

Perceived control systems, work conditions, and efficiency among Swedish dentists: interaction between two sides of Human Resource Management

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Two aspects of Human Resource Management (HRM), a main trend in modern personnel management, are considered in this study: A 'hard' version stressing performance monitoring and competition, and a 'soft' version stressing communication with employees. The aim of the investigation was to examine whether these two aspects of modern management are reflected in dentists' perceptions of differences in work conditions compared with other professionals. A questionnaire was answered by 312 publicly employed dentists and 3,600 other professionals in Sweden. The response rate was 66–77%. Effects from HRM on work conditions and perceived efficiency were confirmed. The interaction effects, reflecting the duality of HRM, resulted in poorer work conditions, e.g. worse balance between effort and reward and worse opportunities for developing competence and collaboration in the workplace. This pertains especially in the case of dentists, where the positive effects of 'soft' HRM did not compensate for the negative effects of 'hard' HRM. Dentists in Sweden's Public Dental Health Service appear as a vulnerable group among Swedish professionals. □ *Organizational change; professionals; public sector; regression; work environment*

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There have been considerable changes in the management doctrines of Swedish public administrators over the last decade, leading to a convergence of traditional public-administration and market models (1). This is also an international development, shared by most western nations (2). Customer orientation, management by objectives, result units, internal competition, and decentralization have become key concepts. This holds in particular in the Swedish Public Dental Health Service (PDHS).

Many of these changes have their origins in the doctrine of Human Resource Management (HRM). HRM is based on assumptions about employee motivation, and aims at improved utilization of employees by enhancing competence and commitment, by unifying the goals of employees and employers, and by focusing on cost-effectiveness (3). HRM advocates say this strategy will benefit all involved; the individual worker, the organization, and society. This type of management style is claimed to be especially fruitful in organizations employing people motivated by challenges, autonomy, learning opportunities, and self-control (4). A motivational profile of this kind is common among Swedish professionals (5).

HRM strategy has also been criticized as being 'brilliantly ambiguous', with a gap between rhetoric and reality. There is both a 'soft' version, stressing communication, motivation, and leadership, and a 'hard' version, stressing quantity and performance monitoring and leading to work intensification (6). Additionally, it is suggested that the 'hard' version is applied to individuals in low positions and 'peripheral' workers, i.e. easily exchangeable workers, and that the 'soft' version is applied to

those in higher positions, 'core' workers. It has also been pointed out that these types of 'soft' control system in reality are 'hard', '... barely covered by the velvet glove of corporate culture is the iron fist of instrumental rationality' (7, p. 532).

A case in point is the PDHS, which often has been an experimental field for organizational change. In fact, PDHS was influenced by management strategies of the private sector before many other parts of the public sector in Sweden, even before 1986 (8). During the 1980s, comparisons were made between public and private dentistry, indicating that the private sector was superior in regard to productivity (9). The legitimacy of the PDHS was questioned, leading to an increased focus on productivity, and competition was seen as an important strategy for stimulating productivity in the dental sector (10). Further, a combination of better dental health, cutbacks in the public dental-insurance system, and an increasing number of qualified dentists has led to unemployment and emigration. Questionnaire-based studies have revealed increasing problems in dentists' work conditions over the last decade (11, 12).

In a previous study (13), the indications were that dentists' experience of a 'hard' version of HRM was strikingly evident in the PDHS. The aim of the present study, extending the findings of the first one, is to examine whether these indications of changes in management style are accompanied by corresponding changes in work conditions and efficiency. It is hypothesized (i) that the main effects of 'soft' HRM will be favorable for work conditions, but (ii) that the 'hard' version has a negative

impact. If hypotheses (i) and (ii) are confirmed, dentists will report a marked deterioration in work conditions compared with other professionals, since the 'hard' version is evident in the PDHS (13). It is also hypothesized that (iii) both aspects of HRM control systems result in increased organizational efficiency, as this is one of the main goals of modern management (3).

