensure employee involvement and empower employees to make independent decisions, that is, to develop teams with some degree of self-management but with good management support. In accordance with scientific definitions, the organization defined a team 'as a group of people who have a joint task to solve, they share a joint responsibility for solving the tasks and within the team there are defined roles and team members depend on each to solve the task' (Sundstrom et al., 1990; West, 1996). Recent research indicates that working in self-managing work teams in the elderly care sector has the potential to bring about positive effects in terms of increased individual autonomy and commitment in personal care workers (equivalent in educational level to the healthcare assistants in this study) (Harley et al., 2007). Teams were formed such that existing groups of employees were divided into smaller teams and became jointly responsible for a group of clients: team members were then jointly responsible for allocating tasks and for deciding how they should be dealt with. Regular team meetings were introduced where team members would share knowledge and experiences and come up with alternative ways of solving problems (making the team implementation a participative intervention). The team managers' responsibilities were focused on communicating a vision for the future, making sure that all that team members were involved in decision making, and supporting team learning.

An elderly care centre manager (who had previous experience with implementing teamwork) worked as a full-time team consultant to develop and implement a top-down strategy for implementing teams. All 17 elderly care centre managers participated in meetings with the consultant in which they were told about teamwork in order to secure their involvement and participation in the intervention programme. The consultant also held after-work meetings with all teams where managers and employees were told about the advantages and the challenges of implementing and working in teams. In addition, external consultancy firms were engaged to provide team-related services to the elderly care centres: all teams were given a budget to buy services (such as coaching for managers, or manager or employee team training). Further, the personnel magazine regularly included material to inform employees and managers about teamwork. The research team was not involved in this part of the intervention.

The manager training intervention

A theory-driven (action learning) and evidence-based team manager training course was delivered to the managers within the intervention group (Nielsen et al., 2008). The research team carried out a thorough review of current theory and research on: i) teamwork, ii) transformational leadership behaviours that may support teamwork and change

processes, and iii) how team managers may implement changes in their own teams (including information on the possible barriers met when implementing changes). Based on this, internal consultants developed a syllabus and manual for the manager training course. This combined the skills of both parties: researchers provided the latest research on teams and managing teams and consultants translated this information into material that would ensure learning and the interpretation of information into the reality of the participants.

The training used action learning theory (Holden, 1997) to emphasize the transfer of theory to practice through exercises and tools that the trainees could practice often and use in their own teams (Campbell and Kuncel, 2005). Training delivered from an action learning perspective often yields good results (Raelin, 1994). The training required managers to address real-life problems, so that managers would be encouraged to re-evaluate their attitudes and start thinking in new ways about their work practices (Holden, 1997).

The training materials were tailored to make them relevant to the content and context of teamwork in elderly care. The training course consisted of six days training spread over a period of six months. Managers were required to develop action plans to be implemented in their own teams to support the transfer of learning (Gollwitzer, 1999). Semi-structured interviews were used to collect data from all managers about their experiences of the training and the teamwork implementation (see Table 4). The data from these interviews was analyzed using template analysis (Patton, 2002).

Table 4 Qualitative evaluation template for analysis

Method	Objective
Observations:	
Level 1	Perceptions of the course and the relevance for daily work
Level 2	Changes in knowledge and attitudes
Interviews:	
Level 2	Managers' changes in attitudes and knowledge towards teamwork
Level 3	Employees and managers' reports of managers' changes in behaviours
Level 4	Managers' and employees' attitudes towards teamwork
	Managers' and employees' reports of changes in employees' behaviour and their interactions
Action plans:	
Level 4	Managers' focus in implementing teams
Interviews:	Hindering factors:
Context	At the national level
	At the local government level
	At the local centre level
	Facilitating factors:
	At the national level
	At the local government level
	At the local centre level

Table 5 Managers’ evaluation of training modules

	Module 1	Module 2	Module 3	Module 4	Module 5
	1 day	1 day	2 days	1 day	1 day
Have you learnt something today?					
To a very high extent	27%	25%	50%	10%	40%
To a high extent	73%	75%	50%	90%	50%
To some extent					
To a very little extent					10%
Not at all					
Will you be able to apply what you have learnt today in your daily work?					
To a very high extent	73%	75%	100%	70%	60%
To a high extent					
To some extent	27%	25%	0%	30%	30%
To a very little extent					
Not at all					10%

Results

Kirkpatrick level 1: Manager reactions to training

At level 1 the training appeared to be successful. The module evaluations, summarized in Table 5, showed that the participating managers were satisfied with the training course and believed they had learnt something that they could use in their daily work.

