



A test of hypotheses derived from self-determination theory among public sector employees

Self-determination theory

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Abstract

Purpose – The purpose of this study was to test the relationship between intrinsic motivation and work performance among individuals from a broad cross-section of job types among public employees with the objectives of contributing to self-determination theory and assisting public management practice and research.

Design/methodology/approach – Respondents were drawn from three municipalities located in Norway. A questionnaire was distributed to 2,015 employees through a web-based tool (Questback), which resulted in complete data from 779 workers, representing a response rate of approximately 39 per cent.

Findings – The findings suggest that the relationships between job autonomy and work performance and task interdependence and work performance are partly mediated by intrinsic motivation, while the relationship between supervisor support for autonomy, competence, and development and work performance is fully mediated by intrinsic motivation.

Research limitations/implications – The two most important limitations, which are discussed in more detail at the end of the paper, are the cross-sectional nature of the study and the reliance on self-reported questionnaire data.

Practical implications – The results support self-determination theory and suggest that public and private sector managers should pay more attention to autonomy-supportive work environments.

Originality/value – First, a recent review of self-determination theory casts doubt on the performance implications of intrinsic motivation for less complex or interesting tasks. Thus, in order to increase our knowledge of the quality of self-determination theory as a work motivation theory, empirical research that spans a broad cross-section of jobs and functions in organisations is needed. Second, and despite the importance of motivation among public employees in an era of transformation to a more business-oriented approach, there is little empirical research on public sector employee motivation.

Keywords Public sector organizations, Motivation (psychology), Job satisfaction, Norway

Paper type Research paper

Introduction

Intrinsic motivation can be defined as the motivation to perform an activity for its own sake, in order to experience the pleasure and satisfaction inherent in the activity (Deci *et al.*, 1989; Vallerand, 1997). Several important contributions have been made in terms of describing and explaining intrinsic motivation over the past decades (e.g. Bandura, 1986; Bryman, 1996; Csikszentmihalyi and Nakamura, 1989; Deci, 1975; Deci and Ryan, 1985a; Hackman and Oldham, 1976; Lepper and Greene, 1978), but of particular interest in this study is self-determination theory (SDT) (Deci and Ryan, 2000; Deci and Ryan, 1985b; Vallerand, 1997).



Kuvaas (2006a) recently reported a strong relationship between intrinsic motivation and self-reported work performance among typical knowledge-workers. Such employees, however, may be much more energised by intrinsic motivation and the work itself when compared with more “ordinary” workers (Thomas, 2002). Furthermore, the recent review of SDT and work motivation by Gagné and Deci (2005) casts doubt on the performance implications of intrinsic motivation for less complex or interesting tasks. Finally, the link between intrinsic motivation and work performance has received very little empirical testing (Piccolo and Colquitt, 2006). Thus, in order to increase our knowledge of the quality of SDT as a work-motivation theory, we need empirical research that spans a broad cross-section of jobs and functions in organisations. Furthermore, and despite the importance of motivation among public sector employees in an era of transformation to a more business-oriented approach, empirical research on public sector employee motivation has received relatively little attention (Manolopoulos, 2008). Accordingly, the purpose of this study was to test the relationship between intrinsic motivation and work performance among individuals from a broad cross-section of job types among public sector employees with the objectives of contributing to SDT and assisting public management practice and research.

Theory and hypotheses

Self-determination theory (SDT) suggests that the social environment influences intrinsic motivation through its impact on need satisfaction or perceptions of competence, autonomy and relatedness (Grouzet *et al.*, 2004). These needs are seen as universal necessities and studies suggest that they are among the most salient needs and those most closely associated with event-based affect (Sheldon *et al.*, 2001). Moreover, the focus of SDT is not individual differences in the strength of these needs, but the degree to which they are satisfied.

Among these needs, the need for autonomy is deemed as being more essential than the need for competence and relatedness. According to Gagné and Deci (2005, p. 337):

[...]SDT postulates that when people experience satisfaction of the needs for relatedness and competence with respect to behaviour, they will tend to internalize its value and regulation, but the degree of satisfaction of the need for autonomy is what distinguishes whether identification or integration, rather than just introjection, will occur.

Thus, autonomy is deemed necessary for value and regulation to be internalised in order for the subsequent enactment of the behaviour to be experienced as autonomous. Accordingly, while intrinsically motivated behaviour is prototypically autonomous, SDT also posits that extrinsic motivation can vary in the degree to which it is autonomous versus controlled (Gagné and Deci, 2005). Since, however, the instruments used to assess different levels of autonomous motivation are designed to measure the motivation of more isolated situations, events or activities, and not the motivation of the more multi-faceted nature of work, I only investigated levels of intrinsic motivation in this study. Furthermore, in order to “translate” SDT into a work setting, I examined potential sources of need satisfaction by investigating employees’ perceived job autonomy and job interdependence, and their perception of supervisor support for development, competence and autonomy (see Figure 1 for a schematic representation of the proposed relationships). Accordingly, this study is designed to test hypotheses derived from SDT, not to test theory itself.