To evaluate the HRM advocates' optimistic view of the outcome of these types of change in management style, as well as the critics' suggestion of the 'the iron fist in the velvet glove', the *combined* effect of 'hard' and 'soft' HRM on work conditions and efficiency is investigated. In the light of reports from dentists that they experience more frequent changes in control systems than other professionals, a fourth hypothesis is presented. (iv) Simultaneous increases in 'soft' and 'hard' HRM will accentuate differences in work conditions between dentists and other publicly employed professionals.

Material and methods

Subjects

In 1992, a questionnaire on work conditions was administered to a random sample of members of the Swedish Confederation of Professional Associations (SACO), an organization that represents physicians, teachers, social workers, economists, engineers, and other graduate employees. The sample comprised 5,383. There was an overall response rate of 67%, equivalent to one of 77% when students were excluded. For the current study, the results employed are mainly those concerning persons who were publicly employed ($n = 2,659$). The same questionnaire was also administered to Swedish dentists; 312 dentists in the PDHS responded, 57% women and 43% men. Male and female dentists were not sampled together, necessitating separate reporting. The response rate for both male and female dentists was 66%. Details of the sample, including an analysis of non-respondents, are reported elsewhere (13, 14).

Dependent variables

The aim of the study was to analyze consequences for work conditions of changes in management control systems. Respondents' evaluations of these consequences were set as dependent variables in multiple-regression models. The questions posed on work conditions emanate from the demand-control model of Karasek & Theorell (15). Questions interpretable as reflecting changes in an effort-reward balance were also included (16). Descriptions in the questionnaire of changes with regard to managerial control systems were followed by a general question: *What is your experience of the above-mentioned changes, concerning your own work conditions in the following respects?* Respondents were requested to choose one of three response alternatives (improved/no change/worse) for: (i)

work load, (ii) collaboration in the workplace, (iii) influence and control over own work, (iv) opportunities to develop professional competence, (v) scope for working professionally, (vi) co-determination, (vii) equality between men and women, (viii) salary in relation to effort, and (ix) job security.

A question on efficiency was also posed: *What is your overall experience of the above-mentioned changes concerning the efficiency of your organization?* Response alternatives were: increased substantially/increased somewhat/not affected/somewhat decreased/substantially decreased/no opinion, do not know.

Independent variables

In the earlier study referred to above, responses to questions concerning changes in management control systems were analyzed (13). Three indices were constructed and evaluated, capturing different aspects of assessed changes: *changes in management by objectives* (performance monitoring, management by objectives, competition as a means of increasing production), *changes in management by dialogue* (dialogue with management, personal development interviews, customer orientation), and *changes in hierarchy* (number of decision levels, managerial control). Here, these indices are given the abbreviations *objectives*, *dialogue*, and *hierarchy*, respectively. *Objectives* mirror the 'hard' version of HRM, *dialogue* the 'soft' version. The idea that HRM has a dual character can be examined with reference to an interaction model. The independent variables indicating changes in *objectives* and *dialogue* were relatively strongly correlated ($r_{xy} = 0.43$; $P < 0.001$).

The questionnaire also covered gender (male/female), and age (in 5-year intervals between 20 and 65). Two questions on hierarchical position (responsibility for co-ordination and extent of supervisory tasks) were used to form three position categories: low, middle, and high. An additive index of 'supportive supervisor', which emanates from House's social-support theory, was also included (17, 18). Cronbach's alpha was 0.87 for this index in the present study. 'Supportive supervisor' was relatively strongly correlated with *dialogue* ($r_{xy} = 0.34$; $P < 0.001$).

Statistical analysis

In a body of material of the current size even trivial differences become statistically significant, and a measure of the strength of any association is therefore necessary (19). Accordingly, we dichotomized the variables, contrasting one response alternative ('worse') with all others, and calculated odds ratios.