During the last module, the observing researcher collected oral feedback on the course from managers. Owing to the small number of respondents we corroborated the findings with the evaluation of the training course made on the last day of the course. All participating managers agreed that the course had been useful, and that going on the course with colleagues from the same care centre had allowed them to develop a coherent strategy for the implementation of teamwork. Many reported that this made *them* feel like a team with a shared mission and as a result they had started functioning as one management team, providing support for each other during the process. They also indicated that the tools provided during the course had been helpful in supporting the development of teamwork at their workplace. One of the managers reported:

I have been thinking about why this course has been better than any other courses I have been on – because it has been better. I haven’t been more motivated than usual. I think the connection has been good – and working together in networks has been a strength, and the storyline has become so strong that it has become natural for us to get together. (Manager 4)

Level 2: Learning

The internal reference evaluation revealed mixed results on changes in attitudes towards aspects of leadership. There was a positive change in attitudes towards change

management and self-managing work teams. However, there was less evidence of changes in attitudes in respect of transformational leadership and teamwork. Strong positive attitudes towards transformational leadership were not evident in internal reference evaluation even though some of the content of the interviews with managers was suggestive of a slight shift in these attitudes.

Both before and after the training course, participating managers rated it to be important for a 'good' manager to formulate a clear vision and function as a role model (six before the training course and eight after the training course). Before the training course, six managers felt it important to show individual consideration but this *decreased* to three after the training course. After the training course, six managers felt it important to instil confidence in followers (compared with eight before the training course). After the training course, more managers felt that the good manager led his or her followers through change processes (from one to three managers), and ensured that employees were willing to accept changes (this rose from three to five managers after the training course).

After the training, fewer managers defined a team as a group of employees who depended on each other to complete a shared task (from four managers to one manager). Instead their focus was on whether team members regarded themselves as being part of a unit (increasing from two managers to seven). Researcher observations revealed that many managers started being more aware of exerting transformational leadership behaviours (e.g. asking followers questions rather than providing answers, signalling high expectations that employees would solve problems themselves, and role modelling). Also, during interviews it became clear that some managers had changed perceptions of their role as manager. The comments of one manager are representative of these views:

That are certainly some things I have become more aware of. I never want to be involved in the day-to-day planning in this department again. Then it is not the job for me: I want these leadership functions, I want to be able to work with developing the team, and myself for that matter, for that is almost two sides of the same matter. (Manager 6)

We next went on to explore whether these attitudes were associated with stability of behaviour.

Level 3: Changes in behaviour

In Table 6 we see the results of the multilevel analyses of team members' perceptions of managers' transformational leadership behaviour. There was some evidence to support hypothesis 1: both the comparison and intervention groups reported a slight increase in exposure to transformational leadership behaviours with the increase in the intervention group being marginally, but not significantly, larger than that in the comparison group. Therefore it appeared that, consistent with the stability of manager attitudes, there was relative stability in transformational leadership behaviour. During interviews, it became evident that some managers had changed their behaviours. Both managers and their employees emphasized a change in behaviour; managers had become more aware of standing back and letting the team take responsibility and solve problems. As one manager put it:

It is about bringing the team to solve its own problems, isn't it? Rather than me trying like mad to find a solution, because I may not have the solution, right? But we have become good at asking the right questions so the team can come up with a solution. That I think the course has helped us do. (Manager 8)

This behaviour was also reported by employees of these managers:

She leaves it up to the team to solve the problems: 'What are you going to do?' She really tries to make us solve it. She gives us feedback in such a way that it is not clear to us whether it was her or us that solved the problem. (Employee 21)