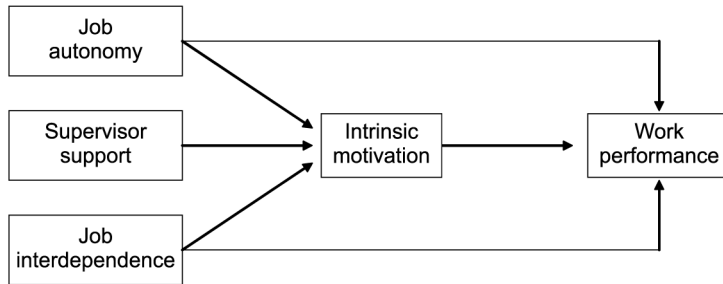


Figure 1.
Hypothesized model

Intrinsic motivation and work performance

Intrinsic motivation as a predictor of performance is strongly supported by research in sports (e.g. Callahan *et al.*, 2003; Catley and Duda, 1997) and educational settings (e.g. Lin *et al.*, 2003; Vansteenkiste *et al.*, 2004; Wang and Guthrie, 2004). In addition, Gagné and Deci (2005) cite a few studies which have found a positive relationship between intrinsic or autonomous motivation and work performance in work organisations. Gagné and Deci (2005, p. 347), however, also cite evidence indicating that intrinsic motivation seems to yield better performance mainly for interesting tasks, which makes them conclude that “When a job involves only mundane tasks, however, there appears to be no performance advantage to autonomous motivation”. Still, two recent studies of performance appraisal among bank employees (ranging from tellers to managers) reported relatively strong relationships between intrinsic motivation and work performance (Kuvaas, 2006b, 2007). Therefore, I hypothesise the following:

H1. Intrinsic motivation is positively related to work performance.

Antecedents of intrinsic motivation

Gagné and Deci (2005) cite several studies which have found that managers’ autonomy support leads to greater satisfaction of the needs for competence, relatedness and autonomy and, in turn, to favourable work behaviours or attitudes. Furthermore, Piccolo and Colquitt (2006) recently reported that core job characteristics (including autonomy) mediated the relationship between transformational leadership and intrinsic motivation. I thus propose that employee perception of supervisor support for development, competence and autonomy will increase intrinsic motivation through greater satisfaction of needs for autonomy and competence. Piccolo and Colquitt (2006) also found a direct relationship between transformational leadership and performance. Since, however, this relationship is probably explained by the “management of meaning” perspective of transformational leadership, and not by managerial support for autonomy, competence and development, I hypothesise that intrinsic motivation will fully mediate the relationship between managerial support and work performance:

H2. The relationship between supervisor support (for development, competence and autonomy) and work performance will be fully mediated by intrinsic motivation.

Although transformational leadership may perhaps influence need satisfaction of job autonomy (e.g. Piccolo and Colquitt, 2006), the strongest and most direct source for satisfying the need for autonomy is most likely the degree to which the job itself allows

freedom, independence and discretion to schedule work, make decisions and choose how to perform the job.

Beyond the SDT argument regarding the importance of satisfaction of the need for autonomy, nearly every single major work design theory proposes that autonomous forms of work design will improve performance. The basic argument proposed by Hackman and Oldham (1976) is that job autonomy leads to the critical psychological state of “experienced responsibility of the outcomes of the work”, and, in turn, internal work motivation. Although the empirical evidence is mixed (Parker and Turner, 2002), it seems that performance increases are more likely when autonomous work (re)design improves intrinsic motivation (Kelly, 1992). Furthermore, autonomy-supportive conditions have been found to predict intrinsic motivation (Gagné *et al.*, 1997) and satisfaction of the needs for autonomy, competence and relatedness across two national cultures (Deci *et al.*, 2001).

Morgeson *et al.* (2005) recently reported that the relationship between job autonomy and performance was mediated by role breadth. This finding suggests that autonomy enhances employees’ motivation to recognise a wider range of skills and knowledge as important for their jobs and that they will try out and master new tasks and integrate more tasks into their focal job roles (e.g. Morgeson and Campion, 2002; Parker, 1998). Although this mechanism should increase intrinsic motivation (e.g. through feelings of competence and meaning), it may also partly represent an independent path to performance. It is therefore hypothesised that the relationship between job autonomy and work performance only will be partly mediated by intrinsic motivation:

H3. The relationship between job autonomy and work performance will be partly mediated by intrinsic motivation.