Principal Components Analysis with varimax rotation was used for data reduction. The number of factors was determined using the Kaiser criterion, and through inspection of scree plots. All indices used in the study were transformed additively to range between 0 and 100, so as to permit interpretation in terms of percent units.

In order to establish whether an interaction term

Table 1. Assessed effects on work conditions of changes in control systems. Results for dentists in the PDHS and for publicly employed Swedish professionals. Percentages and excess risk of dentists reporting "worse" conditions

Work conditions		Dentists	Swedish professionals	OR	95% CI
Work load	<i>Better</i>	4	10	2.20	1.77–2.73
	<i>No change</i>	38	54		
	<i>Worse</i>	58	36		
	(n)	(297)	(2496)		
Collaboration	<i>Better</i>	33	27	1.25	0.93–1.67
	<i>No change</i>	53	60		
	<i>Worse</i>	15	12		
	(n)	(300)	(2512)		
Influence and control	<i>Better</i>	17	28	1.46	1.07–1.98
	<i>No change</i>	69	63		
	<i>Worse</i>	13	9		
	(n)	(298)	(2506)		
Opportunities to develop professional competence	<i>Better</i>	13	20	1.84	1.45–2.35
	<i>No change</i>	61	66		
	<i>Worse</i>	25	14		
	(n)	(298)	(2502)		
Contingencies for working professionally	<i>Better</i>	15	22	1.34	1.03–1.74
	<i>No change</i>	64	63		
	<i>Worse</i>	21	16		
	(n)	(298)	(2500)		
Co-determination	<i>Better</i>	24	20	1.04	0.73–1.48
	<i>No change</i>	66	70		
	<i>Worse</i>	10	10		
	(n)	(299)	(2502)		
Gender equality	<i>Better</i>	4	8	1.92	1.24–2.98
	<i>No change</i>	90	90		
	<i>Worse</i>	6	3		
	(n)	(295)	(2462)		
Salary in relation to effort	<i>Better</i>	16	17	1.77	1.43–2.20
	<i>No change</i>	40	54		
	<i>Worse</i>	44	29		
	(n)	(297)	(2509)		
Job security	<i>Better</i>	1	3	2.14	1.73–2.66
	<i>No change</i>	47	66		
	<i>Worse</i>	52	32		
	(n)	(297)	(2499)		

(between *dialogue* and *objectives*) should be included, the material was analyzed by means of multiple regression with and without an interaction component. Student's (20) criteria for inclusion of a variable in the model specification were followed. Residual plots were examined for heteroscedasticity, unequal variances of residuals.

Interpretation of interaction models is difficult, since the coefficients for the consistent variables, the main effects, become conditional (21, 22). To facilitate such interpretation, graphic representations were made for various values of the variables. The values that form the basis for the figures presented below were derived on the assumption that other variables are at their mean value. The two exceptions are gender, which was set as 'male' for the calculations; and position, which was set as 'middle'. Two data points were then computed for the independent variables *objectives* and *dialogue*, ± 1 SD around the mean.

When calculating points without an interaction term, both *objectives* and *dialogue* were set at their respective mean.

Statistical significance is indicated in the tables by means of asterisks, $*P \leq 0.05$, $**P \leq 0.01$, $***P \leq 0.001$. Missing data were deleted pairwise from the regression analyses. All the data analyses were performed in SPSS.

Results

Constructing models

Table 1 indicates how work conditions were affected by changes in control systems in the views of dentists in PDHS and other publicly employed professionals (hereafter referred to as 'Swedish professionals'). Gender-related differences within the groups were generally small, and

Table 2. Assessed effects on organizational efficiency of changes in control systems. Results for dentists in the PDHS and for publicly employed Swedish professionals. Percentages and excess risk of dentists reporting "increased" efficiency

	Dentists	Swedish professionals	OR	95% CI
Increased considerably	45	12		
Increased somewhat	47	40		
No change	6	27		
Decreased somewhat	0	6		
Decreased considerably	1	3	8.89	5.94–13.28
No opinion, Don't know	1	13		
(n)	(303)	(2598)		

among dentists there were no significant differences of this kind.

