Chapter 3

The moderating role of decision authority and coworker- and supervisor support on the impact of job demands in nursing homes: A cross-sectional study

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Abstract

Background: Healthcare workers in nursing homes are faced with high job demands that can have a detrimental impact on job-related outcomes, such as job satisfaction. Job resources may have a buffering role on this relationship. The Demand-Control-Support (DCS) Model offers a theoretical framework to study how specific job resources can buffer the adverse effects of high demands, and can even activate positive consequences of high demands.

Objectives: The present study tests the moderating (i.e. buffering and activating) effects of decision authority and coworker- and supervisor support that are assumed by the hypotheses of the DCS Model.

Design: A national cross-sectional survey was conducted with an anonymous questionnaire.

Setting: One hundred and thirty six living arrangements that provide nursing home care for people with dementia in the Netherlands.

Participants: Fifteen healthcare workers per living arrangement. In total, 1,147 people filled out the questionnaires (59% response rate).

Methods: Hierarchical multilevel regression analyses were conducted to test the assumption that the effect of job demands on the dependent variables is buffered or activated the most when both decision authority and social support are high. This moderation is statistically represented by three-way interactions (i.e. demands x authority x support), while lower-order effects are taken into account (i.e. two-way interactions). The hypotheses are supported when three-way interaction effects are found in the expected direction. The dependent variables studied are job satisfaction, emotional exhaustion, and personal accomplishment.

Results: The proposed buffering and activation hypotheses of the DCS Model were not supported in our study. Three-way interaction effects were found for emotional exhaustion and personal accomplishment, though not in the expected direction. In addition, two-way interaction effects were found for job satisfaction and emotional exhaustion. Decision authority was found to buffer the adverse effect of job demands and to activate healthcare staff. Supervisor support was found to buffer the adverse effect of job demands on emotional exhaustion in situations with low decision authority. Finally, coworker support was found to have an adverse effect on personal accomplishment in high strain situations.

Conclusions: Findings reveal that decision authority in particular makes healthcare workers in nursing homes less vulnerable to adverse effects of high job demands, and promotes positive consequences of work.

Introduction

The job of healthcare workers is known to include high levels of demands, in particular in nursing homes. In a recent survey in the Netherlands, 78% of healthcare workers in nursing home care stated that they are faced with a too large workload and not enough time to provide good and proper care, compared to 44% of staff in general healthcare.[1] Furthermore, the survey showed that their perceived workload has increased between 2003 and 2009.

Perceived job demands have important implications for employees' health.[2] Due to the ageing of the population, the number of people with dementia will increase[3,4], whereas the labor force will decrease[5]. Therefore, it is not likely that the job demands in nursing homes can easily be reduced. Instead, the upcoming labor shortage in nursing home care asks for ways to keep satisfied and healthy healthcare staff in nursing home care. Instead of trying to decrease job demands, it might be more fruitful to increase job resources such as job control and social support for staff to cope with job demands.[6]

The Demand-Control-Support (DCS) Model[7] is an expansion of the Demand-Control (DC) Model of Karasek[8], and offers a theoretical framework to study how two job resources (i.e. job control and social support) can buffer the potentially adverse effects of high demands and even create positive consequences in jobs with high demands. Initially, the DC Model defines two crucial job aspects in the work situation: job demands and job control. Jobs with high job demands and low job control are referred to as high strain jobs.[8] Later, Johnson and Hall[7] added a social dimension, workplace social support, to the model. This so-called DCS Model assumes that the adverse effect of job demands on health and well-being is buffered the most when both decision authority and social support are high (i.e. the buffering hypothesis).[7] The most adverse health outcomes are expected in jobs with both high levels of demands and low levels of control and social support. In addition, the so-called activation hypothesis of the model proposes that jobs in which demands, job control, and social support are high produce higher levels of learning, motivation, and competence.[6] In turn, jobs with low demands, low control, and low support, or so-called isolated passive jobs[7], are presumed to offer little opportunity for learning and personal development.[9]

Numerous studies have been conducted on the buffering hypothesis of the original DC Model, but, only a relatively small number of studies have found support for this hypothesis.[10-12] The combined buffering effect of job control and social support has been studied less frequently, and results are inconsistent.[11,12] In contrast to

the buffering hypothesis, the activation hypothesis of the expanded DCS Model has received little attention in research[13,14] and results found are mixed.[15,16]

One important criticism on the DCS Model is the specificity of the conceptualization and operationalization of its job characteristics.[10,12] Job control has been originally conceptualized as a mix of a worker's authority to make decisions (decision authority) and the breadth of skills used on the job (skills discretion)[17], which are two theoretically distinct components.[18,19] Karasek and Theorell[6] stated that decision authority in particular enables adjustment to demands. It is suggested that the broad conceptualization of job control, which is often used when studying the DCS Model, is a reason for not finding buffering effects.[19-21] For instance, Schmidt and colleagues[20] detected interaction effects for the more focused measure of control – decision authority – and job demands in relation to job satisfaction, psychosomatic complaints, and emotional exhaustion, whereas they did not find such an effect when a broader measure of control, including skills discretion, was used in analyses. Therefore, instead of the more global measure 'job control', decision authority is used in the present study.