SDT posits that intrinsic motivation is more likely to flourish in contexts characterised by a sense of security and relatedness (e.g. Ryan and Deci, 2000). Activities characterised by high levels of task interdependence and mutual dependencies require spontaneous give-and-take, cooperation and accommodating gestures among the parties involved (Organ, 1988; Podsakoff *et al.*, 2000), and I therefore suggest that task interdependence may help to satisfy the need for relatedness. Task interdependence reflects the degree to which the job depends on others and others depend on it in order to complete the work (Morgeson and Humphrey, 2003). In addition to satisfying the need for relatedness, and therefore increasing intrinsic motivation, research reviewed by (Bachrach *et al.*, 2006) suggests that task interdependence may increase communication, helping and information-sharing, organisational citizenship behaviour, expectations of help and norms of cooperation. These findings suggest that there may be several mechanisms other than intrinsic motivation that can explain the relationship between task interdependence and work performance. Finally, working in the presence of others may have a socially facilitating effect for well-learned tasks (e.g. Zajonc, 1980) through the experience of being challenged (Blascovich *et al.*, 1999), that can directly increase performance and work through intrinsic motivation. It is therefore hypothesised that the relationship between task interdependence and work performance will be partly mediated by intrinsic motivation:

H4. The relationship between task interdependence and work performance will be partly mediated by intrinsic motivation.

Methodology

Sample and procedure

Respondents were drawn from three municipalities located in Norway. A questionnaire was distributed to 2,015 employees through a web-based tool (Questback), which resulted in complete data from 779 workers, representing a response rate of approximately 39 per cent. Of these, about 70 per cent were women, and about 30 per cent men, and the average organisational tenure was 7.5 years. About 40 per cent of the respondents had four years or more of higher education, while approximately 25 per cent had a college degree or less education. More than 85 per cent earned basic pay between NOK 250,000 and NOK 399,000[1] and about 25 per cent of the respondents had managerial responsibility. Finally, the respondents represent a broad cross-section of job types and were employed in the following sectors or functions (administration = 17.3 per cent, culture = 4.2 per cent, technical = 11.4 per cent, social welfare = 21.8 per cent, local healthcare = 9.9 per cent, children and youngsters = 11.7 per cent, schools = 16.9 per cent, other = 6.7 per cent).

Measures

Unless otherwise noted, all items were on a five-point Likert response scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Independent variables. Job autonomy (nine items) and task interdependence (five items) were measured by scales validated by (Morgeson and Humphrey, 2003, 2006). Sample items are “The job allows me to make my own decisions about how to schedule my work” (job autonomy) and “Other jobs depend directly on my job” (task interdependence). Supervisor support was measured by 12 items developed by (Martinsen, 2005) that assess employees’ perceived support from their immediate supervisor regarding development, competence and autonomy. Sample items are “My immediate supervisor contributes to my professional development”, “My immediate supervisor makes me feel competent in performing my job”, and “My immediate supervisor helps me develop self-determination in my job”.

Dependent variable. Work performance was measured by six self-report items based on prior measures (Brockner *et al.*, 1992; May *et al.*, 2002) that have previously been used in a Norwegian context (Kuvaas, 2006a). Example items are “I intentionally expend a great deal of effort in carrying out my job” and “The quality of my work is top-notch”.

Mediating variable. Intrinsic motivation was assessed by six items by the use of descriptive adjectives commonly used to assess intrinsic work motivation (e.g. Cameron and Pierce, 1994) and that have previously been used in a Norwegian context (Kuvaas, 2006b). Sample items include “My job is so interesting that it is a motivation in itself” and “The tasks that I do at work are enjoyable”.

Control variables. Several variables that may affect the hypothesised relationships were included as controls. In order to protect respondent anonymity, and thereby reduce the risk of social desirability bias (Podsakoff *et al.*, 2003), most control variables were measured by way of categories. Level of education was measured by six categories ranging from elementary and secondary school (coded as 1) to four or more years of master’s education (coded as 6). Pay level was measured by eight categories of annual fixed pay ranging from under NOK 199,000 (coded as 1) to more than NOK 500,000 (coded as 8). Organisational tenure was measured in years, and gender and managerial responsibility were measured as dichotomous variables coded such that 1 was male and 2 female and 1 was managerial responsibility and 2 was no managerial

responsibility. Municipality was coded as three dummy variables and sector (i.e. administration, culture, technical, social welfare, local healthcare, children and youngsters, schools and other) was coded as eight dummy variables where the “other” category was omitted from the regression analyses.

Analyses

The data were analysed in several phases. First, factor analysis (principal component analysis with varimax rotation) was performed on all multiple scale items to determine item retention (e.g. Coyle-Shapiro *et al.*, 2004). In order to avoid confounded measures of the constructs, I applied relatively stringent rules-of-thumb and retained only items with a strong loading of 0.50 or higher (Osborne and Costello, 2004), a cross-loading of less than 0.35 on other included factors (Kiffin-Petersen and Cordery, 2003), and a differential of 0.20 or higher between included factors (Van Dyne *et al.*, 1994).

