

Work environments for employee creativity

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Abstract

Innovative organisations need creative employees who generate new ideas for product or process innovation. This paper presents a conceptual framework for the effect of personal, social-organisational and physical factors on employee creativity. Based on this framework an instrument to analyse the extent to which the work environment enhances creativity is developed. We apply this instrument to a sample of 409 employees and find support for the hypothesis that a creative work environment enhances creative performance. We illustrate how the instrument can be used in companies to select and implement improvements.

Keywords: work environment, creativity, innovation

Relevance

The ergonomics discipline addresses the work environment mainly for improving health and safety, and sometimes productivity and quality. This paper opens a new area for ergonomics: designing work environments for enhancing employee creativity in order to strengthen an organisation's capability for product and process innovation, and consequently its competitiveness.

Introduction

Since the industrial revolution, organisations focus on productivity: maximization of output at minimum cost. To support this objective, management principles and instruments have been developed and used in manufacturing and services companies all over the world. As a result, labour is divided into small specialized tasks, processes are standardized allowing mechanisation and automation, and workers are specialized to do remaining tasks, many times resulting in repetitive and monotonous work in standard workplaces. The manager's role is to control whether the worker performs the task according to a predetermined plan, and the worker's payment is partly based on realizing predicted output. Ergonomics has been involved to prevent and correct negative effects of this way of organising work on health and safety, and on productivity and quality.

In an innovation driven competitive business environment, such a work organisation may not be the right choice, and ergonomics and ergonomists could have a different role (Jensen, 2002; Karwowski, 2008; Dul and Neumann, 2009; Neumann and Dul, 2010). A company that needs to compete on innovation needs its employees not only for reaching productivity goals, but also for generating new business ideas. Employee creativity is the production of novel and potentially useful ideas for solving problems, and for developing new products, services, processes, systems, work methods, etc. (e.g. Amabile, 1988). It is a vital resource for an organisation's innovation, and employees at any level in the organisation can contribute to this goal (Madjar et al., 2002; Shalley et al., 2004). Because creative performance of employees depends on individual characteristics such as personality traits (e.g. openness to experience), cognitive style, and creativity relevant skills, practices for enhancing employee creativity have traditionally focused on recruitment and selection of creative talents, and on creativity training of the workforce (Scott et al., 2004).

However, creative employees that are placed in traditional productivity driven organisations with formal structures, time constraints, strict regulations, daily similar tasks, standardised workplaces, etc., may not be stimulated to show the desired creative behaviour. The extent to which a person generates new and useful ideas depends on the support that is received from the work environment (Amabile et al., 1996;

Woodman et al., 1993). This paper addresses the question of how the day-to-day work environment can be designed to foster creativity at work. Designing work environments for creativity could be a new topic for ergonomics research and practice. It fits the dual objective of ergonomics, as formulated in a common description of the discipline (IEA Council, 2000): “[the goal of ergonomics is] to optimize human well-being and overall system performance”. In modern business, creativity and innovation are important indicators of an organisation’s performance, and creative work environment can advance employees’ well-being in terms of job satisfaction and lower intentions to leave (Shalley et al. 2000). First we develop a conceptual framework on the relationship between work environment and creativity. Next we present an instrument for analysing the extent to which the work environments supports employee creativity. We apply this instrument to a sample of 409 Dutch employees to test the hypothesis that a supportive work environment increases employees’ creative performance. Finally, we illustrate how the instrument can be used in practice for selecting and implementing interventions to make the work environment more supportive for employee creativity.

2. Conceptual framework

Work environments for creativity are not only important for employees with creative tasks such as R&D personnel, product designers, or marketers; “creative ideas may be generated by employees in any job and at any level of the organization” (Shalley et al., 2004 p.934). Therefore, all employees in an organisation can produce novel and potentially useful ideas for:

- new or improved products and services that are produced by the organisation;
- new or improved production processes for of these products and services;
- new or improved work methods and procedures;
- solutions for problems faced during the day-to-day work.

