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Longitudinal associations between organizational change, work-unit social capital, and employee exit from the work unit among public healthcare workers: a mediation analysis

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Objectives Organizational changes are associated with higher rates of subsequent employee exit from the workplace, but the mediating role of social capital is unknown. We examined the associations between organizational changes and subsequent employee exit from the work unit and mediation through social capital.

Methods Throughout 2013, 14 059 healthcare employees worked in the Capital Region of Denmark. Data on work-unit changes (yes/no) from July−December 2013 were collected via a survey distributed to all managers (merger, split-up, relocation, change of management, employee layoff, budget cuts). Eight employee-reported items assessing social capital were aggregated into work-unit measures (quartiles: low-high). Data on employee exit from the work unit in 2014 were obtained from company registers.

Results We found a somewhat higher rate of employee exit from the work unit after changes versus no changes [hazard ratio (HR) 1.10, 95% confidence interval (CI) 1.01–1.19] and an inverse dose−response relationship between social capital and employee-exit rates (low versus high: HR 1.65, 95% CI 1.46–1.86). We also showed a higher risk of low social capital in work units exposed to changes [low versus high: odds ratio (OR) 2.04, 95% CI 1.86–2.23]. Accounting for potential mediation through social capital seemed slightly to reduce the association between changes and employee-exit rates (HR 1.07, 95% CI 0.98–1.16 versus HR 1.10).

Conclusions Work-unit organizational changes prospectively predict lower work-unit social capital, and lower social capital is associated with higher employee-exit rates. Detection of weak indications of mediation through social capital, if any, were limited by inconsistent associations between changes and employee exit from the work unit.

Key terms downsizing; health care; longitudinal study; mediator; merger; organisational change; psychosocial work environment; public sector; reorganisation; reorganization; restructuring; turnover

Restructuring of workplaces is widely performed to keep up with increasing demands for productivity and cost-efficiency. However, there seems to be a downside to organizational changes in terms of poor employee health and well-being (1–6). Elevated rates of employee exit (ie, turnover) from the workplace following reorganization have been reported consistently in the literature (7–13), and studies suggest that organizational changes may have a dual impact on employee exit and health (11, 14). Specifically, quarterly employee-exit rates increased from 3.1% to 3.4% after implementation of new healthcare workflows (9), and − relative to no change − excess employee-exit rates of 15–50% have been demonstrated in the years following merger, split-up, relocation, change of management, and ≥3 changes performed simultaneously in the healthcare sector (11, 12). Such higher employee-exit rates have been associated with adverse psychosocial outcomes among the remaining employees as well as high replacement costs and loss of productivity (15).

Social capital refers to the "*resources that are accessed by individuals as a result of their membership of a net-*

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work or a group" (16) and manifests as trust, reciprocity and social cohesion within a group of co-workers (16). The literature on workplace social capital in the context of reorganization is limited. However, since the workplace can be seen as having social dimensions among coworkers, it is reasonable to assume that reorganizations disrupt work-related social networks and friendship ties in a work unit. Employees can perceive such processes as being unfair, lowering their attachment to the workplace (17–20). This is supported by findings of a 4% decrease in trust of management after reorganization involving change of top management (21) as well as distributive justice partially mediating the association between trust and intention to quit in the context of downsizing (20).

Low social capital has been linked to a higher risk of mental-health problems (22, 23), sickness absence (24–26), early retirement (12), and poor self-rated health (27). A study found that self-reported poor health was associated with a 2.3-fold higher "risk" of intention to quit, whereas good collaboration among colleagues as well as trustworthiness and support from managers were associated with 60–80% lower chance of intention to quit (28). Indeed, the associations of workplace social capital on the pathway between organizational changes and employee exit from the workplace remain unclear.