Furthermore, several authors have put forward that it seems worthwhile to focus future research on the potential buffering effects of distinct sources of social support.[12,22,23] It is suggested that the type of job and the accompanying occupational task structure and environment may play central roles in determining which source of support is most salient.[24] The limited number of studies that have been conducted on the DCS Model that takes distinct sources of social support into account indicated that support for the multiplicative buffering effect of the Model (three-way interaction) depended on the source of social support.[11] Van der Doef and colleagues[25], for example, found that when staff perceived high levels of supervisor support, beneficial buffering effects of control were more prominent. Again, results found across studies were not consistent and these studies rarely, or only for a small part, included healthcare workers. It is unclear whether coworker- and supervisor social support have different buffering effects for healthcare workers, and which source is most salient in this setting. Since coworkers play an important role in the daily work of healthcare staff one might expect that coworker support is more likely to buffer the relationship between job demands and strain than support from supervisors.[26] However, previous research results have illustrated that the jury is still out on the buffering effect of coworker- and supervisor support in different occupational environments.

The present study aims to explore whether decision authority and distinct sources of social support (e.g. coworker- and supervisor support) are able to buffer

(weaken) the adverse effects of job demands on job satisfaction and emotional exhaustion, and activate (strengthen) the positive effect of job demands on personal accomplishment in a sample of healthcare staff in nursing homes by testing the hypotheses of the DCS Model. With this study we will expand earlier DCS studies by [1] testing both the buffering and activation hypotheses of the DCS Model, [2] using a more specific measure of control (i.e. decision authority), and [3] using distinct measures of coworker- and supervisor social support. In view of the high demands in jobs of healthcare staff in nursing homes and the upcoming labor shortage, it is important to study the buffering and activating effects of decision authority and social support on the relation between job demands and job-related strain and positive outcomes in this setting. Thus more insight can be obtained into ways to decrease job-related strain and to promote positive consequences of work for healthcare staff.

The first two hypotheses were formulated to test the buffering hypothesis of the DCS Model with two dependent variables to represent job-related strain (i.e. job satisfaction and emotional exhaustion). The third hypothesis was formulated to test the activation hypothesis of the DCS Model with personal accomplishment as the dependent variable.

Hypothesis 1. Job resources, decision authority, and social support moderate (i.e. buffer) the adverse effect of job demands on job satisfaction (three-way interaction). To put it differently, when healthcare workers perceive both high decision authority and social support (from either colleagues or supervisors), the adverse effect of high job demands on job satisfaction will be weakened.

Hypothesis 2. Job resources, decision authority, and social support moderate (i.e. buffer) the adverse effect of job demands on emotional exhaustion (three-way interaction). To put it differently, when healthcare workers perceive both high decision authority and social support (from either colleagues or supervisors), the adverse effect of high job demands on emotional exhaustion will be weakened.

Hypothesis 3. Job resources, decision authority, and social support moderate (i.e. activate) the positive effect of job demands on personal accomplishment (three-way interaction). To put it differently, when healthcare workers perceive both high decision authority, and social support (from either colleagues or supervisors), the positive effect of high job demands on personal accomplishment will be strengthened.

The hypothesized moderating effects are schematically presented in Figure 1.
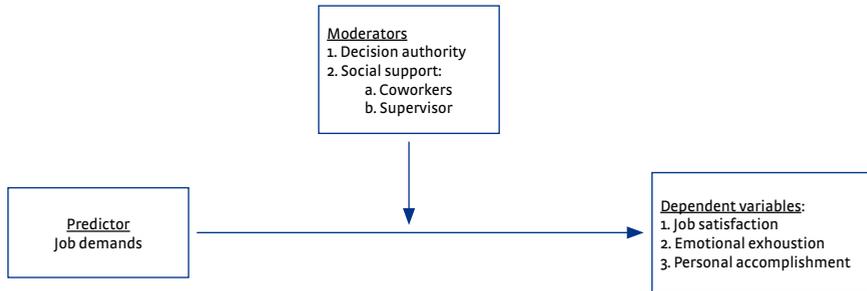

Figure 1. Schematic presentation of variables in this study: predictor, moderators and dependent variables.

Strictly speaking, the hypotheses of the DCS Model are only supported when multiplicative, three-way interaction effects are found that are in the right direction.[27] In other words, the nature of the three-way interaction effect should be in line with the model's assumptions. The model assumes that healthcare staff in jobs with high demands feel least dissatisfied, least emotionally exhausted, and most personally accomplished when they perceive both high levels of decision authority and high levels of social support (from either coworkers or supervisors). As a consequence, the hypotheses of the DCS Model are not supported when only two-way interactions are found (i.e. either decision authority or social support moderates the relationship).

Methods

Participants and procedures

Cross-sectional data were used from the Living Arrangements for people with Dementia study (LAD-study). The LAD-study is a national study of a wide range of living arrangements providing nursing home care for people with dementia in the Netherlands.[28] A total of 136 living arrangements for people with dementia (e.g. nursing homes, homes for the aged with a special care unit for people with dementia, small group living homes) participated in the study. All living arrangements participating in this study were non-private facilities, receiving reimbursement dependent on the referral status of the resident: a regular indication, or a higher indication based on a higher level of behavioral problems.

In each participating living arrangement, 15 care staff members were randomly selected. In arrangements where less than 15 healthcare workers were employed, all healthcare workers were selected. A self-report questionnaire was sent to their home address and could be returned to the researchers in a pre-stamped envelope. Healthcare workers were invited to participate voluntarily and were informed about the process and aim of the study. Written informed consent was not obtained as consent to participate was implied by return of a completed questionnaire. The letter accompanying the questionnaire explained that one was free not to return the questionnaire if one did not want to participate and that this would not have any consequences and would not be disclosed to anyone. The questionnaire was fully anonymous. Healthcare workers (i.e. nursing assistants, certified nursing assistants, and registered nurses) working on a permanent basis in the participating living arrangement were eligible to participate. A total of 1,952 questionnaires was distributed to care staff, and 1,147 care staff participated and met our criteria, resulting in a response of 59%, which is not unusual in this field. The data were collected between November 2008 and May 2009.

