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Evaluation of an organizational health intervention for low-skilled workers and immigrants

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Abstract

We conducted this realist evaluation study of an organizational health intervention involving 421 low-skilled workers (50% female), half of whom were immigrants, in three companies over six months. Non-profit agencies implemented peer-mentoring and taught peer-mentors and line managers how to enhance social support in order to improve workers' work situation in a participative way. We formulated five mechanisms of change: the company management encouragement mechanism, the role model mechanism, the peer-mentor support mechanism, the line manager support mechanism, and the participative

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work improvement mechanism. We combined realist evaluation with a quasi-experimental design and process evaluation in a multi-methods approach. Results of multiple group latent change models and qualitative research showed that intervention-group workers perceived increases in peer-mentor support but not in line manager support. Peer-mentors managed to initiate high-quality improvements at work. Intervention-group workers showed significant reductions in blood pressure. Control-group workers experienced more psychosomatic complaints over time in significant contrast to intervention-group workers. Our results suggest that peer-mentoring offers an effective way for low-skilled workers and immigrants to achieve better health. To improve such health effects, a greater focus on line managers' work situations is needed to help them provide support.

Keywords
job stress intervention, line manager training, low-skilled workers, multi-methods approach, occupational health intervention, organizational health intervention, peer-mentoring, realist evaluation, social support

Introduction

Fifty-eight percent of European men and 44% of European women work in low-skilled jobs (Lyly-Yrjanainen, 2008). There are hardly any health-promoting interventions offered to these workers (Richardson and Rothstein, 2008; Theorell, 2012; Thompson et al., 2005) even though these individuals have higher risks of mortality and morbidity than individuals with higher socioeconomic status (Marmot and Wilkinson, 2011; Marmot et al., 1991, 1997; Wege et al., 2008). The main variables that account for social class inequalities in health are work organization variables: low-skilled workers tend to face disadvantageous working conditions; for example, job insecurity, high physical demands, repetitive work, and a lack of social support and autonomy (Bauer et al., 2009; Borrell et al., 2004; Kawachi and Marmot, 1998; Lyly-Yrjanainen, 2008). They possess few resources at work for coping with the burden of stressful work. Resources are also missing in other spheres of their lives, and personal resources such as control beliefs are insufficient (Bosma et al., 2005; Rydstedt et al., 2007; Wege et al., 2008). Their low participation rates in health-promoting activities may be because of these low control beliefs but also to negative learning experiences and limited reading and writing skills (Blue et al., 2003; Thompson et al., 2005). In European countries such as Germany, immigrants are over-represented in low-skilled jobs because they often lack formal education or their formal education is not acknowledged (Brinkmann et al., 2006; Kirkcaldy et al., 2006). Immigrants have even greater difficulty participating in intervention programs because of language problems and cultural barriers. The participation rates of immigrants are 50% lower than those of natives (Ambos, 2005). Multicultural workforces tend to be characterized by specific demands such as social isolation, communication difficulties, divergent attitudes toward work, and higher levels of absenteeism and turnover (Van Knippenberg and Schippers, 2007; Williams and O'Reilly, 1998).

Organizational health interventions have the potential to reduce health inequalities amongst workers (Bambra et al., 2009). They are 'defined as planned actions that are

designed to remove or modify the causes of job stress and impaired health and well-being, and that target relatively large groups of people in a relatively uniform way' (Nielsen et al., 2010b: 220).

The purpose of this article was to study an organizational health intervention for low-skilled workers and immigrants in Germany. We combined realist evaluation with a quasi-experimental design and process evaluation using mixed methods (Bryman, 2006). The nexus of realist evaluation is to study the mechanisms of change within context-mechanism-outcome configurations (CMOs: Pawson, 2013; Pawson and Tilley, 1997). 'Change occurs when interventions, combined with the right contextual factors, release the generative mechanisms' (Marchal et al., 2012: 202). The health outcome measures that we used to test the effectiveness of the intervention consisted of casual blood pressure as a biomarker for stress (McEwen, 1998) and psychosomatic complaints as bodily responses to stress (Lundberg and Cooper, 2011) in coping with low literacy, cultural barriers and language problems.

The intervention and the underlying mechanisms of change

Consistent with realist evaluation, in the following sections, we present the intervention and the initial middle-range theory about why the intervention is expected to work by identifying the underlying mechanisms of change. Organizational health interventions, which enable participation, reduce work demands, improve communication, and foster social support by supervisors and coworkers, have offered much potential for reducing stress and improving employee health and well-being (Bamberg and Busch, 2006; Egan et al., 2007; Goldgruber and Ahrens, 2010; LaMontagne et al., 2007; Semmer, 2011). Opportunities for workers and line managers to engage in collective problem-solving and job crafting, and methods that capture participation and the role of line managers throughout all phases of the intervention, are beneficial (Berg et al., 2010; Nielsen, 2013; Nielsen et al., 2010a; Nytrø et al., 2000). In the context of low-skilled workers and immigrants, there is a particular need for methods that help overcome participation barriers and strengthen the motivation to participate in both workers and company management (Busch et al., 2010).

In general, cost tends to be the major barrier that prevents company management from offering health interventions to low-skilled employees (Thompson et al., 2005). A solution to this barrier is to utilize the services provided by nonprofit agencies. The German statutory health insurance system consists of fiscally independent, nonprofit health insurance organizations called health insurance funds that operate under the constraints of a federal statute (Aust and Ducki, 2004). By law, they are asked to offer occupational health promotion. Their offers are inexpensive for companies and of high quality. Therefore, we suggest that interventions for low-skilled workers be developed and implemented in close cooperation with the health insurance funds. We call this first underlying mechanism of change *the company management encouragement mechanism* (Mechanism 1, M_1).

Peer-mentoring offers an appropriate way for employees to overcome cultural, language and motivational barriers to participation (Ortiz-Walters and Gilson, 2013). 'A mentor can be defined as one of a network of individuals with equal or greater

experience than the protégé who can be a positive role model and provide emotional and career support' (Ensher et al., 2001: 421). Peer-mentors hold a position that is comparable to that of the protégé in terms of experience and status, and this equality promotes acceptance of the issue at hand and of the mentor (Bussey-Jones et al., 2006; Kram and Isabella, 1985). Peers are easy to locate and connect with if they have the same job at the same location and experience the same work situation. Peer-mentors can also reach immigrants if the mentor and protégé have similar cultural backgrounds and speak the same language (González-Figueroa and Young, 2005; ÓNeill, 2002). For foreign-born immigrant workers (i.e. first-generation immigrants) who are more often overqualified than natives (Eurofound, 2007), the peer-mentor role offers challenges and developmental opportunities. Role model theories such as the social cognitive theory (Bandura, 1986) emphasize the learning aspects and the concept of modeling, the psychological matching of cognitive skills, and the patterns of behavior that occur between a person (in this case, the peer-mentor) and an observer (in this case, the worker). In a study evaluating a peer-led versus a professionally-led physical activity intervention with low-skilled workers, only the peer intervention enhanced workers' self-efficacy and self-reported physical activity (Elbel et al., 2003). We refer to the generative mechanism that is theoretically released by peer-mentoring as the *role model mechanism* (Mechanism 2, M_2).

