

Job Demands-Control-Social Support Model and coping strategies: predicting burnout and wellbeing in a group of Italian Nurses

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KEY WORDS

Job Demand-Control-Social Support Model; JDACS; burnout; nurses

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Modello Domanda-Controllo-Sostegno Sociale; DCS; burnout; infermieri

SUMMARY

Background: Nursing is generally considered to be a stressful profession. **Objectives:** The purpose of the present study was to test the core hypotheses of the job demands-control-social support model (JDACS) of Karasek & Theorell (1990). In order to refine and extend the JDACS model, we also analyzed the direct and interactive role of three coping strategies: task-oriented, emotion-oriented, and avoidance-oriented coping. **Methods:** Questionnaire data from 1383 nurses (77% female) were collected. **Results:** Controlling for demographic variables and non-linearity of the associations between job characteristics and outcomes (job satisfaction, burnout dimensions, psychological distress, and somatic complaints), hierarchical regression analyses indicated that job control and social support combined additively ($p < 0.001$) with job demands to explain the wellbeing outcomes (explained variance between 6% and 28%). Coping strategies accounted for additional variance ($p < 0.001$; explained variance between 4% and 15%) in all outcomes except in job satisfaction. Support was found for main effects of coping. Coping strategies did not moderate the impact of job characteristics on burnout and wellbeing. Emotion-oriented coping emerged as the most important predictor and was consistently associated with higher burnout levels and lower wellbeing levels. **Conclusions:** The results demonstrated the need to include the role of individual variables in the JDACS model. The limitations of the study, and theoretical and practical implications are discussed.

RIASSUNTO

«Il modello Domanda-Controllo-Sostegno Sociale e il ruolo delle strategie di coping nella predizione del benessere e del burnout in un gruppo di infermieri italiani». **Introduzione:** Un'ampia evidenza empirica testimonia che gli infermieri sperimentano una notevole quantità di stress nel corso della loro carriera. **Obiettivi:** Lo scopo principale del presente studio è stato quello di esaminare le modalità d'azione delle dimensioni lavorative del modello Domanda-Controllo-Sostegno Sociale (DCS) di Karasek & Theorell (1990). Abbiamo inoltre analizzato eventuali miglioramenti nel potere esplicativo del modello con l'inclusione delle strategie individuali di coping (strategie di fronteggiamento focalizzate sulla risoluzione dei problemi, sul controllo delle emozioni, sull'evitamento

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delle situazioni di disagio). **Metodi:** In base alle risposte fornite a un questionario somministrato in un gruppo di 1383 infermieri (77% femmine) sono state condotte una serie di analisi della regressione multipla, nella quali sono state considerate come variabili di disturbo il genere, l'età e le relazioni non lineari tra le variabili del modello DCS e le variabili criterio soddisfazione lavorativa, dimensioni del burnout, distress psicologico, e sintomi somatici. **Risultati:** Le analisi hanno evidenziato l'effetto additivo ($p < 0,001$) delle dimensioni del modello DCS nella spiegazione delle variabili criterio (% di varianza spiegata varia tra il 6% e il 28%). Il blocco che includeva le strategie di coping si è mostrato significativo ($p < 0,001$) nella spiegazione di tutte le variabili criterio (% di varianza spiegata varia tra il 4% e il 15%), eccezion fatta nel caso della soddisfazione lavorativa. Non sono risultate significative le interazioni tra dimensioni lavorative e strategie di coping. **Conclusioni:** Complessivamente i risultati dimostrano l'esigenza di considerare il ruolo delle variabili individuali nel modello DCS. Nella discussione verranno presentati i limiti dello studio e le implicazioni teorico applicative.

INTRODUCTION

Nursing is generally considered to be a stressful profession. The nature and organization of the job make nursing inherently difficult (1, 16, 20, 55). Since the mid-1980's, however, work stress among nurses escalated due to the increasing use of technology, changes in health care and increasing complexity of their work (1). These structural changes led to an *intensification* of activity in healthcare as providers seek to do more work, with fewer people, in less time, at lower costs (1, 3, 5, 6, 16, 42). In the last few years a state of emergency among nursing professionals was observed in Italy, reflected in high turnover, high rate of retirement and simultaneously low recruitment, so that the Italian health care context is characterized by one of the lowest nurses/per capita ratios (3.0 nurses per 1000) in Europe (18).

The main purpose of the present study was to test how and to what extent an integrative theoretical framework - based on the interaction between occupational stressors and resources, and individual coping strategies - could explain various dimensions of occupational and general psychological wellbeing, in a group of Italian nurses.

The Job Demands-Control-Social Support Model (JDSCS)

To study the impact of occupational stressors on occupational and general wellbeing, the Job De-

mands Control-Social Support (JDSCS) theory is regarded as a useful conceptual framework (4, 19, 23, 24, 30).

The original version of the model assumes two basic hypotheses of how certain work variables, job demands (e.g., time pressure) and control (e.g., decision authority and skill discretion), may combine and lead to various wellbeing outcomes: (a) the strain hypothesis which assumes additive effects of both: high job demands precipitate job strain, as does low job control (main effects); (b) the interaction or buffer hypothesis, according to which job control has a moderating effect on the relationship between job demands and job strain (interaction effect). Later, social support from co-workers and supervisors was added to the model (22, 24) as a third main dimension. In the literature (12, 46, 47) a crucial issue is whether job demands, job control and social support combine additively (high demands, low control and low workplace social support are associated with highest stress: (iso)strain hypothesis) or interactively (social support decreases the negative impact of high demands and low control: buffer hypothesis) to explain wellbeing.

In a review of 63 studies on the JDC(S) models and psychological outcomes, Van der Doef and Maes (47) explored the two basic hypotheses. They reported that the (iso)strain hypothesis has been tested more often than the buffer hypothesis, and that it has received considerable support, whereas the relatively limited number of studies testing the buffer hypothesis show inconsistent results. Simi-

larly, De Lange et al. (12), in a review on 45 longitudinal studies expressed modest support for buffer hypothesis; they concluded their paper "... the fact that the included studies reported few interaction effects is consistent with previous (mainly cross sectional) findings that multiplicative interaction effects are rare (p. 300)". The results of two studies conducted among health care workers (36, 48) supported the additive effects of job control and social support on the association between high job demands and negative health-related outcomes. However, researchers used general scales to detect differences in JDACS dimensions; several authors argued that the lack of sensitivity in the measures could be a possible reason that contributed to the lack of support for the buffer hypotheses of the model (35, 47, 49).

