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HEALTH POLICY AND SYSTEMS

Supervisors are Central to Work Characteristics Affecting Nurse Outcomes

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Abstract

Purpose: To examine the predictive capability of the demand-control-support (DCS) model, augmented by organizational justice variables, on attitudinal- and health-related outcomes for nurses caring for elderly patients.
Design: The study is based on a cross-sectional survey design and involved 168 nurses working with elderly patients in facilities of a medium to large Australian organization.
Method: Participants were asked to complete a questionnaire consisting of scales designed for measuring independent (e.g., demand, control, support, organizational justice) and dependent (e.g., job satisfaction, organizational commitment, wellbeing and psychological distress) variables. Multiple regression analyses were undertaken to identify significant predictors of the outcome variables.
Findings: The DCS model explains the largest amount of variance across both the attitudinal and health outcomes with 27% of job satisfaction and 49% of organizational commitment, and 33% of psychological distress and 35% of wellbeing, respectively. Additional variance was explained by the justice variables for job satisfaction (5%), organizational commitment (4%), and psychological distress (23%).
Conclusions: Using organizational justice variables to augment the DCS model was valuable in better understanding the work conditions experienced by nurses caring for elderly patients. Inclusion of curvilinear effects added clarity to the potentially artifactual nature of certain interaction variables.
Clinical Relevance: The results indicated practical implications for managers of nurses caring for elderly patients in terms of developing and maintaining levels of job control, support, and fairness, as well as monitoring levels of job demands. The results particularly show the importance of nurses' immediate supervisors.

A growing body of research exists about the effect of work-related stress within the nursing profession. Job stressors are associated with increased nurse-related injuries and illness, such as cardiovascular disease (Lundstrom, Pugliese, Bartley, Cox, & Guither, 2002). Alarmingly, associations have also been made between nurses' stress and the quality of patient care (Aiken et al., 2001). For example, the extent to which stress was experienced by nurses has been associated with incidents such as the frequency of patients' falls and medication and intravenous errors (Dugan et al., 1996), and patients were more than twice as likely to report high levels of

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satisfaction with care in work environments with low burnout than with high burnout rates (Vahey, Aiken, Sloane, Clarke, & Vargas, 2004).

Researchers exploring stress and nursing tend to focus on nursing staff within hospitals. Nurses within care facilities for elderly patients receive less attention, despite changing demographics of an aging population with subsequent increases in demand on care services for elderly patients (e.g., Kennedy, 2005). Nurses caring for elderly patients are a sizable component of the healthcare industry, with approximately 14% of working nurses employed in residential care facilities in Australia (Australian Institute of Health and Welfare [AIHW], 2008). Similarly, government reviews of the nursing shortage indicate that genontologic care nursing is "the sector of nursing in greatest crisis" (Senate Community Affairs Committee, 2002, p. xv). The consequential detrimental effect of nurse-patient ratios is a concern, with nurse-patient ratios affecting patient outcomes (Blegen, Goode, & Reed, 1998) in a variety of contexts (see review by Heinz, 2004), including mortality in intensive care units (Cho, Hwang, & Kim, 2008). Therefore, a common concern for these organizations is to identify strategies to help reduce the negative effects of job strain on nurse retention and the quality of patient care provided by these nurses.

Studies have shown that factors such as supervisor support, promotional opportunities, and distributive justice have a significant role in keeping nurses satisfied in their work (Kovner, Brewer, Wu, Cheng, & Suzuki, 2006) and that justice can play a pivotal role in many of the staffing issues in nursing and health care (e.g., Mantler, Armstrong-Stassen, Horsburgh, & Cameron, 2006). Subsequently, the primary aim of the present study is to analyze working conditions in care facilities for elderly patients associated with nurses' attitudinal outcomes of job satisfaction and organizational commitment, along with the health outcomes of psychological distress and wellbeing. Our study is based on the demand-control-support (DCS) model and extended with organizational justice variables.