In the context of low-skilled workers, the triggering mechanism of peer-mentoring to show effects on health is that peer-mentors provide social support, which is one of the main health resources that such workers have access to (Johnson and Hall, 1988). Social support has been defined as emotional, instrumental and informational aid exchanged through social interactions (House, 1981). Support diminishes job demands and buffers the effects of job demands on health – relations that have been supported by substantial empirical research on low-skilled workers (e.g. the Whitehall studies: Marmot and Wilkinson, 2011; Marmot et al., 1991). Workers in low-skilled jobs and immigrants clearly profit in terms of health (e.g. psychosomatic complaints) from coworker support (Gunnarsdóttir and Björnsdóttir, 2003; Hoppe, 2011). Social support overcomes social isolation in multicultural workgroups, enhances social contact at work and enhances personal resources (e.g. control beliefs) when workers experience effectively solved problems. It has been found to influence low-skilled workers' health-promotion activities and their use of problem-oriented coping strategies at work (Alexy, 1990; Bagwell and Bush, 1999). Therefore, we suggest that peer-mentoring be implemented and that peer-mentors be trained to provide social support and to initiate and support collective problem-solving to improve employees' work situation. We hypothesized two underlying mechanisms of change: the *peer-mentor support mechanism* (Mechanism 3, M_3) and the *participative work improvement mechanism* (Mechanism 4, M_4). We used qualitative and quantitative research methods to test whether the hypothesized mechanisms of change would work in the particular contexts (Bryman, 2006; Karanika-Murray and Biron, 2013; Pawson and Manzano-Santaella, 2012). Concerning M_3, we tested the following hypothesis with quantitative methods:

Hypothesis M_3: Workers in the intervention group will show an increase in perceived peer-mentor support.

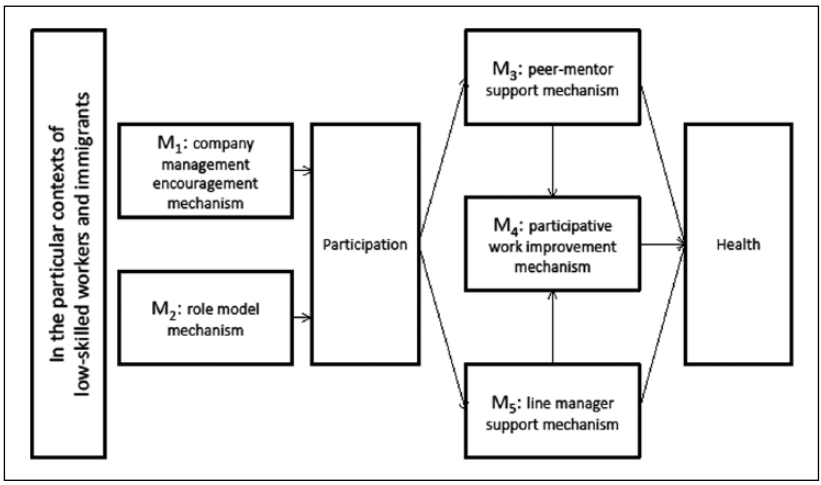

Figure 1. The mechanisms of change (M_1–M_5).

The implementation of peer-mentoring places new demands on line managers. Ideally, line managers support the implementation of peer-mentoring and they support peer-mentors and workers in their efforts to improve the work situation. But line managers, in particular first-level managers, may also feel threatened by empowered employees. Therefore, the participation and, in particular, the training of line managers in an organizational health intervention is essential for its success (Nielsen, 2013; Nielsen et al., 2010a). Besides coworker support, supervisor support is the main coping resource for low-skilled workers and immigrants (Gunnarsdóttir and Björnsdóttir, 2003; Hoppe, 2011; Pelfrene et al., 2010; Winkler et al., 2014, 2015). We suggest that line managers be trained to provide support for the implementation of peer-mentoring and to provide social support to the employees. We call the underlying mechanism the *line manager support mechanism* (Mechanism 5, M_5). Thus, we hypothesized the following:

Hypothesis M_5: Compared with workers in a control group, workers in the intervention group will show an increase in perceived line manager support.

The intervention releases M_1 and M_2 to overcome participation barriers and to strengthen both company managers' and workers' motivation to participate, which in turn releases M_3 to M_5, which then have effects on workers' health (see Figure 1).

In the context of low-skilled workers, biomarkers are appropriate health outcomes. According to the Allostatic Load model (McEwen, 1998) and substantial empirical research, blood pressure is one of the most important biomarkers for occupational stress or job strain (i.e. high job demands with low control and low social support: Landsbergis et al., 2011; Lo et al., 2010; Lundberg and Cooper, 2011; Rosenthal and Alter, 2012). The magnitude of the association between job strain and blood pressure is strongest for the lower social classes (Landsbergis et al., 1999; Marmot et al., 1991; Tsutsumi et al., 2001). Therefore, we hypothesized the following:

Hypothesis Outcome (O)$_{1a}$: Compared with workers in a control group, workers in the intervention group will show a decrease in diastolic blood pressure.

Hypothesis O$_{1b}$: Compared with workers in a control group, workers in the intervention group will show a decrease in systolic blood pressure.

Even if single biomarkers do not exceed traditional risk levels, the cumulative load of placing strain on a number of biological systems may cause psychosomatic problems such as sleep disturbances, insufficient relaxation and musculoskeletal disorders (Ekstedt et al., 2004; Lundberg, 1999). The effects of job strain on psychosomatic problems is widely supported in the context of low-skilled workers (e.g. the Whitehall studies: Marmot and Wilkinson, 2011; Marmot et al., 1991). We expected that the intervention would reduce workers' psychosomatic complaints. Therefore, we hypothesized the following:

Hypothesis O$_2$: Compared with workers in a control group, workers in the intervention group will show a decrease in psychosomatic complaints.

Method

Design

We combined realist evaluation with a quasi-experimental wait-list control group design and process evaluation. The design consisted of the following: a pretest that was administered just before the intervention started; one post-test three months later, directly after the interventions ended; and a follow-up test three months after the post-test. The intervention was not implemented in the wait-list control group until the study had been completed. The wait-list control group completed the questionnaire at the same time points as the intervention group, but that was the extent of their contact with the study. To strengthen the internal validity of the results, company divisions were randomly allocated to the intervention group or the wait-list control group. To strengthen the external validity of the results, the study was conducted in three companies that offered low-skilled jobs in different industries and different regions of Germany.

Workers in low-skilled jobs participated voluntarily in the three waves of data collection: Time 1 (T1) was composed of one questionnaire and casual blood pressure readings one to two weeks before the intervention began; Time 2 (T2) involved the second questionnaire three months later, one to two weeks after the training sessions had ended; and Time 3 (T3) comprised the last questionnaire and the second casual blood pressure readings three months after T2. At each measurement occasion, the participants were administered the same paper and pencil questionnaire. Participants were asked to fill out the questionnaire during regular work hours in break rooms. They received financial incentives for their repeated participation (50€). Every participant had the opportunity to obtain personal help in answering the questions, and we read the entire questionnaire to illiterate workers. The chronological order of the scales was randomly varied within and between measurement occasions. Owing to the large number of immigrants in our sample, we used a bilingual questionnaire with linguistically simplified items in German and

in one additional language (Polish, Russian or Turkish). In a pilot study, the questionnaire was pretested in cognitive interviews (Willis, 1994) with 22 low-skilled workers to evaluate the items' linguistic and cross-cultural comprehensibility. Using an iterative process, we linguistically simplified the items throughout the course of the interviews (Weech-Maldonado et al., 2001).

We conducted structured observations of the training sessions and qualitative, semi-structured interviews with trainers and company management as well as with the trained peer-mentors and line managers after the intervention took place to assess the contexts, implementation processes and the mechanisms of change (see Figure 1).