The mean age of healthcare staff was 43.0 (SD=10.1 years). Most of the participating healthcare workers were of educational level 3, which is equivalent to certified nursing assistant (CNA). Of the participating healthcare staff, 32.5% were working 16 to 24 hours a week. A small number of participants had been working less than 1 year in the profession (1.1%), and 1.3% worked less than 8 hours a week. Participants working less than 1 year in the profession or less than 8 hours a week were excluded from the final analyses. Additionally, all healthcare staff with missing values on any of the key study variables were excluded from the analyses, which reduced the number of participants to 1093.

Measures

Predictor and moderators: Job characteristics

The job characteristic 'job demands' is studied as the main predictor of this study. The moderators studied are the job characteristics 'decision authority', 'coworker-' and 'supervisor social support'. Measures for job characteristics – job demands, decision authority, coworker- and supervisor social support – were derived from the Leiden Quality of Work Questionnaire (LQWQ)[29], a frequently used instrument when studying the DCS Model.[11] All job characteristics were measured on a four-point scale ranging from (1) "strongly disagree" to (4) "strongly agree".

Job demands were measured with the work and time pressure scale (Cronbach's α=.76; 5 items). The items addressed the degree to which the pressure of work and

time urgency dominated the work environment, e.g. 'I have enough time to provide good care to residents'.

On the basis of the recommendations of De Jonge and colleagues[19] and the theoretical base of the DC model[6], our measure of job control was focused on decision authority only. The *decision authority* scale (α=.71; 4 items) measured the extent to which healthcare workers were authorized to make their own decisions, e.g. 'I continuously have to do what others tell me to do'.

This study focused on the distinct buffering effects of two sources of social support on strain. Therefore, social support was operationalized as social support from the supervisor and social support from coworkers. The *social support from the supervisor* scale (α= .92; 4 items) measured to which extent management was supportive, e.g. 'I feel appreciated by my supervisor'. The *social support from coworker* scale (α=.85; 4 items) assessed the extent to which care staff was supportive to one another, e.g. 'People I work with are helpful in getting the job done'. Principal axis factoring was conducted in SPSS (Version 15.0), which confirmed that the two subscales loaded on two different factors.

Dependent variables

The dependent variables are job satisfaction, emotional exhaustion, and personal accomplishment.

Job satisfaction was assessed by a 3-item scale derived from the LQWQ (α=.86).[29] Job satisfaction can be defined as a measure of job-related well-being, e.g. 'I am satisfied with my job'.

Emotional exhaustion was measured by the well-validated Dutch version[30] of the Maslach Burnout Inventory (MBI).[31] The scale contains eight items with a 7-point response scale ranging from (0) "never" to (6) "always, daily" (α=.88), and measures the strain healthcare staff experienced. An example item is: 'I feel emotionally drained from my work'.

Personal accomplishment was assessed with the 7-item subscale of the Dutch version of the MBI (α=.76).[30,31] An example item is: 'I have accomplished many worthwhile things in this job'.

Finally, *demographic characteristics* such as age, gender, and educational level, and characteristics concerning *employment status* such as employment in profession, length of service, and contract hours a week were included as control variables conform de Jonge and colleagues.[32]

Statistical analysis

The hypothesized moderating effects of decision authority, coworker- and supervisor support (moderators) on the relationship between job demands (predictor) and the dependent variables (job satisfaction, emotional exhaustion, and personal accomplishment) were tested by means of hierarchical regression analyses. No significant violations of linear regression assumptions were detected. Given our interest in the independent contribution of the two support scales in the context of the DCS Model, hierarchical multiple regression analyses were performed separately for both coworker- and supervisor social support.

In the first step, demographic characteristics were entered to control for possible confounding effects. Demographic variables that significantly correlated with one or more of the job characteristics (moderators and predictor) and at least one of the dependent variables were considered as confounders (see Table 1). In step 2, the job characteristics 'demands', 'decision authority' and 'social support' were entered. In step 3, the three two-way interaction terms (i.e. demands x decision authority; demands x support; decision authority x support) were added. Finally, in step 4, the three-way interaction term (demands x decision authority x support) was added. Since we were testing a model, the analyses were conducted with simultaneous entry of variables within each hierarchical step.

The data were analyzed and presented starting with step 4, since the multiplicative (three-way) interaction effects are the primary interest of this study. A Likelihood-ratio test (Chi-square distribution) was used to test whether the multiplicative (three-way) interaction term (step 4) yielded a significant improvement in fit of the model over the fit of model 3. In other words, we tested whether the model with multiplicative interaction effect had a better statistical fit in terms of Chi-square. In case step 4 yielded a significant improvement in fit of the model, this model was regarded to be the best model and steps 1 – 3 were not presented. In case step 4 with the three-way interaction effect did not yield a significant improvement, step 3 was presented, and so on. Moderated regression analysis usually suffers from power problems; that is, the chance of accepting the alternative hypothesis in case this hypothesis is true.[33] Since the additive (main effects) and interactive terms (two- and three-way interactions) for job demands and the moderators are necessarily and usually highly intercorrelated, an exact partition of real variance into additive (main) and interactive (buffering) effects is impossible. The moderated regression procedure used here essentially assigns to the main effects all variance that cannot be unequivocally attributed to the interaction effects and, hence, makes the most conservatively possible estimate of the buffering effect. Therefore, the significance

levels to test our hypothesis were set slightly higher at a p-value of 0.10 conform de Jonge and colleagues[19] to reduce the probability to wrongly reject the true alternative hypothesis (Type II error). However, this implies an increase in a Type I error, indicating a rejection of a true null hypothesis.