Background

One of the most widely used theoretical frameworks within occupational research is the DCS model (Fox, Dwyer, & Ganster, 1993). Before the DCS model, Karasek (1979) developed a two-dimensional demand-control (DC) model. The premise of the DC model is that stress-related illness, also referred to as strain, is predictable by an interaction between job demands and control. Job demands refer to employees' workload, while job control refers to their decision-making latitude. Within this framework, high-strain jobs are those characterized by high levels of demands and low levels of job control. In later research the buffering effect of social support on stress became apparent, and, consequently, the DC model was expanded to the DCS model (Johnson & Hall, 1988). According to developers of the DCS model, high-strain jobs are those characterized by high workloads and low job control or social support. Although few studies have used the DCS model for identifying sources of stress among nursing personnel working in care facilities, research involving hospital-based nurses indicates that work characteristics represented in this model are predictive of a range of outcomes central to nurses' health and satisfaction, including emotional fatigue, job stress, and intrinsic motivation (e.g., Hall, 2007; Van Yperen & Hagedoorn, 2003).

The defining feature of the DCS model is the proposed interaction among demand, control, and support. However, the vast majority of research has focused on the linear effects of individual DCS variables (Van Der Doef & Maes, 1999), and the three-way DCS effect (demand×control×support) is underrepresented in job stress research, despite some encouraging results (e.g., Fletcher & Jones, 1993). Further, where the independent effects of demand, control, and support have been identified, one often assumes that these effects are linear. Working conditions such as job demands and job control can have deleterious effects both when they are lacking and when there is an over-supply, hence the need to test for curvilinear effects (Rydstedt, Ferrie, & Head, 2006).

Studies have indicated curvilinear relationships between certain work characteristics and stress outcomes (e.g., Janssen, 2001). Stress models with curvilinear effects reflect, to some degree, the adaptation heritage of much of the stress literature and the classic U-shaped curve of the effect of stress under conditions of either "deprivation" or "excess" (e.g., Selye, 1974, pp. 32–33). Indeed, the results in many of the key studies in this field, even though presented as ordinal categories, have many (e.g., Karasek & Theorell, 1990; Karasek, 1979), if not all (e.g., Karasek, Baker, Marxer, Ahlbom, & Theorell, 1981) of their diagrams representing curvilinear relationships. The lack of stress research incorporating curvilinear effects has led to calls by reviews for future research to look for these effects (Van Der Doef & Maes, 1999). Thus, a notable new contribution of this study is to comprehensively investigate the linear, curvilinear, and interaction effects of the DCS model in a nursing context.

Organizational justice as a stressor is a recent feature within employee-oriented research, with organizational justice variables used as a supplement to the DC model providing an incremental contribution to predicting stress (De Boer, Bakker, Syroit, & Schaufeli, 2002) and having

an effect in the nursing context (Kovner et al., 2006). The implication of these studies is that injustice appears to be acting as a stressor (Judge & Colquitt, 2004). However, only a fraction of the research with justice predicting stress is based on nurses or healthcare workers (e.g., Elovainio, Kivimäki, & Vahtera, 2002; Kivimäki, Elovainio, Vahtera, Virtanen, & Stansfeld, 2003), and many of those had only included one or two of the types of justice. Indeed, as far as we are aware, none of the previous investigators concerning justice and stress for nurses have reported all four types of justice proposed by contemporary justice research.

The conceptualization of organization justice includes four dimensions: procedural, distributive, interpersonal, and informational justice (Colquitt, 2001). Procedural fairness refers to an employee's perceived fairness of decision-making procedures related to outcome distributions, whereas distributive justice refers to the perceived fairness of the actual distributions (Greenberg, 1990). Interpersonal justice is defined as the perceived sincerity and respect that organizational representatives treat the employee with and informational justice refers to the perceived adequacy and honesty these representations provide the employee in their explanations (Colquitt). Previous researchers exploring perceptions of organizational justice have examined linear relationships between justice and stress; however, nonlinear relationships have been less frequently investigated (e.g., Sweeney, 1990). On the other hand, an interaction relationship between procedural and distributive justice, whereby low levels of both forms of justice lead to negative employee outcomes, has been generally supported in the literature (e.g., Brockner & Weisenfeld, 1996). Subsequently, the present study is aimed at testing justice effects, linear and nonlinear, along with interaction between procedural and distributive justice. Further, extending the full DCS (i.e., including social support) with justice variables may provide unique insights into the relationship between justice and stress, as well as potentially improving researchers' ability to predict stress.