Participants

The total sample of $N = 421$ participants was 50% female; the mean age was 40 years (SD = 11.6, ranging from 18 to 63 years). The sample was comprised of 50.4% immigrants (42.3% first-generation, 8.1% second-generation) originating mainly from Kazakhstan (9%), Russia (8.6%), Turkey (7.8%), Poland (5%) and Italy (3.6%). About 32% of the respondents reported having no formal qualifications, 60% had completed a vocational education, and 5% even held a university degree. Participants had attended school on average for 10.4 years (SD = 1.7, ranging from 0 to 15 years). The respondents had worked for the company for an average of six years (SD = 6.8, ranging from 0 to 33 years); 91% of the respondents worked full-time (37.5 hr per week or more including extra hours) with an average of 39.4 hr (SD = 4.9, ranging from 19 to 55 hr including extra hours); 54% of the respondents reported having an employment contract of indefinite duration, 68% reported working in shifts, and 57% also worked at night.

The intervention group included $n = 252$ (59.9%) workers, and the control group included $n = 169$ (40.1%) workers. To check the internal validity of the design, we compared the participants in the intervention group with those in the control group on all sociodemographic variables. We used chi-squared tests to determine whether membership in the intervention or control group was related to gender, immigration background, shift work, having a temporary contract or education. We used *t* tests to compare the two groups on age, tenure, school attendance and working hours as sociodemographic variables. We found no significant differences ($p > .05$) between participants in the intervention group and participants in the control group except in shift work, $\chi^2(2) = 13.69$, $p = .001$. The participants in the intervention group worked more day shifts (23.1%) and night shifts (61.9%) than the participants in the control group (day shifts, 18.7%; night shifts, 51%).

The intervention program

Two of the main success factors for formal mentoring are training prior to the start of the mentorship and participation in the recruiting process (Allen et al., 2006). As the recruiting method for the peer-mentors, we chose the one of natural helping interventions, which includes (a) asking the workers to name the coworkers to whom others often turn for help and support, (b) asking for recommendations from line management to ensure the inclusion of all networks and work areas in the workplace, and (c) allowing workers to identify

themselves as someone with an interest in providing support to coworkers (Tessaro et al., 2000). Peer-mentors attended three fortnightly spaced training sessions of four hours each. They were trained to provide emotional and instrumental support by engaging in active listening and by initiating collective problem-solving and changes to improve the work situation in a participative way. They acted as peer-mentors during their normal work hours as needed, and they were given paid time slots for their peer-mentor tasks (e.g. one hour per week). Furthermore, peer-mentors met with each other regularly under supervision to discuss their role and ways to improve social support and the work environment.

Line managers of low-skilled workers, in particular first-level managers, attended four fortnightly spaced sessions of four hours each. They were trained to improve emotional and instrumental social support, to hold effective staff meetings for collective problem-solving, and to communicate information. A full description of the learning processes and the content of the training sessions is available elsewhere (Busch et al., 2014).

The commitment of company management is at the heart of the successful implementation of an organizational health intervention (Nielsen et al., 2010a). Therefore, the intervention program included a workshop for the company's senior and middle managers so that company management would be able to incorporate the core elements of the intervention into its day-to-day management concepts (Kompier et al., 1998).

Qualitative measures

Materials. Two independent observers assisted the training sessions and marked on a structured observation sheet whether each content element was implemented as intended by the developers (Busch et al., 2014). Semi-structured interviews with the trained peer-mentors, line managers, trainers and company management covered context and key process evaluation components such as reach, dose delivered, dose received, fidelity, implementation, recruitment (Linnan and Steckler, 2002; Murta et al., 2007) and the five mechanisms of change (M_1–M_5; see Figure 1). We assessed additional success factors for mentoring and for organizational interventions as perceived quality of the training, role clarity and common knowledge about the goals and contents of the program (Allen et al., 2006; Nielsen et al., 2010a; Nytrø et al., 2000; Randall et al., 2005).

Data analysis. We transcribed the interviews and analyzed interview responses using deductive category assignment of the qualitative content analysis (Mayring, 2014). The analyses were carried out in MaxQDA (Kuckartz, 2007).

Quantitative measures

Materials. Workers' perceived peer-mentor support and line manager support were measured with linguistically simplified three-item versions of the German social support scale by Frese (1989) and also successfully used by Hoppe (2011) with the target group of low-skilled workers ('My peer-mentor (boss) asks me if I have problems or trouble at work'; 'My peer-mentor (boss) helps to make my work easier'; 'My peer-mentor (boss) listens to me when I have problems'). The response format was a four-point Likert scale ranging from 1 (totally disagree) to 4 (totally agree). Cronbach's alphas for the three peer-mentor support items were .87, .82 and .86 at T1, T2 and T3, respectively. Cronbach's

alphas for the three line manager support items were .82, .83 and .84 at T1, T2 and T3, respectively.

Casual blood pressure readings were taken on the upper arm with a fully automatic sphygmomanometer (boso-carat professional) at T1 and T3 during work hours. To foster reliability, the participants were asked not to smoke or drink coffee half an hour before the readings were taken. The participants were also asked to go to the toilet when needed, and afterwards to sit on a chair in a relaxed position for three to five minutes before we took the readings. Blood pressure readings were taken on both arms while the participants remained seated with their arm resting on a desk before them. The arm with the higher reading was noted, and after one minute, another reading was taken on that arm. If there was a difference of more than 5 mmHg, a third measurement was taken. For the statistical analyses, we used the readings from the second and third measurements as indicators, which is a reliable way to measure casual blood pressure as a biomarker for stress (Greiner et al., 2004). The intercorrelations for diastolic blood pressure were .93 and .92 at T1 and T3, respectively. The intercorrelations for systolic blood pressure were .90 and .89 at T1 and T3, respectively.

Psychosomatic complaints were measured with a simplified nine-item scale for this target group (Hoppe, 2011), which was taken from the scale by Mohr and Müller (2005). The respondents were asked to report the perceived frequency of various psychosomatic symptoms (e.g. headache) on a five-point scale (1 = never, 2 = every few months, 3 = every few weeks, 4 = every few days, 5 = almost every day). Cronbach's alphas for the nine single items were .83 at T1, .87 at T2 and .87 at T3. In the present study, we used structural equation models and partitioned the nine single items into two item parcels justified by the nature of the complaints (Little et al., 2002). The first parcel included items concerning back, neck and shoulder pain. The second parcel included items concerning headaches, dizziness, sleep disturbances and fatigue. Intercorrelations between the two item parcels were .69 at T1, .77 at T2 and .75 at T3.

Data analysis. One problem in longitudinal analyses is the treatment of missing data owing to panel attrition. In our sample, $n = 103$ participants were absent at T1; $n = 101$ were absent at T2; and $n = 122$ at T3. There were $n = 185$ participants who provided complete data across all three measurement points ($n = 114$ in the intervention group and $n = 71$ in the control group), $n = 146$ who provided data at two measurement points, and $n = 90$ who provided data at only one measurement point. To handle the missing data, we estimated the models using the Full Information Maximum Likelihood (FIML) approach for all continuous observed variables (Little and Rubin, 2003). FIML is likely to produce results that are similar to those produced by multiple imputation methods. In addition, we used so-called auxiliary variables, which are correlated with the missing values on the variables of interest in order to reduce the bias caused by attrition (Enders, 2010).