The independent variables (predictor and moderators) were centered within cluster (CWC), which in this study means within the level of the living arrangements (Level 2). According to Enders and Tofighi[34], this is the most appropriate form of centering when a study primarily focuses on a Level 1 predictor, in this case the level of healthcare staff. Interaction terms were computed from centered independent variables in order to reduce problems of multicollinearity.[35] Unstandardized regression coefficients are presented in the tables accordingly conform Aiken and West[33], and Jaccard and colleagues.[35] Because of the hierarchical nature of the data (health care staff nested within living arrangements), it was tested first (likelihood ratio test) whether a model including a random intercept significantly improved the fit of the model with the data. Since this test confirmed the hierarchical nature of the data, two-level multilevel linear regression analyses were used. The data in this study were analyzed with MLwiN (Version 2.15).

In case the model with step 4 fitted the data best, the three-way interaction effect was graphically presented according to the method described by Aiken and West[33] and Jaccard and colleagues[35], since it depends on the precise nature of the interaction whether the interaction effects found supported our hypotheses. Please note that two-way interactions were only plotted if the model with step 3 fitted the data best. Simple regression lines were plotted to represent the relationship between, for instance, job demands and job satisfaction at low and high levels of the moderators. Values of the independent variables (predictor and moderators) were chosen two standard deviations of the centered values of the independent variables below and above the centered mean. Simple regression lines were generated by entering these values in the regression equation. Three-way interaction effects were graphically represented by generating four simple regression lines: two lines in case of high levels of one of the moderators and two lines in case of low levels of one of the moderators. In other words, the relationships between X (predictor) and Y (dependent variable) at high and low levels of one of the moderators (e.g. Z_1: decision authority) were plotted at high and low levels of the other one (e.g. Z_2: coworker social support). For two-way interactions, two simple regression lines were generated: one line in case of high levels of the moderator and one line in case of low levels of the moderator. Finally, a simple slope test (t-test) of the respective simple regression lines was carried, out since interaction plots do not allow inferences regarding

the significance of an individual.[36] The coefficient and significance of the interaction effect only implies that the regression lines are significantly different from each other.

Results

Preliminary analyses
Table 1 shows the means, standard deviations, Cronbach's alphas, and Pearson correlations of the study variables. The alphas showed an acceptable or good internal consistency (alphas ranging from .71 to .92) that are comparable to the alphas found for these measures in other studies.[15,25] As shown in this table, the correlations between the job characteristics and dependent variables were all significant and in the expected direction, except for the correlation between job demands and personal accomplishment. In line with the activation hypothesis of the Demand Control Support Model, we expected a positive relation between job demands and personal accomplishment. Table 1 shows, however, that job demands and personal accomplishment were not significantly correlated. The demographic variables age, educational level, and working hours per week were included as confounders in the analyses.

Regression analyses
Separate hierarchical multilevel regression analyses were performed for both coworker- and supervisor social support. The results of these models that address all kinds of effects are presented in Tables 2-3.

Job satisfaction (hypothesis 1)
Results of the hierarchical regression analyses for job satisfaction are depicted in Table 2. With respect to job satisfaction, the table indicates that in the model with coworker support, model 3 (i.e. the model with two-way interaction effects) fitted the data best (Step 3: ΔX^2(df=3) =7.35; p<.10).

Table 1. Pearson intercorrelations of variables with Cronbach's alpha on the diagonal (N=1,093).

Measure	M	SD	1	2	3	4	5	6	7	8	9	10
1. Age	43.09	9.91										
2. Educational level	2.95	.83	-.06*									
3. Hours per week	-	-	-.08**	.05								
4. Job demands	2.45	.49	.03	-.01	.09**	(.76)						
5. Decision authority	2.97	.41	-.06	.08**	.01	-.46**	(.71)					
6. Coworker support	3.16	.45	-.10**	.03	.01	-.16**	-.32**	(.85)				
7. Supervisor support	3.01	.58	-.03	.00	.07*	-.32**	.43**	.33**	(.92)			
8. Job satisfaction	3.07	.60	.01	-.05	.01	-.47**	.43**	.42**	.44**	(.86)		
9. Emotional exhaustion	1.59	.99	.02	.01	.20**	.57**	-.36**	-.23**	-.30**	-.48**	(.88)	
10. Personal accomplishment	4.65	.76	-.01	.01	.12**	-.14**	.24**	.19**	.18**	.27**	-.15**	(.76)

*p<.05; **p<.01. Hours per week is ordinal data higher scores indicating more working hours per week.

Table 2. Hierarchical multiple multilevel regression analysis of job demands, decision authority and coworker/supervisor support on job satisfaction and emotional exhaustion (N=1,093).