Regression analysis was used to test the hypotheses. The three-step procedure recommended by Baron and Kenny (1986) was used to test the mediation hypotheses. According to Baron and Kenny (1986), the following conditions must be met to support a mediating relationship. First, the independent variable must be significantly associated with the mediator. Second, the independent variable must be significantly associated with the dependent variable. Finally, after the mediator is entered, the relationship between the independent and dependent variables should either disappear (full mediation) or significantly diminish (partial mediation). Structural equation modelling was ruled out because of the large number of parameters to be estimated (owing to the large number of core and control variables, as well as the number of items in multi-item scales).

Results

The principal component analysis revealed that one of the supportive leadership behaviour items had a loading that was too low, that one work performance item cross-loaded on the intrinsic motivation factor, and that two of the intrinsic motivation items loaded on a separate factor (see Table I). These items were removed before scales were computed by averaging of the items. All of the final scales had acceptable reliability estimates (coefficient alphas ranging from 0.79 to 0.93).

Means, standard deviations, bivariate correlations and coefficient alphas for all multiple item scales are reported in Table II. Pairwise and multiple variable collinearity were inspected by collinearity diagnostics in SPSS prior to analysis. The lowest tolerance value was 0.27, which is far from the common cut-off threshold value of 0.10 (Hair *et al.*, 1998) and the “worthy of concern value” of 0.20 (Menard, 1995).

Recall that three criteria need to be satisfied in order to determine a mediator relationship. The results in Table III show that the first criterion, that the independent variables must be associated with the mediator, was met for all three variables (job autonomy; $\beta = 0.25$, $p < 0.001$, supervisor support; $\beta = 0.26$, $p < 0.001$, and task interdependence; $\beta = 0.09$, $p < 0.01$). Furthermore, Table IV shows that the criterion that the independent variables must be related to the dependent variable was also met (job autonomy; $\beta = 0.15$, $p < 0.001$, supervisor support; $\beta = 0.08$, $p < 0.05$, and task interdependence; $\beta = 0.11$, $p < 0.01$). Finally, the third criterion that the relationship between the independent and dependent variables should either disappear or significantly diminish in step was also met (job autonomy; $\beta = 0.09$, $p < 0.05$, supervisor support; $\beta = 0.02$, n.s., and task interdependence; $\beta = 0.09$, $p < 0.05$). To test whether these drops in standardised betas were significant, I ran Sobel tests (Preacher and Leonardelli, 2001) and the computer software MedGraph (Jose, 2003), where the latter provides tests for

Items	Factors						
	1	2	3	4	5	6	7
My immediate supervisor supports the development of my professional skills (SS)	0.88						
My immediate supervisor lets me develop my competency (SS)	0.86						
My immediate supervisor supports me in keeping track of things (SS)	0.86						
My immediate supervisor contributes to my professional development (SS)	0.86						
My immediate supervisor helps me develop self-determination in my job	0.69						
My immediate supervisor stimulates me to make my own decisions about how to schedule my work (SS)	0.64						
My immediate supervisor gives me advice about self-leadership (SS)	0.62						
My immediate supervisor makes me feel competent in performing my job (SS)	0.62					0.61	
My immediate supervisor makes me feel effective in my job (SS)	0.61					0.59	
My immediate supervisor expresses confidence in my abilities (SS)	0.60					0.58	
My immediate supervisor asks me to set self-determined work goals (SS)	0.57						
The job allows me to decide on my own how to go about doing my work (JA)		0.80					
The job allows me to plan how I do my work (JA)		0.79					
The job allows me to make a lot of decisions on my own (JA)		0.76					
The job provides me with significant autonomy in making decisions (JA)		0.76					
The job allows me to make my own decisions about how to schedule my work (JA)		0.76					
The job gives me a chance to use my personal initiative or judgement in carrying out the work (JA)		0.75					
The job allows me to decide on the order in which things are done on the job (JA)		0.74					
The job allows me to make decisions about what methods I use to complete my work (JA)		0.73					
The job gives me considerable opportunity for independence and freedom in how I do the work (JA)		0.72					
Other jobs depend directly on my job (TI)			0.86				
Unless my job gets done, other jobs cannot be completed (TI)			0.85				
The job requires me to accomplish my job before others complete their job (TI)			0.80				
The job activities are greatly affected by the work of other people (TI)			0.76				
The job depends on the work of many different people for its completion (TI)			0.58				

(continued)