Level 4: Effects on employees

Some significant differences were found between the intervention and the comparison group. Involvement ($p < .10$) and job satisfaction ($p < .05$) decreased in the comparison group but these increased or remained stable in the intervention group (Table 6). These were medium-sized effects (Cohen, 1988). Therefore for two of the three team output variables there was some evidence that team manager training had enhanced the effectiveness of team implementation. Similar, albeit non-significant, effects were found for both team effectiveness and motivation: the comparison group experienced a decrease whereas the intervention group remained stable. Contrary to expectations, interdependency *increased* in the comparison group and decreased in the intervention group. This difference was significant ($p < .05$) with a medium effect size. There were no other significant between-group differences in the input-process-output measures.

With regards to autonomy, both the comparison group and the intervention group experienced an increase with the difference being slightly higher in the comparison group (albeit not significantly so). In the interviews, several managers reported that some of the employees who had previously been very withdrawn had started coming forward, taking responsibility and were involved in making the decisions and solving problems. This was also mentioned by employees and, importantly, employees reported a change in how they interacted but in terms of a better social climate: their team members became aware of each other's needs and to take better care of each other, but also in relation to the tasks:

It is in a team you become aware of what you are good at – so maybe that should be your responsibility. You find out where people's resources lie and that's how you get in control of things. (Employee 2)

In addition, a sense of shared goals and purpose have started to emerge:

I clearly think that the shared goals, shared values – that you pull in the same direction – that is everything.... That we have the framework but the content that is less clear – that is what I like about teamwork. (Employee 29)

Table 6 Changes over time controlled for baseline team levels

Variable	Group	Baseline	Follow-up	Change	95% CI	Effect
Input						
Interdependency*	Comparison	76.4 (14.3)	78.9 (11.2)	2.80	(−0.10, 5.71)	.39
	Intervention	79.1 (12.5)	76.7 (11.6)	−2.43	(−5.61, 0.75)	
Autonomy	Comparison	60.7 (16.5)	64.8 (14.5)	3.81	(0.26, 7.36)	.08
	Intervention	60.2 (16.8)	63.4 (13.9)	2.52	(−1.45, 6.50)	
Process						
Motivation	Comparison	65.3 (19.4)	60.0 (19.0)	−4.49	(−8.72, −0.26)	.26
	Intervention	70.3 (17.6)	70.8 (17.6)	0.25	(−4.38, 4.88)	
Social climate	Comparison	65.8 (17.7)	65.8 (17.5)	0.16	(−3.75, 4.07)	.08
	Intervention	68.5 (17.9)	70.6 (14.3)	1.48	(−2.89, 5.85)	
Transformational leadership	Comparison	58.0 (21.3)	59.3 (20.9)	1.97	(−2.01, 5.95)	.01
	Intervention	61.2 (18.0)	65.0 (19.5)	2.16	(−2.34, 6.66)	
Output						
Team effectiveness	Comparison	53.8 (19.1)	51.0 (17.9)	−2.65	(−6.76, 1.46)	.18
	Intervention	56.4 (17.0)	58.6 (19.5)	0.71	(−3.75, 5.16)	
Involvement†	Comparison	55.3 (17.0)	53.5 (15.7)	−1.90	(−5.34, 1.54)	.31
	Intervention	58.5 (16.3)	62.1 (14.2)	3.26	(−0.64, 7.15)	
Job satisfaction*	Comparison	67.6 (16.6)	62.7 (15.7)	−5.00	(−8.49, −1.51)	.35
	Intervention	65.8 (15.1)	66.9 (15.1)	0.50	(−3.42, 4.43)	

To guard against Type II error that may result from dividing the sample into comparison and intervention groups we set the significance level at $p < .10$. † $p < .10$, * $p < .05$. CI = Confidence Interval

Qualitative evaluation of intervention processes and the organizational context

A review of the action plans developed by the managers participating in the training course revealed an emphasis on developing team processes, with little consideration of task design. None of the action plans focused on increased interdependence; only two focused on increasing autonomy. This is consistent with, and provides a plausible explanation for, the decrease in interdependency in the intervention group.