We aimed to investigate the hypothesized (objective a) prospective associations between organizational changes and low work-unit social capital, (objective b) the association between low social capital and higher rates of employee exit from the work unit (EFW), and (objective c) work-unit social capital as a mediator on the associations between organizational changes and higher rates of subsequent EFW (figure 1). In this study, EFW refers to an employee terminating employment in a work unit regardless of the reason. A mediator refers to a factor that explains the impact of an exposure on a given outcome (29). Such mediation may highlight social capital as a target of intervention to prevent adverse effects of organizational changes.

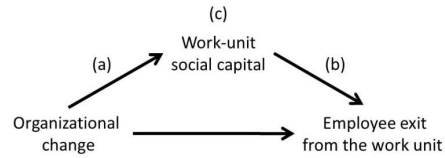

Figure 1. Diagram of the associations examined in the present study. (a) Association between organizational change and work-unit social capital. (b) Association between work-unit social capital and employee exit from the work unit. (c) Work-unit social capital mediates the association between organizational change and subsequent employee exit from the work unit.

Methods

Study design and data collection

This longitudinal study was based on the Well-being in Hospital Employees (WHALE) cohort (30) and examined the associations between work-unit organizational change in the last six months of 2013, work-unit social capital in March 2014, and employee EFW during 2014.

The source population comprised 37 720 employees from the Capital Region of Denmark who were invited to complete a work-environment questionnaire in March 2014 (response rate: 84%). From April through June 2016, we distributed a survey to the managers of all 2696 work units to collect data on six types of organizational changes occurring in the last six months of 2013 (response rate: 59%). Sociodemographic and occupational background information for every employee holding a paid position between January 2012 through December 2014 was recorded from company registers, and information on income during 2013 were extracted via linkage to national registers. These data were applied to estimate monthly employee EFW in 2014 as well as employee- and work-unit-level covariates at baseline (31 December 2013).

Study population

At baseline, 25 926 eligible employees had at least one year of seniority in the current work unit (or one of its associated unit[s] if merger and/or split-up had occurred) and a minimum of 18.5 weekly fixed working hours in average (ie, part-time working hours) during 2013. We excluded 279 work units with fewer than three employees. Some work units changed their name during 2013. Thus, to ensure that the employees had at least one year of seniority in the current work unit at baseline (31 December 2013), we included employees in the study population if they were affiliated to a work unit where a significant proportion of the staff (ie, ≥30% and ≥3 employees) remained in the new-named work unit. For instance, if work unit *A* with six employees split-up into work unit *B* with two employees and work unit *C* with four employees, only the four employees in work unit *C* were included in the study population.

The study population comprised 14 059 employees nested in 1216 work units with complete data on work-unit organizational change in the last six months of 2013, work-unit social capital in March 2014, employee EFW from January through December 2014, and covariates (figure 2).

Employee exit from the work unit

We estimated monthly EFW from January through December 2014 at the employee level. This was defined

