

Sense of coherence and job characteristics in predicting burnout in a South African sample

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Orientation: Research that considers the effects of individual characteristics and job characteristics jointly in burnout is necessary, especially when one considers the possibility of curvilinear relationships between job characteristics and burnout.

Research purpose: This study examines the contribution of sense of coherence (SOC) and job characteristics to predicting burnout by considering direct and moderating effects.

Motivation for this study: Understanding the relationships of individual and job characteristics with burnout is necessary for preventing burnout. It also informs the design of interventions.

Research design, approach and method: The participants were 632 working adults (57% female) in South Africa. The measures included the Job Content Questionnaire, the Sense of Coherence Questionnaire and the Maslach Burnout Inventory. The authors analysed the data using hierarchical multiple regression with the enter method.

Main findings: Job characteristics and SOC show the expected direct effects on burnout. SOC has a direct negative effect on burnout. Job demands and supervisor social support show non-linear relationships with burnout. SOC moderates the effect of demands on burnout and has a protective function so that the demands-burnout relationship differs for those with high and low SOC.

Practical/managerial implications: The types of effects, the shape of the stressor-strain relationship and the different contributions of individual and job characteristics have implications for designing interventions.

Contribution/value add: SOC functions differently when combined with demands, control and support. These different effects suggest that it is not merely the presence or absence of a job characteristic that is important for well-being outcomes but how people respond to its presence or absence.

Introduction

Several authors have highlighted the necessity to consider individual differences to improve our understanding of the relationships between job characteristics and strain (Rubino, Perry, Milam, Spitzmueller & Zapf, 2012; Maslach, Schaufeli & Leiter, 2001; Györkös, Becker, Massoudi, De Bruin & Rossier, 2012), yet these differences remain a relatively understudied area. It is necessary to explore moderation effects in studies that combine job characteristics and individual differences. These types of studies can provide insight into the ways in which individual characteristics affect the stressor-strain relationship (Rubino *et al.*, 2012). The Job Demand-Control (-Support) (JDC(S)) model explains how job characteristics contribute to job strain (Johnson & Hall, 1988; Karasek, 1979).

The current authors supplement this model by jointly considering how individual differences, in the form of sense of coherence (SOC) (Antonovsky, 1979), and job characteristics affect burnout (Maslach & Jackson, 1986). This type of research seems pertinent for South Africa where topics like burnout and work-related well-being are of key interest (Rothmann, 2003; Van der Colff & Rothmann, 2009).

Burnout may develop in response to stressful work situations, like those with high job demands, low control and low social support (Johnson & Hall, 1988; Karasek, 1979; Verhoeven, Maes, Kraaij & Joeke, 2003). However, the likelihood of experiencing a strain response, like burnout, is not equal for all people. Variations in the appraisal of, and response to, characteristics of the work situation are a function of individual differences. Piedmont (1993) argued that burnout is: 'clearly associated with enduring qualities of the individual' (p. 469).

Therefore, the authors consider how the general orientation of SOC, which provides a foundation for successful coping (Antonovsky, 1993), modifies the relationship between job characteristics

and burnout. Theoretically, there are grounds to consider the effects of SOC in the relationship between job characteristics and burnout.

SOC has negative correlations with the dimensions of burnout and helps to improve sense making of events, appraisal of whether resources are adequate to deal with events and increases feelings of control (Rothmann, Jackson & Kruger, 2003). Specifically, SOC results in better perceptions of job characteristics, like those the authors find in the JDC[S] model of job strain (Feldt, Kivimäki, Rantala & Tolvanen, 2004). These job characteristics – demands, control and social support – are important for a wide range of health and well-being outcomes (Schmidt & Diestel, 2011).

The JDC[S] model (Johnson & Hall, 1988; Karasek, 1979) provides a framework for understanding how job characteristics affect well-being. Despite the demonstrated usefulness of the JDC[S] model for understanding job strain (Häusser, Majzisch, Niesel & Schulz-Hardt, 2010), researchers have identified two further areas of research. Firstly, the JDC[S] model overlooks the potentially important dimension of how individual differences influence perceptions and experiences of work situations (Van der Doef & Maes, 1999). Secondly, previous research has indicated the presence of curvilinear relationships between job characteristic variables and well-being outcomes (De Jonge, Reuvers, Houtman, Bongers & Kompier, 2000). Despite some studies that tested for curvilinear effects, most studies, as meta-analyses indicate, do not examine curvilinear effects (Häusser *et al.*, 2010; Van der Doef & Maes, 1999).

This research aims to address these two research needs by using the JDC[S] model, in combination with SOC, to examine the effect of this individual characteristic in the relationship between job characteristics and burnout. The authors extend previous work on the moderating effects of SOC (Rothmann *et al.*, 2003; Söderfeldt, Söderfeldt, Ohlson, Theorell & Jones, 2000) by proposing that SOC moderates the linear and non-linear relationships between job characteristics (demands, control and support) and burnout. This is consistent with the research tradition that has considered the buffering effects of various personal resources in relation to job characteristics (Tremblay & Messervey, 2011).