Table I.
Principal component analysis with varimax rotation

Items	Factors						
	1	2	3	4	5	6	7
I almost always perform better than what can be characterised as acceptable performance (WP)				0.80			
I often perform better than what can be expected (WP)				0.78			
I often expend extra effort in carrying out my job (WP)				0.73			
I try to work as hard as possible (WP)				0.65			
The quality of my work is top-notch (WP)				0.60		0.30	
I intentionally expend a great deal of effort in carrying out my job (WP)				0.54	0.47		
The tasks that I do at work are enjoyable (IM)					0.77		
My job is meaningful (IM)					0.74		
The tasks that I do at work themselves represent a driving power in my job (IM)					0.73		
My job is so interesting that it is a motivation in itself (IM)					0.64		0.39
My immediate supervisor speaks about me as a self-motivated and competent employee (SS)	0.45					0.71	
The job is like a hobby to me (IM)							0.74
I feel lucky being paid for a job I like this much (IM)							0.66
Initial eigenvalues	9.76	4.08	3.36	2.74	1.93	1.30	1.16
Pct. of variance	25.69	10.74	8.85	7.21	5.09	3.42	3.06
Coefficient alpha for final scales	0.93	0.92	0.84	0.79	0.82	n.a.	n.a.

Notes: Factor loadings less than 0.30 are not shown. SS = supervisor support; JA = job autonomy; TI = task interdependence; WP = work performance; IM = intrinsic motivation

Table I.

partial versus full mediation. Based on statistics from the full regression models including the control variables, these tests provided support for *H2* and full mediation for supervisor support ($Z = 4.91, p < 0.001$), support for *H3* and partial mediation for job autonomy ($Z = 4.80, p < 0.001$) and support for *H4* and partial mediation for task interdependence ($Z = 2.56, p < 0.05$). Finally, *H1* is supported by the positive relationship between intrinsic motivation and work performance ($\beta = 0.25, p < 0.001$).

Discussion

The purpose of this study was to test the relationship between intrinsic motivation and work performance among individuals from a broad cross-section of job types among public employees. Although SDT is based on a strong empirical foundation, there have been relatively few studies that have tested the theory within an organisational setting (Gagné and Deci, 2005). Furthermore, SDT research has typically investigated either the determinants or the antecedents of intrinsic motivation (Grouzet *et al.*, 2004), while this study examined both determinants and the consequence of intrinsic work motivation in a public organisational setting.

The findings of this study suggest that job autonomy, supervisor support for competence, development and autonomy, and task interdependence, positively influence intrinsic motivation. These results indicate support for the SDT position that the social environment influences intrinsic motivation through its impact on need satisfaction or perceptions of autonomy, competence and relatedness (Grouzet *et al.*,

	M	SD	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17	18	19	20	21	
1 Education	4.64	1.47	-																				
2 Basic pay	3.97	1.16	0.52	-																			
3 Tenure	7.55	7.35	-0.14	0.07	-																		
4 Gender ^a	1.70	0.46	0.02	-0.16	-0.02	-																	
5 Managerial responsibility ^b	1.75	0.44	-0.15	-0.48	0.01	0.14	-																
6 Municipality 1	0.47	0.50	0.07	0.02	0.11	0.05	0.06	-															
7 Municipality 2	0.28	0.45	-0.13	-0.05	0.03	-0.09	0.06	-0.58	-														
8 Municipality 3	0.25	0.43	0.05	0.02	-0.16	0.03	-0.13	-0.54	-0.36	-													
9 Administration	0.17	0.38	-0.21	0.01	0.00	0.01	0.11	-0.03	0.07	-0.04	-												
10 Culture	0.04	0.20	-0.06	-0.09	0.06	0.01	0.05	0.01	0.11	-0.12	-0.10	-											
11 Technical	0.11	0.32	-0.24	-0.09	0.05	-0.38	-0.03	0.00	0.16	-0.16	-0.16	-											
12 Social welfare	0.22	0.41	0.15	-0.13	-0.15	0.09	0.10	-0.11	-0.13	0.27	-0.24	-0.19	-										
13 Local healthcare	0.10	0.30	-0.02	-0.04	-0.10	0.14	-0.07	-0.02	-0.03	0.05	-0.15	-0.12	-0.18	-									
14 Children and youngsters	0.12	0.32	0.11	0.03	0.01	0.14	-0.29	-0.05	-0.12	0.18	-0.17	-0.13	-0.19	-0.12	-								
15 Schools	0.17	0.38	0.33	0.35	0.18	-0.01	0.04	0.26	-0.04	-0.26	-0.21	-0.16	-0.24	-0.15	-0.16	-							
16 Other	0.07	0.25	-0.18	-0.14	0.02	-0.03	0.06	-0.08	0.06	0.02	-0.12	-0.10	-0.14	-0.09	-0.10	-0.12	-						
17 Job autonomy	3.96	0.61	0.16	0.26	0.01	-0.10	-0.20	-0.01	0.06	0.04	-0.05	0.07	-0.11	-0.06	0.11	0.06	0.01	0.01	0.01	0.01	0.01	0.01	0.01
18 Supervisor support	3.50	0.67	0.04	0.13	0.02	0.00	-0.08	0.04	0.03	-0.08	-0.03	-0.03	-0.04	0.01	0.06	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00
19 Task interdependence	3.48	0.74	-0.01	0.11	-0.01	-0.08	-0.18	0.03	0.04	-0.08	0.05	0.13	-0.16	0.03	0.05	-0.02	-0.04	0.08	0.12	0.12	0.12	0.12	0.12
20 Intrinsic motivation	4.05	0.58	0.13	0.21	0.13	0.03	-0.14	0.11	-0.01	-0.11	-0.10	0.00	-0.12	-0.03	0.14	0.17	-0.07	0.38	0.38	0.38	0.38	0.38	0.38
21 Work performance	3.84	0.55	-0.02	0.04	0.11	0.04	-0.06	0.13	-0.07	-0.08	-0.03	0.01	-0.08	-0.03	0.06	0.11	0.00	0.18	0.15	0.13	0.31	0.31	0.31