Figure 1 shows a conceptual framework for the relationship between creative person, the work environment, and employee creativity.

INSERT FIGURE 1 ABOUT HERE

The central part of the model is an employee's creative process. This process can be considered as a series of steps that an individual must take (Lubart, 2000-2001; Reiter-Palmon and Illies, 2004). For example, an old and still useful step-model was developed by Wallas (1926) and consists of the following steps: (1) Preparation: when the person directs his attention to a particular topic and gathers information within himself and the environment, (2) Incubation: when conscious work stops, and attention is directed to other things, while unconsciously the creative process continues, (3) Illumination: the moment when new inside suddenly comes to mind, and (4) Verification: when logical and rational thought comes in again to turn the new inside into something apparent to others (Schweizer, 2005; Haner, 2005). The output of the creativity process is an idea that is considered as novel and potentially useful. In an organisational setting, this idea can be related to products, services, processes, systems, work methods, etc. Only after adoption of the idea in the organisation, innovation starts (idea implementation).

The extent to which people produce ideas depends on individual characteristics. A large body of knowledge is developed during the last 50 years on the relationship between individual characteristics of creative persons and creative performance. Most of this research can be found in the psychological domain. Summaries of this research show that, for example, personality (e.g. openness, broad interest, toleration of ambiguity), cognitive style (e.g. divergent thinking, problem solving), and knowledge (e.g. domain knowledge, broad knowledge) are positively related to worker creativity (e.g. Oldham and Cummings, 1996; Mumford, 2000; Shalley et al., 2004). Organisations could develop creativity by selecting individuals that are potentially creative, for instance based on assessment tools like Gough's Creative Personality Scale (Gough, 1979), or by training workers in cognitive skills like divergent thinking (Scott et al., 2004).

Only recently, the literature acknowledges the importance of the 'context' to support creative workers. Two leading models that emphasize this are Amabile et al.'s (1996) "componential theory model" and

Woodman et al.'s (1993) "interactionist" model. These models state that a supportive work environment can enhance an employees's creativity. In this paper we distinguish between two dimensions of the work environment: the social-organisational work environment, and the physical work environment. The social-organisational work environment refers to the employee's social and organisational context in terms of job design, teamwork, reward system and leadership styles; the physical work environment refers to the employee's context in terms of the physical surroundings such as immediate workplace and surrounding building.

The social-organisational context can be described at three levels: the level of the entire organisation (e.g. organisation's culture, HRM policies), team level (e.g. group composition) and at job level (e.g. complex and demanding jobs, autonomy, supervisory support). Shalley and Gilson (2004, p. 47) state that "because research has indicated that those factors that are more proximal to an individual's day-to-day work [...] may have a stronger effect than factors more distal or at the organisational level [...], it may be best to focus on job-level factors first because they may have the most immediate and critical effect on employee creativity". We therefore evaluated recent review studies in the psychology and management literature addressing proximal social-organisational context factors (Zhou and Shalley, 2003; Shalley et al. 2004; Shalley and Gilson, 2004; Runco, 2004; Anderson et al. 2004; Egan, 2005; Rank et al., 2004; Hunter et al. 2007; George, 2008). From these reviews we selected nine proximal elements of the social-organisational work environment that appear to have a relationship with creativity (Table 1, numbers 1-9.

INSERT TABLE 1 ABOUT HERE

Many scholars presume that the relationship between social-organisational work environment and creativity is mediated by motivation (e.g. Amabile et al., 1996). In a supportive social-organisation work environment employees feel motivated to show creative behaviour. Several studies also highlight the role of mood in fostering creativity: a positive mood may facilitate the generation of a large number of ideas

(e.g. Isen et al., 1987; Amabile et al., 2005; Davis, 2009) and may mediate or moderate the relationship between social-organisational environment and creativity (Shalley et al., 2004).