All action plans focused on process issues such as openness, social climate, mutual respect, sense of community and learning. Three action plans included improved customer service and satisfaction as their focus. During the course, team managers were asked to rate their teams: the degree to which team members were jointly responsible for a task and had to work together to complete this task. The average for all ratings was 7.20 out of a possible 10. This was supported by the data from interviews that indicated that many managers and employees in the intervention group felt that they already worked well in teams, even if it had not previously been named teams. Therefore, the focus of the action plans seemed to be on enhancing existing team processes rather than on the formation of teams.

The action plans developed on the training course showed that several team managers and staff had worked together on improving communication, problem solving and social support. Interventions of this type have been shown in other studies to increase

involvement and job satisfaction. However, the implementation of such action plans in groups that have functioned as teams for some time appears unlikely to result in changes in employee perceptions of transformational leadership behaviour.

Qualitative data about the organizational context of the team implementation in the comparison group also helped to explain the results of the quantitative evaluation. During the interviews with managers and focus groups with employees, a number of changes were reported in the comparison group: some groups had been reorganized into smaller teams where a group of employees were responsible for a smaller number of clients, ensuring a closer relationship between employee and client. Employees were given additional responsibilities, for example, planning the rota, including days off and holidays. Regular team meetings were also introduced where members of the team would meet every fortnight to discuss clients' needs and solve problems arising in daily work. Employees were mostly responsible for the agenda of these meetings as well. In the intervention group few teams reported such changes in responsibility. These data supported our first hypothesis: implementing teams – with or without manager training – can bring about changes in team interdependency and autonomy. Therefore, it could be that a ceiling effect meant that the training appeared unlikely to bring about incremental changes in these variables.

Template analysis of the interview and focus group data also identified *hindering factors at the local government level*. Employees and managers in both the comparison and the intervention groups reported that external factors had made it more difficult to implement team-working. The local government had overspent its budget and had to pay a financial penalty to the Danish government, leading to significant downsizing and reorganization. For both the comparison and the intervention groups this meant that they were no longer allowed to use temporary staff to cover for absent colleagues (a serious problem for both the elderly care centres). As a result, hardly any shifts had a full complement of staff. Both employees and managers reported this made it difficult to find the time and energy to work with team implementation.

In addition, in the intervention group, many service teams had to make redundancies and a merger with another local centre was planned. This meant that managers would have to apply for their own positions in competition with the managers of the local centre with which they were merging. At first, it was decided that the intervention group would be split up and merged with two other centres. The elderly care centre went for six months before the decision was made about which local centre they would merge with, leading to considerable uncertainty. When the decision was made, it was reversed after just one month. It was then decided that the local centre that served as a comparison group would have to be divided up into two and merged with two different local centres – one of which was the intervention group in this study. This merger took place immediately after the Time 2 questionnaires were sent out. Managers in the intervention centre reported the threat of an imminent merger had had a huge impact on their work with team implementation. Given this difficult intervention context, the finding that only one of the Level 4 outcome measures (team interdependency) had decreased could be interpreted as a positive outcome of the manager training.

The threat of the merger and downsizing heavily influenced employees and managers and hindered progress. One manager commented:

I talked to my staff about it. And I could feel they felt it was ridiculous. We were waiting for who was going to be laid off and then they really didn't feel like talking about teams and spending our time on training and the like.... And then we agreed to wait until after the summer holidays, when this had been cleared out of the way. And I agreed with the training coordinator that we should start making plans and then the news about the merger came out. What teams will I have then? (Manager 3)

Neither the intervention group nor the comparison group reported any *facilitating* factors at the local government or the local centre level. When prompted they did report that the meetings held by the team consultant had been interesting but they had not had a large impact on the actual work with implementing teams. In fact, many employees did not mention the meeting.