Notes: N = 779; where appropriate, coefficient alphas indicating scale reliabilities are in parentheses. Correlations equal to greater than 0.07 are significant at $p < 0.05$, and those equal to or greater than 0.10 are significant at $p < 0.01$.^aMale = 1 and female = 2. ^bManagerial responsibility = 1 and no managerial responsibility = 2. ^cMale = 1 and female = 2. ^dManagerial responsibility = 1 and no managerial responsibility = 2. ^eMale = 1 and female = 2. ^fManagerial responsibility = 1 and no managerial responsibility = 2. ^gMale = 1 and female = 2. ^hManagerial responsibility = 1 and no managerial responsibility = 2. ⁱMale = 1 and female = 2. ^jManagerial responsibility = 1 and no managerial responsibility = 2. ^kMale = 1 and female = 2. ^lManagerial responsibility = 1 and no managerial responsibility = 2. ^mMale = 1 and female = 2. ⁿManagerial responsibility = 1 and no managerial responsibility = 2. ^oMale = 1 and female = 2. ^pManagerial responsibility = 1 and no managerial responsibility = 2. ^qMale = 1 and female = 2. ^rManagerial responsibility = 1 and no managerial responsibility = 2. ^sMale = 1 and female = 2. ^tManagerial responsibility = 1 and no managerial responsibility = 2. ^uMale = 1 and female = 2. ^vManagerial responsibility = 1 and no managerial responsibility = 2. ^wMale = 1 and female = 2. ^xManagerial responsibility = 1 and no managerial responsibility = 2. ^yMale = 1 and female = 2. ^zManagerial responsibility = 1 and no managerial responsibility = 2.

Table II. Descriptive statistics, correlations and scale reliabilities

ER 31,1	Education	0.00
	Basic pay	0.06
48	Tenure	0.09**
	Gender ^a	0.07*
	Managerial responsibility ^b	0.01
	Municipality 1	0.07
	Municipality 2	0.02
	Administration	0.00
	Culture	0.07
	Technical	0.06
	Social welfare	0.04
	Local healthcare	0.04
	Children and youngsters	0.13*
	Schools	0.15*
	Job autonomy	0.25***
	Supervisor support	0.26***
	Task interdependence	0.09**
	R^2	0.28
F	17.49***	

Table III.
Regression results for
intrinsic motivation

Notes: Standardised regression coefficients are shown; $n = 779$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
^aMale = 1 and female = 2. ^bManagerial responsibility = 1 and no managerial responsibility = 2

	Step 1	Step 2
Education	-0.07	-0.07
Basic pay	-0.05	-0.06
Tenure	0.08*	0.05
Gender ^a	0.06	0.04
Managerial responsibility ^b	-0.04	-0.04
Municipality 1	0.09	0.07
Municipality 2	-0.03	-0.03
Administration	-0.02	-0.02
Culture	-0.05	-0.07
Technical	-0.01	-0.03
Social welfare	-0.02	-0.02
Local healthcare	-0.03	-0.04
Children and youngsters	0.03	0.00
Schools	0.09	0.06
Job autonomy	0.15***	0.09*
Supervisor support	0.08*	0.02
Task interdependence	0.11**	0.09*
Intrinsic motivation		0.25***
R^2	0.09	0.14
F	4.66***	6.78***

Table IV.
Regression results for
work performance

Notes: Standardised regression coefficients are shown; $n = 779$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.
^aMale = and female = . ^bManagerial responsibility = 1 and no managerial responsibility = 2

2004). Furthermore, the relatively weak, albeit significant, direct relationships between job autonomy and task interdependence and work performance also suggest that there are other paths from environmental factors to work performance than those which are mediated by intrinsic motivation. Accordingly, the findings obtained in this study also support other theories, for instance, job design theories (e.g. Hackman and Oldham, 1976; Kiggunde, 1983), role theories (e.g. Morgeson *et al.*, 2005) and self-efficacy theories (e.g. Bandura, 1997; Gist and Mitchell, 1992).