Moreover, the JDACS model is considered too simplistic because it is excessively characterized as a stimulus-model for stress, suggesting that only occupational demands (stressors) and external resources (job control and social support) can lead to strain and wellbeing (47). However, psychological, physical and/or behavioural responses to stressors are considered to be the result of the interaction between environment and the individual. Mounting evidence (26) supports the usefulness of the stress and coping model in integrating the process of adjustment to occupational stress.

In this study, we were not only interested in testing the basic assumptions of the JDACS model, but we applied the stress-coping model of the process of adjustment to occupational stress, and investigated the direct and moderating effects of coping on various indicators of general and occupational psychological wellbeing.

Coping

Coping strategies may be defined as "constantly changing cognitive and behavioural efforts to manage specific external and internal demands that are appraised as taxing or exceeding the resources of the person" (26; p. 141). Endler and Parker (17) divided coping strategies into task-oriented, emotion-oriented, and avoidance-oriented. The task-oriented coping dimension involves

strategies aimed at changing the stressful situation itself (e.g., problem-focused coping, primary control), emotion-oriented coping includes strategies aimed at reframing the problem to fit with external demands or managing the negative emotions aroused by the stressful event (e.g., emotion-focused coping), and avoidance-oriented coping is characterized by escape strategies, in the form of distraction and social diversion.

Two alternative models were proposed to explain relationships between stress, coping strategies, and well-being (57).

The main effects model proposes that stressors and coping strategies have direct, independent effects on wellbeing. This line of research was assumed in the majority of studies (57). In general, problem-focused coping responses were found to be more reliably related to diminished emotional distress than were both emotion and avoidance-focused coping responses (32). Moreover, emotion-focused coping responses and avoidance coping were linked to increased, rather than decreased, psychological distress. Welbourne et al. (54), in a group of 190 nurses, found that job satisfaction was associated with greater use of problem solving/cognitive restructuring coping styles, and less use of avoidance coping styles to deal with workplace stress. However, the findings are not always consistent within and between studies. For instance, Bennett et al. (5) in a group of UK nurses found that the use of avoidance coping strategies such as denial and use of alcohol and drugs was associated with high levels of anxiety and low levels of work satisfaction; but after considering the role of occupational variables through a stepwise regression analysis, the significant associations disappeared. Thus, these findings suggest that occupational stress and coping research needs to examine the role of coping strategies within a larger theoretical framework that includes occupational stressors, job resources, and coping strategies.

Alternatively, the interactive model proposes that coping strategies moderate the impact of stressful episodes to varying degrees. Consistent with the stress-coping interaction hypothesis is the view that coping strategies may buffer the individual against the negative consequences of stressors,

with their effect on wellbeing being evident only at high levels of perceived stress. There is less research on stress-buffering effects of coping processes than on their main effects on psychological wellbeing (57). Stress-buffering effects of task-focused coping were found in some studies. For example, Daniels (9) attempted to enhance the explanatory and predictive power of the JDCS model examining the role of coping strategies as moderator variables in a heterogeneous sample of 272 workers; he found that active coping strategies (i.e., problem-solving behaviour) have a favourable effect on employee health, but only among those with high job control and high job demands. Shimazu et al. (40) in their study conducted among 726 male employees in a large electrical company in Japan, demonstrated moderating relationships between active coping and social support from fellow workers in explaining psychological distress; whereas they did not find any evidence of interaction with job control and social support from supervisors. Furthermore, de Rijk et al. (13) examined an interactive model in a sample of Dutch emergency unit nurses and found that active coping in combination with a high level of job control attenuated increases in emotional exhaustion due to job demands. Few studies have found that both emotion-focused coping and avoidance-focused coping exacerbated the negative effect of stressors on the strain outcomes (8). However, other studies did not find any effect of interaction between occupational stressors and emotion-focused coping on distress symptoms (21); and between occupational stressors and avoidance-oriented coping (9, 21).

Research findings provide mixed support for both models, although interactive (buffer) effects may be more prevalent for problem-focused coping, and main effects for other coping strategies.

Aims of the present study

Several studies have shown that the components of psychological wellbeing can be grouped into five main categories: cognitive, physical, affective, motivational, and behavioural (39). In order to provide a general overview of employee wellbeing, outcome variables from four of these five categories were in-

cluded, namely burnout (cognitive, motivational and affective dimensions), psychosomatic complaints (physical and affective components), and job satisfaction (cognitive and motivational dimension).

Burnout could be described as a combination of emotional exhaustion, depersonalisation, and diminished personal accomplishment that may occur among individuals “who work with other people in some capacity” (31). Burnout prevalence among nurses varies between 2% and 11% (25, 39).

Psychosomatic complaints regard general feelings of illhealth, which are an expression of the tendency to somatize psychosocial stress conditions, such as headache and back pain. We considered psychosomatic health complaints because in previous research it was shown that in nurses, as health care workers, psychosomatic complaint levels were above average risk (15).

Lastly, we considered *job satisfaction* because previous studies (28) identified this as a key factor in nurses' recruitment and job permanence. Job satisfaction could be defined as “a positive (or negative) evaluative judgment one makes about one's job or job situation” (53, 54), which can be explained by the perceived degree of fulfilment within the organizational setting. Empirically, there is some evidence that low job satisfaction is a consequence of perceived stress at the workplace, however further research is required to understand the role and action of occupational stressors, job resources and individual differences (28).

In summary, the aim of the present study was to test an expanded JDCS model which incorporates the role of coping strategies.

More specifically we tested four hypotheses

H1): high job demands, low control and low social support are related to high burnout, high psychosomatic complaints, and low job satisfaction (additive or iso-strain hypothesis);

H2): job control and social support will buffer the negative impact of job demands on occupational and general psychological wellbeing (two-way -buffer -interactive hypothesis); and/or a three-way interaction effect between demands, control and social support (three-way -buffer -interactive hypothesis).