Discussion

This study has reported of an intervention study that tested whether additional team manager training enhanced the impact of a team-working intervention. We found limited effects for the teamwork intervention when manager training was not used (Hypothesis 1): only interdependency measures were found to have increased after the implementation of teams in the comparison group. Additional manager training led to a better outcome for team implementation (Hypothesis 2): the training was found to have a modest, mainly protective, effect on job satisfaction and involvement. Our third hypothesis only received partial support: although managers evaluated the training positively there appeared to have been limited change in managers' behaviour and attitudes with regard to transformational leadership. Important explanations for these findings were found in the organizational context and this had impacted significantly on the opportunities of the managers to transfer learning to their teams. It is important to note that both the comparison and the intervention group underwent changes while being subject to a turbulent environment. It can be said that during such circumstances finding these effects, albeit subtle, is remarkable. The main contribution of this article is that we provide an example of how the use of sophisticated analyses based on a theoretical framework can help researchers to move beyond the traditional quasi-experimental design and identify subtle effects, despite a turbulent environment, and why they occurred. In the following section we discuss the implications of this study under three headings: The protective effect of manager training, the benefits of using a mixed methods approach to evaluating complex and multi-faceted organizational interventions, and the importance of measuring impact at different levels.

The protective effect of manager training

There was substantial evidence that the way teams had been implemented and the organizational context had influenced intervention processes and outcomes. Managers who reported that they found the training course useful often also reported difficulties working with the implementation of teamwork because of the uncertainty caused by downsizing and the imminent merger. The negative impact of a turbulent intervention context has been identified in previous research (Saksvik et al., 2002), and may have blunted the positive

effects of the training in our research. In addition, none of the trained managers had focused on interdependence in their actions plans. Interviews revealed that managers felt no need to focus on this as they felt employees already worked in teams.

In the comparison group, team interdependency increased. However, teams did not report working better together nor did they report being more involved or satisfied with their jobs (in fact decreases were reported). In the intervention group, managers focused on improving the way team members worked together, and here involvement and job satisfaction remained stable. Therefore the manager training could be argued to have had a protective effect: even if no improvements were found, the deterioration reported in the comparison group was avoided. As such our results support the suggestion of Bambra et al. (2007) that inconsistent results of team implementation may be partly due to: i) damaging concurrent changes and ii) lack of team manager training. It may be that during times of turbulence (lack of staffing, concurrent mergers and downsizing) it is important for the manager to take charge and support employees. This can compromise interdependence but the protective affect of social support during organizational change has been well-documented (Kieselbach et al., 2009). It is possible that during turbulent times, managers should focus on ensuring a good climate and cooperation.

The importance of measuring impact at different levels

The Kirkpatrick (1983) training evaluation model provided a strong framework for understanding intervention processes and outcomes. At all 4 levels there was some evidence of the effects of the training. The Kirkpatrick model allowed us to identify the mechanisms of these effects. The qualitative data about the turbulence in the intervention context showed how concurrent events in the organization limited the impact of the interventions. Participating managers had little opportunity to perform differently, nor were managers being made accountable for introducing changes, nor did there seem to be much support from top management during the implementation phase despite the fact that they had made the overall decision to implement teams (Alvarez et al., 2004; Burke and Hutchins, 2007). As a consequence the focus of many managers and employees was on downsizing and merging rather than the implementation of team and use of the skills acquired to implement and manage teams. This may help to explain why there was little change in perceived transformational leadership behaviours: within a more stable context, changes in transformational leadership behaviour may be more apparent and have more of an impact on intervention outcomes.

The Kirkpatrick model of training evaluation proved to be a useful way of isolating the successes and failures of the training programme and the team implementation intervention. When looking at the process evaluation there was a strong indication that it may be that implementation problems, rather than a weak or ineffective intervention, accounted for the somewhat disappointing results. Managers evaluated the course to be useful and developed detailed action plans to be implemented in their own teams, even without significant changes in their attitudes to, or display of, transformational leadership behaviour. The evaluation also showed that attitude change is not a necessary pre-condition for behaviour change in some aspects of team implementation. Implementation of action plans was perceived to be problematical due to the turbulence caused by financial problems; the environment did not support fully training transfer.