The most conspicuous differences between dentists and Swedish professionals were found for work load and job security. Differences were somewhat less for worse salary in relation to effort, and for worse opportunities to develop professional competence.

Table 2 shows responses to the question about *perceived changes in organizational efficiency* (EFF). There were no significant gender-related differences within the groups. The odds of a dentist in relation to a Swedish professional reporting an increase in EFF were as high as 8.9.

The variables concerned with work conditions were subjected to Principal Components Analysis with the aim of data reduction. For assessment of stability, the factor analysis was performed on two parts of the full sample, those publicly employed and those who were not. A further reason for adopting this procedure lay in the short scales of the items, which may have rendered the analysis unstable. The question about gender equality was deleted because there was so little variation in the variable that extreme values would have been attributed an exaggerated importance.

The outcome, presented in Table 3, is a two-factor solution, stable for both private and public employees. The

first factor ($\alpha = 0.77$) organized five variables, and was interpreted as indicating *changes concerning the core of professional work* (CORE). The second factor ($\alpha = 0.42$) organized variation from three variables indicating *changes in effort-reward balance at work* (ERB).

As point of departure for the evaluation of the effects of assessed changes in management control systems on work conditions and efficiency, three multiple regression models were constructed. First, ERB, CORE and EFF were set as dependent variables in models with 'dentist or Swedish professional' as an independent variable. The models show that *objectives* worsen the effort-reward balance, and *dialogue* improves both effort-reward balance and scope for the core of professional work. Both *dialogue* and *objectives* increase perceived efficiency. Being a dentist had a strong independent effect in all three regression models (found in the first coefficient column in Tables 4–6). For example, dentists showed a greater assessed change in EFF of 11 percentage points. In sum, being a dentist meant worsened ERB, decreased scope for CORE, and increased EFF.

ERB, i.e. better workload, job security and salary in relation to effort, was analyzed in the multiplicative regression model presented in Table 4. The model was run first without and then with an interaction component to indicate whether the interaction term should be

Table 3. Principal Components Analysis with varimax-rotated factor loadings >0.40 for questions on work conditions for privately and publicly employed Swedish professionals, including dentists in the PDHS

Item	Factor 1		Factor 2		Communality
	Public	Private	Public	Private	
Influence and control	0.76	0.82			0.59
Co-determination	0.77	0.67			0.59
Collaboration	0.63	0.66			0.41
Develop competence	0.64	0.76			0.49
Contingencies for professionalism	0.62	0.71			0.55
Salary in relation to effort			0.63	0.56	0.44
Work load			0.66	0.61	0.46
Job security			0.67	0.78	0.45
Eigenvalue	2.99	3.20	1.00	1.02	
Variance explained %	37.4		12.6		

Table 4. Regression model of assessed changes in effort-reward balance (ERB). Analysis for dentists in the PDHS and for publicly employed Swedish professionals

Independent	Effort-reward balance					
	Total		Dentists		Swedish professionals	
	b	P	b	P	b	P
Dentists	-6.09	***	—	—	—	—
Gender, male	-.40		-1.21		-.57	
Age	-.05		.02		.27	
Position, middle	.23		-6.85	**	.21	
Position, high	3.19	**	-9.25	*	3.42	**
Supportive supervisor	.36	***	.51	***	.31	***
Hierarchy	-.05	**	-.19	***	-.07	***
Dialogue	.15	***	3.68	***	.89	***
Objectives	-.16	***	2.52	***	.51	***
Dialogue × objectives	—		-.038	***	-.009	***
Adj. R ²	0.14		0.19		0.13	
F/df1/df2	27/8/1469		6/8/200		20/8/1201	
Signif. F	***		***		***	

included. A significant regression coefficient, an improvement in explained variance, and effects on the coefficients for the other variables all spoke for inclusion of an interaction term. The interaction effect accounted for a 5.4% increase in explained variance of ERB in the analysis of dentists, and a 1.8% increase in the analysis of Swedish professionals.