As regards coping strategies, we tested two hypotheses:

H3) in accordance with the main effects model, it was proposed that all three coping strategies would have direct effects on all general and occupational wellbeing outcomes, beyond the impact of demographic variables and job characteristics; more specifically, low levels of task-oriented coping, and high levels of emotion-oriented coping and avoidance-oriented coping will be associated with high burnout, high psychosomatic complaints, and low job satisfaction;

H4) in line with the interactive model, we tested the moderating role of coping strategies in the relationship between job characteristics and outcomes; more specifically we assumed that problem-oriented coping would buffer the negative impact of job demands and/or low job resources on occupational and general psychological wellbeing; whereas emotion-oriented coping and avoidance-oriented coping would enhance the negative effects of job demands and/or low job resources on occupational and general psychological wellbeing.

METHODS

Subjects and procedure

Full-time nurses working in 9 public health care organizations in central Italy (Umbria and Lazio Regions) volunteered to take part in the study. The research was approved by the local ethics committees. Firstly, with the help of the hospital management, the researchers randomly selected 2186 nurses, 1405 of whom agreed to take part in the study (64% response rate). They were contacted at their place of work and received a questionnaire and an accompanying letter in which they were invited to participate in the study. Informed consent was obtained from all participants. They were asked to leave their completed anonymous questionnaires in a sealed box. Twenty-two incomplete questionnaires were excluded. Thus, the final group consisted of 1383 nurses. Data were collected anonymously and the voluntary nature of the study was emphasized.

The mean age of the respondents was 39.1 years ($SD=8.4$); 22.6% ($N=312$) were men and 77.2% ($N=1067$) were women. The mean length of service in the nursing profession was 15.4 years ($SD=9.2$), 50% ($N=691$) worked in medical and surgical wards, 17.6% ($n=244$) worked in emergency wards, and 31.3% ($N=433$) were community nurses.

Measurements

The study variables were divided into four sections: socio-demographic variables, JDCS variables, coping strategies and wellbeing outcomes.

- *Background variables.* Age was measured in years and gender was categorized as 1=male and 2=female.

- *JDCS Variables.* These variables were measured with three scales of the Italian language version of the Leiden Quality of Work Life Questionnaire for Nurses (LQWLQ-N; (29)). These three LQWLQ-N scales provide an occupation-specific measurement corresponding closely to the original operationalization of job demands, control, and social support (30). Responses were measured on a 4-point scale ranging from 1 (*totally disagree*) to 4 (*totally agree*). Job demands were measured with one scale (work and time pressure: 4 items; e.g. "I must care for too many patients at once"). Control was measured combining ranks for skill discretion (4 items; e.g. "My work is varied.") and decision authority (4 items; e.g. "I can decide for myself when to carry out patient-related tasks and when to carry out non-patient-related tasks."). Social support was assessed combining two scales: social support from supervisor (6 items; e.g. "I can count on the support of my direct supervisor when I face a problem at work.") and social support from co-workers (6 items; e.g. "The nurses in my department work well together"). For the purposes of this study both scales were integrated into one social support scale.

- *Coping Strategies.* Data regarding nurses' responses to stressful situations were collected by using the Coping Inventory for Stressful Situations – Situation Specific Form (CISS-SSF) (17). Nurses rated the extent to which they engaged in various types of coping activities when confronted with an

occupational stressful situation using a 5-point Likert-type scale ranging from “*Not at All*” to “*Very Much*”. Scores were calculated for the three scales: task-oriented coping (7 items, e.g. “Decide a course of action and follow it”), emotion-oriented coping (7 items, e.g. “Blame myself for the situation”) and avoidance-oriented coping (7 items, e.g. “Go out for a snack or a meal”).

- *Well-being outcomes.* Two categories of outcomes were assessed: general wellbeing and occupational wellbeing. General wellbeing outcomes were assessed with three scales from the Italian version (50) of the Symptom Checklist (SCL-90; (14)): anxiety (10 items, e.g. “feeling afraid”), depression (16 items, e.g. “feeling lethargic”) and somatization (12 items, e.g. “headache”). Respondents indicated to what extent they had experienced each symptom over the past week. Answers were provided on a 5-point scale (1=*not at all*; 5=*very much*). Due to high intercorrelations ($r > 0.70$), the items comprising the scales of anxiety and depression were combined to form a single measurement of psychological distress. The occupational wellbeing dimensions were measured through job satisfaction and the three burnout components (emotional exhaustion, depersonalization and personal accomplishment). Job satisfaction was operationalized with the seven-item LQWLQ-N scale (e.g., “I am satisfied with my job”). Burnout was assessed by the Italian version (43) of the 22-item Maslach Burnout Inventory (MBI; (31)) which contains three subscales: emotional exhaustion (9 items; e.g. “I feel frustrated by my job”); depersonalisation (5 items; e.g. “I don’t really care what happens to some patients”) and personal accomplishment (8 items; e.g. “I feel very energetic”). Participants were asked to rate from 0 (*never*) to 6 (*daily*) how often they experienced feelings described in each of the 22 items.

Data analysis

Descriptive statistics, Pearson’s correlations and multiple regression analyses were performed in order to answer the research questions. For all tests, the significance level was set at 0.01. To analyse the pattern of direct relationships between the variables bivariate correlations were calculated.

Previous studies (10, 11, 33, 34, 51) showed that non-linear relationships exist between work dimensions and outcomes. In this study, a series of regression analyses was carried out for each outcome variable to examine the (non)-linearity of the relationships. More specifically, the linearity of the relationship between each variable of the JDCS model and each outcome variable was checked introducing a quadratic term (squared value of the job dimension examined) in the regression equation.

Additive or buffer effects of the JDCS variables and the unique contribution of coping strategies after controlling for the JDCS variables were tested in hierarchical regression analyses (2). We entered gender and age (control variables) in the first block, and the main effects of the job dimensions in the second block. In the third block, the squared scores of the job dimensions which showed significant curvilinear relationships in the preliminary analyses were entered. Subsequently, the two-way and three-way interactions between the JDCS variables were included in the model. Next, the main effects of the three coping strategies: task, emotion and avoidance were entered, followed by the interactive terms of coping strategies and JDCS dimensions.