A comprehensive set of attitudinal and health outcomes can be used to test the various effects of components of the DCS model and organizational justice variables. This set of outcomes has been found to determine nurse performance, job retention, and quality of care (Decker, 1997; McGrath, Reid, & Boore, 2003; Packard & Motowidlo, 1987). Similarly, the elements of the core DCS model have been found to predict employee-level outcomes of job satisfaction, organizational commitment, psychological distress, and wellbeing (e.g., Mikkelsen, Øgaard, & Landsbergis, 2005; Noblet, McWilliams, Teo, & Rodwell, 2006). The aforementioned employee-level outcomes have also been associated with perceptions of organizational justice (e.g., Colquitt, Conlon, Wesson, Porter, & Ng, 2001; Kivimäki et al., 2003). Job satisfaction and organizational commitment are two closely related employee attitudes (e.g., Staw, 1984). Psychological distress and wellbeing, on the other hand, are often considered as employee health outcomes that are context specific (i.e., work) and context free, respectively (Warr, 1996).

In this study we investigate the efficacy of the DCS model and organizational justice variables in predicting employee attitudinal outcomes of job satisfaction and organizational commitment, as well as health outcomes of psychological distress and wellbeing of nurses caring for elderly patients. By assessing the predictive capacity of these variables, the study can show issues and work conditions essential to not only nurses' satisfaction and wellbeing, but also performance and turnover. We hypothesize that (a) components of the DCS model will predict attitudinal and health outcomes of nurses caring for elderly patients, and (b) organizational justice components will also predict these outcomes.

Methods

Design and Sample

This study is based on a survey undertaken in the aged-care facilities of a medium to large, private, not-for-profit, Australian healthcare organization. Most of the residents in these facilities needed low levels of care, although approximately 40% of beds were available for clients needing high levels of care, including patients with dementia. This organization employed 230 nurses in the aged-care facilities and all were invited to take part in this study via a letter from the chief executive officer (CEO). The organization has a flat structure with the aged-care staff reporting to one executive group, rather than having a CEO and director of nursing per each facility. Questionnaires, as well as the rationale for undertaking the study, were sent to employees using the internal mail service. When staff had completed the questionnaires, they were asked to seal them in envelopes and return them to the first author. Completed surveys were received from 168 nurses, representing a response rate of 73%. The majority of respondents were female (93.5%), 40 years of age or more (80.3%), and had worked for the organization for 9 years or less (75.6%). Respondents were mostly part time (67.3%) and many had a tertiary degree (usually at least a 3-year degree; 38.3% had undertaken postgraduate studies).

Instruments

The attitudinal outcome variables in this study were job satisfaction and organizational commitment, while the health-related outcome variables were psychological distress and wellbeing. In terms of predictor variables, job demands, job control, social support, and organizational justice were used. All of the scales had fair or good reliability coefficients from .77 to .94 (see **Table 1**; Nunnally & Bernstein, 1994).

Job satisfaction. Job satisfaction was measured using a shortened version of the satisfaction scale developed by Brayfield and Rothe (1951). The six-item job satisfaction scale is a global measure of job satisfaction and includes items such as "I find real enjoyment in my work." The scale has been shown to have good reliability and validity in previous research (e.g., Agho, Price, & Mueller, 1992). Respondents rated the items on a 5-point Likert scale (from *strongly disagree* to *strongly agree*).

Organizational Commitment. Organizational commitment was measured using the eight-item Affective Commitment Scale developed by Allen and Meyer (1990). The affective commitment scale allows assessing a person's affective orientation toward the organization and includes items such as "I would be very happy to spend the rest of my career with this organisation." Each item was rated on a 5-point Likert scale (from *strongly disagree* to *strongly agree*).

