Chapter four

How to assess work characteristics? A comparison of response formats

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Abstract

Objectives:

The aim of this study was to contribute to decisions regarding the choice between various response formats, in studies in which the identification of work characteristics as determinants of job dissatisfaction and need for recovery is a research goal. Associations of various work characteristics measured with two different response formats were compared: scales composed of items measuring the presence or absence of a certain work characteristic (´current status´) and scales composed of items measuring the appreciation of the work characteristic (´appreciation´). In addition, by summing the scores measured with these formats, an 'additive scale' was computed.

Methods:

A self-report questionnaire among university employees (n=591, response 36.3%) was used. Regression analyses were used for comparison of explained variances in job dissatisfaction and need for recovery using the three distinguished work characteristic scales, alone or in combination in separate models.

Results:

Additive scales reached satisfactorily reliability (Cronbach's alpha's between 0.68 and 0.90). Their associations with the work outcomes were statistically significant, but the 'current status scale' and the 'appreciation scale' together explained job dissatisfaction and need for recovery better. However, the additive scale explained in two of 15 and in six of 11 work characteristics more variance in job dissatisfaction and need for recovery than the 'appreciation scale' alone. In addition, the ´appreciation scale´ alone mostly explained as much or more variance in job dissatisfaction and need for recovery.

Conclusions:

Based on the strength of the association with the work outcomes (job dissatisfaction and need for recovery), it should be advised to choose a response format that asks for participants' appreciation of work characteristic ('appreciation'), rather than to measure only the presence or absence of work characteristics ('current status'). However, in research aimed at practical purposes (e.g. risk assessment or health surveillance), calculating scales combining both formats may offer a good alternative over the usage of the two scales independently because of convenience of interpretation.

Keywords: Work characteristics; Job dissatisfaction; Need for recovery; Response format; Methodological issues

Background

A lot of research has been conducted into the determinants of well-being at work, operationalized by job satisfaction, workload, need for recovery, et cetera (De Croon *et al.* 2002, Demerouti *et al.* 2001). By far, most of this research is based on self-reported data. The use of self-reported measures has disadvantages, including the risk of socially desirable answers, distort answers due to fear or shame and recall bias or misunderstanding (Armstrong and White 1994) and this has been extensively discussed (e.g. Rick *et al.* 2001). However, alternatives appear not always better than self-reports. Spector and Jex (1998) argued that objectively measuring job stressors may be problematic and can be less accurate measures of what was intended than are self-reports (Spector and Jex 1998, p.359). Compared to objective measures, self-reports are less expensive in time and money (Schouteten 2001), and, more importantly, they represent perceptions; a person's subjective experience of work characteristics. The personal perception has an important mediating role in the process of the onset of feelings of stress. The impact of stressors on well-being depends on the cognitive appraisal of the potential stressor (Armstrong and White 1994, Rick *et al.* 2001). Likewise, the appraisal of work characteristics is dependent on personal characteristics like perfectionism, accuracy, and ambitions. The perception of the work environment mediates the influence of the work environment on psychological well-being (Stansfeld *et al.* 1995). This research is aimed at finding the most suitable way to measure work characteristics, using self-reports.

To measure work characteristics as closely as possible, it seems important to include a subjective component into the wording of the response choices. Based on this assumption, Wännström et al. (2008) compared four different response formats for measuring job demands. They found that response formats that tapped the employee's experience of the demands, performed best in measuring job demands and concluded that both the existence of job demands ('current status' i.e. 'How is your situation today?') and the appreciation of job demands (i.e. 'Do you appreciate the current situation?') should be measured. Measuring both the current status and the appreciation of work characteristics may have advantages when used in applied research, such as employee satisfaction surveys. The results may not only inform employers about potential hazards due to the presence of a work characteristic at an undesired level, but they can also provide insight into which work characteristics are not well appreciated by employees. However, offering employers two measures for each work characteristic may complicate interpretation. A solution to this problem might be to combine both formats in one parameter. To this purpose, new scale scores were computed by summing the scores measured with a 'current status' and a 'appreciation' response format; the 'additive scale' score.