We used various multiple group latent change (MG-LC) models to examine true (i.e. measurement-error free) change (Crayen et al., 2011) in peer-mentor and line manager support and in blood pressure and psychosomatic complaints. To systematically test for indicator-specific (IS) factors as well as for different degrees of measurement invariance (MI) across groups and time, we specified up to six different MG-LC models for each outcome measure. First, we specified a baseline MG-LC model without IS factors, implying strong MI between groups and configural MI across time (Model A). If the

overall fit of this general model was good, we continued to test the degree of MI across time. Otherwise, we extended Model A to IS factors (Model B). Thus, either Model A or Model B was used as the baseline model. Third, we imposed parameter restrictions step by step, scrutinizing the highest possible degree of MI across time while allowing for different change trajectories in both groups (Model C, free change). More specifically, we tested weak, partially strong, strong and strict MI restrictions across time without imposing any restrictions with regard to the means of the latent change factors across groups. For reasons of simplicity, we report only the model implying the highest possible degree of MI across time (i.e. partially strong, strong, or strict MI) that still allowed for the analysis of true change (Millsap, 2011). In order to evaluate the intervention program, we tested whether or not the two groups differed significantly from each other with regard to true change across time (Model D, equal change). Next, we tested whether or not the means of the latent change factors differed significantly from zero (Model E, no change). We tested whether there were associations between company affiliation and the change factors.

In the present study, all analyses were carried out in M*plus* with Maximum Likelihood Robust (MLR) estimation for continuous observed variables, and we used the THETA parameterization and Weighted Least Squares Means and Variance Adjusted (WLSMV) estimation for categorical (ordered) observed indicators (Muthén and Muthén, 2010). The following indices were used to assess the overall model fits: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the chi-squared test statistic as well as the chi-squared differences test (West et al., 2012).

Workers were naturally nested within 22 divisions of three companies and assigned to either the intervention or to the wait-list control condition (11 divisions in each condition). To handle the clustering in the data, we used the M*plus* option 'TYPE=COMPLEX', which adjusts the standard errors as well as the chi-squared fit statistics for the dependencies in the data.

Results

Contexts and processes

We conducted our study with 74 kitchen assistants in a canteen section of a welfare facility (Company A), 81 workers in the control and assembly departments of a service production company (B), and 266 workers handling the arrival, warehousing and issuing of goods in a car accessory manufacturing plant (C). Company managements' support was given in all three companies. However, in Company C, the support offered by middle management and works council was stronger and the process was more carefully driven, here by the human resource developer, than in the other two companies. All stakeholders in Company C cooperated with high intervention commitment. Besides these aspects, the implementation processes did not differ between the three companies. The results of the structured observations showed that the quality and the integrity of the three interventions were as originally conceived. The trainers in all three interventions were female, German and highly experienced with occupational health interventions. Twenty-three peer-mentors were successfully recruited and trained, nine (39%) with an immigration

background, and 13 (57%) female workers. Sixteen (70%) took part in all three training sessions and seven (30%) in two of the three sessions. All 18 invited line managers were trained, of which 15 (83%) were first-level managers, and three (17%) were second-level managers who each led a small division of the company. Three (17%) of the trained line managers had an immigration background; six (33%) were female. It is remarkable that only 10 (56%) of the trained line managers took part in all four sessions and nine line managers (50%) had never or only once attended a line manager training before.

Nearly 40% of the workers in the intervention group did not attend the information session about the intervention, and 47% of the workers in the intervention group knew little or nothing about the intervention program. One reason for this lack of information was the high percentage of temporary workers: 46% of the study participants had a temporary contract. Furthermore, low-skilled workers are prone to contracting illnesses. These are characteristics of the target group as already mentioned above.

Mechanisms of change

The company managers reported in the interviews that they were encouraged to participate because of the target-group specific interventions at low costs. The *company management encouragement mechanism* (M_1) was successfully released by utilizing the services provided by nonprofit agencies such as health insurance funds in Germany. The workshop for the companies' senior and middle managers ensured their on-going support.

The 23 recruited and trained peer-mentors reported in the interviews that they were proud to be chosen by their coworkers and line managers. They were highly motivated to participate and to fulfill their new roles, which was clearly supported by the results of the interviews with line managers, trainers and senior managers. The *role model mechanism* (M_2) was successfully released by peer-mentoring in all three companies.

The results of the quantitative analyses are given in Tables 1 and 2. Table 1 provides the goodness-of-fit tests with regard to the different MG-LC models. Table 2 provides detailed information on the mean changes in the intervention and control groups. With regard to peer-mentor support (Hypothesis M_3), the overall fit of the baseline MG-LC model (Model B) was good, $\chi^2(4) = 9.38$, $p = .05$, CFI = .99, RMSEA = .07. The fit of Model C with partial strong MI across time was marginally significantly worse ($p = .04$) than the baseline model but had an acceptable overall fit, $\chi^2(4) = 10.48$, $p = .03$, CFI = .99, RMSEA = .08. Model E (no change) fitted significantly worse than the baseline model ($p < .01$). Table 2 shows that workers' perceived peer-mentor support increased across time in the intervention group, $M_{\text{pm1-2}} = 1.003$, $p = .075$, and $M_{\text{pm1-3}} = .407$, $p = .33$. Although these results were non-significant, the effect sizes were small to medium, $\delta = .32$ and $\delta = .13$. The qualitative research results showed that the peer-mentors increasingly supported their coworkers. The results mostly supported Hypothesis M_3. The *peer-mentor support mechanism* (M_3) was activated by the intervention in all three companies.

Peer-mentors initiated high-quality changes at work in a participative way such as improving the organization of shift work, creating a new rest area, cleaning up workplaces and reducing social conflicts at work in all three companies. The *participative work improvement mechanism* (M_4) was clearly released by the intervention in all three companies.

Table 1. Goodness-of-fit coefficients for the different multiple group latent change models.

	Model	$\chi 2$	d.f.	p	$\Delta\chi 2$	Δd.f.	p	CFI	RSMEA	AIC	SBIC
Peer-mentor support	A Baseline model	18.10	5	<.01				.985	.103	–	–
	B Baseline model with IS variables	9.38	4	.05				.994	.074	–	–
	C Partial strong MI with free change	10.48	4	.03	8.48	3	.04	.993	.081	–	–
	E Partial strong MI with no change	12.31	4	.02	9.48	2	<.01	.991	.092	–	–
Line manager support	A Baseline model	17.11	9	.05				.992	.065	–	–
	C Strong MI with free change	17.85	9	.04	12.93	6	.04	.991	.068	–	–
	D Strong MI with equal change	14.55	8	.07	.67	1	.41	.993	.062	–	–
	E Strong MI with no change	18.14	9	.03	1.29	2	<.01	.990	.070	–	–
Diastolic blood pressure	A Baseline model	11.01	6	.08	–	–	–	1.00	.064	6877.50	6906.24
	C Strict MI with free change	23.49	16	.10	12.60	10	.24	.994	.048	6868.47	6888.76
	D Strict MI with equal change	26.54	17	.06	2.70	1	.10	.992	.052	6868.60	6888.04
	E Strict MI with no change	33.33	18	.01	7.56	1	<.01	.987	.064	6872.76	6891.35
Systolic blood pressure	A Baseline model	26.01	6	<.001	11.33	2	<.01	.980	.127	7686.46	7715.21
	B Baseline model with correlated error variables	14.65	4	<.01				.990	.114	7679.14	7709.57
	C Strict MI with free change	21.46	14	.09	6.93	10	.73	.993	.051	7673.64	7695.62
	D Strict MI with equal change	25.75	15	.04	3.74	1	.05	.989	.059	7675.38	7696.51
	E Strict MI with no change	34.22	16	<.01	22.24	1	<.01	.982	.074	7685.10	7705.39
Psychosomatic complaints	A Baseline model	239.21	18	<.001				.866	.24	4122.86	4167.94
	B Baseline model with IS variables	19.50	14	.15				.997	.043	3954.53	4003.08
	C Strong MI with free change	26.37	21	.19	7.13	7	.41	.997	.035	3945.39	3987.87
	D Strong MI with equal change	33.87	23	.07	6.47	2	.04	.993	.047	3946.39	3987.14

d.f. = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; AIC = Akaike information criterion; SBIC = Schwarz` Bayesian information criterion. For ordered categorical observed variables using the WLSMV estimator, no information criteria are reported by M*plus*.