The relatively strong positive relationship between intrinsic motivation and work performance may suggest that intrinsic motivation can be a potent motivator across tasks and functions, in contrast with the cautionary notes provided by Gagné and Deci (2005). Moreover, this result replicates the findings obtained by Kuvaas (2006a, b, 2007), who reported standardised betas of 0.23 ($p < 0.001$, $N = 434$) and 0.36 ($p < 0.001$, $N = 593$) in two independent samples of bank employees and 0.34 ($p < 0.001$, $N = 634$) among more typical “knowledge-workers”. It is still possible, however, that the combination of intrinsic motivation and internalised extrinsic motivation may be superior in jobs that include both complex tasks that are interesting and less complex tasks that require discipline, as suggested by Gagné and Deci (2005). If, however, intrinsically motivated behaviour is prototypically autonomous, lower and moderate levels of intrinsic motivation will probably involve moderate autonomous or autonomous extrinsic motivation. Besides, it seems that many of the environmental factors that enhance intrinsic motivation would also facilitate internalisation of extrinsic motivation (Gagné and Deci, 2005). Furthermore, even though I did not measure need satisfaction or perceptions of autonomy, competence and relatedness, I did investigate environmental factors that are theoretically (and to some extent empirically) related to these needs or perceptions. Thus, while SDT provides a detailed theory of basic human motivation mechanisms, including the difference between intrinsic motivation and different levels of autonomous extrinsic motivation, this study supports the implications of SDT regarding the importance of work climates characterised by support for autonomy, competence and relatedness across different tasks and functions that vary in how interesting, important, challenging, complex and meaningful they are.

This study may also contribute to public management research and practice. Consistent with recent findings based on a Greek sample of public employees (Manolopoulos, 2008), the results obtained here underscore the importance of intrinsic motivation among public sector employees. Accordingly, from a motivational point-of-view, “hard new public management”, with its strong emphasis on management by objectives, detailed goal-setting schemes and performance management (e.g. Christensen and Lægveid, 2007), can impede productivity to the extent that it may represent a threat to autonomy-supportive work environments. Similar arguments are found in human resource management (HRM) research on “soft”, progressive, high-involvement, high-commitment or “best practice” HRM, which basically proposes that superior organisational performance is achieved when employees exert themselves on behalf of the organisation (Guest, 1997; Purcell, 1999). Unlike controlling or hard HRM, this perspective views the fulfilment of employee needs as an end in itself (e.g. Guest, 1997) and pertains to flexible, autonomous and empowering work systems that rest primarily on employees’ self-regulated behaviour and discretionary effort (e.g. Arthur, 1994; Pfeffer, 1998a; Truss *et al.*, 1997). This line of thinking is perhaps best explained by Pfeffer and Veiga (1999, p. 40), who suggest that “Simply put, people work harder because of the increased involvement and commitment that comes from having more control and say in their work; people work smarter because they are encouraged to

build skills and competence; and people work more responsibly because more responsibility is placed in hands of employees further down in the organization". Still, whether such "best practices" have these types of favourable outcomes in every organisation is widely debated (e.g. MacDuffie, 1995; Wright and Boswell, 2002).

Limitations and research directions

The contributions of this research should be viewed in the light of several limitations. First, the data were gathered at one point in time, making it impossible to draw inferences of causality or rule out the possibility of reverse causality. Consequently, longitudinal or experimental studies are needed to come closer to causality inferences on the relationships examined in the present study. Another limitation is the reliance on self-reported questionnaire data, causing concerns about possible mono-method bias and percept-percept inflated measures (e.g. Crampton and Wagner, 1994). The principal component analysis, however, generated seven factors with eigenvalues of 1 or more, and an explained variance of the factors ranging from 25.69 per cent (factor 1) to 3.06 per cent (factor 7). Although this analysis, the Harman's one-factor test (Podsakoff and Organ, 1986), is nothing more than a diagnostic technique for assessing the extent to which common method variance may be a problem (Podsakoff *et al.*, 2003), it seems to indicate that mono-method variance was not a serious threat in this study. Furthermore, given the modest correlations between the variables in this study and the conservative criteria used in determining item retention, it is not very likely that common method bias has heavily influenced the observed relationships.