Theoretical overview

The Job Demand-Control (-Support) model of job strain

The JDC[S] model of job strain (Karasek, 1979; Johnson & Hall, 1988) holds that three job characteristics (demands, control and social support) combine to influence workers' well-being in the workplace.

Demands refer to: 'psychological stressors involved in accomplishing the work load, stressors related to unexpected tasks, and stressors of job related personal contact' (Karasek, 1979, p. 289). Demands require constant attention in the forms of physical and/or psychological effort. Job control, or job decision latitude, refers to the control people have over their

tasks and behaviour during the workday (Karasek, 1979). It includes aspects like participation in, and authority over, making decisions as well as skill discretion, so that workers can decide how to use their skills, resources and time to complete their work (Van der Doef & Maes, 1999). Johnson and Hall (1988) extended the Karasek model to include social support as a resource that moderates the effects of demands. Researchers consider support from supervisors and co-workers separately because they may contribute differently to the possible reduction of burnout (Beehr, Bowling & Bennett, 2010).

The JDC[S] model has been widely applied across occupational groups and tested in relation to various well-being outcomes. Job characteristics have different effects, depending on the well-being outcome at hand (De Jonge & Schaufeli, 1998; 1999; Häusser *et al.*, 2010). Researchers have provided strong cross-sectional support for the additive effects of demands, control and support on a variety of work and non-work related well-being outcomes (Häusser *et al.*, 2010). Consequently, the authors expect the three job characteristics to have different relationships with burnout and propose the first hypothesis of this study: demands will show a positive relationship with burnout, whereas control and social support contribute to lower levels of burnout (Hypothesis 1) (Häusser *et al.*, 2010; Van der Doef & Maes, 1999; Verhoeven *et al.*, 2003).

In addition to the effects of job characteristics on well-being, there have been two advancements in applying the JDC[S] model. One is investigating the curvilinear relationships between job characteristics and well-being outcomes (De Jonge *et al.*, 2000; Rydstedt, Ferrie & Head, 2006). The other is adding personal characteristics or resources to the JDC[S] model (Györkös *et al.*, 2012).

In his vitamin model, Warr (1990) proposed that job characteristics, like vitamins in the body, might help up to a point, after which they can become detrimental or fail to have increasing positive effects. Therefore, in the case of burnout, the authors' second hypothesis proposes a U-shaped relationship between job characteristics and burnout. This suggests that levels of a job characteristic, which are too low or too high, could be harmful (Hypothesis 2). Insufficient demands may lead to boredom and frustration, whereas excessive demands contribute to distress and burnout (LeFevre, Matheny & Kolt, 2003). The effect of demands on burnout may also depend partly on the person's appraisal of the demands as a challenge or hindrance stressor (Lepine, Podsakoff & Lepine, 2005). Low levels of control may be associated with burnout because of an inability to meet demands. Alternatively, jobs with high levels of control are often the positions with high levels of uncertainty, responsibility for making decisions and the obligation for accepting liability for decisions or mistakes. They could also contribute to burnout (De Jonge & Schaufeli, 1999). Low levels of social support may represent a lack of resources, whereas high levels of social support could become negative

when, according to the stress transfer theory (Karasek, Triantis & Chaudhry, 1982), less strained people absorb the strain of those around them.

Researchers have tested the non-linear propositions of the vitamin model. For a variety of different outcomes, researchers found curvilinear relationships of the expected U-shape for job demands and job decision latitude (Warr, 1990) as well as for job demands, job autonomy and social support (De Jonge & Schaufeli, 1998; De Jonge *et al.*, 2000). For demands and control, the curvilinear relationships are usually in the expected direction, but the results for social support have been less consistent. Researchers have found curvilinear relationships with an unexpected shape. They indicate that average levels of support correspond to high burnout (De Jonge, 1995; De Jonge & Schaufeli, 1999) and low job satisfaction scores (Rydstedt *et al.*, 2006).

Because this study is particularly interested in the moderating effect of SOC, it is prudent to include the curvilinear effects to ensure that its findings represent a true moderating effect. Excluding curvilinear effects may influence the chances of detecting moderating effects (Fletcher & Jones, 1993; Ganzach, 1997). The presence of curvilinear effects also requires a different intervention approach. The solution of merely increasing or decreasing the relevant job characteristic (as the JDC[S] model defines it), without considering an optimal level, could fail to help (Adams & White, 2005; LeFevre *et al.*, 2003). Understanding the true nature of the relationship between job characteristics and burnout is crucial given the severe and chronic nature of burnout.