If the non-linear effects or the interaction effects of the JDCS and coping strategies proved non-significant, they were omitted from the final regression analyses. In all regression analyses both JDCS dimensions and coping strategies were standardized to avoid multi-collinearity that might otherwise result from the use of quadratic and multiplicative terms (2).

RESULTS

Preliminary analyses

The correlations between the variables and their respective means, standard deviations and reliability (Cronbach’s α) are shown in table 1. All scales measuring the study variables displayed acceptable levels of reliability (alpha coefficients ranged from 0.69 to 0.94).

Table 1 - Means (M), Standard Deviations (SD), Internal Consistencies (Cronbach's α), and Zero-Order Correlations of the Study Variables (N=1383)

| Variable | M | SD | α | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|------------------------------|------|------|----------|----------|----------|----------|----------|----------|---------|----------|----------|----------|----------|----------|----------|----------|
| <i>Background variables:</i> | | | | | | | | | | | | | | | | |
| 1) Gender | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2) Age | 39.1 | 8.4 | --- | 0.01 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| <i>Job conditions</i> | | | | | | | | | | | | | | | | |
| 3) Job Demands | 2.6 | 0.7 | 0.74 | 0.01 | 0.02 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4) Job Control | 2.8 | 0.6 | 0.74 | 0.00 | 0.00 | -0.03 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 5) Social Support | 2.8 | 0.6 | 0.87 | 0.01 | 0.00 | 0.00 | 0.44*** | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| <i>Coping Strategies</i> | | | | | | | | | | | | | | | | |
| 6) Task-oriented Coping | 3.4 | 0.7 | 0.69 | -0.03 | -0.08** | 0.02 | 0.16*** | 0.10*** | --- | --- | --- | --- | --- | --- | --- | --- |
| 7) Emotion-oriented Coping | 2.3 | 0.8 | 0.82 | 0.12*** | -0.06** | 0.06* | -0.12*** | -0.09** | 0.02 | --- | --- | --- | --- | --- | --- | --- |
| 8) Avoidance-oriented Coping | 2.0 | 0.8 | 0.78 | 0.01 | -0.23*** | 0.02 | -0.00 | -0.01 | 0.04 | 0.37*** | --- | --- | --- | --- | --- | --- |
| <i>Wellbeing Outcomes</i> | | | | | | | | | | | | | | | | |
| 9) Emotional exhaustion | 19.9 | 12.1 | 0.89 | 0.05 | 0.05 | 0.20*** | -0.24*** | -0.23*** | -0.04 | 0.25*** | 0.10*** | --- | --- | --- | --- | --- |
| 10) Depersonalization | 4.4 | 5.1 | 0.70 | -0.11*** | -0.06* | 0.09** | -0.19*** | -0.17*** | -0.08** | 0.25*** | 0.16*** | 0.39*** | --- | --- | --- | --- |
| 11) Personal accomplishment | 36.2 | 8.8 | 0.85 | 0.02 | 0.13*** | -0.00 | 0.28*** | 0.22*** | 0.23*** | -0.25*** | -0.15*** | -0.19*** | -0.33*** | --- | --- | --- |
| 12) Psychological distress | 70.9 | 23.1 | 0.94 | 0.17*** | 0.08** | 0.11*** | -0.19*** | -0.16*** | -0.01 | 0.43*** | 0.11*** | 0.52*** | 0.31*** | -0.22*** | --- | --- |
| 13) Somatic complaints | 25.0 | 8.6 | 0.84 | 0.15*** | 0.09** | 0.18*** | -0.17*** | -0.20*** | -0.03 | 0.23*** | 0.07** | 0.50*** | 0.19*** | -0.14*** | 0.65*** | --- |
| 14) Job satisfaction | 17.1 | 3.8 | 0.72 | -0.01 | -0.02 | -0.13*** | 0.44*** | 0.42*** | 0.08** | -0.11*** | 0.02 | -0.39*** | -0.20*** | 0.25*** | -0.24*** | -0.25*** |

^a Male=1; Female=2
 Note: *p < 0.05; **p < 0.01; ***p < 0.001

Confirming expectations, the correlations between the JDCS and the dependent variables were all significant and in the expected directions, with the exception of a non-significant correlation between demands and personal accomplishment.

Task-oriented coping was associated both with job resources (job control and social support) and with some dimensions of occupational wellbeing (depersonalization, personal accomplishment and job satisfaction); more specifically, high levels of task-oriented coping were related with high levels of job control, social support, personal accomplishment and job satisfaction, and with low levels of depersonalization. Emotion-oriented coping showed significant associations with all JDCS variables and with all outcomes and the relationships were in the expected directions: high levels of emotion-oriented coping were associated with low values of job control, social support, personal accomplishment and job satisfaction, and with high values of job demands, emotion exhaustion, depersonalization, psychological distress, and somatic complaints. Avoidance-oriented coping did not show any significant correlation with the JDCS dimensions but was correlated with all outcomes with the exception of job satisfaction: the correlations were in the expected directions: high values of avoidance-oriented coping were associated with lower values of personal accomplishment, and with higher values of emotional exhaustion, depersonalization, psychological and somatic complaints.

Testing nonlinear associations

The results of the linearity check showed that job demands dimension was significantly non-linearly related with emotional exhaustion (Figure 1, $F_{change}(1, 1119)=13.39$, $p=0.000$, $\Delta R^2=0.01$), psychological distress (Figure 2, $F_{change}(1, 1048)=8.99$, $p=0.003$, $\Delta R^2=0.01$), somatic complaints (Figure 3, $F_{change}(1, 1119)=13.75$, $p=0.000$, $\Delta R^2=0.01$), and with job satisfaction (Figure 4, $F_{change}(1, 1048)=13.29$, $p=0.000$, $\Delta R^2=0.01$). The non-linear curves were U-shaped for distress variables (emotional exhaustion, psychological distress and somatic complaints variables) and inverted U-shaped for wellbeing job satisfaction dimension;