In the models for CORE (improved control, competence, and collaboration at work) the explained variance was more than twice as high as for ERB (Table 5). *Dialogue* improved CORE and *hierarchy* worsened it, while it was unaffected by *objectives*. The interaction effect should be

included in the model specification for this variable on the same grounds as for ERB.

In the analysis of EFF, ERB and CORE were included as independent variables (Table 6). For Swedish professionals there was an association between CORE and EFF, but for dentists there was an association between ERB and EFF. This means that while perceived efficiency was related to poorer effort-reward balance among dentists, efficiency was related to improved scope for the core of professional work among other professionals. Since the metric in the dependent variable can be discussed, the model was also analyzed using logistic regression with a

Table 5. Regression model of assessed changes in the core of healthy work (CORE). Analysis for dentists in the PDHS and for publicly employed Swedish professionals

Independent	Core of healthy work					
	Total		Dentists#		Swedish professionals	
	b	P	b	P	b	P
Dentists	-4.35	***	—	—	—	—
Gender, male	-.10		1.21		-.14	
Age	-.33	*	-.45		-.50	**
Position, middle	1.67	*	6.18	**	1.64	*
Position, high	5.26	***	7.14	***	4.88	***
Supportive supervisor	.36	***	.35	**	.37	***
Hierarchy	-.15	***	-.26	***	-.12	***
Dialogue	.33	***	1.42		-.02	
Objectives	-.01		.88		-.34	**
Dialogue × objectives	—		-.013		.004	**
Adj. R ²	0.35		0.35		0.36	
F/df1/df2	89/8/1469		12/8/176		75/8/1201	
Signif. F	***		***		***	

#24 individuals with Cook distances ≥ 0.5 were excluded.

Table 6. Regression model of assessed changes in organizational efficiency (EFF). Analysis for dentists in the PDHS and for publicly employed Swedish professionals

Independent	Organizational efficiency					
	Total		Dentists		Swedish professionals	
	b	P	b	P	b	P
Dentists	11.18	***	—	—	—	—
Gender, male	-.38		-.15		-.32	
Age	-.22		-.35		.23	
Position, middle	1.65		1.94		.87	
Position, high	5.90	***	5.71		3.90	**
Supportive supervisor	.33	***	.12		.17	**
Hierarchy	-.12	***	-.00		-.09	***
Dialogue	.23	***	-.80		.63	***
Objectives	.34	***	-.57		.84	***
Dialogue × objectives	—		.010		-.007	**
CORE	—		.16		.41	***
ERB	—		-.18	*	.02	
Adj. R ²	0.32		0.08		0.35	
F/df1/df2	77/8/1469		3/10/198		59/10/1195	
Signif. F	***		**		***	

dichotomized dependent variable. The results of the original analysis were confirmed.

Hierarchical position was among the dependent variables included in all regression models (Tables 4–6). Among Swedish professionals, low position was related to a negative assessment of changes in work conditions, and also to a less optimistic assessment of changes in organizational efficiency. The results for dentists were more ambiguous. Gender had no independent effect in the regression models. It should be pointed out, however, that women were in a majority in lower positions, and men in higher positions, among both dentists and other professionals.

Analyzing interactions

The advocates' and critics' view on HRM is interpreted in shaded parts of Figs 1 and 2. In the case of ERB, the prediction of the HRM critics is that a simultaneous increase in *dialogue* and *objectives* worsens the balance between effort and reward for the individual worker in a 'peripheral' or low position. This is depicted in Fig. 1a. An increase in *objectives* has a negative effect, and more so when *dialogue* also increases.