Wellbeing. The General Health Questionnaire-12 (GHQ-12; Goldberg & Williams, 1988) was used to measure employees' self-perceived psychological health. The GHQ-12 was scored on a 4-point Likert scale (from not at all to much more than usual) and has been assessed to be a valid self-rated indicator of current psychological health. The scale includes items for assessing both normal and abnormal functioning (Banks et al., 1980). Psychological Distress. The Kessler-10 (K10; Kessler & Mroczek, 1994) was used to measure self-perceived psychological distress. The K10 has been found to have strong psychometric properties and to have the capability to discriminate between Diagnostic and Statistical Manual of Mental Disorders, 4th edition (DSM-IV) cases and noncases across a variety of demographic subpopulations (Kessler et al., 2002). The 10-item scale was rated on a 5-point Likert scale (from *all the time* to *none of the time*).

Job demands. Job demands were measured using an 11-item scale developed by Caplan, Cobb, French, Harrison, and Pinneau (1980). The scale allows measurement of physical and psychological demands. Example items include "How often does your job leave you with little time to get things done?" and "How often does your job require you to work very fast?" Respondents rated each item on a 5-point Likert scale (from *rarely* to *very often*).

Job control. Job control was measured using a nine-item scale from Karasek (1985). The job control scale includes items such as "My job requires me to make a lot of decisions on my own" and has been successfully employed with studies across a variety of occupations, including nursing (Zohar, 1995). Items were rated on a 5-point Likert scale (from *strongly disagree* to *strongly agree*).

Support. Social support from within the organization and from nonwork sources was measured using a four-item scale developed by Caplan et al. (1980). Each item required three answers relating to the employee's immediate supervisor, colleagues at work, and life outside work. These three responses formed three subscales: supervisor support, coworker support, and outside work support. Responses were recorded on a 5-point Likert scale (from don't have any such person to very much).

Table 1. The Means, Standard Deviations, Cronbach Alpha Coefficients, and Correlations of the Variables Analyzed

	M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Job demands	41.6	7.64	0.89											
2. Job control	30.6	5.05	.05	0.77										
3. Supervisor support	10.9	3.73	−.16*	.35**	0.90									
4. Coworker support	12.1	2.57	−.00	.14	.31*	0.80								
5. Outside work support	13.9	2.70	.02	−.02	.17*	.39**	0.87							
6. Procedural justice	18.6	6.75	−.25*	.36**	.44**	.18*	.00	0.91						
7. Distributive justice	9.3	4.50	−.33**	.28**	.40**	.16	.02	.56**	0.90					
8. Interpersonal justice	14.5	4.05	−.16	.39**	.52**	.21*	.07	.53**	.48**	0.92				
9. Informational justice	16.4	5.15	−.23*	.34**	.50**	.25*	−.01	.57**	.57**	.82**	0.94			
10. Job satisfaction	17.7	4.35	−.06	.43**	.33**	.20*	.05	.18*	.21*	.30**	.28**	0.87		
11. Organizational commitment	25.1	6.08	−.09	.38**	.52**	.19*	.14	.36**	.33**	.48**	.45**	.61**	0.77	
12. Wellbeing	23.0	6.47	−.25*	.32**	.45**	.22*	.17*	.25*	.32**	.36**	.32**	.37**	.42**	0.91
13. Psychological distress	16.6	6.16	.18*	−.26**	−.30**	−.16*	−.13	−.27**	−.29**	−.40**	−.35**	−.44**	−.31**	−.72**

Note. The Cronbach's alpha coefficients are on the diagonal. The Cronbach's alpha for psychological distress is 0.91. *$p<.05$. **$p<.001$.

Organizational justice. This variable was measured using a 21-item scale developed by Colquitt (2001), for measuring four types of justice: procedural, distributive, interpersonal, and informational. Details of the reliability and validity analyses for construction of the four justice scales are in Colquitt's article, and the scales have been applied and retested in other studies (e.g., Judge & Colquitt, 2004). Items were rated on a 5-point Likert scale (from *very often* to *rarely*).