The choice regarding the response format to be used for measuring work characteristics can be based on the comparison of the variance explained in work outcomes that are considered important. Two outcomes were chosen: job dissatisfaction and need for recovery. Both these outcomes are important for workers' sustainable ability to work and health (Sluiter *et al.* 2003, Faragher *et al.* 2005, Lindberg *et al.* 2006) and substantially different. Job dissatisfaction is an attitude, an evaluation of experiences at work along the dimension of favour or disfavour (Fishbein and Ajzen 2010), while need for recovery is an emotional state, an early stage of a long-term strain process (Sonnentag and Zijlstra 2006) resulting from unfavourable working conditions combined with non-optimal recuperation. This study compared the associations of various work characteristics as measured by the ´current status-scale´, the ´appreciation-scale´, and the calculated 'additive scale' with the two work outcomes. The aim of the study is to show how to preferably measure work characteristics, if the goal of the study is to explain differences in variances, distinguishing

between 'current status' and 'appreciation' response formats and their sum (additive scale). More specifically, the study examined I) whether the additive scale is an alternative for measuring both the ´current status´ and ´appreciation´ of work characteristics, and II) which response format is to be preferred when the identification of most relevant determinants is a research goal.

Subjects and methods

Subjects

All 1629 scientific and non-scientific employees of four departments of a Dutch university were invited to participate in an inventory on psychosocial workload. A reminder was sent after one week and after two weeks. This resulted in 591 usable questionnaires (36.3%). Compared with figures of all employees at the university, the study population was similar regarding age distribution, job classification and number of hours per week. Somewhat less males (52.1 vs. 56%) and somewhat more employees with permanent contracts of employment (82.4 vs. 77%) were included. The number of years in the same position seems slightly higher (Table 1).

Table 1   Demographic characteristics

	Characteristics	n/ N (%)
Age	< 26 years	20/586 (3.4)
	26 – 35 years	122/586 (20.6)
	36 – 45 years	153/586 (25.9)
	46 – 55 years	183/586 (31.0)
	55 – 65 years	108/586 (18.3)
Sex	male	297/570 (52.1)
Job classification	faculty	227/583 (38.9)
Contract of employment	permanent	478/580 (82.4)
Number of hours per week	0 – 8 hours	10/584 (1.7)
	9 – 16 hours	23/584 (3.9)
	17 – 24 hours	80/584 (13.7)
	25 – 32 hours	154/584 (26.4)
	33 – 40 hours	317/584 (54.3)
Number of years in the same position	< 1 year	27/561 (4.8)
	1 – 5 years	200/561 (35.7)
	6 - 10 years	140/561 (25.0)
	11 – 20 years	107/561 (19.1)
	20 years and more	87/561 (15.5)

n indicates the number of cases
N indicates the number of respondents that answered the question

Questionnaire

The questionnaire was designed to obtain information about aspects frequently measured in risk assessments and to portray the quality of working life. Besides demographic characteristics, the questionnaire mainly contained scales from two authoritative and frequently used Dutch questionnaires measuring psychosocial workload and emotional strain at work (see Table 2). The Questionnaire on the Experience and Evaluation of Work (QEEW, Dutch abbreviation VBBA) was developed, reviewed and tested by Van Veldhoven and Meijman (1994, Van Veldhoven 1996). Dhondt and Houtman (1992) tested the psychometric qualities of the NOVA-WEBA. This is a questionnaire measuring the well-being at work for

analyzing and evaluating jobs in organizations (Schouteten and Benders 2004). Table 2 presents an overview of the scales used, their origins and reliability scores in this study.