For dentists (Fig. 1b), interaction is very strong. A dual increase in *objectives* and *dialogue* leads to a greatly worsened ERB. The figure, in fact, provides a good illustration of the difficulties involved in understanding interaction models. The first column of Table 4 shows the main effects of the single variables, and it seems that *dialogue* improves ERB. This, however, is a spurious result. Analyses of the interaction gives the correct interpretation, and supports the criticism of HRM.

As shown in Fig. 1c, there is also an interaction effect in the case of Swedish professionals. It is not as pronounced

as for dentists, but still in accordance with the prediction of the HRM critics.

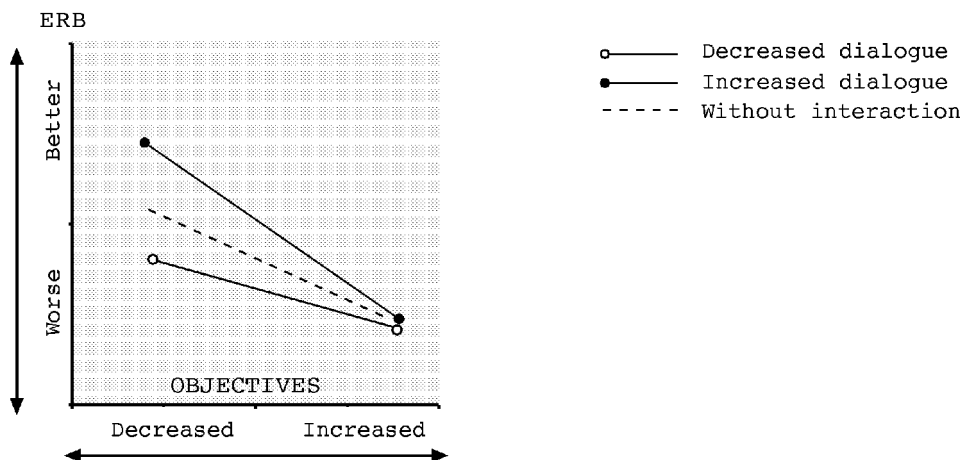
Advocates of HRM state that interaction should improve work conditions for all, in the sense indicated by CORE (3). HRM critics claim that this holds only for workers who are not easily replaceable, i.e. core workers (6). Fig. 2a was constructed to facilitate interpretation of HRM theories in this respect. For dentists, the advocates' view was not confirmed, since increased *dialogue* improved control, competence, and co-operation substantially only when *objectives* had decreased—a result entirely contrary to prediction. For Swedish professionals, the interaction effect only weakly supported the view of HRM advocates.

The third dependent variable, EFF, would be expected to increase with the duality of HRM. In the case of dentists, this could not be confirmed, since the interaction effect was not significant.

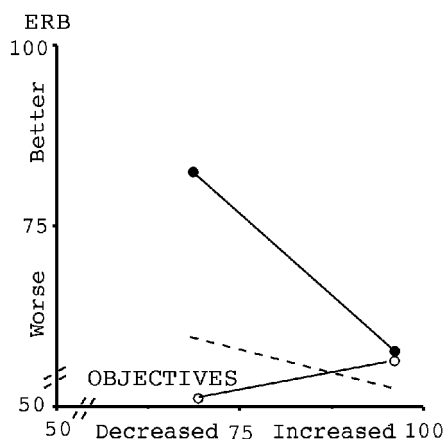
Discussion

In assessing the present results, a number of methodological problems should be considered. Studies like the present one have been criticized for being biased by negative affectivity, i.e. that certain personality types tend to report both higher exertion and worse outcomes. In evaluations of the influence of this possible bias, negative affectivity has been found to be of small explanatory importance (23). In the case of the current study, which focuses on dentists in relation to other professionals, such considerations are of less importance. There is no reason to believe that negative affectivity would be distributed differently between the two groups. Indeed, in specialized