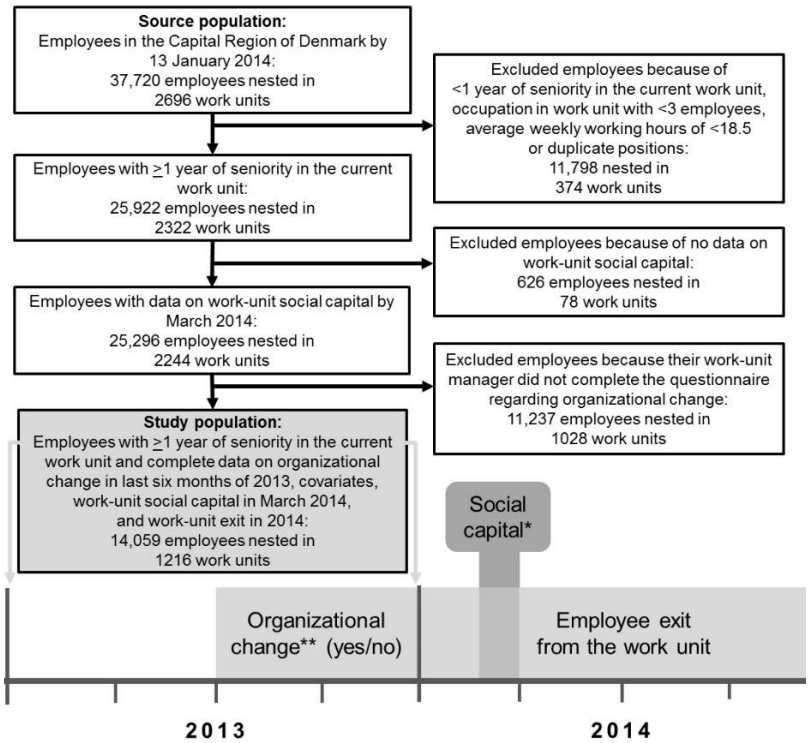

Figure 2. Diagram showing the study design and the flow of employees and work units. * Data collected in March 2014. ** Data collected from April–June 2016.

as an employee's loss of affiliation to the current work unit at baseline. Because we presumed that some work units also changed name during 2014, we did not regard it as an EFW if an employee was affiliated to a work unit where a significant proportion of the staff (ie, ≥30% and ≥3 employees) worked in a renamed work unit.

Work-unit organizational change

In the survey on organizational changes, the managers were invited to provide semi-annual information on six types of changes (yes/no) at the work-unit level occurring from January 2011 to December 2013 (Q "In the work unit you manage/managed, have there been the following organizational changes in the period 1 January 2011 and 31 December 2013?"): (A1) merger, (A2) demerger, (A3) relocation of a work unit, (A4) change of management, (A5) employee layoff or (A6) budget cuts. This study used measures of organizational changes in the last six months of 2013, including no change (reference category), change (any/no change), number of changes performed simultaneously (1, 2 or ≥3 changes/no change), and each type of change (yes/no change). Exposure to each of these six types of change were modelled separately.

Work-unit social capital

The social capital scale ranging 0–100 was based on eight employee-reported items from the work-environment survey in March 2014 assessing collaboration ("To what degree…:" Q1"…are you and your colleagues good at coming up with suggestions for improving work procedures?", Q2 "…do you get help and support from your colleagues when needed?", Q3 "…do you and your colleagues take responsibility for a nice atmosphere and tone of communication?") and trust/organizational justice ("To what degree…:" Q4 "…does the management trust the employees to do their work well?", Q5 "…can you trust the information that comes from the management?", Q6 "… are conflicts resolved in a fair way?", Q7 "…is the work distributed fairly?", Q8 "…is your staff group respected by the other staff groups at the workplace?"). Five of these items originated from the Copenhagen Psychosocial Questionnaire (31), whereas the remaining three items were selected by four specialists in occupational medicine. Responses on ≤50% of the social-capital items were set to missing. Cronbach's alpha was 0.85 and correlation coefficients between all items ranged 0.24–0.74 (P-values<0.001). The work-unit-level social capital measure was computed by averaging the employee-level social capital scores in work units with ≤50% missing data. The work-unit social capital measure was categorized into quartiles (level I–IV: low–high) and assigned to each individual employee in a given work unit. This approach was consistent with previous studies using WHALE cohort data (12, 26).

Employee- and work-unit-level covariates at baseline

We used the following a priori confounder variables at the employee level: age (quartiles), sex, occupational groups, previous absence related to sick child between 2012–2013 (yes/no), previous number of sickness-absence days in 2012 (quartiles), and personal gross income in 2013 (quartiles). Absence due to sick child was a proxy variable for having a child. Number of previous sickness-absence days was a proxy variable for health status. Employees with no observed sickness absence were allocated to the lower-quartile category. Personal gross income in Danish kroner were divided by 7.5 to express these values in euros (€).

We used the following a priori confounder variables aggregated at the work-unit level: number of employees within work unit (quartiles), mean of employee age (continuous), mean of personal gross income in 2013 (continuous), mean of sickness-absence days in 2012 (continuous), proportion of females within work unit (continuous), proportion of employees with child-related absence between 2012−2013 within work unit (continuous), and proportion of each occupation group within work unit (continuous).