Both Amabile's and Woodman's models, as well as most empirical studies concentrate on the support of the social-organisational work environment for employee creativity. However many scholars suggest that the physical work environment may enhance creativity as well. For example, Amabile et al. (1996, p. 249) state that "physical environments that are engineered to be cognitively and perceptually stimulating can enhance creativity". Woodman et al. (1993 p. 296) mentions the physical environment as a contextual influence as well, and Shalley and Gilson (2004 p. 48) suggest that future research should address the effect of the physical layout of the workspace on creative performance. However, no specific details are provided as how the physical work environment could enhance creativity. We therefore reviewed empirical studies in ergonomics (e.g. Kwallek and Lewis, 1990; Furnham and Strbac, 2002; Küller et al., 2006), environmental psychology, architecture/indoor design and other fields on the relationship between elements of the physical work environment (e.g. the presence of plants, windows, light, and sound) and creativity. We included studies on the effect of physical elements on performance on a creative task, and studies on the effect of physical elements of the environment on positive mood, assuming that a positive mood is supportive for creativity (Amabile et al., 2005; Davis, 2009). Based on this review we selected twelve physical elements of the work environment that can contribute to creativity (Table 1, numbers 10-21).

3. An instrument for analysing the creativity support of the work environment

Based on the conceptual framework of Figure 1 we developed the Creativity Development Quick Scan (CDQS), which is a checklist that has to be filled out by the employee. For each element the work environment (Table 1) the employee rates the extent to which the element is present (realized) in the respondent's current work environment on a 7-point scale (from very little to very much). All elements together describe the overall support that an employee perceives from the work environment. The overall score is obtained by summing the separate scores for the 21 work environment elements. Hence, we

presume that each element is equally important and that the overall support from the work environment consists of parts that can add up. A low overall score indicates that the employee perceives little support from his/her work environment, whereas a high score indicates much support.

When several employees work in the same organisation (e.g. company) or organisational unit (e.g. group, department), an aggregate score of supportive work environment can be obtained by averaging scores from employees belonging to that entity, while the distribution of individual scores reflects individual variation within that entity. CDQS measures not only the extent to which creative elements of the work environment are present (realized), but also asks employees to rate for each element how *important* it is for supporting his/her creativity, using a 7-point scale ranging from “not important at all” to “very important”. We suggest that a presence score that is larger than the importance score indicates that the environment fits the person’s needs, whereas a presence score that is smaller than the importance score indicates a “misfit”. Information on misfit can be useful for setting priorities for improvements (see below).

The CDQS instrument has been applied in several studies (e.g. Ceylan and Dul, 2007; Dul and Ceylan 2008; Dul et al., 2009; Lukersmith, 2007; Cesano, 2009; Woezik, 2009), which resulted in a database that currently contains data from more than 1500 employees with various professional backgrounds from 6 nations in different regions of the world (Australia, Brazil, Italy, Japan, Netherlands, Turkey).

4. Empirical study on relationship between creative work environment and employee creativity

A basic assumption in our conceptual framework and related CDQS instrument is that individuals who perceive support from their work environment show higher creative performance. We performed an empirical study to test this hypothesis. From the CDQS database we selected 409 Dutch employees working in 49 companies of different size and from different industries. We selected these employees because we had data about their creative performance. The data were obtained by visiting the companies and asking the respondents to fill in questionnaires. Response rates per company varied between eighty and hundred percent. The mean age of the respondents was 37.5 years, and 76 percent of them were male.