Job burnout

Job burnout is a form of strain specific to the work context and includes emotional exhaustion, depersonalisation or cynicism and reduced personal accomplishment (Maslach & Jackson, 1986). Exhaustion refers to the draining of physical and mental energy, cynicism to a negative, detached and impersonal attitude at work and reduced personal efficacy to the belief that one is no longer effective at work. Negative self-evaluation and feelings of incompetence accompany them (Maslach *et al.*, 2001; Rothmann, 2003). Burnout reduces a person's ability to work, solve work-related problems and develop professional efficacy. It is likely to lead to increased absenteeism, job turnover, loss of productivity and poor performance (Maslach & Goldberg, 1998; Schaufeli, 2003). Given that burnout is an individual response to enduring stressors at work, dual attention to job characteristics and individual characteristics is necessary (De Beer, Pienaar & Rothmann, 2013; Maslach & Goldberg, 1998; Rothmann, 2003; Van der Colff & Rothmann, 2009).

Sense of coherence

Antonovsky's (1979) SOC concept first developed from considering how stressors affect a person's health and physical well-being. This has broadened to include a person's psychological well-being (Feldt, 1997). SOC is part of the salutogenic paradigm that aims to understand how people

live well and remain healthy despite exposure to stressors (Antonovsky, 1987). Therefore, SOC seems a relevant characteristic to consider in the relationship between job characteristics, work stressors, resources and burnout.

One can regard SOC as a broad individual attribute that influences the way people perceive and interpret events. It stimulates motivation and positive coping behaviours, like acquiring resources (Feldt *et al.*, 2004). SOC is not a personality trait or a specific coping strategy. Rather, it is a general orientation that provides a basis for successful coping. It consists of three highly interrelated dimensions: comprehension, manageability and meaningfulness (Antonovsky, 1987; 1993). These three components of SOC help people to understand demands in their environment, manage challenges and attach meaning to their experiences (Antonovsky, 1987). Throughout childhood and adolescence, various experiences provide opportunities for developing SOC: consistency in life experiences contributes to comprehension, the availability of resources with which to respond to demands contributes to manageability and participation in valued activities increases meaningfulness (Feldt, Metsäpelto, Kinnunen & Pulkkinen, 2007). Therefore, SOC develops because of life experiences. This suggests that it can change over time and is different from personality traits, which are stable behavioural tendencies (McCrae & Costa, 1994).

Furthermore, a well developed SOC helps people to perceive situations and social environments and their accompanying demands as less stressful, threatening or anxiety provoking (Feldt *et al.*, 2004; Rothmann *et al.*, 2003). Consequently, the third hypothesis of this study is that SOC has a negative relationship with burnout (Hypothesis 3). Finally, the authors propose that SOC will moderate the effects of the job characteristic variables on burnout (Hypothesis 4). Hochwälder (2006) proposed that characteristics of the work environment do not have consistent relationships with mental health. Instead, their effect may vary as a function of individual differences. From this perspective, a moderating effect of SOC would change the way demands, control and support contribute to burnout. Previous studies that combined job characteristics and SOC in predicting burnout have been limited in their hypotheses. They normally only propose that SOC will moderate the effects of job demands in relation to well-being (Rothmann *et al.*, 2003; Söderfeldt *et al.*, 2000). The authors extend this work and test the moderating effect of SOC in relation to the three job characteristics included in the JDC[S] model: job demands, control and social support. As a salutogenic construct, SOC may protect people from the negative effects of work stressors in the form of high demands, low control and low support (Hanse & Engström, 1999). SOC could moderate the effect of demands because people with strong SOC are more likely to interpret stressors in their environments favourably (Feldt *et al.*, 2004). With regard to control, SOC may moderate its effect on burnout because people with high SOC have increased levels of perceived control (Rothmann *et al.*, 2003). With regard to support, people with clear SOC are more likely to use the

available social support resources and search for additional resources (Feldt *et al.*, 2004). This suggests that, in the case of low social support, SOC could help to make up for this absence. Testing the moderating role of SOC on both the linear and curvilinear job characteristic variables should yield greater insight than will separate tests of individual and job characteristics (Györkös *et al.*, 2012; Maslach & Goldberg, 1998).

Aims of this research

This study aims to explore the function of SOC in predicting burnout in relation to the effects of the job characteristics. Firstly, the authors propose that demands will show positive linear relationships with burnout, whereas both support and control will have negative effects on burnout. Secondly, they explore the possibility of curvilinear relationships of a U-shape between job characteristics and burnout. Thirdly, they propose that SOC has a negative effect on burnout and a moderating effect on the relationships between job characteristics and burnout.

Research design

This study is cross-sectional with primary data collected at a single point in time.

Research method

Participants

The participants were 632 working adults in South Africa. The authors included them in the study by using convenience sampling. Master's students in industrial and organisational psychology used their networks to recruit participants for the study.