Statistical main analysis

Work-unit organizational changes and work-unit social capital. Logistic regression models were used to estimate the risk of low social capital in March 2014 according to each measure of organizational changes in the last six months of 2013 (objective a). Analyses were weighted by the number of employees within each work unit (continuous variable). We adjusted for *all* work-unit-level confounders (except the categorical variable for number of employees within work unit) because exposure and outcome were both measured at the work-unit level.

Work-unit social capital and employee exit from the work unit. Marginal Cox models were used to assess the rate of EFW during 2014 associated with each lower level of social capital in March 2014 relative to the highest level (objective b). The employees were followed on the month-scale from 1 January 2014 until EFW, censoring by death, or end of study (31 December 2014), whichever came first. We adjusted for all employee-level covariates and the number of employees at the work-unit level. Since the variables in the marginal Cox models were measured at multiple levels, we used the COVSANDWICH option on the work-unit level to obtain robust 95% confidence intervals (CI). We fitted marginal models with no distributional assumptions instead of mixed-effects models because the latter require assumptions about the joint distribution and the random effects, which are unclear (eg, due to new changes and seasonal variances in EFW during follow-up) (32).

Mediation through work-unit social capital. Marginal Cox models were also used to assess the rate of EFW during 2014 after organizational changes in the last six months of 2013 relative to no change. We used the same covariates and criteria during follow-up on EFW as those described above for the marginal Cox models addressing objective b. To establish mediation (objective c), the mediator variable (social capital) must be associated with both the exposure (organizational changes) and the outcome (EFW). We interpreted a reduction in the EFW rate when including the social-capital variable in model as evidence of mediation (29).

Sensitivity analyses

We conducted four sensitivity analyses using the same methods as above unless otherwise stated.

First, because social capital was measured in March 2014 and follow-up on EFW started on January 2014, we assessed potential reverse causation by splitting the follow-up into two periods: one period from January through March 2014, and a second period from April through December 2014 (excluding employees EFW in the first period). Two analyses assessed the association between social capital and EFW in each follow-up period (relating to objective b). Four analyses assessed the associations between organizational changes and EFW in each period with and without social capital included in the model (relating to objective c).

Second, we explored if work-unit collaboration and trust/organizational justice (comprising social capital) separately mediated the association between organizational changes and EFW during 2014. This was assessed with two analyses for the association between changes and EFW including work-unit-aggregated collaboration and trust/organizational justice, respectively, in comparison to a model without any mediator.

Third, we analyzed the association between organizational changes and subsequent employee exit from the company instead of EFW. We calculated employee exit from the company as months to loss of affiliation to the Capital Region of Denmark from January through December 2014.

Fourth, to assess the impact of missing data on organizational changes, we used a two-way *t*-test and a χ^2-test to analyze if work-unit social capital and employee EFW rates differed among work units and employees, respectively, with and without data on changes.

All statistical analyses were performed using SAS Software 9.4 (SAS Institute Inc, Cary, NC, USA).

Results

Table 1 shows the characteristics of the study population by exposure to organizational change and levels of low/high social capital. Exposure to organizational changes was more prevalent in work units with low social capital and those with more employees. Male employees, work units with more employees, and employees with a lower income were mostly represented in work units with low social capital. In contrast, female employees, work units with fewer employees, and employees with a higher income were mostly represented in work units with high social capital.

Table 1. Employee and work-unit characteristics of the study population by exposure to organizational change and work-unit social capital level I (low) and level IV (high). [EFW=exit from the work unit; WSC=work-unit social capital.]