For the independent variable we used CDQS' overall measure for supportive work environment as defined above. This measure is a formative index (Damantopoulos and Winklhofer, 2001), where the 21 item scores from the elements of the work environment cause the latent variable "overall creativity supporting work environment", in contrast to a traditional reflective scale where the observed item scores are assumed to be caused by a latent variable. Because the item scores of a formative index do not need to correlate, common test methods for assessing construct reliability do not apply (Rossiter, 2002). For the dependent variable (employee creativity) we developed a 3-item reflective scale for employee self-rating of creativity on the basis of George and Zhou's (2001) 13-item scale for supervisor rating of employee creativity, and Noordam's (2006) modification of this scale for self-rating of employee creativity: "In my work I often have new and innovative ideas", "In my work I often come up with creative solutions to problems", and "In my work I often suggest new ways of performing work tasks". Cronbach's alpha for this scale was 0.80. We included age and quadratic age (Simonton, 1988), gender and creative personality as control variables in our analysis. For measuring creative personality we selected sixteen positive adjectives from Gough's Adjective Check List (Gough, 1979) that are supposed to describe creative personality: capable, clever, confident, egotistical, humorous, informal, individualistic, insightful, intelligent, wide interests, inventive, original, reflective, resourceful, self-confident, and unconventional (Unsworth et al., 2000). A respondent indicates which of the adjectives best describes him or her. The total number of selected adjectives is considered as a measure of creative personality.

Table 2 presents means, standard deviations, and correlations for the main variables.

INSERT TABLE 2 ABOUT HERE

As expected, the overall creativity supporting work environment ('Work environment') positively and significantly relates to creative performance. The results of a hierarchical regression analysis are presented in Table 3.

INSERT TABLE 3 ABOUT HERE

The control variables were entered first (model 1), followed by the independent variable work environment (model 2). Both models are significant. The explained variance increases significantly from model 1 to model 2. The regression analysis of model 2 shows that the regression coefficient for the creative work environment differs significantly from zero. This means that there is a significant positive effect of creative work environment on creative performance (coefficient: 0.28 and $p < 0.001$). This result confirms our hypothesis that the more an employee perceives support from his/her work environment, the higher is his/her creative performance.

5. Practical application of CDQS in companies

The above results indicate that an organisation can boost employee creativity by realizing a supportive work environment. CDQS can be used as a starting point for making improvements when individual scores are aggregated to the level of that organisation or organisational unit. Application of CDQS can consist of the following steps:

1. Analyse the organisation/organisational unit's present work environment with CDQS;
2. Benchmark the fit scores with the scores in the CDQS database;
3. Discuss the relatively strong points (high fit scores) and weak points (low fit scores) of the organisation/organisational unit in comparison to other organisations with management and employees, and formulate possibilities for improvements;
4. Select, implement and evaluate improvements.

We illustrate the use of CDQS with scores from a Dutch case company that provides pest control services to companies in the retail, healthcare and food industry. Data were obtained from 22 office workers dealing with sales, finance and services. These units represent one organisational unit, the headquarter of the company.

In step 1 CDQS data are obtained from each employee of the organisation/organisational unit, and scores are aggregated to the level of the organisation/organisational unit. Table 4 shows the aggregated fit scores for the case company. It shows that the case company has relatively high fit scores for the social organisational element ‘Challenging job’, and for the physical elements ‘Indoor plants/flowers’, and ‘Window view’. Furthermore, the case company had relatively low fit scores for the social-organisational elements ‘Time for thinking’, ‘Creative goals’, ‘Recognition of creative ideas’, and ‘Incentives for creative results’, and for the physical elements ‘Inspiring colours’, ‘Indoor physical climate’ and ‘Sound’. Relatively low company fit scores (e.g. considerable below 100), indicate that on average employees in that company desire more support for creativity for that particular elements of the environment than that is provided.

INSERT TABLE 4 ABOUT HERE

In step 2 the organisation/organisational unit’s fit scores are compared with the scores of other comparable companies/organisational units in the CDQS database. For the case company we selected 55 Dutch organisations/organisational units as a benchmark, and their mean fit scores are shown in Table 4. A fit score for the case company that is below the average score for the benchmark indicates that solutions may be readily available to realize a better fit. For instance the case company has relatively low scores for ‘Inspiring colours’ (76%), whereas the average score for other Dutch organisations is 117% . On the other hand the case company has a relatively higher score for ‘Challenging job’ (126%) in comparison to other Dutch organisations (92%).