Table 2. Means, standard errors (SE), standardized estimates and effect sizes (Cohen's δ) of the latent change variables in both groups (control and intervention group).

Group	Variables	Estimate	SE	Stand. estimate	Cohen's δ	Group	Variables	Estimate	SE	Stand. estimate	Cohen's δ
Control group	PM_2-1					Intervention group	PM_2-1	1.003	.564	.324	.32
	PM_3-1						PM_3-1	.407	.418	.131	.13
	LM_2-1	−.392*	.138	−.427	.43		LM_2-1	−.251*	.118	−.158	.16
	LM_3-1	−.112	.148	−.077	.08		LM_3-1	−.281	.141	−.211	.21
	Dia_3-1	−.512	.668	−.068	.07		Dia_3-1	−1.994*	.095	−.254	.25
	Sys_3-1	−1.325	1.634	−.186	.19		Sys_3-1	−4.031*	1.254	−.391	.39
	PC_2-1	.090*	.042	.228	.23		PC_2-1	−.054	.045	−.116	.12
	PC_3-1	.088	.056	.325	.32		PC_3-1	−.028	.044	−.055	.05

SE = standard error; PM_2-1 = latent change variable of peer-mentor support Time 2–Time 1; PM_3-1 = latent change variable of peer-mentor support Time 3–Time 1; LM_2-1 = latent change variable of line manager support Time 2–Time 1; LM_3-1 = latent change variable of line manager support Time 3–Time 1; Dia_3-1 = latent change variable of diastolic blood pressure Time 3–Time 1; Sys_3-1 = latent change variable of systolic blood pressure Time 3–Time 1; PC_2-1 = latent change variable of psychosomatic complaints Time 2–Time 1; PC_3-1 = latent change variable of psychosomatic complaints Time 3–Time 1; *$p < .05$.

The trained line managers reported in the interviews that they did not feel threatened by the empowered workers because they felt sufficiently involved in the peer-mentoring implementation process. However, they also reported that they were not motivated to participate in an intervention that was designed to enhance their support for improving the work situation and health of their subordinates because they felt too stressed themselves. They wished their own work situation to be improved first. These interview results were supported by the results of the interviews with peer-mentors, trainers and company managers and by the quantitative research results: For line manager support (Hypothesis M_5), the overall fit of the baseline MG-LC model (Model A) was good, $\chi^2(9) = 17.11$, $p = .05$, CFI = .99, RMSEA = .065. The fit of Model C (free change) was marginally significantly worse ($p = .04$) than the baseline model but had an acceptable overall fit, $\chi^2(9) = 17.85$, $p = .04$, CFI = .99, RMSEA = .07. The results of the χ^2 difference test of Model D (equal change) showed that each group did not differ significantly from the other (see Table 1). Model E (no change) fitted significantly worse than model D ($p < .01$). Line manager support decreased significantly from T1 to T2 and nonsignificantly from T1 to T3 in both groups (see Table 2). The results failed to support Hypothesis M_5. The *line manager support mechanism* (M_5) was not activated by the intervention program in all three companies.

Health outcomes

For diastolic blood pressure (Hypothesis O_{1a}), the overall fit of the baseline MG-LC model (Model A) was excellent, $\chi^2(6) = 11.01$, $p = .08$, CFI = 1.00, RMSEA = .06. The results of a χ^2 difference test showed that the MG-LC model with strict MI across time and free change (Model C) did not fit significantly worse than Model A, $\Delta\chi^2(10) = 12.60$, $p = .24$. Moreover, the overall fit of this more restrictive MG-LC model C (free change) was excellent, $\chi^2(16) = 23.49$, $p = .10$, CFI = .99, RMSEA = .05. Model D did not fit significantly worse than Model C, $\Delta\chi^2(1) = 2.70$, $p = .10$; overall fit: $\chi^2(17) = 26.54$, $p = .06$, CFI = .99, RMSEA = .05. According to the results in Table 2, diastolic blood pressure decreased from T1 to T3 in both groups; however, a statistically significant decrease in diastolic blood pressure from T1 to T3 was merely found in the intervention group, $M_{dia} = -1.99$, $p < .05$ (Cohen's $\delta = .25$). The results mostly supported Hypothesis O_{1a}.

For systolic blood pressure (Hypothesis O_{1b}), the overall fit of Model B was acceptable, and it improved in Model C (free change; see Table 1). The χ^2 difference test was marginally significant when Model D (equal change) was compared with Model C (free change), $\Delta\chi^2(1) = 3.74$, $p = .05$, and the overall fit was slightly worse for Model D, $\chi^2(15) = 25.75$, $p = .04$, CFI = .99, RMSEA = .06. The results in Table 2 show that there was a significant decrease in systolic blood pressure in the intervention group but not in the control group, $M_{sys} = -4.03$, $p < .05$ (Cohen's $\delta = .39$). The results mostly supported Hypothesis O_{1b}.

For psychosomatic complaints (Hypothesis O_2), the baseline Model B had an excellent fit, which improved when strong MI was imposed with free change (Model C), $\Delta\chi^2(7) = 7.13$, $p = .41$, with a perfect overall fit, $\chi^2(21) = 26.37$, $p = .19$, CFI = 1.00 RMSEA = .04. The more restrictive Model D with equal change across groups fitted significantly worse than Model C, $\Delta\chi^2(2) = 6.47$, $p = .04$ (see Table 1). Psychosomatic

complaints showed a significant mean increase from T1 to T2 in the control group, $M_{pc} = .90$, $p < .05$ (Cohen's $\delta = .23$) but not in the intervention group (see Table 2). Instead of reducing workers' psychosomatic complaints in comparison with a control group (Hypothesis O_2), the results showed that the intervention did protect the workers against an increase in psychosomatic complaints. There were no associations between company affiliation and the change factors.

Discussion

The present study addressed the evaluation of an organizational health intervention for low-skilled and immigrant workers. We combined realist evaluation with a quasi-experimental design and process evaluation using a multi-methods approach. The results showed that company management in all three companies was encouraged to participate by being offered a target-goup-specific, low-cost intervention. Peer-mentoring was well received by the workers. The recruited peer-mentors were highly motivated to participate, and 70% even took part in all training sessions. They increasingly supported their coworkers, and they were eager to initiate collective problem-solving to improve the work situation after completing the peer-mentor training. Peer-mentors initiated changes at work in a participative way such as improving the organization of shift work, creating a new rest area, cleaning up workplaces and reducing social conflicts at work in all three companies. Although the perceived increase in peer-mentor support was not statistically significant, both the effect size and the results of the qualitative research indicate that there was a considerable change with regard to peer-mentor support. The intervention did not manage to foster workers' perceived line manager support. In the interviews, the line managers reported that they were not motivated to participate in an intervention that was designed to enhance their support for improving the work situation and health of their subordinates because they felt too stressed themselves. The intervention and control groups did not differ in their perception of line manager support changes and even showed statistically significant negative changes from Time 1 to Time 2 in workers' perceived line manager support.

The results provide evidence that the intervention had effects on the health outcome measures of diastolic and systolic blood pressure. The workers in the intervention groups showed significant decreases in diastolic and systolic blood pressure across a time period of six months. The marginally non-significant chi-squared differences tests for the models D with equal change in both groups can be explained by the small sample size.