Control variables. Some previous research has found certain demographic variables have an effect on outcomes similar to those studied here (e.g., Kennedy, 2005). The demographic variables of gender (male=1, female=2) and tenure (less than 12 months, 1 to 4 years, 5 to 9 years, 10 to 14 years, 15 to 19 years, 20 to 24 years, 25 years or more) are used as control variables in this study.

Data Analysis

The data were analyzed using descriptive and inferential statistical techniques. The descriptive statistics (e.g., means and standard deviations) for each of the variables are shown in **Table 1**, along with the reliability and correlation coefficients. The correlation matrix shows the general pattern of relationships between the variables. Multiple regression analyses were then conducted to show the particular variables that predict the target variables and the level of explained variance in the outcome measures attributed to the different sets of variables in this study (i.e., DCS variables, DCS squared variables, DCS interaction terms, justice variables, justice squared variables, and the justice interaction term). The squared and interaction terms were created to identify nonlinear and moderating effects respectively. All data analyses were conducted using SPSS 15.0 for Windows (SPSS Inc., Chicago, IL).

Findings

Descriptive statistics, reliabilities, and correlation coefficients are shown in **Table 1**. Inter-relationships between variables are complex, with most variables showing significant correlations. More specifically, significant positive correlations were noted between the attitudinal outcomes of job satisfaction and organizational commitment with all of the predictor variables except job control and outside work support.

Before conducting inferential statistics, preliminary analyses were conducted to ensure there were no violations of the assumptions for multiple regression analyses (Tabachnick & Fidell, 2007). The outside work support variable was transformed using the reflect square root technique (Tabachnick & Fidell). Demographic variables were dummy coded. The order in which blocks of variables were entered into each regression analyses were (a) demographic variables, (b) DCS variables, (c) DCS squared variables, (d) DCS interaction terms, (d) justice variables, (e) justice squared variables, and (f) the justice interaction term. The predictor variables were first centered (i.e., the mean was subtracted from each value) before being multiplied to create the squared and interaction variables. From a statistical point of view, the centering process and inclusion of the squared variables is also beneficial to more thoroughly test for interaction effects (see discussion by Cohen, Cohen, West, & Aiken, 2003, especially pp. 261–301). Results of the regression analyses for the attitudinal outcomes are shown in **Table 2**. Post hoc power analyses using G*Power 3 (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the analyses had a power of 0.993 with this sample (α=.05, effect size=large, i.e., f^2=.35).

The overall model of the multiple regression analyses explained a significant amount of variance in the attitudinal outcome variables of job satisfaction (R^2_{adj}=.374, $F[33, 97]=3.35$, $p<.001$) and organizational commitment (R^2_{adj}=.578, $F[33, 86]=5.94$, $p<.001$). In the first step of the analyses, the demographic variables accounted for a significant amount of variance in both job satisfaction and organizational commitment. More specifically, tenure at 9 years or less, 10 to 14 years, and 15 to 19 years significantly predicted job satisfaction, while tenure at 15 to 19 years predicted organizational commitment. The DCS variables also had significant amounts of variance, with 27% of job satisfaction and 44% of organizational commitment. The explained variance in this step of the regression analyses was the largest compared with all other steps. Job control and supervisor support significantly predicted job satisfaction and organizational commitment. Workload significantly predicted organizational commitment. For the DCS squared (i.e., curvilinear) variables, the only significant predictor was job demands squared for organizational commitment. None of the DCS interaction terms significantly contributed to the overall model for either job satisfaction or organizational commitment.

None of the four forms of justice significantly predicted job satisfaction or organizational commitment. However, in terms of the squared justice variables, distributive justice squared significantly predicted job satisfaction and procedural justice squared predicted organizational commitment. The procedural and distributive justice interaction term was not significant for either job satisfaction or organizational commitment.