	Job satisfaction				Emotional exhaustion			
	Coworker support		Supervisor support		Coworker support		Supervisor support	
	B	B	B	B	B	B	B	B
Model 1: Confounders								
Age	.00	.00	.00	.00	-.00	-.00	-.00	-.00
Educational level	-.04†	-.04†	-.04*	-.04*	.01	.01	.01	.01
Hours per week	.04*	.04*	.03†	.03†	.16***	.16***	.16***	.16***
Model 2: Main effects								
Demands	-.37***	-.37***	-.32***	-.32***	1.03***	1.03***	.97***	.97***
Decision authority	.23***	.22***	.21***	.22***	-.24**	-.24**	-.24*	-.20*
Social support	.39***	.39***	.28***	.29***	-.24***	-.23***	-.13*	-.13*
Model 3: Two-way Interactions								
Demands x authority	.21*	.21*	.15	.17	-.43**	-.43**	-.25	-.25
Demands x support	-.01	-.02	-.04	-.04	-.11	-.11	-.06	-.06
Authority x support	-.06	-.05	.07	.05	-.03	-.04	-.03	-.03
Model 4: Three-way Interactions								
Demands x authority x support	.04		-.10		-.04		.37†	.37†
% Increase in variance explained (ΔR²)	.0	.9	.5	26.2	.2	1.2	.2	.2
ΔX²	.06	7.35†	2.55	290.97***	.03	11.08*	3.31†	3.31†
Best Model	R^2=29.8		R^2=26.9		R^2=33.4		R^2=33.1	
	X^2=333.39		X^2=298.83		X^2=371.68		X^2=369.72	

The bold values represent the best models.

† p <.10; *p<.05; **p<.01; ***p<.001

More specifically, we found a significant two-way interaction effect (B=.21; p<.05) between job demands and decision authority. As can be seen in Figure 2, demands were negatively related to job satisfaction among healthcare staff reporting low decision authority (simple slope test: t=-6.81; p<.001), whereas at high levels of decision authority the effect of demands was less pronounced (t=-2.87; p<.01). This implies a buffering effect of decision authority for healthcare staff.
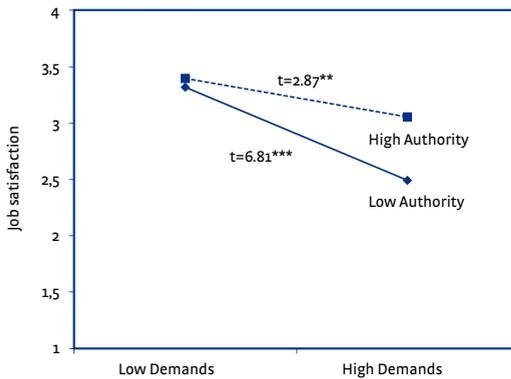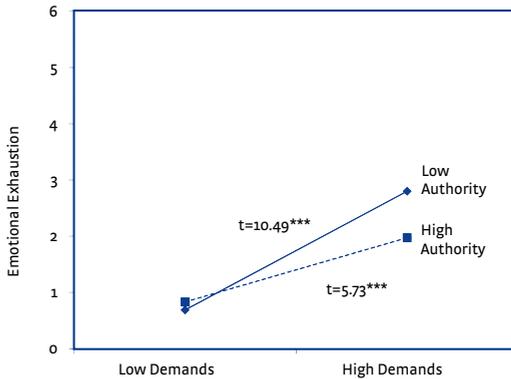

*p<.05; **p<.01; ***p<.001

Figure 2. Two-way interaction of job demands and decision authority in relation to job satisfaction.

As far as the main effects are concerned, findings showed that high job demands, low decision authority, and low coworker support were related to lower levels of job satisfaction.

No significant three-way or two-way interaction effects were found in the model with supervisor support. The model with main effects of job demands, decision authority, and supervisor support fitted the data best (Step 2: ΔX^2(df=3) =290.97; p<.001). As was to be expected, high job demands, low decision authority, and low supervisor support were related to lower levels of job satisfaction.

Emotional exhaustion (hypothesis 2)
Table 2, furthermore, shows that in the model with coworker support the regression model with two-way interactions (Model 3) was the best fitting model with regard to emotional exhaustion (Step 3: ΔX^2(df=3) =11.08; p<.05). A significant two-way interaction effect (B=-.43; p<.01) was found between job demands and decision authority.
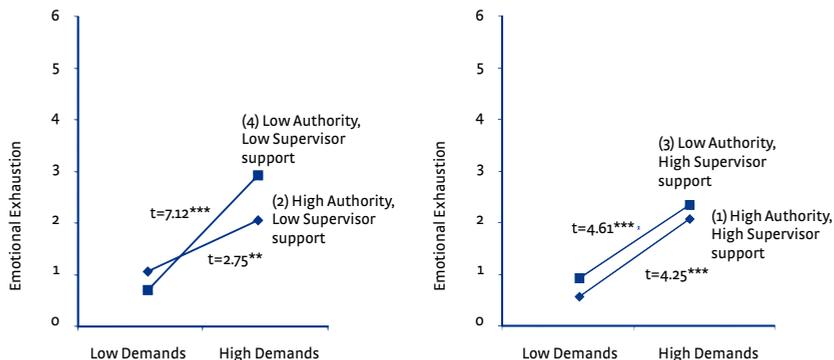
*p<.05; **p<.01; ***p<.001

Figure 3. Two-way interaction of job demands and decision authority in relation to emotional exhaustion.

Figure 3 shows that the adverse effects of job demands on emotional exhaustion were stronger for healthcare staff experiencing low decision authority (t=10.49; p<.001) than for those with high levels of decision authority (t=5.73; p<.001). With increasing decision authority, the adverse effect of job demands on emotional exhaustion weakened which implies a buffering effect of decision authority. The main effects found showed that job demands were strongly and positively related to emotional exhaustion. Both decision authority and coworker support were negatively associated with emotional exhaustion.