All participants had completed at least Grade 12, which is the end of high school education in South Africa, and were at least 18 years old ($M = 34.42$, $SD = 11.38$). Their ages ranged between 18 and 64. The sample comprised 41.9% males ($n = 265$) and 57.3% females ($n = 362$). Missing values were because of non-responses.

With regard to education, 22.6% ($n = 143$) of the participants had completed the final year of school, 22.2% ($n = 140$) had obtained bachelor's degrees, 20.4% ($n = 129$) had diplomas, 15.5% ($n = 98$) had honours degrees, 10.8% ($n = 68$) had certificates and one participant had completed a doctorate degree. Missing values were because of non-responses.

All the participants had employment with a minimum of one-year of work experience. They represented a variety of industries and organisations. Therefore, they do not represent a particular sector. The most commonly reported job titles were accountant ($n = 18$), administrator ($n = 12$), consultant ($n = 10$) and director ($n = 8$). The racial composition was: 351 (55.5%) participants were White, 178 (28.2%) were Black, 50 (7.9%) were of mixed-race, 49 (7.8%) were Asian and two (0.3%) did not specify a race.

Measuring instruments

Job content questionnaire (JCQ): The authors assessed job characteristics with the 29-item JCQ (Karasek, 1979). It included nine items that measure psychological job demands, nine items that measure job control and 11 items that measure social support (six items for co-worker support and five items for supervisor support). For supervisor support, participants could indicate, 'I have no supervisor'. The authors scored all the items using a four-point scale that ranged from 1 ('completely disagree') to 4 ('completely agree'). The reliabilities are 0.76 for demands, 0.80 for control, 0.77 for supervisor and co-worker support and 0.79 for total support.

Maslach Burnout Inventory-General Survey (MBI-GS): The MBI-GS allows for the measurement of burnout beyond the traditional setting of human services in which the construct of burnout was first developed (Maslach & Jackson, 1986). The MBI-GS includes items that measure emotional exhaustion (five items), cynicism (five items) and professional efficacy (six items). The authors scored the items using a seven-point Likert scale that ranged from 1 ('never') to 7 ('every day'). The professional efficacy scale is reverse scored so that a high score on the scale shows reduced efficacy (Schaufeli & Salanova, 2007). The reliability is 0.90 for the total burnout scale.

Sense of coherence: This study used the 13-item version of the Sense of Coherence Questionnaire (SOC-13) with a unique seven-point scale for each item (Antonovsky, 1987; 1993). The scale contains items that reflect three sub-dimensions of meaningfulness, manageability and comprehensibility. However, one should use only the total score. Therefore, the authors used the total score only (Antonovsky, 1987; 1993). The SOC scale has a reliability of 0.62.

Research procedure

The authors collected the data as part of a larger research study. They recruited participants with the help of master's students in industrial and organisational psychology. They asked the master's students to find participants who represented a wide range of occupations, status levels and race groups in South Africa. Participants needed to have at least one year of working experience, be 18 years or older and have finished Grade 12.

Participants did not receive any compensation for participating in the study. The covering letter the authors provided with the questionnaires gave full information about the research and emphasised that participation was voluntary. The authors regarded a returned and completed questionnaire as consent to participate.

Statistical analysis

Hierarchical multiple regression was the principal analytic tool the authors used in this study and they met the standard assumptions with respect to multicollinearity,

homoscedasticity and normality of residuals. The authors centred all independent variables. To test the curvilinear hypotheses, they entered quadratic terms of the job characteristic variables into the regression analyses where necessary (Cohen, Cohen, West & Aiken, 2002; Ganzach, 1997). Testing moderating effects requires one to compute an interaction term by multiplying the moderator by the independent variable (Cohen *et al.*, 2002).

In each analysis, the authors controlled for age and gender in the first step. One should include variables that could correlate with the regressors or dependent variables in the model as controls (Antonakis, Bendahan, Jacquart & Lalive, 2010; Brewer & Shapard, 2004). Age and gender have shown a relationship with burnout (Pedrabissi, Rolland & Santinello, 1993).

The authors proposed a separate hierarchical regression model for each job characteristic term. Following the recommendations of Ganzach (1997), to include quadratic and interaction terms in the same model, the authors set up the models as follows:

- Step 1 contained age and gender.
- Step 2 contained the linear job characteristic term.
- Step 3 contained the curvilinear job characteristic term.
- Step 4 contained the SOC term.
- Step 5 contained the linear interaction term of the job characteristic variable multiplied by SOC.
- Step 6 contained the curvilinear interaction term of the job characteristic variable multiplied by SOC.

Results

The authors conducted analyses for the three separate burnout dimensions first and then for burnout as a total score. The pattern of significant results and size of regression coefficients were the same regardless of whether they used the separate burnout dimensions or the total score. Therefore, they present only the results for total burnout.