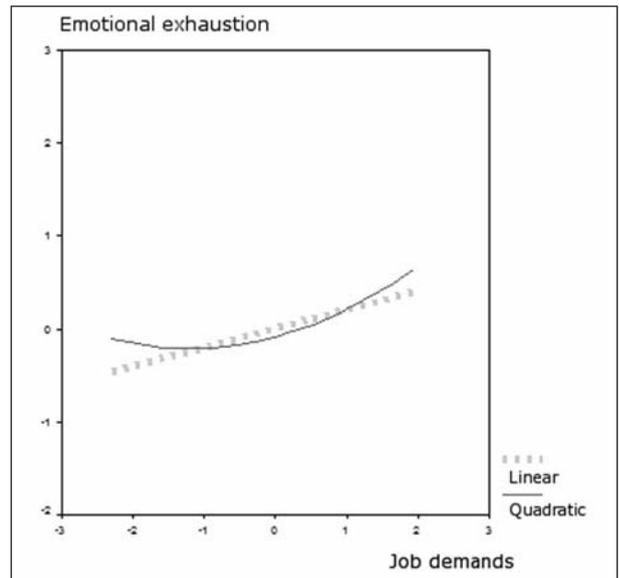


Figure 1 - Graphical representation of the non-linear relationship between job demands and job satisfaction

showing that higher and lower levels of demands were associated with high scores of the former and with low scores of the latter.

Social support, showed a non-linear association with somatic complaints (Figure 1, $F_{change}(1, 1119)=8.36$, $p=0.004$, $\Delta R^2=0.01$). Job control did not show significant curvilinear relationships with any criterion variable.

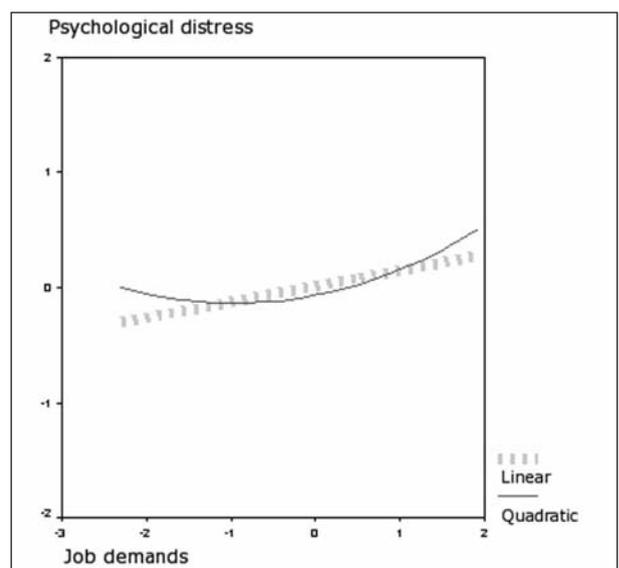


Figure 2 - Graphical representation of the non-linear relationship between job demands and emotional exhaustion

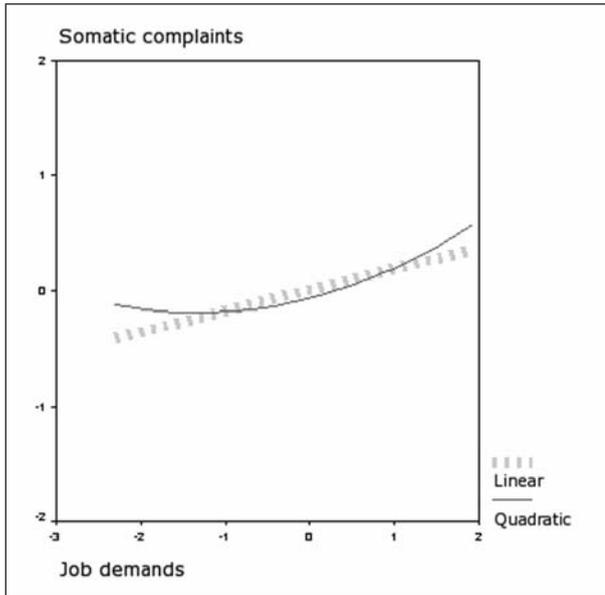


Figure 3 - Graphical representation of the non-linear relationship between job demands and somatic complaints

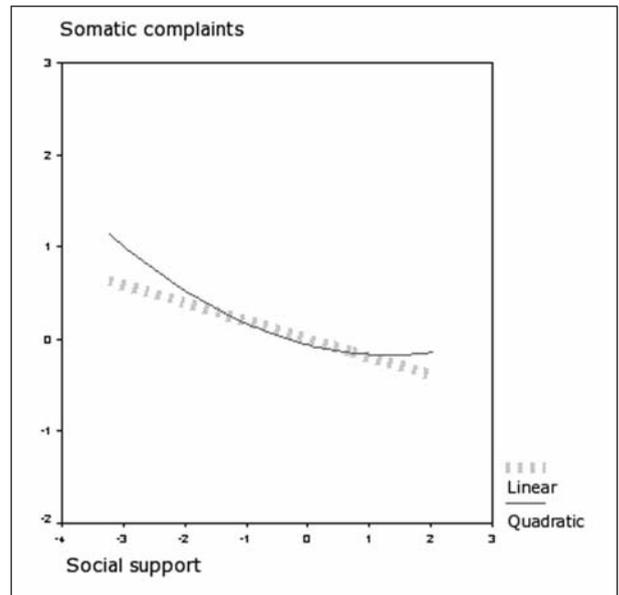


Figure 5 - Graphical representation of the non-linear relationship between social support and somatic complaints

Hierarchical regression model

Table 2 presents the results of the hierarchical regression analyses in which burnout components, job satisfaction, psychological distress and somatic complaints were regressed on the psychosocial job

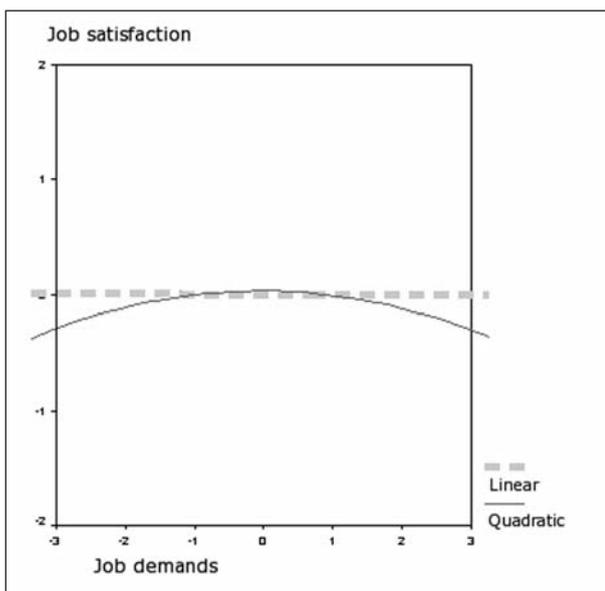


Figure 4 - Graphical representation of the non-linear relationship between job demands and psychological distress

dimensions and coping. The last significant steps are discussed below.