Two types of work characteristics can be distinguished: job demands and job resources. Schaufeli and Bakker (2004) cited Jones and Fletcher (1996) when they define demands as 'the degree to which the environment contains stimuli that should require attention and response. They state that job demands are not necessarily negative, but that they may turn into job stressors when meeting those demands requires high effort. Job demands are therefore associated with high ´costs´ that elicit negative responses (Schaufeli and Bakker 2004). Job resources refer to those physical, psychological, social, or organizational aspects of the job that either/or (1) reduce the effects of job demands on the associated physiological and psychological costs; (2) are functional in achieving work goals and (3) stimulate personal growth, learning and development (Demerouti *et al.* 2001).

Both the 'current status' and the 'appreciation' of all work characteristics were assessed. The 'current status' was measured by asking for the presence or absence of a certain work characteristic (e.g. 'Do you experience workload: yes or no'). Appreciation was measured by asking for the appreciation of the work characteristic, using a 5-point Likert scale format ranging from ´very dissatisfied´ to ´very satisfied´ (e.g. 'Do you appreciate the current amount of workload?'). Scale scores were calculated by averaging the item scores whereby the 'current status scale' ranges from 1 to 2 and the 'appreciation scale' ranges from 1 to 5. Some of the 'current status' items were recoded so that a higher scale score indicates that the work characteristic is more not demanding. A higher score on the appreciation format indicates more appreciation of the degree of presence of a particular work characteristic.

Table 2 Origins of the work characteristics and reliability estimates (expressed in Cronbach's alpha) for each of the response formats

	Reference	N items	α Current status scale	α Appreciation scale	α Additive scale
Job demands					
Workload	Dhondt & Houtman (1992)	10	.79	.86	.84
Role ambiguity	Van Veldhoven & Meijman (1994)	6	.77	.86	.80
Responsibility	Jetten and Pat (1999)	5	.68	.85	.69
Complexity	Van Veldhoven & Meijman (1994)	7	.64	.90	.68
Changes in tasks	Van Veldhoven & Meijman (1994)	6	.72	.88	.84
Job resources					
Autonomy	Dhondt & Houtman (1992)	9	.80	.92	.82
Information	Dhondt & Houtman (1992)	11	.80	.91	.84
Voice	Dhondt & Houtman (1992)	6	.65	.85	.75
Task variety	Van Veldhoven & Meijman (1994)	5	.71	.86	.74
Social support from colleagues	Van Veldhoven & Meijman (1994)	9	.70	.91	.79
Supervisor support	Van Veldhoven & Meijman (1994)	11	.86	.95	.90
Work organisation	Van Veldhoven & Meijman (1994)	5	.64	.81	.72
Promotion opportunities	KUN RIE (2003)	2	.69	.86	.81
Pay	KUN RIE (2003)	3	.72	.85	.79
Working conditions	Kompier & Marcelissen (1993)	5	.67	.83	.69

Work characteristics

In this secondary analysis study, fifteen work characteristics were included that are known to be important for university employees' job satisfaction and emotional exhaustion –a concept closely related to need for recovery (Van Veldhoven and Broersen 2003): role overload, insufficient job feedback, limited opportunities to influence decision-making (Winter and Sarros 2002, Winter *et al.* 2000), insufficient reward, work organization, working conditions and information as aspects of leadership and management (Gillespie *et al.* 2001, Adriaenssens *et al.* 2006), collegial and supervisor support (Neumann and Finaly-Neumann 1991), time demands, and (lack of) decision latitude (Taris *et al.* 2001). These characteristics were supplemented with other potentially harmful work characteristics known to be associated with stress, but whose relationship with job dissatisfaction or need for recovery among university employees has not been previously established: role ambiguity (Kinman 2001), and career prospects (Kinman 1998).

Computation of additive scale scores

Additive scale scores were computed by summing the scores measured with the 'current status' and the 'appreciation' formats. In order to facilitate interpretation, we chose to dichotomize the appreciation items: 'very dissatisfied and 'dissatisfied' were regarded as "no appreciation" and the 'neutral' score, 'satisfied' and 'very satisfied' were regarded as "appreciation". An additive item ranging from 1 to 4 - instead of from 1 to 10 when dichotomization would not be applied- could therefore be computed. With the encoding, account was taken of the importance of ´appreciation´ over ´current status´ (Wännström *et al.* 2008). To emphasize the importance of appreciation, the dichotomized appreciation item was coded 0 and 2, while current status was coded 1 (for demanding) and 2 (for not demanding). This way a higher additive scale score in job resources indicates a more favourable condition, while a higher additive scale score in job demands indicates a less favourable condition (see Table 3). Scale scores were derived by averaging the additive item scores.