As can be seen in Table 2, in the model with supervisor social support the regression model with three-way interaction (Model 4) was the best fitting model (Step 4: ΔX^2(df=1) =3.31; p<.10). More specifically, we found a three-way interaction in which both decision authority and supervisor support moderated the relation between job demands and emotional exhaustion (B=.37; p<.10). This three-way interaction effect is graphically represented in Figure 4.

*p<.05; **p<.01; ***p<.001

Figure 4. Three-way interaction of job demands, decision authority and supervisor support in relation to emotional exhaustion: low supervisor support on the left, high supervisor support on the right.

Lines 2 and 4 in Figure 4 show that the adverse effect of job demands on emotional exhaustion was stronger for healthcare staff experiencing low decision authority (t=7.12; p<.001) than for those with high levels of decision authority (t=2.75; p<.01), implying a buffering effect of decision authority. Looking at line 3 and 4, one sees that supervisor support could also buffer the adverse effects of high job demands on emotional exhaustion among healthcare staff reporting low levels of decision authority (t=4.61; p<.001). However, the strongest buffering effect was not found when both decision authority and supervisor support were high, as is assumed by the DCS Model. Therefore, the graphical representation of the three-way interaction found shows that the interaction effect was not in line with the expected multiplicative buffering effect of the DCS model.

As far as the lower-order effects are concerned, the same main effects were found as in the model with coworker support.
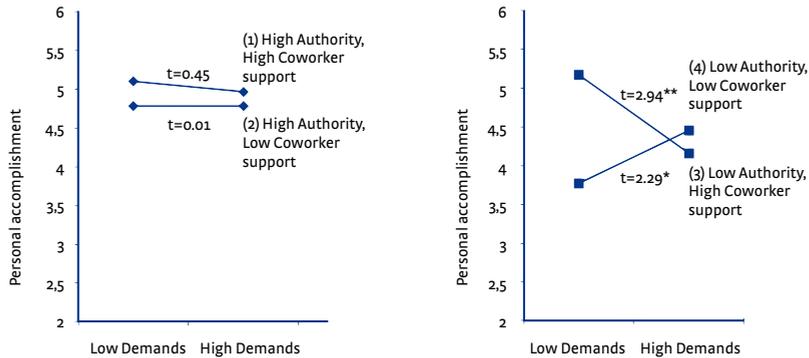
Personal accomplishment (hypothesis 3)

Results of the hierarchical regression analyses concerning the outcome 'personal accomplishment' are depicted in table 3. The regression model with three-way interaction (Model 4) was the best fitting model with regard to the model with coworker support (Step 4: ΔX^2(df=1) =4.17; p<.05).

Table 3. Hierarchical multiple multilevel regression analysis of job demands, decision authority and coworker/supervisor support on personal accomplishment (N=1,093)

	Personal accomplishment			
	Coworker support	Supervisor support		
	B	B	B	B
Model 1: Confounders				
Age	**.00**	-.00	-.00	**-.00**
Educational level	**-.01**	-.01	-.01	**-.01**
Hours per week	**.09***	.09***	.09***	**.09***
Model 2: Main effects				
Demands	**-.07**	-.03	-.02	**-.02**
Decision authority	**.37***	.37***	.35***	**.35***
Social support	**.25***	.16**	.15**	**.13**
Model 3: Two-way Interactions				
Demands x authority	**.04**	-.12	-.15	
Demands x support	**-.37***	-.10	-.10	
Authority x support	**-.14**	-.18	-.13	
Model 4: Three-way Interactions				
Demands x authority x support	**.45***	.18		
% Increase in variance explained (ΔR²)	**.6**	.2	.2	**5.8**
ΔX²	**4.17***	1.05	2.25	**58.70***
Best Model	R²=10.0 X²=95.97	R²=7.8 X²=77.00		

The bold values represent the best models.
*p<.05; **p<.01; ***p<.001

*p<.05; **p<.01; ***p<.001

Figure 5. Three-way interaction of job demands, decision authority and coworker support in relation to personal accomplishment: high decision authority on the left, low decision authority on the right.

A significant three-way interaction effect was found in which both decision authority and coworker support moderated the relationship between job demands and personal accomplishment (B=.45; p<.05). This three-way interaction effect is graphically represented in Figure 5. Lines 1 and 2 show that demands were not related to personal accomplishment among healthcare staff reporting high levels of decision authority. The slopes of both regression lines at high levels of decision authority are not significant (line 1: t=0.45; p=n.s. and line 2: t=0.01; p=n.s.). Healthcare workers reporting high levels of decision authority felt personally accomplished, regardless of the level of demands or coworker support they perceived. On the other hand, job demands and coworker support were related to personal accomplishment at low levels of decision authority. Job demands were negatively related to personal accomplishment among healthcare staff experiencing low levels of decision authority and high coworker support (line 3: t=-2.94; p<.01). In contrast, job demands were positively related to personal accomplishment among healthcare staff reporting both low levels of decision authority and coworker support (line 4: t=2.29; p<.05). These findings were not in line with the expected multiplicative activating effect of the DCS Model. However, it was found that healthcare workers felt most personal accomplished in situations with high demands, when they experienced both high decision authority and high coworker support (line 1), and least personally accomplished when they experienced low demands, low decision authority, and low support (line 4).