	Study population		Exposed to any change		WSC level I (low)		WSC level IV (high)	
	N	%	N	%	N	%	N	%
Employee level								
Total employees	14 059	100	5649	40	3406	24	3715	26
EFW	2383	17	999	18	680	20	504	14
Female	10 727	76	4258	75	2278	67	2948	79
Male	3332	24	1391	25	1128	33	767	21
Age group (years)								
18–40	3469	25	1378	24	908	27	792	21
40–48	3550	25	1400	25	837	25	1010	27
48–56	3530	25	1424	25	825	24	986	27
56–75	3510	25	1447	26	836	25	927	25
Occupational group								
Nurses	6038	43	2444	43	1195	35	1769	48
Administrative staff	2615	19	1060	19	581	17	710	19
Social/healthcare workers	1865	13	665	12	593	17	369	10
Service/technical staff	1777	13	751	13	789	23	280	8
Medical doctors and dentists	1379	10	598	11	137	4	451	12
Pedagogical workers	385	3	131	2	111	3	136	4
Days of sickness absence during 2012								
0–3	6897	49	2787	49	1440	42	2102	57
4–6	2141	15	851	15	504	15	576	16
7–13	2687	19	1015	18	722	21	607	16
14–363	2334	17	996	18	740	22	430	12
Child–related absence during 2012 and 2013 (yes)	4222	30	1645	29	1026	30	1134	31
Personal gross income (€)								
<46 000	3602	26	1501	27	1039	31	727	20
46 000–53 333	3630	26	1427	25	929	27	817	22
53 333–64 000	3455	25	1346	24	861	25	952	26
>64 000	3372	24	1377	24	577	17	1219	33
Work-unit level								
Total work units	1216	100	430	35	238	20	434	36
No organizational change	786	65	.	.	139	58	303	70
Organizational change	430	35	.	.	99	42	131	30
1 type of change	272	22	.	.	61	26	82	19
2 types of changes	99	8	.	.	26	11	31	7
≥3 types of changes	59	5	.	.	12	5	18	4
Merger	88	10	.	.	23	14	22	7
Split–up	44	5	.	.	11	7	10	3
Relocation	89	10	.	.	21	13	35	10
Change of management	166	17	.	.	41	23	45	13
Employee layoff	161	17	.	.	33	19	51	14
Budget cuts	126	14	.	.	28	17	42	12
Number of employees in work unit								
3–12	634	52	186	43	98	41	300	69
13–22	289	24	113	26	62	26	72	17
23–32	182	15	81	19	46	19	44	10
33–142	111	9	50	12	32	13	18	4
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Employee age (years)	48	6	48	6	47	5	48	6
Proportion of females	74	30	73	29	66	35	77	28
Personal gross income (€)	61 946	23 127	63 548	25 519	57 182	19 038	65 495	24 562
Proportion with child–related absence	30	22	28	19	29	21	30	25
Days of sickness absence during 2012	8	8	9	10	10	9	6	9
Proportion of nurses	34	42	36	43	28	40	36	41
Proportion of administrative staff	24	36	25	37	23	37	25	35
Proportion of social/healthcare/pedagogical workers	19	33	14	29	21	36	19	32
Proportion of service/technical staff	13	31	23	31	20	38	9	26
Proportion of medical doctors and dentists	11	28	12	29	7	23	12	27

Work-unit organizational change and social capital

Table 2 shows that work units had an excess risk of lower social-capital levels relative to high social capital after organizational changes. However, this pattern was not observed for exposure to relocation.

Work-unit social capital was slightly lower in work units without data on changes [mean 68, standard deviation (SD) 10] than work units with data on changes [mean 69, SD 10; $t(2242) = -3.6$, P<0.001], indicating some underestimation.

Work-unit social capital and employee exit from the work unit

Table 3 shows an inverse dose–response relationship between social capital and EFW through 2014. In total, 7 employees were censored from the analyses due to death in 2014. Of the 2471 employees who exited their work unit in 2014, 785 employees (32%) exited before the assessment of social capital in March 2014. Only 35 of these 785 employees (4%) had missing data on work-unit social capital. Splitting the follow-up on EFW during 2014 into January–March and April–December yielded similar inverse dose–response relationships between social capital and EFW. However, the associations were slightly stronger in the period after assessment of social capital (supplementary table S1, www.sjweh.fi/show_abstract.php?abstract_id=3766).