Table 3 Calculating the additive scales

Job demands				
Current status *(not demanding = 2; demanding= 1)*	Not demanding (1)	Demanding (2)	Not demanding (1)	Demanding (2)
Appreciation scale *(no appreciation =2; appreciation=0)*	Appreciation (0)	Appreciation (0)	No appreciation (2)	No appreciation (2)
Additive scale	**1**	**2**	**3**	**4**
Job resources				
Current status *(not demanding = 2; demanding = 1)*	Demanding (1)	Not demanding (2)	Demanding (1)	Not demanding (2)
Appreciation scale *(no appreciation =0; appreciation=2)*	No appreciation (0)	No appreciation (0)	Appreciation (2)	Appreciation (2)
Additive scale	**1**	**2**	**3**	**4**

Outcome variables

Job dissatisfaction and need for recovery originate from the QEEW (Van Veldhoven and Meijman 1994, De Croon *et al.* 2002). Job dissatisfaction was assessed using a 9-item dichotomous scale (e.g. I have to continually overcome my resistance to do my work; I find the thought that I shall have to do this job until I retire very oppressive). The scale need for recovery consists of 11 dichotomous items (e.g. I find it difficult to relax at the end of a working day; By the end of the working day, I feel really worn out.). Scale scores were calculated by averaging the score, whereby the scale scores range from 0 to 1. Higher scores indicated a more non-desirable situation. Both job dissatisfaction and need for recovery reached good reliability - Cronbach's alpha was .84 and .88, respectively- comparable to other studies (De Croon *et al.* 2002, Jansen *et al.* 2002).

Statistical analyses

Job dissatisfaction and need for recovery were regressed against the work characteristics as obtained in the three distinguished ways: using the 'current status scale (not present or present), using the 'appreciation scale' (5 options ranging from ´very dissatisfied´ to ´very satisfied) and using the 'additive scale', computed by summing the two formats.

To address the research goals, three regression models were used for each work characteristic. The first models comprised only the 'additive scale'. The second models contained two scales; the 'current status scale' and the ´appreciation scale´. Because the additive scales also include the variance explained by the interaction between its components, we checked for significance of interaction scales by including them in the second models. Interaction scales were computed by multiplying the 'current status' Z-scale score with the 'appreciation' Z-scale score (Mendenhall and Sincich 1989). None of the interaction scales reached significance, except for Task variety in analyses on job dissatisfaction. Only in this analysis, the interaction scale was maintained in the second model. Finally, in the third models, either only a ´current status scale´ or an ´appreciation scale´ was included. Analyses on work characteristics that produced non-significant betas in all three the models were not suitable for answering the research questions and thus omitted from further interpretation, which applied only to need for recovery. Four work characteristics (task variety, promotion opportunities, working conditions and pay) were not significantly associated with need for recovery and were omitted

The first research goal was to find out whether representing work characteristics with the 'additive scales' (models 1) is a good alternative for using the 'current status' and the 'appreciation' scales simultaneously (models 2). Additive scales were considered appropriate when the explained variance was as high as or higher than the explained variance using both scales together. To investigate the second research goal, explained variances of the models including either a scale calculated from items that measure the 'current status' of a work characteristic or a scale calculated from items that measure the 'appreciation' thereof (models 3) was compared with explained variance using both scales (models 2). Finally, explained variances of models using the current status scale or the appreciation scale were compared to find out which may preferably be used solitarily. The format in the model that explained most variance in job dissatisfaction and need for recovery was considered most useful. Significance of association with the work outcomes was tested two-tailed at $p \leq 0.05$. Reliability was tested using Cronbach´s alpha. All analyses were computed using SPSS 17.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

Tables 4 and 5 present the betas and the explained variance (R^2) resulting from the three regression analyses on job dissatisfaction and need for recovery, respectively.