In addition to the three-way interaction, a two-way interaction was detected between demands and coworker support that also was not in line with what was expected. Furthermore, positive main effects of decision authority and coworker support were found on personal accomplishment. No significant main effect of job demands was found on personal accomplishment.

These significant interaction effects were not found in the model with supervisor support. The best fitting regression model for personal accomplishment in the model studying the relationship with supervisor support was the main effect only model (Model 2; ΔX^2(df=3) = 58.70; p<.001). The main effects found were the same as in the model with coworker support: more decision authority and more supervisor support were related to more personal accomplishment.

Finally, table 4 shows the explained variance (R^2) for the three outcomes of the model with coworker- and supervisor social support. Overall, the explained variance for job satisfaction, emotional exhaustion, and personal accomplishment of the models including coworker support (R^2= respectively 29.8%; 33.4%; 10.0%) was somewhat higher than for the models with supervisor support (resp. 26.9%; 33.1%; 7.8%). The explained variance for both models was highest for emotional exhaustion (R^2= 33.4% and 33.1%) and lowest for personal accomplishment (R^2= 10.0% and 7.8%).

Table 4. Proportion of explained variance in percentages (R^2) for the model with coworker and supervisor support for all dependent variables.

	Coworker support R^2	Supervisor support R^2
Job satisfaction	29.8 %	26.9 %
Emotional exhaustion	33.4 %	33.1 %
Personal accomplishment	10.0 %	7.8 %

Discussion

The present study examined the buffering hypothesis and activation hypothesis of the Demand-Control-Support (DCS) Model in a sample of healthcare staff providing nursing home care to people with dementia. A specific measure of job control (i.e. decision authority) and two distinct sources of social support (i.e. coworker- and supervisor support) were studied as moderators of the relationship between job

demands and job satisfaction, emotional exhaustion, and personal accomplishment, successively. The DCS Model assumes that healthcare workers in jobs with high demands feel least dissatisfied, least emotionally exhausted, and most personally accomplished when they perceive both high levels of decision authority and high levels of social support. Special attention was paid to the question in what way coworker- and supervisor support have different buffering effects to meet the demands in healthcare environments.

Hypotheses

The first hypothesis was not supported, since no three-way interaction effects between job demands, decision authority, and either source of social support were found for job satisfaction. However, we did find support for one of the core assumptions of the predecessor of the DCS Model (i.e. the DC Model) in the model with coworker support; that is, decision authority buffered the adverse effect of job demands on job satisfaction.

Despite the fact that we found a significant three-way interaction effect between job demands, decision authority, and supervisor support regarding emotional exhaustion, the second hypothesis was not supported because the nature of this effect is not in line with the DCS Model's assumptions. Findings did show that both decision authority and supervisor support can buffer the adverse effect of job demands on feelings of emotional exhaustion. However, the buffering effect was not found to be strongest when both decision authority and supervisor support were high. In the model in which coworker support was included, in accordance with the findings for job satisfaction, a buffering effect of decision authority was found.

With regard to our findings for the activation hypothesis of the DCS Model, in this study we could find no evidence for this hypothesis as the significant three-way interaction effect in the model with coworker support was not in the expected direction. Although the most favorable situation seemed to occur when healthcare staff perceived both high levels of decision authority and coworker support, staff did not seem to be activated by a higher level of demands as is expected by the activation hypothesis. Healthcare workers with high levels of decision authority felt highly competent to perform their job, regardless of the amount of demands they perceived. Healthcare staff felt least personally accomplished in isolated passive situations with low job demands, low decision authority, and low coworker support. This supports the counterpart of the activation hypothesis that states that a passive work situation has negative consequences for staff's personal development.[9]

Not finding the expected DCS moderating effects (three-way interactions) of job decision authority and social support is in line with findings of most studies regarding evidence for the DCS Model.[10,11,12]

Limitations
The findings of this study need to be considered within the context of a number of methodological limitations. First, there are obvious limitations to the cross-sectional design used. It provides no information on the work stress process and it does not allow for any firm conclusions on the direction of causality. However, longitudinal DCS studies have provided arguments against a reverse causal interpretation of work stress processes.[11] Second, our data were collected with a self-report method, which could have influenced the associations by common method effects. Third, the robustness of our findings regarding the moderating effects is questionable since these effects accounted for relatively little variance (R^2 ranging from 0.2% to 1.2%). However, Evans[37] concluded that even interaction effects explaining a very small proportion of the total variance should be considered important since moderator effects are so difficult to detect in field studies, especially when using self-reports. Finally, our study population contained mostly female (95%) employees of a single occupation (healthcare staff in nursing home care) which makes it difficult to generalize the results to other occupations. At the same time, this single occupation is a strength since research on the effects of social support suggests that the effects differ amongst occupations.[24]

Theoretical implications
The buffering effect of decision authority that we found in this study confirms that decision authority is an important job resource that enables partial adjustment of healthcare staff to demands. This is in line with earlier DC research in which one found that with increasing decision authority, the adverse effects of job demands on job satisfaction and emotional exhaustion decline.[18,20] The current finding regarding the activation of healthcare staff also adds to this that decision authority not only can buffer the adverse effects of job demands, but also promotes positive consequences of work. Healthcare workers who perceive that they can make their own decisions at work seem to feel more competent to perform their jobs regardless of the level of demands or social support from coworkers.