Table 1 presents the means, standard deviations and Pearson inter-correlations of the variables. Each job characteristic term correlated significantly and in the expected direction with burnout. SOC showed significant positive correlations with control and support and had a negative correlation with burnout. Age and gender both correlated significantly with burnout, co-worker support and control. Age also correlated significantly with SOC and job demands.

Linear effects of sense of coherence, linear and curvilinear effects of job characteristics

As Hypothesis 1 proposes, support and control show a negative linear relationship with burnout, whereas job demands show a positive relationship with burnout (Table 2). The proposed negative relationship between SOC and work stress is significant and confirms Hypothesis 3. Hypothesis 2 explored whether job characteristics would show curvilinear relationships with burnout. Demands and supervisor

TABLE 1: Descriptive statistics and intercorrelations.

Variable	M	SD	1	2	3	4	5	6	7	8
Age	34.42	11.38	-	-	-	-	-	-	-	-
Gender ^a	0.58	0.49	-0.03	-	-	-	-	-	-	-
Sense of coherence	61.47	8.58	0.11**	-0.01	-	-	-	-	-	-
Demands	25.58	3.69	0.10*	-0.07	-0.04	-	-	-	-	-
Control	26.53	4.22	0.17**	-0.15**	0.25**	0.17**	-	-	-	-
Support – supervisor	15.00	2.52	0.07	-0.07	0.13*	-0.16**	0.26**	-	-	-
Support – co-worker	17.80	2.80	-0.08*	0.10*	0.15**	-0.11**	0.19**	0.41**	-	-
Support – total	32.21	4.22	-0.09	0.01	0.17**	-0.20**	0.24**	0.84**	0.84**	-
Burnout	45.61	15.59	-0.15**	0.08*	-0.38**	0.16**	-0.42**	-0.40**	-0.29**	-0.40**

M, mean; SD, standard deviation; N = 631. (Missing data excluded pairwise).

^a, Gender was coded as 0 = male, 1 = female and point-biserial correlations were used. Age was assessed in years.

*, $p < 0.05$; **, $p < 0.01$; ***, $p < 0.001$.

TABLE 2: Linear and curvilinear effects of job characteristic terms and moderating effects of sense of coherence in predicting burnout (N = 632).

Effect	Demands			Control			Support – Co-worker			Support – Supervisor			Support – Total			
	β	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	β	ΔR^2	F	
Lin ^a	0.15**	0.03	12.17	-0.34**	0.15	18	42.39	-0.27**	0.10	0.12	27.39	31.68	-0.38**	0.17	20	33.03
Curv ^b	0.08†	0.01	10.96	-0.01	0.00	0.18	31.79	-0.09†	0.01	0.12	20.65	25.54	-0.07	0.01	0.20	25.73
SOC	-0.44**	0.12	27.09	-0.31**	0.08	0.26	40.66	-0.34**	0.11	0.23	35.38	33.53	-0.31**	0.09	0.29	33.43
L*SOC ^c	-0.13*	0.01	23.60	-0.00	0.00	0.26	33.89	0.04	0.00	0.23	29.67	27.87	0.05	0.00	0.29	28.04
C*SOC ^d	0.16*	0.01	21.84	0.04	0.00	0.26	29.15	0.02	0.00	0.23	25.41	24.36	0.00	0.00	0.29	23.97

β , standardised regression coefficients reported for the last step of each model, all final steps are significant; ΔR^2 , corresponds to the change in R^2 for each term added to the model; R^2 , adjusted value; F, F-value; SOC, sense of coherence.

^a, Linear Job Characteristic

^b, Curvilinear Job Characteristic

^c, Linear Job Characteristic X SOC

^d, Curvilinear Job Characteristic X SOC

†, $p < 0.001$

*, $p < 0.05$; **, $p < 0.01$

support yielded evidence of non-linear relationships with burnout and partially confirmed this hypothesis. Adding the curvilinear term to these models resulted in significant F_{change} statistics for demands $F_{change}(1, 577) = 6.95; p < 0.01$ and supervisor support $F_{change}(1, 396) = 5.14; p < 0.05$.

Figure 1 illustrates the curvilinear effect of demands. It shows that demands that are too high or too low can result in burnout, with an increase in demands first contributing to a decrease in burnout before being associated with an increase in burnout.