The intervention and control groups differed in changes in psychosomatic complaints. We found that workers in the control group reported a significant increase in psychosomatic complaints, but workers in the intervention group did not. The intervention program appeared to protect the workers in the intervention group against such an increase in psychosomatic complaints. The fact that we found these effects on the health outcome variables is remarkable when considering the lack of support given by the line managers and the turbulent environment of work organizations in general.

The main contribution of this article is that we developed an organizational health intervention program for low-skilled workers and immigrants on the basis of an initial middle-range theory covering five underlying mechanisms of change. We analyzed these

generative mechanisms of change that were supposed to be released by the intervention program and contexts by applying a multi-methods approach.

Low-skilled workers and immigrants currently receive far too little attention in the occupational health intervention and stress management literature. The social gradient in health is a widespread and well-known phenomenon (Marmot and Wilkinson, 2011), but for various reasons, it is very difficult to design interventions and to conduct intervention research with low-skilled workers. In the following sections, we discuss the implications and strengths of this study under three headings: (a) refining the initial middle-range theory, which refers to the mechanisms of change and the intervention program for low-skilled workers and immigrants; (b) doing intervention research with low-skilled workers and immigrants; and (c) the benefits of using not only realist evaluation with a multi-methods approach to evaluate complex and multifaceted organizational interventions but also multiple group latent change models to analyze true change.

Refining the initial middle-range theory

We formulated five mechanisms of change that underlie the health intervention for low-skilled workers and immigrants. First, employers tend to show low motivation with respect to offering intervention programs to their low-skilled workers because such workers are easily replaced (e.g. Thompson et al., 2005). We formulated the *company management encouragement mechanism* (M_1) and successfully utilized the services provided by nonprofit agencies (e.g. health insurance funds in Germany) to offer employers of low-skilled workers an intervention program with low costs and high quality. Second, low-skilled workers, and immigrants in particular, tend to experience language and cultural barriers and lack the personal resources to be motivated to participate in health promotion programs (e.g. Blue et al., 2003). Therefore, we formulated the *role model mechanism* (M_2), which was successfully activated through peer-mentoring. The intervention allowed the workers and line managers to take active roles in recruiting the peer-mentors. Peer-mentors and line managers were trained to give social support for improving the work situation in a participative way so that workers could achieve better health. The peer-mentors in this study were highly motivated to participate in the intervention program. They proactively and adaptively embraced their new role of supporting their coworkers and their goal of improving the employees' work situations. Intervention research profits from considering job crafting research for low-skilled participants and immigrants in particular (Berg et al., 2010). We were able to confirm the release of the *peer-mentor support mechanism* (M_3) and of the *participative work improvement mechanism* (M_4) through the intervention and within the contexts, but we failed to confirm the *line manager support mechanism* (M_5). The line managers of low-skilled workers were not motivated to participate in health interventions that were designed to benefit their subordinates. Line managers reported experiencing their own work situation as stressful and were primarily motivated to improve their own work situation. We now suggest a refinement to our initial middle-range theory that involves the addition of a mechanism of change that has to be released by the intervention before the *line manager support mechanism* can be activated; we call it the *line managers' work improvement mechanism*.

Line managers' own work situation should be improved in a participative way in order to enable the line managers to provide support.

Doing intervention research with low-skilled workers and immigrants

Doing intervention research with low-skilled workers is demanding because of their lack of literacy and the large number of immigrants in low-skilled occupations (e.g. Ambos, 2005). To overcome language and cultural barriers, we used blood pressure as a biomarker for stress and a simple bilingual questionnaire. The results showed that with our advanced analytic strategy, it was possible to establish (partial) strong or strict measurement invariance across time and groups with this questionnaire. The use of objective measures was very important for overcoming language and cultural barriers in our target group.

Researchers have to cope with not only cultural barriers and language problems but also temporary contracts and workers who are prone to contracting illnesses, both of which lead to limited involvement in the implementation process and to missing data in longitudinal studies. We assessed the extent to which the workers were involved in the intervention process, but we decided not to use the adapted design approach (Randall et al., 2005), which assigns participants to groups according to their degree of involvement. We wanted to measure the effectiveness of the intervention for this particular occupational group within realist paradigm. To handle the missing data, we used an advanced strategy: we estimated models using the FIML approach and we used auxiliary variables, which are correlated with the missing values on the variables of interest.

Using realist evaluation and multiple group latent change models

Using realist evaluation, we were able to triangulate the data and to analyze the mechanisms of change in particular contexts. By applying qualitative research methods, we learned about the mechanisms and high quality of changes initiated by the peer-mentors, and we came to understand that the line managers feel the need to improve their own work situation first. We applied multiple group latent change models to examine true (i.e. measurement-error free) change in the measures of interest. Further, we used not only MLR estimation for continuous observed variables but also the THETA parameterization and WLSMV estimation for categorical observed indicators. With our advanced analytical strategy, it was possible to establish (partial) strong or strict measurement invariance across time and groups with this questionnaire.

Limitations and future research

In interpreting the current findings, several limitations should be taken into consideration. First, the high proportion of missing workers at each measurement occasion is the main limitation of longitudinal intervention studies with this occupational group. Our sample comprised a large number of temporary workers, a finding that is characteristic for low-skilled workers. It is also characteristic of low-skilled workers that they are prone to contract illnesses. To deal with missing data, we used an advanced estimation technique. Second, we used a short follow-up period of three months because of the high

percentage of temporary workers. If we had used a longer follow-up period, the proportion of missing workers would have been even larger.

Conclusions

Health promotions at work should have a greater focus on low-skilled workers and immigrants because they are the work groups that have the highest health risks. Second, there is a particular need for methods that can be applied to overcome participation barriers and strengthen the motivation to participate in company management. Utilizing the services provided by nonprofit agencies (e.g. health insurance funds in Germany) is effective for reaching employers of low-skilled workers. Third, we found that implementing peer-mentoring was effective in overcoming participation barriers in low-skilled workers and immigrants, and in improving social support, the workers' work situation in a participative way, and the health of low-skilled and immigrant workers. Fourth, training line managers to provide support, in particular for the peer-mentors' and workers' efforts to improve their work situation, is not beneficial if we fail to acknowledge the line managers' own work situation or provide ways to improve it. Fifth, biomarkers and simple bilingual questionnaires overcome language and cultural barriers with this occupational group (e.g. blood pressure and psychosomatic complaints). Last, but not least, utilizing multiple group latent change models enables us to control for measurement invariance across time and groups and to analyze true change when doing intervention research with low-skilled and immigrant workers.

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References

Alexy B (1990) Workplace health promotion and the blue collar worker. *AAOHN Journal* 38(1): 12–16.

Allen TD, Eby LT and Lentz E (2006) The relationship between formal mentoring program characteristics and perceived program effectiveness. *Personnel Psychology* 59(1): 125–153.

Ambos I (2005) *Nationaler Report: Geringqualifizierte und berufliche Weiterbildung – empirische Befunde zur Weiterbildungssituation in Deutschland* [National Report: low-skilled and professional development - empirical findings for further training situation in

Germany]. Available at: http://www.die-bonn.de/esprid/dokumente/doc-2005/ambos05_01.pdf (accessed 7 November 2016).

Aust B and Ducki A (2004) Comprehensive health promotion interventions at the workplace: Experiences with health circles in Germany. *Journal of Occupational Health Psychology* 9(3): 258–270.

Bagwell MM and Bush HA (1999) Health conception and health promotion in blue collar workers: Program planning issues. *AAOHN Journal* 47(11): 512–518.