Using a mixed methods approach

If we had used a traditional quasi-experimental design with a quantitative pre- and post-evaluation, we would have concluded that team manager training had few, if any, effects (Bambra et al., 2007). The integration of both quantitative and qualitative methods provided us with a detailed picture of the effects of team implementation and the incremental effects of additional team manager training at different levels. The mixed methods approach enabled us to achieve three important goals. Firstly, it enabled us to *triangulate data*. We used observation data to support the managers' ratings of the training and we used interviews and questionnaires to explore the effects of training and team implementation on managers' behaviours and on employees. Secondly, it enabled us to *identify mechanisms behind the changes* brought about by the training and the teamwork implementation. The combination of internal referencing and interviews and observational data allowed us to get a detailed picture of where attitudes had changed. In addition, the impact of manager training on intervention outcomes did not appear to be driven by a change towards more transformational leadership behaviour, but rather that managers focused on ensuring a good climate and cooperation. Also, at Level 3, interviews did indicate some changes in behaviour that would not have been captured by survey data, specifically that employees had started coming forward. Overall, the interviews indicated that changes took place at a local level and that there was between-team variability within both the comparison and intervention groups. While some managers and their teams had been successful in implementing teams, others had procrastinated and made little progress. Furthermore, through the action plans and questionnaire data we were able to understand why we saw a decrease in interdependence in the intervention group; managers had little focus on this. Thirdly, the mixed methods approach allowed us to *identify the impact of the intervention context* on the processes and outcomes of change. The questionnaires yielded unexpected results but when analyzing the context using interviews it became clear that, owing to great turbulence faced especially by the intervention group, stability in many of the measures could be seen as a desirable outcome. This emphasizes the importance of thorough evaluation of both processes and the effects of training. Using a mixed methods approach enabled us to analyze effects at several levels at the same time as investigating hypotheses using several sources of data.

Strengths and limitations

The main strengths of this study are its relatively large sample size and the between-groups study design with cluster random assignment, accompanied by a high level of documentation of both intervention outcomes and process applying both qualitative and quantitative methods (Alvarez et al., 2004; Semmer, 2006). The study design provided some protection against threats of internal validity (Cook and Campbell, 1979) by using a cluster randomized design based on pre-existing units (Campbell and Stanley, 1963). One possible limitation was that we compared data from teams whose managers had been on the training course with data from another elderly care centre also implementing teams. To provide a clearer understanding of the change process it would have been desirable to compare the results of these two groups with an elderly care centre that had not

implemented changes to teamwork but experienced the same turbulence, thus providing a 'no intervention' comparison group. A further limitation was the use of only one follow-up measurement occasion. It would have been ideal to include a follow-up after 36 months to see whether the impact of the intervention and the training had changed. However, this was not possible owing to funding constraints. Other studies have discussed the difficulties of conducting longitudinal research owing to organizational changes (Guastello, 1993; Saksvik et al., 2002). Our study shows how the impact of such events may be properly examined and used to understand intervention outcomes (especially since such events are relatively frequent and can rarely be controlled by the researcher). Interviews revealed that a number of concrete changes had been implemented; however, our outcome measure (the questionnaire) did not capture the effects of these changes. It may be that the questionnaire measures were too distant from the intervention mechanisms to capture these changes: more sensitive measures may be needed to evaluate these proximal and specific outcomes. However, interviews did indicate that the small changes were owing to some teams and that their managers had done little towards implementing teamwork, thus indicating great variance between teams within the same experimental condition. Our findings regarding the impact of the intervention context mean that the validity of our findings regarding manager training need to be examined in a less turbulent organizational context.

Conclusion

This study has three important implications. First, it appears that training team managers to implement and manage teams may help ensure successful team implementation. In times of turbulence (such as during mergers and downsizing) such training may be particularly useful. Second, the Kirkpatrick model allowed change to be examined at several levels and was a useful way of separately identifying theory failure and process failure. Third, it also shows the importance of careful documentation of the implementation processes to understand changes. Without careful documentation of the reception of the training course, monitoring planned changes through the action plans and implementation of these changes, together with the importance of the ambient environment, we would have been unable to understand the reasons behind changes found.

Funding

This research was funded by the Danish Working Environment Research Fund grant number 16-2004-09.

References

- Alvarez K, Salas E, and Garofano CM (2004) An integrated model of training evaluation and effectiveness. *Human Resource Development Review* 3(4): 385–416.
- Baldwin TT, Ford JK (1988) Transfer of training: A review and directions for future research. *Personnel Psychology* 41(1): 63–105.
- Bambra C, Egan M, Thomas S, Petticrew R, and Whitehead M (2007) The psychosocial and health effects of workplace restructuring. 2. A systematic review of task restructuring interventions. *Journal of Epidemiology and Community Health* 61(12): 1028–1037.