Figure 2 shows the curvilinear relationship for supervisor support. It shows that a steep decrease in burnout only occurs after employees reach average levels of supervisor support. However, the shape of this relationship is different to the expected U-shape. Control, co-worker support and total support only show linear relationships with burnout with non-significant F_{change} statistics for the addition of the curvilinear term to the models of control; $F_{change}(1, 573) = 0.170, n.s.$, co-worker support; $F_{change}(1, 578) = 0.590, n.s.$ and total support; $F_{change}(1, 393) = 3.26, n.s.$

Moderating effect of sense of coherence

The fourth hypothesis proposed the moderating effect of SOC for both linear and curvilinear job characteristic terms. There is partial support for this hypothesis. SOC moderates the effects of linear ($F_{change}(1, 575) = 5.16; p < 0.05$) and curvilinear demands ($F_{change}(1, 574) = 9.27; p < 0.01$). For linear demands, high SOC prevents an increase in burnout even as demands increase. For those low in SOC, an increase in demands is associated with a much steeper increase in burnout.

Figure 3 shows the moderating effect of curvilinear demands. For those with low SOC, the relationship between demands and burnout is linear. However, for those with high SOC, the curvilinear effect of demands on burnout is more pronounced. This suggests that an average level of demands only results in a decrease in burnout for those with high SOC but not for those with low SOC.

For the other job characteristic models, adding the linear interaction term resulted in non-significant F_{change} statistics for all the models; $F_{change}(1, 571) = 0.284, n.s.$ for control; $F_{change}(1, 576) = 1.087, n.s.$ for co-worker support, $F_{change}(1, 394) = 0.013, n.s.$ for supervisor support and $F_{change}(1, 391) = 0.1.07, n.s.$ for total support.

Discussion

This study considered the relationship between job characteristics and burnout in a South African sample and focused on the curvilinear effects of job characteristics. The study extended these considerations by focusing on the direct and moderating effects of SOC in predicting burnout.

Job characteristics and burnout

Concerning the first hypothesis, this study confirms the well-known notion that job characteristic variables have

direct linear effects in predicting burnout (Häusser *et al.*, 2010; Van der Doef & Maes, 1999). Demands have a positive relationship with burnout, whilst control and social support have negative relationships with burnout.

However, we know less about the possibility of curvilinear relationships between job characteristics and burnout (De Jonge *et al.*, 2000). Some studies find relationships contrary to the expected direction (Rydstedt, *et al.*, 2006) whilst others find support for non-linear relationships for some outcomes but not for others (De Jonge *et al.*, 2000). Results in this study indicated non-linear relationships between demands and burnout, and between supervisor support and burnout, thus partly confirming the second hypothesis.

The results indicated a slight J-shaped relationship between demands and burnout, similar to the relationship that De

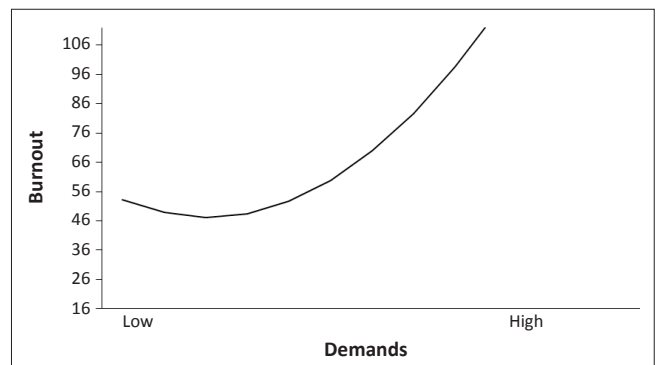


FIGURE 1: Curvilinear relationship between demands and burnout.

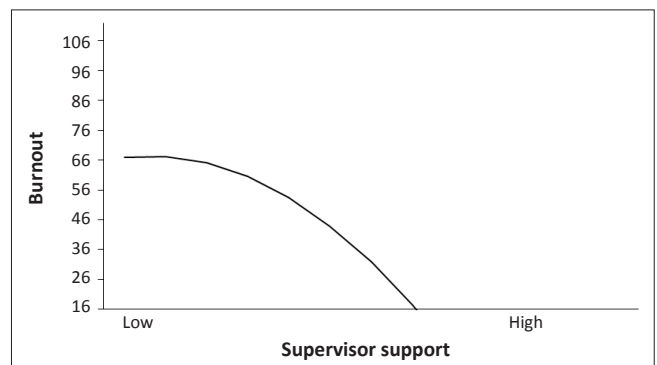


FIGURE 2: Curvilinear relationship between supervisor support and burnout.

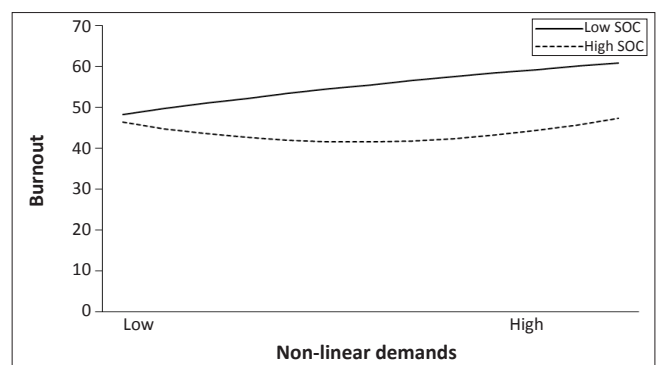


FIGURE 3: Moderating effect of sense of coherence on the relationship between non-linear demands and burnout.