The current findings regarding social support partially support the suggestions and findings of several researchers that distinct sources of support are differently

related to work-related outcomes.[12,22,23] Only supervisor support was found to buffer the adverse effect of job demands on emotional exhaustion, which supports the results of House and Well[38], Sargent and Terry[39] and Van der Doef and colleagues.[25] However, this was only true when healthcare staff perceived low decision authority. This is consistent with the findings of Sargent and Terry[39], who also found that high levels of supervisor support seemed to have a beneficial effect on staff in high strain jobs in particular (i.e. high demands and low decision authority). These findings suggest that supervisor support could compensate for a lack of decision authority to meet the requirements of job demands, although decision authority seems more fruitful for healthcare staff overall. On the other hand, an empirically strong connection between decision authority and supervisor support[40] could make it difficult to detect the expected multiplicative buffering effect of high decision authority and high supervisor support on the adverse effects of job demands.

Furthermore, the finding that supervisor support can buffer adverse effects of job demands to some extent and coworker support cannot, is in line with the idea that distinct sources of support have various functions that may be more or less effective in addressing a problematic situation.[41] For example, coworkers could provide emotional and affective support by talking to each other to help decrease emotional arousal after feeling threatened by an aggressive patient.[41] However, they may not have the right position or ability to truly change a work situation, e.g. to eliminate a high workload.[42] A possible explanation for not finding a buffering effect of coworker support lies in the degree to which the job demands and resources match.[11,43,44] Possibly, coworker support does not match the type of demands (i.e. pressure of work and time urgency) measured in this study. This might also explain why combined buffering effects of job control and social support are only scarcely found when studying the DCS Model. It is not likely that one type of job demands can be compensated by two completely different types of resources.[44]

Although our findings only show a buffering effect of supervisor support, we generally found that both coworker- and supervisor support serve a positive function through direct positive effects on healthcare staff outcomes. This is in line with the general assumption that social support serves a positive function through direct effects on health and well-being[45], self-esteem, enhancement of self-efficacy, or direct changes in problem-solving behaviors.[46] However, our study also revealed disadvantageous consequences of coworker support on personal accomplishment in high strain jobs (i.e. low control and high demands). A substantial minority of studies focusing on social support have reported negative effects as well. Deelstra and associates[47], for example, found that social support can serve as a potential threat to an

employee's self-esteem, if someone feels that he or she must consistently rely upon others to deal with work-related stressors. Furthermore, results found in a recent study have shown that it were those individuals reporting high levels of coworker support who had low personal accomplishment scores when perceived job demands were high.[48] Our study specifies this earlier finding by revealing that this opposite effect of coworker support especially emerges in high strain jobs (i.e. high demands and low decision authority). In these situations supportive coworkers may help one to see that their job conditions are as bad as, or even worse than they actually are, thereby, accentuating feelings of powerlessness and helplessness, and deteriorating staff's self-perceptions (i.e. personal accomplishment).

Practical implications

In light of the upcoming labor shortage in nursing home care, and the consequently growing importance of keeping healthcare staff healthy and satisfied, it is important to look at the practical implications of our study. The present findings especially show the importance of decision authority in the jobs of healthcare staff. High levels of decision authority can create a work environment in which they are less susceptible to high demands and less prone to the possible negative effects of a highly cohesive team of coworkers or low levels of supervisor social support. So, organizational structures that increase the ability of healthcare staff to make their own decisions at work may be beneficial for their well-being and should therefore be stimulated. The hierarchical organization of care in traditional nursing homes providing care for older people with dementia hampers staff initiative and control.[49] However, first indications have been found that new care models that are more resident-oriented have a positive impact on the amount of job control that healthcare workers experience in their job.[50-52] Whereas in more traditional nursing homes, the main principle in organizing work often is task division and task allocation in the horizontal and vertical dimensions, resident-oriented care models take the individual resident as the focus of care to be achieved by means of systematic and comprehensive care, coordinated by a continuously responsible caregiver with integrated tasks.[50,53] As a consequence, staff is less dependent on the routines of various services in the nursing home and has more freedom to determine the daily routine together in accordance with residents' needs. Our findings suggest that these new care models involve a more beneficial organizational structure for healthcare staff's well-being since it is found to increase their decision authority.

Although it seems more fruitful to focus on how to increase decision authority instead of trying to decrease demands, our findings imply that attention should also

be paid to organizational structures that can decrease high levels of perceived job demands (i.e. high time pressure). At high levels of decision authority, the adverse impact of high job demands on job satisfaction and emotional exhaustion of health-care staff is less pronounced, but still present. On the other hand, as an absolute lack of time pressure in combined with low resources is associated with lower feelings of personal accomplishment, it seems important to establish a reasonable balance between job demands and sufficiently available resources.

Future research
A first avenue for future research should be to focus on how the organizational structures of new care concepts in nursing home care influence job demands and job resources. This could give more insight into the way in which the organization of nursing home care can be (re)designed into a work environment with a good mixture of job characteristics to enhance healthcare staff well-being and positive conse-quences at work. A second avenue of future research, especially in this work envi-ronment, concerns the type of job demands when studying the buffering effect of distinct sources of social support. Research should not only focus on time pressure, but also on emotional demands that are known to be strongly related to interper-sonal relationships, such as caring and concerning for others conform de Jonge and colleagues.[32] The question remains whether coworker support can buffer the adverse consequences of emotional demands caused by, for example, difficult behavior of people with dementia for healthcare staff. Finally, future research could benefit from assessing a broader scope of positive consequences of work, such as active learning and creativity, to get more insight into the possibly negative influence of coworker support on healthcare staff.

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