Table 4   Results for analyses, regressing *job dissatisfaction* onto various work characteristics, measured using the distinguished response formats or the sum thereof (additive scales).

Work characteristics	Model 1 Additive scales	Model 2 Current status & Appreciation	Model 3 Current status	Model 3 Appreciation
Workload				
current status (β)		**.124**	-.047	
appreciation (β)	**.156**	**-.301**		**-.224**
R^2	.024	.065	.002[1]	.050
Role ambiguity				
current status (β)		-.060	**-.264**	
appreciation (β)	**.291**	**-.282**		**-.328**
R^2	.085	.108	.070	.108
Responsibility				
current status (β)		.028	.071	
appreciation (β)	**.104**	**-.196**		**-.200**
R^2	.011	.041	.003[1]	.040
Complexity				
current status (β)		.016	.060	
appreciation (β)	**.125**	**-.239**		**-.242**
R^2	.016	.059	.004	.058
Changes in tasks				
current status (β)		**-.112**	**-.279**	
appreciation (β)	**.311**	**-.257**		**-.331**
R^2	.097	.118	.078	.110
Autonomy				
current status (β)		-.007	**-.153**	
appreciation (β)	**-.277**	**-.274**		**-.279**
R^2	.077	.077	.023	.078
Information				
current status (β)		-.102	**-.245**	
appreciation (β)	**-.239**	**-.206**		**-.281**
R^2	.057	.083	.060	.079
Voice				
current status (β)		.002	**-.164**	
appreciation (β)	**-.265**	**-.313**		**-.313**
R^2	.070	.094	.027	.098
Task variety				
current status (β)		-.058	**-.388**	
appreciation (β)	**-.460**	**-.354**		**-.455**
Interaction (β)		**.107**		
R^2	.211	.216	.151	.207
Social support colleagues				
current status (β)		-.058	**-.134**	
appreciation (β)	**-.181**	**-.138**		**-.172**
R^2	.033	.032	.018	.029
Social support supervisor				
current status (β)		-.092	**-.265**	
appreciation (β)	**-.243**	**-.208**		**-.275**
R^2	.059	.081	.070	.076

Work organisation				
current status (β)	**-.248**	-.076	-.246	
appreciation (β)		**-.229**		**-.290**
R²	*.061*	*.085*	*.060*	*.084*
Promotion opportunities				
current status (β)	**-.227**	.012	-.014	
appreciation (β)		**-.248**		**-.275**
R²	*.052*	*.058*	*.013*	*.076*
Pay				
current status (β)	**-.150**	.083	**-.107**	
appreciation (β)		**-.243**		**-.182**
R²	*.022*	*.035*	*.011*	*.033*
Working conditions				
current status (β)	-.020	.095	.008	
appreciation (β)		**-.167**		**-.108**
R²	*.000[1]*	*.017*	*.000[1]*	*.012*

Bolt figures indicate a statistical significant association with job dissatisfaction at p ≤ .05
[1] indicates a non-significant regression model (F-value)

Additive scales

All 15 additive scales reached satisfactory reliability with Cronbach's alpha varying between .68 and .90 (see Table 2). All but one of the fifteen additive scales were significantly associated with job dissatisfaction (Table 4). The additive scale for working conditions was not significantly associated with job dissatisfaction (model 1), while in model 2 and model 3 the appreciation scale was significant. The eleven additive scales were significantly associated with need for recovery (Table 5). Generally, the additive scales (models 1) explain less variance (R^2) than the two original response formats together (models 2). Two out of 15 for job satisfaction and five out of 11 additive scales for need for recovery explained as much or more variance than the two original scales together. In addition, especially in need for recovery, the additive scales (models 1) explained quite often as much or more variance than the appreciation scales alone (models 3). In two out of fifteen and six out of eleven work characteristics, the 'additive scales' explained as much or more variance in job dissatisfaction and need for recovery, respectively. Differences were rather small in some cases.