Jonge and colleagues (2000) found. The results showed that experienced burnout is lowest at an optimal level of demands whereas under- and over-stimulation can lead to distress (LeFevre *et al.*, 2003). This confirms the authors' prediction and the previously supported propositions of the vitamin model (De Jonge & Schaufeli, 1998; De Jonge *et al.*, 2000; Warr, 1990). However, low demands are not as damaging as high demands – the higher the demands, the stronger the association between demands and burnout. In the case of optimal demands, people may perceive these demands as challenge stressors and not as hindrance stressors and therefore experience positive emotions, motivation and productive coping (Lepine *et al.*, 2005), which may lower the risk of burnout. In the case of low demands, people may be bored and under stimulated (Rydstedt *et al.*, 2006) and experience burnout (possibly indicated by reduced personal efficacy) because of lack of challenge. In the case of high demands, as demands increase, burnout continues to increase. This is possibly because of the reciprocal relationships between job characteristics and outcome variables (Häusser *et al.*, 2010).

With regard to the non-linear relationship between supervisor support and burnout, the shape of this relationship is contradictory to the authors' second hypothesis. Previous studies have shown curvilinear relationships between support and the dimensions of burnout (De Jonge *et al.*, 1995; De Jonge & Schaufeli, 1998). These studies, like the current one, suggest that average levels of social support do correspond to lower levels of burnout.

However, the point of contradiction relates to how increasing levels of social support correspond to burnout. The current study suggests that burnout levels continue to decrease with increased social support (De Jonge *et al.*, 1995; 2000). However, other work (De Jonge & Schaufeli, 1998; 1999) suggests that increasing social support after a certain level may tend to contribute to increased burnout. This is consistent with the predictions of the vitamin model and those of this study, that increasing a job characteristic like social support may only be helpful up to a certain point, after which its effect becomes detrimental because of the stress transfer theory (Karasek *et al.*, 1982). Contradictory results about the shape of the relationship between support and burnout may relate to the type of social support one is testing. Previous work (De Jonge *et al.*, 1995; 2000; De Jonge & Schaufeli, 1998; 1999) made no distinction between support that colleagues provide and that of supervisors. This makes it difficult to disentangle the true nature of the curvilinear relations based on the type of support. Differing effects of colleague and supervisor support may also be evident in different occupation groups.

In this study, control, total and co-worker support showed only linear relationships with burnout. This does not support the second hypothesis. Curvilinear relations between total support and control have been confirmed elsewhere (De Jonge & Schaufeli, 1998; Verhoeven *et al.*, 2003). The linear relationships for control, co-worker and total support in the current study may be because of the choice of outcome. If the

authors had tested an outcome like job satisfaction (which has stronger associations with support and control), perhaps they would have found curvilinear effects (De Jonge & Schaufeli, 1998; 1999). Clearly, factors like the choice of outcome, type of job characteristic and occupational differences cloud the exploration of non-linear relations. Therefore, we need further research in this area.

Functioning of sense of coherence: A necessary consideration

With regard to the functioning of SOC in relation to burnout, the study confirms previous research findings that indicate the direct effect of SOC: people with a higher SOC experience less burnout (Rothmann *et al.*, 2003; Söderfeldt *et al.*, 2000; Van der Colff & Rothmann, 2009). As a general orientation, SOC does appear to help with successful coping and helps to reduce burnout. This supports the third hypothesis.

Finally, with regard to hypothesis four, the study confirms evidence for SOC as a moderator variable. This effect clarifies the conditions under which demands will affect burnout and the strength of this effect. Given the curvilinear relationship between demands and burnout, the authors have given attention to SOC's moderating effect on this relationship. Previous research has not considered the possibility that individual characteristics may moderate the curvilinear effects (Häusser *et al.*, 2010). Therefore, this study shows how the demand-burnout relationship differs for those with high and low SOC.

For those low in SOC, the relationship between demands and burnout is linear. An increase in demands corresponds to an increase in burnout. This suggests that the effects of job demands are more detrimental for those with low SOC. However, for those with high SOC, the relationship is slightly curvilinear. This suggests that an optimal level of demands corresponds to lower burnout. Individual differences underpin the concept of an optimal level of demands: 'the distressful or eustressful nature of any particular stimulus is governed by how one interprets it and chooses to react to it' (LeFevre *et al.*, 2003, p. 730). People high in SOC are more likely to benefit from an optimal level of demands because they can capitalise on available resources and manage the demands better. For those high in SOC, an initial increase in demands may actually reduce burnout slightly. People with high SOC need quite high demands to result in an increase in burnout. Researchers have found similar differential job characteristic-strain relationships in people with high and low emotional stability (Rubino *et al.*, 2012).