Overall, the model used in the multiple regression analyses explained a significant amount of variance in the

Table 2. Results of the Regression Analyses for Attitudinal Outcomes

	Job satisfaction			Organizational Commitment			Psychological Distress			Wellbeing		
(Step) Variable	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*	*B*	*SE B*	*β*
(1) Gender	−1.16	1.53	−.06	−.51	1.60	−.02	1.53	1.83	.06	−3.32	2.04	−.14
(1) Tenure<9 years	−3.00	1.12	−.29*	−1.98	1.20	−.15	2.25	1.15	.17	−2.53	1.48	−.19
(1) Tenure 10–14 years	−4.03	1.75	−.24*	1.11	1.95	.05	−4.65	2.43	−.17	−4.03	2.41	−.18
(1) Tenure 15–19 years	−3.64	1.80	−.19*	−6.52	2.26	−.23*	5.20	2.55	.17*	−2.26	4.00	−.06
(2) Demands	−.06	.05	−.10	−.14	.06	−.21*	.13	.06	.19*	−.31	.08	−.43**
(2) Control	.34	.09	.38**	.32	.10	.27*	−.15	.11	−.14	.10	.13	.08
(2) Supervisor support	.31	.12	.28*	.42	.14	.29*	−.27	.14	−.19	.38	.17	.26*
(2) Coworker support	.02	.15	.02	.17	.17	.08	−.01	.19	−.00	.17	.22	.08
(2) Outside work support	.08	.39	.02	−.11	.44	−.02	−.10	.45	−.02	.39	.55	.07
(3) Demands^2	.01	.01	.06	.02	.01	.19*	.01	.01	.09	−.00	.01	−.01
(3) Control^2	−.01	.01	−.05	−.01	.02	−.06	−.03	.02	−.14	−.00	.02	−.02
(3) Supervisor support^2	.03	.03	.10	.00	.03	.00	−.01	.04	−.03	−.01	.04	−.03
(3) Coworker support^2	.02	.05	.04	.04	.05	.05	−.06	.05	−.08	.01	.06	.01
(3) Outside work support^2	.56	.44	.11	.33	.50	.05	−.33	.52	−.05	−.03	.63	−.01
(4) Demands×job control	.01	.01	.05	.01	.01	.03	−.01	.01	−.07	−.01	.02	−.08
(4) Demands×supervisor support	−.02	.02	−.10	.01	.02	.04	.01	.02	.02	.01	.03	.03
(4) Demands×coworker support	.02	.02	.11	.00	.02	.00	.01	.03	.03	.01	.03	.05
(4) Demands×outside work support	.00	.05	.00	.03	.06	.05	.07	.06	.09	.04	.07	.05
(4) Control×supervisor support	.03	.03	.13	.02	.03	.06	.03	.03	.12	−.00	.04	−.00
(4) Control×coworker support	−.02	.04	−.05	−.03	.04	−.08	.08	.042	.19	.03	.05	.06
(4) Control×outside work support	−.10	.08	−.11	−.06	.10	−.05	.16	.01	.15	.01	.12	.01
(5) Demands×job control×supervisor support	.00	.00	.03	.01	.00	.15	−.00	.00	−.05	.00	.01	.03
(5) Demands×control×coworker support	.00	.01	.08	.00	.01	−.01	.00	.01	.08	.00	.01	.00
(5) Demands×control×outside work support	−.00	.01	−.02	.00	.01	.02	.02	.02	.13	−.01	.02	−.04
(6) Procedural justice	−.13	.07	−.22	−.14	.07	−.18	.07	.07	.09	−.09	.10	−.12
(6) Distributive justice	−.11	.10	−.12	.13	.11	.11	−.05	.11	−.04	.15	.15	.13
(6) Interpersonal justice	.05	.15	.05	.10	.17	.08	−.70	.19	−.56	.34	.21	.26
(6) Informational justice	.07	.12	.09	.16	.14	.16	.05	.15	.05	−.13	.17	−.12
(7) Procedural justice^2	.01	.01	.14	.02	.01	.18*	−.01	.01	−.10	.01	.01	.10
(7) Distributive justice^2	.05	.02	.26*	.01	.02	.06	.02	.02	.07	−.05	.03	−.24
(7) Interpersonal justice^2	−.04	.02	−.20	−.03	.02	−.12	.08	.03	.38*	−.02	.03	−.06
(7) Informational justice^2	.01	.02	.05	.00	.02	.02	−.03	.02	−.19	.02	.02	.16
(8) Procedural justice x distributive justice	−.01	.02	−.08	−.00	.02	−.01	−.01	.02	−.05	.01	.03	.06