The only construct that could have been validly measured by means other than self-report in this study is work performance. Research on salespeople suggests that self-rated performance tends to be upward-biased, but also that the amount of bias does not seem to vary across performance levels (Sharma *et al.*, 2004). It is therefore not unlikely that the respondents in the present study have overestimated their performance levels, but that such an overestimation has not heavily affected the results. Still, the mean value for self-reported work performance was 3.84 compared with 4.05 for intrinsic motivation and 3.96 for job autonomy. Furthermore, whereas performance ratings by supervisors help rule out the validity threats of self-report and mono-method, performance appraisal research suggests that performance ratings conducted by supervisors may be even more biased than self-report measures (Levy and Williams, 2004). Fox and Dinur (1988), for instance, found that self-ratings were markedly less affected by halo than were ratings offered by others, and Sharma *et al.* (2004) reported that both salespeople and managers overestimated performance, but also that self-ratings showed better ability to discriminate between medium and high performers than managerial evaluations. Thus, it is far from obvious that the extra effort involved in gathering performance data by supervisors would have produced better performance data. Still, future research should ideally use both self-report and supervisor measures of work performance.

This study may also be limited by the fact that the data were obtained exclusively from employees in Norwegian municipalities. Norway has very high per capita income, low income inequality and a very low unemployment rate (OECD, 2005). Furthermore, data on Hofstede's cultural dimensions (International, 2005) indicate that Norwegians score extremely low on the masculinity dimension when compared with people from other countries (e.g. USA, UK and China). Together, these economic and cultural characteristics may imply that Norwegians have a less instrumental orientation towards work, implying that the results may only generalise to similar contexts such

as the Scandinavian countries (Kuvaas, 2006a). Still, research on the self-determination model of intrinsic motivation provides support for the relevance of need for autonomy and competence across the USA and Bulgaria, which have very different national cultures (Deci *et al.*, 2001), and a recent study by Grouzet *et al.* (2005) suggests that the structure of goal contents is similar across 15 cultures around the world. Furthermore, the link between intrinsic job characteristics and job satisfaction is found to be similar across richer countries, countries with better governmental social welfare programmes, more individualistic countries, and smaller power distance countries (Huang and Van de Vliert, 2003). Since all of these characteristics apply to Norway and most western countries, and the relationships referred to relate to key constructs in the present study, the results obtained may have implications for other western countries (Kuvaas, 2006a). Still, research in other organisations from different countries should be conducted before any firm conclusions can be drawn.

In order to test the more detailed propositions from SDT, future research should also include measures of need satisfaction or perceptions of autonomy, competence and relatedness in organisational settings. Then it will be possible to investigate the relationships between environmental factors, need satisfaction and intrinsic motivation simultaneously.

SDT does not focus on the consequences of the strength of needs for different individuals, but on the consequences of the extent to which individuals are able to satisfy their needs (Gagné and Deci, 2005). Still, Kuvaas (2007), for instance, recently found that perceptions of developmental performance appraisal and work performance were strongly moderated by employees' autonomy orientations. For employees with a weak autonomy orientation, the relationship was positive, but for those with a strong autonomy orientation, the relationship was negative. This finding indicates that different individuals will react differently to the same environmental factors and may suggest that some employees will be more intrinsically motivated by higher levels of instruction and direction. Although SDT researches would probably argue that employees with a low autonomy orientation simply need less autonomy-supportive working conditions than others, an important avenue for future research is to learn more about how individual differences may systematically affect the relationship between environmental factors and intrinsic motivation.

Implications for practice

Despite its limitations, this study may have important implications for practice. First, the findings imply that empowering working conditions characterised by autonomy and competence support and task interdependence seems to increase intrinsic motivation and work performance across different tasks and functions that vary in how interesting, important, challenging, complex and meaningful they are. Despite the fact that this is not a totally novel finding, which may even be moderated by individual differences and other factors, it suggests that managers should expect positive effects from empowering working conditions. Still, the tendency to predict that others are more motivated than themselves by extrinsic rewards and less motivated than themselves by intrinsic rewards is prevalent among many managers in both the private and the public sectors (DeVoe and Iyengar, 2004; Ferraro *et al.*, 2005; Heath, 1999; Manolopoulos, 2008; Pfeffer, 1998b; Pfeffer and Veiga, 1999), leading them to use improper lay theories to offer inappropriate and ineffective working conditions for their employees (Heath, 1999; Noblet *et al.*, 2005).

Conclusion

Even though self-determination theory (SDT) is based on a strong empirical foundation, there have been relatively few studies that have tested the theory within organisational settings (Gagné and Deci, 2005). Accordingly, this study contributes to SDT by obtaining support for hypotheses derived from it among a sample of public sector employees from a broad cross-section of job types and therefore supports the use of SDT as a theory of work motivation.

Note

1. NOK 250,000 correspond to approximately €30,850 and \$40,950.

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