Current status versus appreciation

Comparing explained variances using models in which both scales were entered (models 2) with variances explained by either the ´current status scale´ or the ´appreciation scale´ (models 3), showed that generally more variance was explained when using both scales than using either one of them.

Eleven out of 15 work characteristics in the model 2 explained equal or more variance in job dissatisfaction and all work characteristics in the model 2 explained equal or more variance in need for recovery. When explained variances of job dissatisfaction and need for recovery, measured using either the 'current status scale' or the 'appreciation scale' (models 3) are compared, it is apparent that the ´appreciation scale´ alone mostly explains as much or more variance. Job dissatisfaction is always better explained by using the appreciation scale, and need for recovery is explained as well or better using the 'appreciation scale' in eight out of 11 work characteristics.

Table 5 Results for analyses, regressing *need for recovery* onto various work characteristics, measured using the distinguished response formats or the sum thereof (additive scales).

Work characteristics	Model 1 Additive scales	Model 2 Current status & Appreciation	Model 3 Current status	Model 3 Appreciation
Workload				
current status (β)		-.167	-.313	
appreciation (β)	**.382**	-.262		-.349
R²	.146	.145	.098	.122
Role ambiguity				
current status (β)		-.100	-.240	
appreciation (β)	**.267**	-.183		-.258
R²	.071	.071	.058	.067
Responsibility				
current status (β)		-.190	-.154	
appreciation (β)	**.214**	-.128		-.101
R²	.046	.045	.024	.010
Complexity				
current status (β)		-.132	-.101	
appreciation (β)	**.202**	-.180		-.146
R²	.041	.040	.010	.021
Changes in tasks				
current status (β)	**.279**	-.252	-.286	
appreciation (β)		-.061		-.234
R²	.078	.088	.082	.055
Autonomy				
current status (β)	**-.187**	.004	-.094	
appreciation (β)		-.195		-.192
R²	.035	.037	.009	.037
Information				
current status (β)	**.251**	-.067	-.240	
appreciation (β)		-.240		-.287
R²	.063	.085	.058	.082
Voice				
current status (β)		.023	-.080	
appreciation (β)	**-.140**	-.195		-.180
R²	.020	.034[1]	.006[1]	.032
Social support colleagues				
current status (β)		-.099	-.139	
appreciation (β)	**-.158**	-.075		-.134
R²	.025	.024	.019	.018
Social support supervisor				
current status (β)		-.059	-.123	
appreciation (β)	**-.133**	-.082		-.130
R²	.013	.018	.015	.017
Work organisation				
current status (β)		-.029	-.259	
appreciation (β)	**-.373**	-.292		-.309
R²	.074	.100	.067	.096

Bolt figures indicate a statistical significant association with need for recovery at p ≤ .05
[1] indicates a non-significant regression model (F-value)

Discussion

This study has been carried out to contribute to decisions regarding the choice between various response formats, in studies in which the identification of determinants of job dissatisfaction and need for recovery is a research goal.