Bamberg E and Busch C (2006) Stressbezogene Interventionen in der Arbeitswelt [Stress-related interventions in the workplace]. *German Journal of Work and Organizational Psychology* 50(4): 215–226.

Bambra C, Gibson M, Sowden A, et al. (2009) Working for health? Evidence from systematic reviews on the effects on health and health inequalities of organisational changes to the psychosocial work environment. *Preventive Medicine* 48(5): 454–461.

Bandura A (1986) *Social Foundations of Thought and Action: A Social Cognitive Theory*. Englewood Cliffs, NJ: Prentice Hall.

Bauer GF, Huber C, Jenny GJ, et al. (2009) Socioeconomic status, working conditions and self-rated health in Switzerland: Explaining the gradient in men and women. *International Journal of Public Health* 54(1): 23–30.

Berg JM, Wrzesniewski AMY and Dutton JE (2010) Perceiving and responding to challenges in job crafting at different ranks: When proactivity requires adaptivity. *Journal of Organizational Behavior* 31: 158–186.

Blue CL, Black DR, Conrad K, et al. (2003) Beliefs of blue-collar workers: Stage of readiness for exercise. *American Journal of Health Behavior* 27(4): 408–420.

Borrell C, Muntaner C, Benach J, et al. (2004) Social class and self-reported health status among men and women: What is the role of work organisation, household material standards and household labour? *Social Science & Medicine* 58(10): 1869–1887.

Bosma H, Van Jaarsveld CHM, Tuinstra J, et al. (2005) Low control beliefs, classical coronary risk factors, and socio-economic differences in heart disease in older persons. *Social Science & Medicine* 60(4): 737–745.

Brinkmann U, Dörre K, Röbenack S, et al. (2006) *Prekäre Arbeit* [Precarious work]. Bonn: Friedrich-Ebert-Stiftung.

Bryman A (2006) Integrating quantitative and qualitative research: How is it done? *Qualitative Research* 6(1): 97–113.

Busch C, Staar H, Åborg C, et al. (2010) The neglected employees: Work-life balance and stress management intervention program for low-qualified workers. In: Houdmont J and Leka S (eds) *Contemporary Occupational Health Psychology: Global Perspectives on Research and Practice*. Chichester: John Wiley & Sons, 98–123.

Busch C, Cao P, Clasen J, et al. (2014) *Betriebliches Gesundheitsmanagement bei kultureller Vielfalt* [Health promotion for multicultural workforces]. Berlin: Springer.

Bussey-Jones J, Bernstein L, Higgins S, et al. (2006) Repaving the road to academic success: The IMeRGE approach to peer mentoring. *Academic Medicine* 81(7): 674–679.

Crayen C, Geiser C, Scheithauer H, et al. (2011) Evaluating interventions with multimethod data: A structural equation modeling approach. *Structural Equation Modeling: A Multidisciplinary Journal* 18(4): 497–524.

Egan M, Bambra C, Thomas S, et al. (2007) The psychosocial and health effects of workplace reorganisation: A systematic review of the health effects of organisational-level interventions that aim to increase employee control. *Journal of Epidemiology & Community Health* 61: 945–954.

Ekstedt M, Akerstedt T and Söderström M (2004) Microarousals during sleep are associated with increased levels of lipids, cortisol, and blood pressure. *Psychosomatic Medicine* 66(6): 925–931.

Elbel R, Aldana S, Bloswick D, et al. (2003) A pilot study evaluating a peer led and professional led physical activity intervention with blue-collar employees. *Work* 21: 199–210.

Enders CK (2010) *Applied Missing Data Analysis*. New York: Guilford Press.

Ensher EA, Thomas C and Murphy SE (2001) Comparison of traditional, step-ahead, and peer mentoring on proteges' support, satisfaction, and perceptions of career success: A social exchange perspective. *Journal of Business and Psychology* 15(3): 419–438.

Eurofound (2007) *Employment and Working Conditions of Migrant Workers*. Luxembourg: Publications Office of the European Union.

Frese M (1989) Gütekriterien der Operationalisierung von sozialer Unterstützung am Arbeitsplatz [Quality criteria of the operationalization of social support in the workplace]. *Zeitschrift für Arbeitswissenschaft* 43: 112–121.

Goldgruber J and Ahrens D (2010) Effectiveness of workplace health promotion and primary prevention interventions: A review. *Journal of Public Health* 18(1): 75–88.

González-Figueroa E and Young AM (2005) Ethnic identity and mentoring among Latinas in professional roles. *Cultural Diversity and Ethnic Minority Psychology* 11(3): 213–226.

Greiner B, Krause N, Ragland D, et al. (2004) Occupational stressors and hypertension: A multimethod study using observer-based job analysis and self-reports in urban transit operators. *Social Science & Medicine* 59(5): 1081–1094.

Gunnarsdóttir S and Björnsdóttir K (2003) Health promotion in the workplace: The perspective of unskilled workers in a hospital setting. *Scandinavian Journal of Caring Sciences* 1978(4): 66–73.

Hoppe A (2011) Psychosocial working conditions and well-being among immigrant and German low-wage workers. *Journal of Occupational Health Psychology* 16(2): 187–201.

House JS (1981) *Work Stress and Social Support*. Reading, MA: Addison-Wesley.

Johnson JV and Hall EM (1988) Job strain, work place social support, and cardiovascular disease: A cross-sectional study of a random sample of the Swedish working population. *American Journal of Public Health* 78(10): 1336–1342.

Karanika-Murray M and Biron C (2013) The nature of change in organizational health interventions: Some observations and propositions. In: Bauer GF and Jenny GJ (eds) *Salutogenic Organizations and Change*. Heidelberg: Springer, 239–258.

Kawachi I and Marmot M (1998) Commentary: What can we learn from studies of occupational class and cardiovascular disease? *American Journal of Epidemiology* 148(2): 160–163.

Kirkcaldy B, Wittig U, Furnham A, et al. (2006) Health and migration: Psychosocial determinants. *Bundesgesundheitsblatt - Gesundheitsforschung - Gesundheitsschutz* 49(9): 873–883.

Kompier MAJ, Geurts SAE, Gründemann RWM, et al. (1998) Cases in stress prevention: The success of a participative and stepwise approach. *Stress Medicine* 14(3): 155–168.

Kram KE and Isabella LA (1985) Mentoring alternatives: The role of peer relationships in career development. *The Academy of Management Journal* 28(1): 110–132.

Kuckartz T (2007) *Einführung in die computergestützte Analyse qualitativer Daten* [Introduction to computer-aided analysis of qualitative data]. Wiesbaden: VS Verlag.

LaMontagne AD, Keegel T, Louie AM, et al. (2007) A systematic review of the job-stress intervention evaluation literature, 1990 – 2005. *International Journal of Occupational and Environmental Health* 13(3): 268–280.

Landsbergis PA, Schnall PL, Warren K, et al. (1999) The effect of job strain on ambulatory blood pressure in men: Does it vary by socioeconomic status? *Annals of the New York Academy of Sciences* 896: 414–416.

Landsbergis PA, Schnall PL, Belkić K, et al. (2011) Workplace and cardiovascular disease: Relevance and potential role for occupational health psychology. In: Quick JC and Tetrick LE (eds) *Handbook of Occupational Health Psycholog* (2nd edn). Washington, DC: APA, 243–264.

Linnan L and Steckler A (2002) Process evaluation for public health interventions and research. In: Steckler A and Linnan L (eds) *Process Evaluation for Public Health Interventions and Research*. San Francisco, CA: Jossey-Bass, 1–24.

Little RJA and Rubin DB (2003) *Statistical Analysis with Missing Data*. New York: Wiley.