Testing the additive and/or interactive effects of the JDACS Model

The analyses of all outcomes showed consistent additive effects of the psychosocial work dimensions. In line with the iso-strain hypothesis (H1 hypothesis), higher job demands, lower control and lower support were associated with higher levels of emotional exhaustion ($Fchange(3, 1275)=59.2, p=0.000, \Delta R^2=12\%$), depersonalization ($Fchange(3, 1262)=24.6; p=0.000, \Delta R^2=6\%$), psychological distress ($Fchange(3, 1116)=36.5, p=0.000, \Delta R^2=6\%$), and somatic complaints ($Fchange(3, 1201)=37.5 p=0.000, \Delta R^2=6\%$). Analyses of positive outcomes, however, partially supported the iso-strain hypothesis H1. Both higher levels of control and higher levels of social support were associated with higher levels of personal accomplishment ($Fchange(3, 1202)=37.5, p=0.000, \Delta R^2=8\%$) and job satisfaction ($Fchange(3, 1267)=154.1, p=0.000, \Delta R^2=28\%$). Only in the case of personal accomplishment, did job demands not show any significant association.

Table 2 - Results of Hierarchical Multiple Regression Analyses : Standardized Coefficients (β s)

| Variables | <i>J.S.</i> | <i>E.E.</i> | <i>D.</i> | <i>P.A.</i> | <i>S.C.</i> | <i>P.D.</i> |
|--------------------------------|-------------------|-------------------|-------------------|-------------------|-------------------|-------------------|
| Gender (1=M; 2=F) | -0.02 | 0.05 | -0.11*** | 0.01 | 0.15*** | 0.13*** |
| Age | -0.03 | 0.07** | -0.06* | 0.13*** | 0.08** | 0.10*** |
| Block 1 ΔR^2 | 0.00 | 0.01** | 0.02*** | 0.02*** | 0.03*** | 0.02*** |
| Gender (1=M; 2=F) | -0.02 | 0.05 | -0.12*** | 0.01 | 0.16*** | 0.14*** |
| Age | -0.02 | 0.06* | -0.06* | 0.13*** | 0.07* | 0.09*** |
| Demands | 0.03 | 0.13*** | 0.09** | 0.04 | 0.11*** | 0.14*** |
| Control | 0.32*** | -0.20*** | -0.17*** | 0.23*** | -0.10*** | -0.14*** |
| Social support | 0.30*** | -0.16*** | -0.09** | 0.10** | -0.16** | -0.12*** |
| Block 2 ΔR^2 (R^2) | 0.28*** | 0.12*** (0.13) | 0.06*** (0.08) | 0.08*** (0.10) | 0.06*** (0.09) | 0.06*** (0.08) |
| Gender (1=M; 2=F) | -0.02 | 0.05 | -0.12*** | 0.01 | 0.15*** | 0.14*** |
| Age | -0.03 | 0.08** | -0.06* | 0.13*** | 0.08** | 0.10*** |
| Demands | 0.20*** | -0.17*** | 0.09** | 0.04 | -0.14*** | -0.12* |
| Control | 0.30*** | -0.16*** | -0.17*** | 0.23*** | 0.05 | -0.12*** |
| Social support | 0.29*** | -0.16*** | -0.09** | 0.10** | -0.19*** | -0.11*** |
| Demands * Demands | -0.28*** | 0.36*** | N.E. | N.E. | 0.31*** | 0.20*** |
| Social Sup. * Social Sup. | N.E. | N.E. | N.E. | N.E. | 0.14** | N.E. |
| Block 3 ΔR^2 (R^2) | 0.02*** (0.30) | 0.03*** (0.16) | NS: | NS: | 0.04*** (0.13) | 0.01* (0.09) |
| Gender (1=M; 2=F) | -0.02 | 0.02 | -0.15*** | 0.05 | 0.12*** | 0.08*** |
| Age | -0.03 | 0.10*** | -0.03 | 0.11*** | 0.09** | 0.12*** |
| Demands | 0.20*** | -0.16** | 0.08** | 0.04 | -0.14** | -0.10* |
| Control | 0.30*** | -0.14*** | -0.12*** | 0.19*** | 0.04 | -0.09** |
| Social support | 0.29*** | -0.15*** | -0.08** | 0.08** | -0.19*** | -0.10*** |
| Demands * Demands | -0.28*** | 0.34*** | N.E. | N.E. | 0.30*** | 0.17*** |
| Social Sup. * Social Sup. | N.E. | N.E. | N.E. | N.E. | 0.14** | N.E. |
| Task-oriented coping | 0.02 | 0.00 | -0.05 | 0.20*** | -0.04 | -0.01 |
| Emotion-oriented coping | -0.05 | 0.21*** | 0.23*** | -0.21*** | 0.18*** | 0.40*** |
| Avoidance-oriented coping | 0.04 | 0.04 | 0.07* | -0.04 | 0.03 | -0.01 |
| Block 4 ΔR^2 (R^2) | 0.00 (0.30) | 0.05*** (0.20) | 0.07*** (0.15) | 0.10*** (0.21) | 0.04*** (0.17) | 0.15*** (0.24) |
| R^2 | 0.31 | 0.21 | 0.15 | 0.22 | 0.17 | 0.24 |
| Adj R^2 | 29 | 18 | 13 | 20 | 16 | 22 |

* $p < 0.01$; ** $p < 0.005$; *** $p < 0.001$;

J.S.=Job Satisfaction; E.E.=Emotional Exhaustion; D.=Depersonalization; P.A.=Personal Accomplishment; S.C.=Somatic Complaints; P.D.=Psychological Distress. N.E.=Not Entered; N.S.=Not Significant. Block n ΔR^2 : R Squared Change

Job demands, job control and social support had no statistically significant two-or three-way interaction effects on any wellbeing outcomes. This means that the buffer hypothesis (H2) was not supported.