This study adds to this growing body of literature that emphasises the necessity to consider individual and job characteristics jointly. The authors found no evidence of the moderating effect of SOC on control and support. This fails to support hypothesis four. A possible explanation is that SOC may only have a protective function, by acting as a buffering resource, in the case of low support and control (Hanse & Engström, 1999). Mean scores for control and support are

quite high in this study. This suggests that there are limited opportunities for SOC to act as a moderator and compensate for the lack of job resources.

Limitations and directions for future research

The study is cross-sectional. This means that it is impossible to infer causation. The relationship between burnout and job characteristics may be bi-directional and the relationship between SOC and job characteristics may be reciprocal (De Beer *et al.*, 2013; Häusser *et al.*, 2010). Consequently, longitudinal research, which explores relationships that are more detailed between the dimensions of SOC, job characteristics and burnout whilst considering linear and curvilinear effects, is necessary. Research that includes subjective and objective measures of job characteristics would be ideal (Häusser *et al.*, 2010) because using self-reporting measures leads to common method variance that may bias the regression coefficients (Antonakis *et al.*, 2010).

However, this may not be a problem for tests of moderation because bias should not result in an overestimation of the interactive effects (Van der Doef & Maes, 1999). The authors entered quadratic terms before the interaction terms in the regression models. This may result in a loss of power or unstable regression coefficients (Ganzach, 1997). Conversely, if one does not control for curvilinear relationships, the interaction effects one observes could be incorrect (Fletcher & Jones, 1993).

The sample was not representative. Therefore, replication studies in samples that are more representative are necessary and in occupation or sector specific samples because the nature of job characteristics may vary in different groups.

Practical implications

The focus of an intervention may differ depending on whether a certain individual characteristic provides an explanation of when or why one factor affects another. The moderating effect of SOC on demands is a promising finding.

Organisations can help to develop SOC by providing information in a structured and consistent manner, by equipping employees with the necessary resources to perform their jobs, allowing them to exercise independence and become involved in making decisions (Van der Colff & Rothmann, 2009). Organisations can also intervene at the level of the stressor and address high levels of job demands through activities like redesigning jobs, flexible work schedules and setting goals (Rothmann, 2003). Furthermore, organisations need to design interventions with sector or industry specific requirements in mind.

The shape of the relationship between job characteristics and strain outcomes has implications for the practical management of stress (LeFevre *et al.*, 2003). Linear relationships suggest that organisations can use a population approach to stress management to increase resources and decrease stressors for everyone. The assumption is that this

will improve well being for everyone and that everyone will respond to the intervention in the same way (Rydstedt *et al.*, 2006). However, curvilinear relationships imply optimising the level of the stressor until a certain point. However, here an organisation cannot use a population approach (Rydstedt *et al.*, 2006). When an organisation uses a population approach to prevention, the presence of a non-linear relationship between a stressor and strain outcome (as is the case with demands) will result in increased risk for some people (Adams & White, 2005).

Finally, managing the job characteristic-strain relationship requires an understanding of the individual response. Therefore, managers need to help people to interpret stressors as challenge stressors and focus on understanding the individual response to workplace characteristics (LeFevre *et al.*, 2003; Rubino *et al.*, 2012). Stress management programmes, or those that promote an awareness of available resources and boost people's capacity to use these resources, may help people to manage their responses to job stressors and demands.

Conclusion

This study suggests that it is worth considering the curvilinear effects of job characteristics and that more specific measures of job characteristics may be necessary to obtain a clearer understanding of these effects for practical and theoretical reasons.

Jointly considering individual and job characteristics in predicting burnout is useful. The negative effects of job control and social support on burnout seem independent of the negative effect that SOC has on burnout: SOC does not moderate social support and control. However, one cannot understand the effect of demands on burnout fully unless one considers SOC jointly with demands. The different effects of demands on burnout for people high and low in SOC suggests that it is not merely the presence or absence of a job characteristic that it is important for well-being outcomes, but how people respond to its presence or absence.

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Competing interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them when they wrote this article.

Authors' contributions

C.S.J. (University of Johannesburg and University of Lausanne) completed this research in partial fulfilment of the requirements for her Mphil in industrial psychology under the supervision of G.P.D (University of Johannesburg) and M.G. (University of Johannesburg). G.D.P (University of Johannesburg) proposed the study design, assisted with the analysis, theoretical sections and provided overall expert advice. C.G (University of Lausanne) assisted with data collection and made theoretical contributions. M.G. (University of Johannesburg) assisted with the theoretical overview and discussion. K.M (University of Lausanne) provided comments on the overall manuscript and J.R. (University of Lausanne) provided expert advice and gave statistical and theoretical contributions.

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