- Barling J, Weber T, and Kelloway K (1996) Effects of transformational leadership training on attitudinal and financial outcomes: A field experiment. *Journal of Applied Psychology* 81(6): 827–832.
- Bass BM (1999) Two decades of research and development in transformational leadership. *European Journal of Work and Organizational Psychology* 8(1): 9–32.
- Becker-Reims ED (1994) *Self-Managed Work Teams in Health Care Organizations*. USA: JB AHA Press.
- Bryman A (2006) Integrating quantitative and qualitative research: How is it done? *Qualitative Research* 6(5): 97–113.
- Bryman A (2007) Barriers to integrating quantitative and qualitative research. *Journal of Mixed Methods Research* 1(1): 8–22.
- Burke LA, Hutchins HM (2007) Training transfer: An integrative literature review. *Human Resource Development Review* 6(3): 263–296.
- Butler J, Cantrell S, and Flick R (1999) Transformational leadership behaviors, upward trust, and satisfaction in self-managed work teams. *Organizational Development Journal* 17(1): 13–28.
- Campbell JP, Kuncel NR (2005) Individual and team training. In: Anderson N, Ones DS, Sinanagil HS, and Viswesvaran C (eds) *Handbook of Industrial, Work & Organizational Psychology*. London: SAGE, 278–312.
- Campbell DT, Stanley JC (1963) *Experimental and Quasi-experimental Designs for Research*. Chicago, IL: Rand-McNally.
- Carless S, Wearing A, and Mann L (2000) A short measure of transformational leadership. *Journal of Business and Psychology* 14(3): 389–405.
- Clarke N (2002) Job/work environment factors influencing training effectiveness within a human service agency: Some indicative support for Baldwin and Ford's transfer climate construct. *International Journal of Training and Development* 6(3): 146–162.
- Cohen J (1988) *Statistical Power Analysis for the Behavioral Sciences*. Mahwah, NJ: Erlbaum.
- Cook TD, Campbell DT (1979) *Quasi-experimentation: Design and Analysis Issues for Field Settings*. Chicago, IL: Rand McNally.
- Gillespie NA, Mann L (2000) The building blocks of trust: The role of transformational leadership and shared values in predicting team members' trust in their leaders. Paper presented at the *Academy of Management Conference*, Toronto.
- Gollwitzer PM (1999) Implementation intentions: Strong effects of simple plans. *American Psychologist* 54(7): 493–503.
- Grant AM, Wall TD (2009) The neglected science and the art of quasi-experimentation: Why-to, when-to and how-to advice for organizational researchers. *Organizational Research Methods* 12(3): 653–686.
- Greene JC, Benjamin L, and Goodyear L (2001) The merits of mixing methods in evaluation. *Evaluation* 7(1): 25–44.
- Guastello S (1993) Do we really know how well our occupational accident prevention programs work? *Safety Science* 16(3-4): 445–463.
- Guth W D, MacMillan IC (1986) Strategy implementation versus middle manager self-interest. *Strategic Management Journal* 7(4): 313–327.
- Harachi T, Abbott R, Catalan R, Haggerty K, and Fleming C (1999) Opening the Black Box: Using process evaluation measures to assess implementation and theory building. *American Journal of Community Psychology* 27(5): 711–731.