The role of coping strategies

As reported in table 2, the main effects of coping strategies explained additional variance in all outcomes except job satisfaction. More specifically,

an additional 5% for emotional exhaustion ($F_{change}(3, 1242)=24.4, p=0.000$); 7% for depersonalization ($F_{change}(3, 1229)=33.3, p=0.000$); 10% for personal accomplishment ($F_{change}(3, 1174)=47.3, p=0.000$); 4% for somatic complaints ($F_{change}(3, 1171)=16.7, p=0.000$), and lastly, 15% for psychological distress ($F_{change}(3, 1091)=59.1, p=0.000$).

The most important coping strategy was emotion-oriented coping: higher levels of emotion-oriented coping were associated with higher levels of psychological distress (emotional exhaustion, depersonalization, psychological distress, and somatic complaints) and lower levels of personal accomplishment. On the basis of these findings, it can be concluded that hypothesis H3a, regarding the main effects model of coping strategies, was partially supported. In testing the interactive coping strategies model, all interaction terms failed to reach significance; hence, hypothesis H3b was not supported.

The final explanation of occupational and general wellbeing outcomes

Job satisfaction

In line with the iso-strain hypothesis, all JDC(S) variables significantly added to the variance explained in job satisfaction that was negatively associated with psychological job demands and conversely associated both with social support and control. The previously mentioned curvilinear association between job demands and satisfaction was maintained in the final model: the \cap -shaped relationship indicated that low levels and high levels of job demands were associated with lower levels of satisfaction. The block including coping strategies did not add any significant contribution to the final model. After the last significant step, 29% of variance (adj. R^2) of job satisfaction was explained by the predictors.

Burnout dimensions

The final model for *emotional exhaustion* accounted for 18% of the explained variance (adj. R^2).

Significant multivariate associations were found for age, all JDCS variables, curvilinear effect of job demands, and emotion-oriented coping. Higher levels of demands and emotion-oriented coping were associated with higher levels of emotional exhaustion, whereas high levels of both job resources (control and social support) were associated with low levels of emotional exhaustion. In addition, it appeared that older nurses felt more exhausted. The significant non-linear relationship between job demands and exhaustion indicated that emotional exhaustion showed a tendency to increase, in particular, when the job demands level was perceived as low, but also when the level of job demands was reported as very high.

Depersonalization was related to gender, whereby men indicate that they feel more cynical and negative towards patients. Negative job conditions, such as high demands as well as low levels of control and social support, play a significant role in the occurrence of higher levels of depersonalisation. Lastly both emotion-oriented coping and avoidance-oriented coping contributed to this cynical and negative attitude. Altogether, 13% (adj. R^2) of the variance in depersonalisation was explained.

For the third burnout factor *personal accomplishment* (in total 20% of the explained variance, adj. R^2) the main predictors were high levels of control and social support. In addition, high levels of task-oriented coping and low levels of emotion-oriented coping were related to higher levels of personal accomplishment, as did older age.

Somatic complaints

The regression analysis for somatic complaints showed that almost 16% of the variance (adj. R^2) of the scale was explained by demographic variables, by the main effects of job demands and social support, by the non-linear associations of both of job demands and social support and by emotion-oriented coping. Female and older nurses reported higher levels of somatic complaints. Also, a closer inspection of the relationships between job demands, social support and somatic complaints revealed that low levels both of job demands and social support, as well as higher levels of these two

job dimensions, were associated with higher levels of somatic complaints. Lastly subjects characterized by high levels of emotion-oriented coping and low levels of job control, showed higher levels of somatic complaints.

Psychological distress.

With regard to psychological distress, the regression model accounted for 22% of the explained variance (adj. R^2). Important associations were found for gender, age, all JDCS variables, curvilinear effect of job demands and emotion-oriented coping. The previously demographic differences mentioned were confirmed in the last significant block: female and older nurses reported higher levels of psychological distress. Job demands and emotion-oriented coping were positively associated with psychosomatic distress, whereas both control and social support were negatively related to criterion variable.

DISCUSSION

This study was carried out to answer some research questions. We wanted to investigate the nature of the relationships between psychosocial job dimensions and job-related strain, focusing on the two basic assumptions (additive and/or interactive hypotheses) of JDCS model; we also focused on the additional variance explained by coping strategies, focusing on additive and/or interactive hypotheses.

Firstly, it was assumed that job demands, job control and social support would be significantly associated with job-related strain. This assumption was confirmed in all outcomes, except in the case of personal accomplishment where job demands did not show a significant relationship. Further, a second order of assumptions regarding two-way or three-way interactions between demands and job resources (as stated by Karasek & Theorell, (24)) in predicting job-related strain was tested. These assumptions were not supported. This finding is in line with Taris (46), who concluded that full support for the buffer hypothesis was found in a small

percentage of studies, little more than chance level. The available evidence suggests that the interactive effect is an exception rather than the rule. Some authors (12, 47) have argued that the assumptions of the JDCS model are only valid for heterogeneous occupational populations. When homogeneous occupational samples are considered, the resulting lack of variance in the psychosocial job characteristics has been put forward as an explanation for the lack of support for the JDCS. However, in this study the lack of variance in the psychosocial job dimensions was overcome with the use of a nurses-specific questionnaire.

Furthermore, regression results showed some curvilinear associations between JDCS dimensions and psychological well-being outcomes. Although, it should be noted that the variance increments were rather low (1 per cent), the power of statistical tests for quadratic terms was in line with previous studies (10, 33, 34) and it was expected to be low (2). The shapes of curvilinear relationships were in the expected direction of "Vitamin Model" (51). Warr argued that the pattern of association between each job dimension and each index of mental health is similar to the curvilinear relationship between vitamins (in particular A and D) and physical health. Vitamin intake is required for physical health up to a certain level, after which it may induce toxic effects in the human organism (additional decrement pattern). A similar inverted U-shaped relationship would characterise the association between demand, control, and support on the one hand and wellbeing on the other. Given that five out of eighteen possible curvilinear associations (28%) were significant at 0.01; this study demonstrated the importance of testing the non-linear relationships between job characteristics and distress-wellbeing outcomes.