Mediation through work-unit social capital

Table 4 shows that only some change indicators were associated with a higher rate of subsequent EFW, specifically ≥3 types of simultaneous changes, merger, split-up, relocation, and change of management. Including social capital in the models reduced the EFW rates only slightly, suggesting no convincing indications of mediation through social capital on the inconsistent association between changes and EFW.

The EFW rate after changes were higher January–March than April–December 2014, but social capital did not consistently mediate the excess EFW rates in either period (supplementary table S2, www.sjweh.fi/show_abstract.php?abstract_id=3766). Similar inconsistent indications of mediation were observed for collaboration and trust/organizational justice (supplementary table S3, www.sjweh.fi/show_abstract.php?abstract_id=3766). There was a ≈1.5-fold higher company-exit rate after >3 types of changes, merger, and relocation relative to no change (supplementary table S4, www.sjweh.fi/show_abstract.php?abstract_id=3766), indicating the sensitivity of the EFW measure. The rate of EFW during 2014 was higher among eligible employees without data on changes (19%) than employees with data on changes (17%; χ^2=22.22 (1), P<0.001), pointing to some underestimation of the EFW rates.

Discussion

We found that work units had an excess risk of low social capital after organizational changes relative to no change. There was an inverse dose–response relationship between social capital and EFW regardless of the reason. Some change measures were associated with a higher rate of employee EFW, but there were no convincing indications of mediation via social capital on these inconsistent associations.

Work-unit organizational change and social capital

Previous findings showed significant declines on a 3-point trust scale at the employee level associated with reorganization of divisions/sections (β=-0.075) and change of management (β=-0.085) (33) pointing to the

Table 2. Odds ratios (OR) of lower work-unit social capital (level I, II or III) than the highest level of work-unit social capital (level IV) as reference after exposure to organizational change. Logistic regression analyses were adjusted for work-unit level mean of employee age, proportion of females, mean personal gross income, proportion of employees with previous child-related absence, mean of sickness absence days in 2012, and proportion of each occupational group within work unit. [WSC=work-unit social capital; CI=confidence interval]

Organizational change	N	WSC level I			WSC level II			WSC level III		
		%	OR	95% CI	%	OR	95% CI	%	OR	95% CI
No change	786	18			20			24		
Change	430	23	2.04	1.86–2.23	22	1.51	1.39–1.64	24	1.51	1.39–1.65
1 change	272	22	2.05	1.85–2.27	22	1.60	1.45–1.76	25	1.58	1.44–1.75
2 changes	99	26	1.85	1.58–2.16	21	0.92	0.78–1.08	21	1.23	1.06–1.42
≥3 changes	59	20	2.30	1.87–2.82	24	2.30	1.91–2.76	25	1.70	1.41–2.06
Merger	88	26	2.24	1.88–2.66	27	1.89	1.60–2.22	22	1.52	1.28–1.79
Split-up	44	25	3.66	2.85–4.70	32	3.33	2.62–4.22	20	1.50	1.16–1.95
Relocation	89	24	1.13	0.96–1.33	19	1.10	0.95–1.28	18	0.67	0.57–0.79
Change of management	166	25	2.58	2.28–2.93	25	1.78	1.57–2.01	23	1.72	1.52–1.94
Employee layoff	161	21	1.86	1.63–2.11	22	1.67	1.48–1.89	26	1.72	1.52–1.94
Budget cuts	126	22	1.92	1.68–2.15	15	0.87	0.75–1.01	29	1.90	1.68–2.15

Table 3. Adjusted hazard ratios (HR) and robust 95% confidence intervals (CI) of employee exit from the work unit through 2014 associated with levels of work-unit social capital (level IV–I: high–low) compared to high work-unit social capital as reference. Marginal Cox regression analyses were adjusted for employee-level age, sex, occupational group, previous sickness absence, child-related absence and personal gross income, and work-unit level number of employees. [WSC=work-unit social capital.]