- Harley B, Allen BC, and Sargent LD (2007) High performance work systems and employee experience of work in the service sector: The case of aged care. *British Journal of Industrial Relations* 45(3): 607–633.
- Holden L (1997) Training. In: Beardwell I, Holden L (eds) *Human Resource Management: A Contemporary Perspective*. London, UK: Pitman, 378–382.
- Johnson RB, Onwuegbuzie AJ, and Turner LA (2007) Toward a definition of mixed methods research. *Journal of Mixed Methods Research* 1(1): 112–133.
- Kieselbach T, Armgarth E, Bagnara S et al. (2009) *Health in Restructuring: Innovative Approaches and Policy Recommendations*. Bremen, Germany: Universität Bremen.
- Kirkpatrick DL (1998) *Evaluating Training Programs: The Four Levels*. San Francisco, CA: Berrett-Koehler.
- Kraiger K, Ford JK, and Salas E (1993) Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of Applied Psychology* 78(2): 311–328.
- Kristensen T, Hannerz H, Hogh A, and Borg V (2006) The Copenhagen Psychosocial Questionnaire (COPSOQ). A tool for the assessment and improvement of the psychosocial work environment. *Scandinavian Journal of Work and Environmental Health* 31(6): 438–449.
- Lim DH, Johnson SD (2002) Trainee perception of factors that influence learning transfer. *International Journal of Training and Development* 6(1): 36–48.
- Nastasi BK, Hitchcock J, Sarkar S, Burkholder G, Varjas K, and Jaysena A (2007) Mixed methods in intervention research: Theory to adaptation. *Journal of Mixed Methods Research* 1(1): 164–182.
- Nemanich LA, Keller RT (2007) Transformational leadership in an acquisition: A field study of employees. *The Leadership Quarterly* 15(1): 175–194.
- Nielsen K, Fredslund H, Christensen KB, and Albertsen K (2006) Success or failure? Interpreting and understanding the impact of interventions in four similar worksites. *Work & Stress* 20(3): 272–287.
- Nielsen K, Martini Jørgensen M, and Munch-Hansen M (2008) *Teamledelse med det rette twist – inspiration til at arbejde med team, teamledelse og forandringsprocesser [Team Management with a Twist – Inspiration to Work with Teams, Team Management and Change Processes]* Copenhagen, DK: The National Research Centre for the Working Environment.
- Nielsen K, Randall R (2009) Managers' active support when implementing teams: The impact on employee well-being. *Applied Psychology: Health and Well-being* 1(3): 374–390.
- Parker S, Williams H (2001) *Effective Teamworking: Reducing the Psychosocial Risks*. Norwich: HSE Books.
- Parry KW, Sinha PN (2005) Researching the trainability of transformational organisational leadership. *Human Resource Development International* 8(2): 165–183.
- Patton MQ (2002) *Qualitative Research & Evaluation Methods*. Thousand Oaks, CA: SAGE.
- Pearce C, Sims HP (2002) Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group Dynamics: Theory, Research, and Practice* 6(2): 172–197.
- Pillai R, Williams E (2004) Transformational leadership, self-efficacy, group cohesiveness, commitment, and performance. *Journal of Organizational Change Management* 17(2): 144–159.
- Raelin JA (1994) Whither management education? Professional education, action learning and beyond. *Management Learning* 25(2): 301–317.

- Rouiller JZ, Goldstein IL (1993) The relationship between organizational transfer climate and positive transfer of training. *Human Resources Development Quarterly* 4(4): 377–390.
- Saksvik PØ, Nytrø K, Dahl-Jørgensen C, and Mikkelsen A (2002) A process evaluation of individual and organizational occupational stress and health interventions. *Work & Stress* 16(1): 37–57.
- Semmer NK (2003) Job stress interventions and organization of work. In: Tetrick L, Quick JC (eds) *Handbook of Occupational Health Psychology* Washington, DC: APA, 325–353.
- Semmer NK (2006) Job stress interventions and the organization of work. *Scandinavian Journal of Work and Environmental Health* 32(6): 515–527.
- Sundstrom E De Meuse K, Futrell D (1990) Work teams: Applications and effectiveness. *American Psychologist* 45(2): 120–133.
- Trist E, Susman G, and Brown G (1977) An experiment in autonomous working in an American underground coal mine. *Human Relations* 30(3): 201–236.
- West M (1996) Working in groups. In: Warr P (ed.) *Psychology at Work*. London: Penguin.
- West M, Markiewicz L, and Dawson JF (2004) *TPI: The Team Performance Inventory: User guide*. Birmingham: Aston Organisation Development.
- Yeatts DE, Hyten C (1998) *High-Performing Self-Managed Work Teams*. Thousand Oaks, CA: SAGE.

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