B = regression weight; *SE B* = Standard Error of the regression weight; *β* = the standardized regression weight, ^{2} denotes squared.

health outcome variables (see **Table 2**) of psychological distress (R^2_{adj}=.562, F[33, 78]=5.32, p<.001) and wellbeing (R^2_{adj}=.341, F[33, 88]=2.89, p<.001). For these analyses, the only significant demographic predictor was tenure at 15 to 19 years for psychological distress. In a similar manner to the regression analyses for the attitudinal outcomes, the DCS variables explained the largest amount of variance for the health outcomes, with 33% of psychological distress and 35% of wellbeing. More specifically, job demand was a significant predictor of psychological distress, while job demands and supervisor support significantly predicted wellbeing. There were no significant DCS squared variables or interaction terms for either psychological distress or wellbeing.

In terms of the justice variables, a significant amount of variance was accounted for in psychological distress (19%), with interpersonal fairness significantly predicting this outcome variable. Further, the interpersonal justice squared variable was a significant predictor of psychological distress. There were no significant contributions from the justice variables or squared justice variables for wellbeing. The justice interaction term did not significantly contribute to the explained variance of psychological distress or wellbeing.

Discussion

The hypothesis that the DCS model has the capability to predict attitudinal and health outcomes of nurses

caring for elderly patients was supported by the results of the study. The main effects of the DCS model explained the largest amount of variance in all of the outcome variables, both attitudinal- and health-related, relative to any of the other steps of the model. This finding verifies use of the DCS as proposed by Johnson and Hall (1988) and indicates the utility of applying the DCS model to predicting these outcomes for nurses caring for elderly patients. In keeping with the DCS model (Johnson & Hall), several findings of the present study were expected: (a) high job demands lead to high psychological distress and low wellbeing, (b) high job control leads to high job satisfaction and organizational commitment, and (c) high supervisor support leads to high job satisfaction, organizational commitment, and wellbeing. These results indicate the strong influence of all three dimensions of the DCS model and their effect in managing the satisfaction, commitment, distress, and wellbeing of nurses caring for elderly patients.

The results also indicate a nonlinear relationship between job demands and organizational commitment. This finding shows an inverse-U effect, whereby very high and low levels of job demands led to lower organizational commitment levels. However, moderate levels of demand lead to high levels of commitment. Thus, an important aspect of maintaining the commitment levels of nurses caring for elderly patients is to provide workloads of an adequate amount, not in excess or to the point of boredom.

Conversely, the second hypothesis of the present study, that the organizational justice components can predict the attitudinal and health outcomes of nurses, was to some extent supported by the results. For wellbeing, the organizational justice main, nonlinear, and interaction effects did not explain a significant amount of variance. This finding was not in line with the proposition that injustice is a stressor recently introduced in the literature (e.g., Judge & Colquitt, 2004). However, a large amount of the variance accounted for in the health outcome of psychological distress was by perceptions of justice, complementing earlier research on the effect of justice on health (e.g., Elovainio et al., 2002). More specifically, low levels of perceived interpersonal fairness are associated with high psychological distress (e.g., Kivimäki et al., 2003). In summary, significant contributions were made by the justice variables on organizational commitment and job satisfaction.

Curvilinear relationships between interpersonal fairness and psychological distress, procedural justice and organizational commitment, and distributive justice and job satisfaction, were also apparent. These relationships show that very high and low perceived interpersonal, procedural, and distributive justice leads to high psychological distress, organizational commitment, and job satisfaction, respectively; whereas moderate levels of these justice types lead to more positive levels of these outcome variables.