WSC level	Study population (N=14 059)				Source population (N=25 296) [a]			
	N	Exited (%)	HR	95% CI	N	Exited (%)	HR	95% CI
IV	3715	14	1.00		6323	15	1.00	
III	3566	17	1.29	1.15–1.45	6277	17	1.16	1.06–1.26
II	3372	17	1.34	1.18–1.51	6349	18	1.26	1.15–1.37
I	3406	20	1.65	1.46–1.86	6347	21	1.60	1.47–1.74

[a] Including participants with and without missing data on exposure to organizational change.

Table 4. Adjusted hazard ratios (HR) and 95% confidence intervals (CI) of employee exit from the work unit after organizational change relative to no change. Main model additionally adjusted for potentially mediated effects via work-unit social capital. Marginal Cox regression analyses were adjusted for employee-level age, sex, occupational group, previous sickness absence, child-related absence and personal gross income, and work-unit level number of employees. [WSC=work-unit social capital.]

Organizational change	N	%	Main model		Adjusted for WSC	
			HR	95% CI	HR	95% CI
No change (reference)	8410	17	1.00		1.00	
Change	5649	18	1.10	1.01–1.19	1.07	0.98–1.16
1 change	3728	17	1.04	0.95–1.15	1.01	0.92–1.11
2 changes	1170	17	1.03	0.89–1.20	0.99	0.85–1.15
≥3 changes	751	23	1.53	1.30–1.80	1.48	1.26–1.73
Merger	1085	21	1.29	1.12–1.49	1.24	1.08–1.43
Split-up	508	22	1.41	1.16–1.72	1.33	1.09–1.62
Relocation	978	19	1.17	1.00–1.36	1.16	0.99–1.35
Change of management	2149	19	1.23	1.10–1.38	1.17	1.05–1.31
Employee layoff	2163	16	1.03	0.91–1.16	1.00	0.89–1.13
Budget cuts	1757	18	1.10	0.97–1.25	1.08	0.96–1.23

same direction as the present findings of 1.5–3.7-fold excess risk of lower social capital after merger, split-up or change of management versus no change. Work units with high social capital may have difficulties including outsiders (16), which could decrease social cohesion and trust, for instance, in the context of a merger. However, relocation did not predict lower social capital, which could be explained by the fewer social ties being disrupted in relation to this type of change.

One interpretation of these associations is that organizational changes adversely impact the work-unit social capital, which is consistent with conclusions of a review on other psychosocial factors (1). An alternative interpretation of lower social capital after organizational changes may be due to reverse causality. Lower social capital has been linked to lower quality of patient care (34) and productivity (35), which may encourage reorganization. However, changing a work unit with low social capital may arguably have some positive influence on the psychosocial work environment (eg, change of a distrusted management), which is in contrast to our consistent demonstrations of low social capital after changes.

Work-unit social capital and employee exit from the work unit

We found an inverse dose–response relationship between social capital and EFW concurrent with a meta-analysis on 190 studies concluding strong significant inverse correlations between procedural/distributive justice and intention to quit (weighted *r*-values = -0.40) (36). Our findings also corroborate demonstrations of a 1.3 times higher rate of early retirement associated with a 20-point decrease on a 100-point social-capital scale (12) and an inverse dose–response relationship between social capital and long-term sickness absence (26). Previous findings show that good collaboration among employees and trust in managers were associated with a 60–80% lower chance of intention to quit (28). Collaboration and trust may be prerequisites for a well-functioning workplace and a decline in these factors could lower job satisfaction and lead to EFW.

Although 785 employees exited their work unit before/during assessment of social capital in March 2014, only 4% of these employees had missing data on work-unit social capital since this score was assigned to each employee regardless of survey participation. Sensitivity analyses showed comparable EFW rates before/during and after assessment of social capital. Indeed, employees exiting before assessment of social capital due to changes would likely respond more critically to the social-capital items than their participating colleagues, and thus the time gap between organizational changes and assessment of social capital may contribute to some underestimation of the association.