Little TD, Cunningham WA, Shahar G, et al. (2002) To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling: A Multidisciplinary Journal* 9(2): 151–173.

Lo S-H, Lin L-Y, Hwang J-S, et al. (2010) Working the night shift causes increased vascular stress and delayed recovery in young women. *Chronobiology International* 27(7): 1454–1468.

Lundberg U (1999) Stress responses in low-status jobs and their relationship to health risks: Musculoskeletal disorders. *Annals of the New York Academy of Sciences* 896: 162–172.

Lundberg U and Cooper CL (2011) *The Science of Occupational Health: Stress, Psychobiology and the New World of Work*. Oxford: Wiley-Blackwell.

Lyly-Yrjanainen M (2008) *Who needs up-skilling? Low-skilled and low-qualified workers in the European Union*. Available at: http://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef0897en.pdf (accessed 7 November 2016).

McEwen BS (1998) Stress, adaptation and disease: Allostasis and allostatic load. *Annals of the New York Academy of Sciences* 840(1): 33–44.

Marchal B, van Belle S, van Olmen J, et al. (2012) Is realist evaluation keeping its promise? A review of published empirical studies in the field of health systems research review of realist evaluations in health systems research. *Evaluation* 18(2): 192–212.

Marmot M and Wilkinson RG (eds) (2011) *Social Determinants of Health*. Oxford: Oxford University Press.

Marmot MG, Smith GD, Stansfeld S, et al. (1991) Health inequalities among British civil servants: The Whitehall II study. *The Lancet* 337(8754): 1387–1393.

Marmot MG, Bosma H, Hemingway H, et al. (1997) Contribution of job control and other risk factors to social variations in coronary heart disease incidence. *The Lancet* 350(9073): 235–239.

Mayring P (2014) *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution*. Available at: http://nbn-resolving.de/urn:nbn:de:0168-ssoar-395173 (accessed 7 November 2016).

Millsap RE (2011) *Statistical Approaches to Measurement Invariance*. New York: Routledge Taylor & Francis Group.

Mohr G and Müller A (2005) Psychosomatic complaints in a non-clinical context. In: Glöckner-Rist A (ed.) *ZUMA-information System: Digital Handbook of Measures in the Social Sciences*. Mannheim: Zentrum für Umfragen, Methoden und Analysen.

Murta SG, Sanderson K and Oldenburg B (2007) Process evaluation in occupational stress management programs: A systematic review. *American Journal of Health Promotion* 21(4): 248–254.

Muthén LK and Muthén BO (2010) *M*plus *User's Guide* (6th edn). Los Angeles, CA: Muthén & Muthén.

Nielsen K (2013) Review article: How can we make organizational interventions work? Employees and line managers as actively crafting interventions. *Human Relations* 66(8): 1029–1050.

Nielsen K, Randall R, Holten A-L, et al. (2010a) Conducting organizational-level occupational health interventions: What works? *Work & Stress* 24(3): 234–259.

Nielsen K, Taris TW and Cox T (2010b) The future of organizational interventions: Addressing the challenges of today's organizations. *Work & Stress* 24(3): 219–233.

Nytrø K, Saksvik PØ, Mikkelsen A, et al. (2000) An appraisal of key factors in the implementation of occupational stress interventions. *Work & Stress* 14(3): 213–225.

O`Neill RM (2002) Gender and race in mentoring relationships: A review of the literature. In: Clutterbuck D (ed.) *Mentoring and Diversity: An International Perspective*. Oxford: Butterworth-Heinemann, 1–22.

Ortiz-Walters R and Gilson LL (2013) Mentoring programs for under-represented groups. In: Passmore J, Peterson DB and Freire T (eds) *The Wiley-Blackwell Handbook of the Psychology of Coaching and Mentoring*. Chichester: Wiley-Blackwell, 266–282.

Pawson R (2013) *The Science of Evaluation: A Realist Manifesto*. London: SAGE.

Pawson R and Manzano-Santaella A (2012) A realist diagnostic workshop. *Evaluation* 18(2): 176–191.

Pawson R and Tilley N (1997) *Realistic Evaluation*. London: SAGE.

Pelfrene E, Vlerick P, Mak RP, et al. (2010) Scale reliability and validity of the Karasek 'Job Demand–Control–Support' model in the Belstress study. *Work & Stress* 15(4): 297–313.

Randall R, Griffiths A and Cox T (2005) Evaluating organizational stress-management interventions using adapted study designs. *European Journal of Work and Organizational Psychology* 14(1): 23–31.

Richardson KM and Rothstein HR (2008) Effects of occupational stress management intervention programs: A meta-analysis. *Journal of Occupational Health Psychology* 13(1): 69–93.

Rosenthal T and Alter A (2012) Occupational stress and hypertension. *Journal of the American Society of Hypertension* 6(1): 2–22.

Rydstedt LW, Devereux J and Sverke M (2007) Comparing and combining the demand-control-support model and the effort reward imbalance model to predict long-term mental strain. *European Journal of Work and Organizational Psychology* 16(3): 261–278.

Semmer NK (2011) Job stress intervention and organization of work. In: Quick JC and Tetrick LE (eds) *Handbook of Occupational Health Psychology* (2nd edn). Washington, DC: APA, 299–318.

Tessaro IA, Taylor S, Belton L, et al. (2000) Adapting a natural (lay) helpers model of change for worksite health promotion for women. *Health Education Research* 15(5): 603–614.

Theorell T (2012) Stress reduction programs for the workplace. In: Gatchel RJ and Schultz IZ (eds) *Handbook of Occupational Health and Wellness*. New York: Springer, 383–403.

Thompson SE, Smith BA and Bybee RF (2005) Factors influencing participation in worksite wellness programs among minority and underserved populations. *Family & Community Health* 28(3): 267–273.

Tsutsumi A, Kayaba K, Tsutsumi K, et al. (2001) Association between job strain and prevalence of hypertension: A cross sectional analysis in a Japanese working population with a wide range of occupations: The Jichi Medical School cohort study. *Occupational and Environmental Medicine* 58(6): 367–373.

Van Knippenberg D and Schippers MC (2007) Work group diversity. *Annual Review of Psychology* 58: 515–541.

Weech-Maldonado R, Weidmer BO, Morales LO, et al. (2001) Cross-cultural adaptation of survey instruments: The CAHPS experience. In: Cynamon ML and Kulka RA (eds) *Seventh Conference on Health Survey Research Methods*. Hyattsville, MD: Department of Health and Human Services, 75–81.

Wege N, Dragano N, Erbel R, et al. (2008) When does work stress hurt? Testing the interaction with socioeconomic position in the Heinz Nixdorf Recall Study. *Journal of Epidemiology and Community Health* 62(4): 338–341.

West SG, Taylor AB and Wu W (2012) Model fit and model selection in structural equation modeling. In: Hoyle RH (ed.) *Handbook of Structural Equation Modeling*. New York: The Guilford Press, 209–231.

Williams KY and O'Reilly CA (1998) Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior* 20: 77–140.

Willis G (1994) *Cognitive Interviewing and Questionnaire Design: A Training Manual*. Washington, DC: National Center for Health Statistics.

Winkler E, Busch C, Clasen J, et al. (2014) Leadership behavior as a health-promoting resource for workers in low-skilled jobs and the moderating role of power-distance orientation. *German Journal of Research in Human Resource Management* 28(1–2): 96–116.

Winkler E, Busch C, Clasen J, et al. (2015) Changes in leadership behaviors predict changes in job satisfaction and well-being in low-skilled workers: A longitudinal investigation. *Journal of Leadership & Organizational Studies* 22(1): 72–87.

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