a) Critics' view on HRM: outcome for low position/"peripheral" workers



b) Dentists



c) Swedish professionals

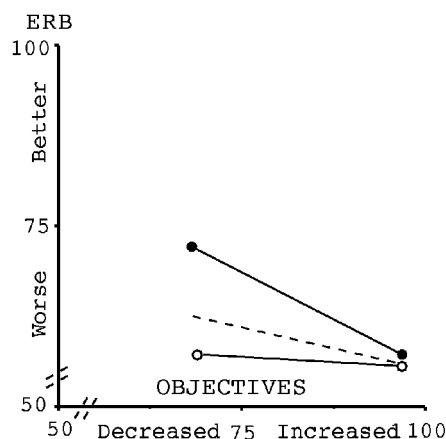


Fig. 1. Theory and analysis of the interaction between *dialogue* and *objectives* in relation to the effort–reward balance (ERB). Critics' view of HRM is interpreted in (a). Results for dentists in PDHS (b) and publicly employed Swedish professionals (c).

methodological studies it has been shown that self-reports are surprisingly reliable and valid (24).

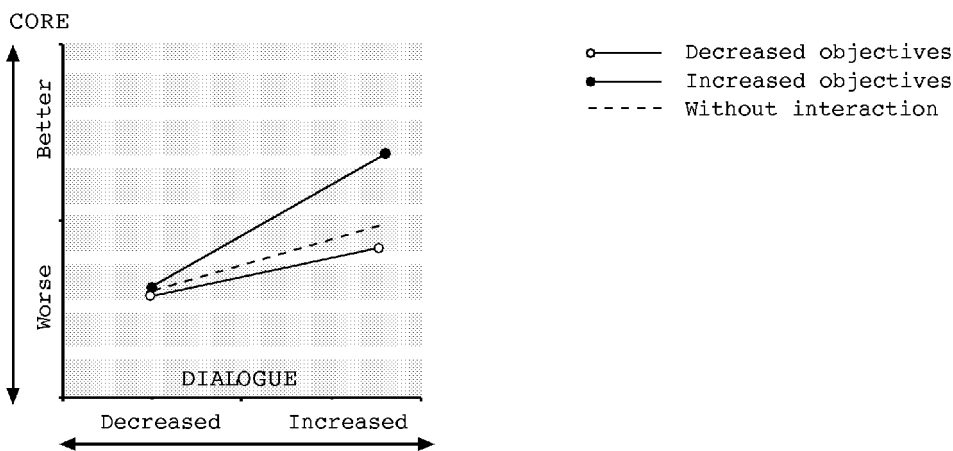
Another problem is that the questions posed in the questionnaire involved the making of difficult assessments on the part of participants. This was manifested, for example, in a relatively high internal non-response. Regression analysis, however, is especially suitable in such cases, since regression coefficients are calculated as tendencies even on low-precision data. Random variations are leveled out.

A methodological problem is that the dependent variables, especially in the EFF model, are scarcely continuous interval variables, as is usually required for regression analysis. But there are two counter-arguments with regard to appropriateness in this context: first, regression is a robust method; second, there is the underlying assumption that the latent constructs employed (changes in EFF, CORE and ERB) are indeed continuous.

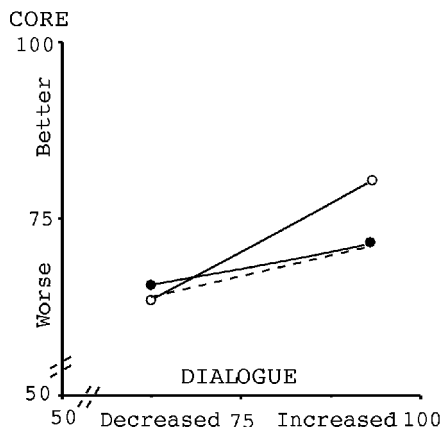
According to the critics (6), work intensification is the main outcome of the HRM process for employees in lower positions and 'peripheral' workers. For this large group, the 'soft' version of HRM is either a form of rhetoric to legitimize the measures that management takes, or an 'iron fist in a velvet glove' (7). This criticism was corroborated here. Dentists in the PDHS appear as a particularly vulnerable group among professionals, with a low resistance to organizational changes that have negative outcomes in terms of work conditions.