Work-unit social capital as a potential mediator

There were no convincing indications of mediation through social capital (objective c) on the rather inconsistent association between changes and EFW demonstrated in this study. Although the relative reduction in the EFW rate for change versus no change comprised ≈30% when including social capital in the model, mediation should also be interpreted in keeping with the absolute reduction (HR 1.10 versus 1.07). It is likely that the inconsistent association between changes and EFW limited the statistical power to detect a potential mediation through social capital. Indeed, a sensitivity analysis on a stronger association between changes and EFW in the first three months of follow-up neither showed convincing indications of mediation through social capital (15%; HR 1.27 versus HR 1.23). These indications are somewhat comparable to other findings

showing no mediation by employee-level social conflict between downsizing and self-rated health (37).

A previous study found that trust partially mediated the association between lower distributive justice and intention to quit among employees remaining at the workplace after downsizing (from r = -0.64 to r = -0.50) (20). However, we showed a higher rate of EFW only in the first three months after employee layoff, which seemed not to be mediated convincingly by social capital. Another study (38) found that about half of the association between major staff reduction and long-term sickness absence were reduced when adjusting for mediation through job control, job insecurity, and physical demands. These factors may also be mediators on EFW, but this remains to be investigated.

Social capital may as well buffer the adverse effects of organizational change as such properties were found between high job strain and smoking status (39). However, since social capital was measured after the organizational changes occurred, we refrained from examining the potential modifying effects of social capital between changes and EFW.

EFW may be considered as a less problematic outcome than exit out of the healthcare sector: the latter would more likely predict severe illness, long-term unemployment, disability retirement etc. Although job rotation within the healthcare sector may comprise a healthy work life, the literature on organizational change mainly shows adverse impacts on employees. Thus, employee EFW to another work unit may likely be motivated by deteriorated well-being and/or health among some employees. In addition, high EFW rates seem also to adversely affect those who remain in the work unit in terms of mental health problems, lower job satisfaction, and excess risk of medical errors (40).

Strengths and limitations

It was a strength of this longitudinal study that we tracked the work-unit affiliation of all employees (despite some work-unit names being changed) reducing loss to follow-up mainly among employees exposed to organizational changes. Also, data on exposure, outcome and mediation were obtained from independent data sources, which reduces common-method bias in the associations examined (41). By collecting data on changes from the work-unit managers and assigning these to each employee, we obtained valid information on organizational changes since managers may recall the organizational history more accurately than the employees. Using data from independent sources is particularly important in mediation analysis, and therefore a major strength of this study, because mediated effects found in data from the same source could be due to the common method applied (41). Additionally, we included employees regardless of survey participation as social capital was aggregated at the work-unit level, which also makes the findings less influenced by individual factors (eg, lifestyle).

This study has some potential limitations. We assessed the sensitivity of EFW by analyzing associations between changes and company exit. These associations attenuated compared to results in table 4, but some change measures, including merger, remained significantly associated with company exit, which is contrary to previous findings (10). Not examining EFW during or before the organizational changes occurred could have underestimated the results. It has been demonstrated that the adverse effects of reorganization can be observed shortly after a merger is announced (42). Although data on EFW were available during occurrence of the changes, we did not use these because it was unclear when the changes were announced. Moreover, we were unable to adjust for effects of organizational change during the follow-up on EFW through 2014 due to lack of data. This may have underestimated the results as work units not changed during 2013 may more likely be changed in the following year. Assessment of mediation through social could be limited by focusing on a 2-year period, since changes in social capital may occur over a longer period. However, choosing this narrow time frame was pivotal to capture the immediate prospective associations on EFW soon after organizational changes. Finally, the differences in EFW rates and social capital among employees and work units with/without data on changes suggest that these missing data may somewhat contribute to some underestimate the findings.

In conclusion, we demonstrated a higher risk of low work-unit social capital after organizational change relative to no change and an inverse dose−response relationship between work-unit social capital and EFW. We found no convincing indications of mediation through social capital between organizational change and subsequent EFW. The inconsistent effects of change on EFW may have limited the statistical power to detect such – if any – mediation.

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