Two aspects were investigated. Firstly, does a measure, combining data revealed by two response formats, i.e. items asking for the current status ('How is your situation?') and items concerning the appreciation of that current status ('How satisfied are you with your situation?'), reflect work characteristics significantly well? The study found that betas of additive scales as computed in our study were significant in most work characteristics (see Tables IV and V), but revealed that the work outcomes were better explained by using the two original response alternatives simultaneously. The ´additive scale´ should therefore not be regarded a good alternative for using both the two original response formats in one model. Secondly, we investigated which of the two response formats used in this study would preferably be used to measure job demands and job resources? Derived from the amount of explained variance, our study showed that a response format representing an employee's experiences of work characteristic, i.e. 'appreciation', added value over a response format measuring employees' opinion on the absence or presence of a work characteristic, i.e. the 'current status'. This finding was consistent with Wännström et al. (2008). A work characteristic will probably not cause harm if the employee does not perceive stress from it. In addition, in most work characteristics the appreciation scale explained more variance than the additive scale. However, there may be circumstances in which an additive scale can serve as a good alternative for the two scales. For instance, when it comes to modelling, the purpose of the study is decisive for making a choice for the variables that should be included into the model of analysis (Kleinbaum *et al.* 1998). In studies that have some practical use (e.g. to advise employers about which work aspects to tackle first in order to improve quality of work), the use of an additive scale may also be suitable. The additive scale reflects current status and appreciation of the current status, weighted according to the importance of "appreciation" for the impact of a work characteristic on work outcomes. Presenting one instead of two series of parameters per work characteristic will facilitate the interpretation. In addition, the real situation may be better reflected by the additive scales than by the 'current status' or 'appreciation' scales alone, because they combine the aspect of appearance (current status) with that of appreciation of various work characteristics.

Methodological considerations

The study response was 36.3%. Although higher response is desirable, the study population represented the population under research well as to gender and age. Similar response rates were found in other research among university employees (e.g. Bradley and Eachus 1995, Winter and Sarros 2002, Kinman 2008). A low response may be an indication that the opinions of the respondents are not completely representative for those of the study population as a whole. In addition, more employees with high (or low) perceived workload may have participated in the study, because the study was designed to explore psychosocial workload. This might have affected the strength of the betas as well. However, the aim was to make an informed choice regarding the use of response formats by comparing the explained variances. If selective response had any effect, the effects were in the same direction in all models. Therefore, we expect no serious impact on the conclusions. For a similar reason, we choose not to correct for possible confounding in the regression analyses.

It should be noted that, compared to analyses on need for recovery, highest associations were found between work characteristics measured with the ´appreciation´ response format and job dissatisfaction.

Both 'appreciation' and job dissatisfaction ask for the respondents' attitude about their work, and higher correlation between job dissatisfaction and 'appreciation' is probably not surprising. However, the values of the betas in the models with job dissatisfaction as outcome are not so high (> .80 or .90) that they suggest the measurement of analogous aspects (Field 2002). Nevertheless, the results found for need for recovery may provide a better answer to the usefulness of 'appreciation' above 'current status' than the results for job dissatisfaction. The conclusions were similar: 'appreciation' was more strongly associated with need for recovery than 'current status' in eight out of the eleven work characteristics.

The decision how to compute the additive scales was based on the assumption that especially the appreciation of work characteristics was of importance for work outcomes (Wännström *et al.* 2008). Other ways to calculate a summed score are conceivable. The same applies to the response formats used in this study. 'Current status' has been scored on a dichotomous scale (yes or no). The use of more answer alternatives, for instance varying from 'always' to 'never' on a 5-point scale, could potentially affect the results of the analyses. Future research may investigate these variants.

'Appreciation' was assessed on a 5-point scale ranging from 'very dissatisfied' to 'very satisfied'. However, most people tend to score items on satisfaction positively, resulting in skewed distributions. A skewed distribution of independent factors may affect the association with the outcome measure. In order to enlarge the spread of the responses, researchers sometimes offer more answer options to score satisfaction and less answer options to score dissatisfaction, e.g. 'dissatisfied', 'only moderately satisfied', 'fairly satisfied', 'clearly satisfied', and 'very satisfied' (Hendriks *et al.* 2001). It is recommendable to investigate the influence of various additive scales in future research.

Conclusions

When one has to choose a format for the response options in a questionnaire, based on the strength of the association to our work outcomes (job dissatisfaction and need for recovery) it should be advised to measure work characteristics by asking for the appreciation of the work characteristic ('appreciation'), rather than to measure only its presence or absence ('current status'). However, in research aimed at practical purposes (e.g. risk assessment or health surveillance in a particular company or work organisation), calculating scales combining both formats may offer a good alternative over the usage of the two scales independently because of convenience of interpretation.

Acknowledgements

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