The hypotheses stated in the introduction on the outcome of HRM policies are all supported by the present results. 'Hard' HRM results in greater effort–reward imbalance. 'Soft' HRM results in a greater emphasis on the core of professional work. Perceived organizational efficiency increases with both 'hard' and 'soft' HRM. Interaction effects, reflecting the duality of HRM, show

a) Advocates' view on HRM: outcome for all. Critics' view on HRM: outcome for high position/"core" workers



b) Dentists



c) Swedish professionals

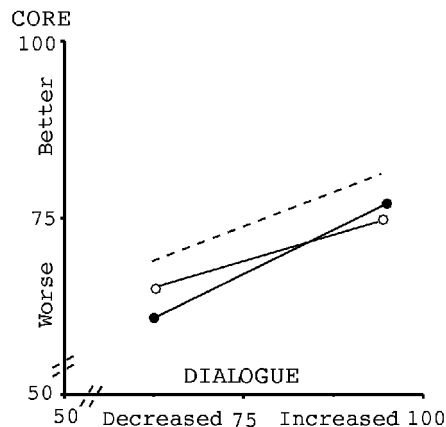


Fig. 2. Theory and analysis of the interaction between *dialogue* and *objectives* in relation to the core of healthy work (CORE). Advocates' and critics' views on HRM are interpreted in (a). Results for dentists in PDHS (b) and publicly employed Swedish professionals (c).

that these changes in management control systems result in poorer work conditions, especially in the case of dentists in the PDHS. The positive effect of increased management by *dialogue* did not compensate for the negative effect of increased management by *objectives*.

A case study by Hasselbladh (25) was conducted the same year as the present study, 1992. His analysis of the introduction of 'market management' in one county council nicely illustrates the processes our data may reflect. This organizational change, which was introduced as a dental health promotion project, turned out to be a local bureaucratic process resulting in increased control and pressure to reduce costs. The gap between rhetoric and reality was considerable.

Our findings with regard to dentists should be considered in the context of government and local-government efforts to increase control over the dental

services. In a Swedish context, the vulnerability of dentists might be regarded as an effect of their high 'visibility' as individuals in the detailed control systems of the Public Dental Health Services (11) in combination with a strong focus on competition (9, 10, 26). Other aggravating circumstances for dentists are their 'enclosed' position due to a large investment in education, a narrow area of competence, and a strictly regulated labor market. Their visibility and enclosure are now accompanied by unemployment in the profession, facilitating the exchangeability of the individual dentist. In sum, for salaried dentists there is an uneven balance of power between employer and employee.

The Swedish dental sector is heavily influenced by principal-agent theory, an economic model based on how rational individuals calculate their self-interest in deciding whether to 'work or shirk' (e.g. frequent time studies, fee-for-service system, focus on supplier-induced demand).

This theory has been criticized for not considering the asymmetry of power between employers and employees, giving rise to social costs (27). Reports on health problems among dentists indicate problems of this kind, such as adverse work conditions. Female dentists are especially vulnerable to these conditions (pain and musculoskeletal complaints (28), and suicide (29)). Reports of job-related stress among publicly employed dentists in England indicate that the problems analyzed in this study may not be unique to dentists in the Swedish PDHS (30, 31).

As a whole, it can be concluded that assessed changes in management style effected according to HRM principles did have an impact on perceived work conditions and organizational efficiency. Criticism of HRM is largely supported, while HRM advocates find few arguments in their favor. Being a dentist was found to be an independent predictor of poorer work conditions and increased perceived efficiency. The drastic effects of being a dentist and having a low hierarchical position revealed by the analyses demonstrate the importance of work content in this context. The impact of changes in management control systems within different types of professions needs to be investigated further.

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