Another central aim of the study was to examine the nature of the relationships between occupational stressors, job resources, coping strategies, and wellbeing. Concerning the additive hypothesis, this was partially supported by the data: only in the case of job satisfaction, coping strategies did not account for any significant amount of variance.

In this study, emotion-oriented coping proved to be the most important coping strategy, as it was

consistently associated with all outcomes under study. Higher levels of emotion-oriented coping were associated with higher scores of emotional exhaustion, depersonalization, psychological distress and somatic complaints, and with lower scores of personal accomplishment. Whereas, after taking into account demographic and JDCS dimensions, task-oriented coping was significant only in the case of personal accomplishment and lost its significant associations in the prediction of depersonalization and job satisfaction; avoidance-oriented coping showed a significant relationship with depersonalization, but lost its significant correlations in the prediction of emotional exhaustion, personal accomplishment, psychological and somatic complaints. It should be pointed out that previous studies found mixed results regarding the main effects hypothesis. However, as mentioned in the introduction, studies that examined the main effects hypothesis controlling for demographic and job dimensions reported an attenuation or elimination of the direct effects of coping strategies on wellbeing outcomes (5, 49). The hypothesis regarding the interactive role of coping strategies (H3) was not supported; we found no evidence that coping strategies moderate the JDCS effects on wellbeing.

The result of the multiple regression analyses revealed a somewhat different picture for each outcome considered. For instance, job satisfaction was mainly explained by additive effects of JDCS variables (27%); another 1% was accounted for by non-linear association of job demands. Only in this case, coping did strategies not account for a significant amount of variance, probably because we operationalized job satisfaction as an agreeable or positive state resulting from the appraisal of one's job and/or one's organization without considering (individual) self-appraisal dimensions; therefore the most important predictors were job demands and job resources. With regard to the burnout dimensions, the findings were in line with the results of the meta-analysis made by Lee and Ashforth (27): job demands dimension was primarily associated (linearly and non-linearly) with emotional exhaustion, whereas resources (job control and social support) were more strongly related to depersonalization and personal accomplishment. The associa-

tions with coping strategies were in line with the burnout literature (37, 39). Emotion-oriented coping explained variance in all three burnout dimensions confirming its role as a dysfunctional coping strategy; avoidance-oriented coping explained variance in depersonalization in line with the theories of both Maslach (31) and Cherniss (7), that consider depersonalization as a defensive coping strategy characterized by avoidance and withdrawal. Personal accomplishment was associated with task-oriented coping: in line with the literature (39) subjects with high levels of personal accomplishment will in general attribute positive outcomes to intrinsic factors, and negative outcomes to external factors. Finally, as regards the two non-job-related measures psychological and somatic distress, the results showed a similar trend: main significant effects of JDCS variables were in line with the iso-strain hypothesis, non-linear effects of demands and social support (only in the case of somatic complaints) explained an additional 1 per cent of variance, finally emotion-oriented coping accounted for notable portions of variance (15% and 4%). The inclusion of coping strategies to extend the JDCS model revealed the important role of emotion-oriented coping. In this study we considered coping as a goal-directed process in which the individual directs thoughts and behaviour towards the goals of resolving the source of stress, or managing emotional reactions to stress, or avoiding the stressors (26). A possible reason for this finding can be that the nursing profession in Italy is very stressful from an emotional point of view, due to the permanent employment status and the "emergency" state of nursing in Italian health care organizations. Therefore the development of purposeful responses, that are directed towards mitigating negative emotions arising as a result of workplace stress, could be addressed in specific training courses.

Limitations

The present study has some limitations. Firstly, the generalization of our results may be limited because the study was based on a selection of health care organizations in Italy; hence, the results are

not representative of Italy as such. Second, this study was based on data collected in the context of a nurses occupational stress survey, therefore it has the advantage of avoiding the confounding effects of occupational differences, but it has the disadvantage that results cannot be generalized to other occupations. Third, like all cross-sectional research, this study does not provide possibilities for causal inferences. In the general literature on stress and coping, researchers disagree about causal directionality between a person and the environment. Does the environment cause emotional and physiological reactions, or does an individual's internal state alter his or her perception of the environment and somehow create problems? A carefully designed longitudinal study, with appropriate time intervals (4, 56) is warranted to enhance insight into the causal processes involved. Furthermore, it should be noted that the variance explained in the outcomes is relatively low (29% of job satisfaction, 18% of emotional exhaustion, 13% of depersonalization, 20% of personal accomplishment, 16% of psychological distress and 22% of somatic complaints). However, given the cross-sectional design, we cannot rule out the influence of cumulative exposure to various job demands and resources (38), and given the multi-causal aetiology of wellbeing and health, including both work-related and non-work-related factors, it is impossible to build a deterministic model that covers all the variables influencing wellbeing, thus this is a fairly explicable result (41). Finally, our study relies on self-reported measurementss. The correlations among variables could be inflated by affective dispositions, such as Negative Affectivity (52). However, in two contributions, Spector et al. (44, 45) demonstrated that this problem is probably overstated. These authors (45) argued that if neither the stressor nor the strain variables are characterized by affective tone and are overlapping with negative affectivity, as is the case of all predictors and the majority of the outcomes in our data, then the inflating effect is very small. Furthermore, the same authors (45) concluded that partializing out the effect of negative affect potentially removes substantial effects between antecedents and outcomes rather than bias, and as such may lead to underestimation of the effects.

Implications

Despite these limitations, the present findings have some theoretical and practical implications. The most important theoretical implication of this study stems from the fact that in the explanation of employee burnout and wellbeing we found no support for interactive effects between job stressors and job resources, nor between job characteristics and coping strategies. This suggests that health care organizations should pay attention independently to occupational stressors, job resources, and to individual coping strategies. The findings thus emphasize that both organizational and individual interventions are warranted in order to increase occupational wellbeing. Therefore, reducing job demands and fostering job resources by making changes in the job design (e.g. task enrichment, decentralization of decision authority), and the working environment (e.g. staffing, managerial style); seem promising initiatives, since these factors play an important role in the development of occupational wellbeing on the one hand and burnout symptoms and health complaints on the other. Furthermore, stress management training focussing on extending the individual's repertoire of coping behaviour, and enhancing the employee's potential to implement ways of coping that are appropriate to the circumstances, seem worthwhile

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED

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