These findings clearly indicate the importance of interpersonal, procedural, and distributive fairness for nurses in reducing levels of psychological distress experienced and for increasing organizational commitment and job satisfaction. A further important implication of this pattern of results for justice comes from lack of a significant procedural by distributive justice interaction effect. That is, in contrast to Brockner and Weisenfeld (1996) and the many studies they reviewed, the current study did not indicate any significant interaction effect.

This lack of interaction effect, in the context of simultaneously finding significant curvilinear effects, may indicate that the interaction results of previous studies are not present among nurses caring for elderly patients. However, the lack of an interaction effect and the multiple significant justice squared results may mean that the previously found interaction effects are actually curvilinear effects, an artifactual result that can occur when squared variables are not tested with interaction variables (see discussion by Cohen, Cohen, West, & Aiken, 2003), a best practice process rarely used in those earlier studies, thereby casting doubt on whether that justice interaction effect is real or a statistical artifact in that previous research.

Results of the present study are practical implications for the work conditions of nurses caring for elderly patients. In particular, the results show that providing nurses caring for elderly patients with opportunities of moderate levels of job demands decreases levels of psychological distress and increases levels of organizational commitment and wellbeing. Therefore, managers should recognize that it is vital for nurses caring for elderly patients to be challenged by their work as well as not overwhelmed with excess demands. The strong influence of high job control on high levels of job satisfaction and commitment indicates that managers should also bear in mind that nurses caring for elderly patients require the ability to control their workload with minimal assistance. Support from supervisors appears to be extremely influential to the levels of job satisfaction, organizational commitment, and wellbeing experienced by nurses caring for elderly patients. Levels of support from supervisors or managers can be achieved by actions such as providing aged-care nursing staff with increased or adequate levels of advice and feedback when at work.

Results of the current study also provide practical implications for maintaining perceptions of justice, in particular, procedural, distributive, and interpersonal justice, which appear to have the strongest influences on

nurses' outcomes. The results indicate that moderate levels of procedural, distributive, and interpersonal justice for nurses by higher bodies within the organization or the care unit itself may be beneficial. Similarly, the results show the centrality of the supervisor, especially with the supervisor being the locus for the strong effects of supervisor support and interpersonal justice. Managers and supervisors should attempt to be fair in the decision-making procedures of outcome allocations to maintain high levels of organizational commitment, as well as allocating the actual outcomes fairly to maintain high levels of job satisfaction. That is, treating nurses caring for the elderly with respect and sincerity could reduce psychological distress levels.

Limitations of this study include the cross-sectional nature, precluding the ability to determine any cause-effect relationships. The current study we used a sample of nurses caring for elderly patients from a single organization, limiting the generalizability of the findings. Future studies using longitudinal data from a range of healthcare organizations could be beneficial in determining whether the findings of the current study hold over time and across other healthcare organizations.

Conclusions

This study shows the utility of the overall DCS model in predicting a spectrum of outcomes (attitudinal- and health-related) for nurses caring for elderly patients. The contribution of the organizational justice model was somewhat supported, predicting a degree of all the outcome variables except wellbeing. That is, using organizational justice variables to augment the DCS model was valuable in moving toward a greater understanding of the work conditions of nurses caring for elderly patients. Further, the pattern of results show the importance of the supervisor, both directly, through the effect of supervisor support and interpersonal justice, and indirectly, through the effects of control and procedural justice, in managing nurses caring for elderly patients. The results provide practical implications for managers of nurses in developing and maintaining levels of job control, support, and fairness, as well as monitoring levels of job demands.

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Clinical Resources

- A section of the UK's Health and Safety Executive that is focused on the health services industry, incorporating resources on stress and related issues: http://www.hse.gov.uk/healthservices/
- Health Workforce Australia, including health workforce research and planning information: http://www.nhwt.gov.au/
- The World Health Organization's overview of nursing staffing: http://www.who.int/hrh/en/

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