In step 3 the results are discussed with management and employees of the organisation/organisational unit. The objectives of this step are: (1) to check the correctness of the findings for the organisation/organisational unit (2) to create awareness about the current position of the organisation/organisational unit in comparison to other organisations/organisational units (3) to formulate a common problem (4) to set priorities for improvements, and (5) to discuss possible directions for

solutions. In the case company this resulted in a re-interpretation of the high score on ‘Challenging jobs’, which the employees did not consider as positive, because it was caused by a high level of workload. In general there was a feeling of lack of support from the management for showing creative behaviour, which may explain the low scores for ‘Creative goals’, ‘Recognition of creative ideas’, and ‘Incentives for creative results’, although low scores for these three aspects of the social-organisational work environment are not uncommon in other organisations. In Step 4 a selection of improvements is made, and after implementation an evaluation with CDQS can be done to verify whether changes have been realized. In the case company the management decided that lack of management support should be changed first, before other elements would be considered. Examples of proposed social-organisational improvements are: training of the current management (communication skills, positive feedback, compliments), to start a new, to provide a white board to recognize good ideas, to implement job rotation and to reduce work pressure by hiring new employees. Physical work environment improvements included inspiring colours on the walls, a new carpet in the office, more pictures and posters on the walls, and realizing more working space to reduce crowding.

5. Discussion

This study shows that the work environment can enhance employee creativity, and that practical tools and solutions are available to realize creativity supporting work environments. By focusing on work environments for employee creativity, the ergonomics discipline could help organisations to better use its internal resources (employees) for product and process innovation. Linking ergonomics in this way to creativity and innovation appears to be relatively new for ergonomics (Dul and Ceylan, 2006, Ceylan et al., 2008). In addition to “quality” (e.g. Eklund, 2000; Lee, 2005) and “productivity” (e.g. Lutz et al., 2001; Hagberg et al., 2007), “creativity for innovation” can be another ergonomics theme that could be appealing to managers and other decision makers, beyond the theme “health and safety” (Dul and Neumann, 2009). A major concern in the management and business field is how to strengthen an organisation’s capacity for innovation. We suggest that ergonomics can contribute to innovation by

designing work environments that foster the creativity of employees at any level in the organisation. This will unlock hidden *internal* resources for an organisation's innovation ("bottom up innovation"). For example, creativity is important for the organisation's knowledge workers who are involved in the creation, distribution, or application of knowledge (Davenport, 2002). Offices are their common work environments, but only rarely offices have been studied from the perspective of stimulating creativity and innovation (for a few exceptions see, Haner, 2005; Ceylan et al., 2008, Lee and Brand, 2010), although many studies exist on the effect of offices on stress and workload (for a review see Croon et al., 2004). But the importance of creativity is not limited to knowledge workers. Employees in any job, including factory workers, need to be creative for solving day-to-day problems and for providing input to the organisation's products and processes innovation (Genaidy et al. 2010). Apart from these internal resources for innovation, currently in management and business there is much attention for the use of *external* resources for innovation, e.g. ideas of suppliers, customers or the general public (e.g. "open innovation", "crowdsourcing"). It appears that some companies focus primarily on their external sources. As Chesbrough (2003 ,xxiv), a main promoter of the concept of "Open Innovation" states: "Open Innovation is a paradigm that assumes that firms can and should use external ideas as well as internal ideas...". Hence, for both closed and open innovation, internal resources are essential, and ergonomics could contribute to boost the creativity of employees.

Our approach to enhance employee creativity has been applied to more than 30 companies. Our experience illustrates that companies can differ considerably regarding the support provided for employee creativity. In nearly all companies there is (considerable) room for improvement. Improvements may range from "quick wins" such as realizing inspiring colours in the physical work environment, to more complex improvements such as realizing challenging jobs or jobs with autonomy as part of the social-organisational work environment. It is interesting to note that many problems and solutions regarding work environments for supporting creativity are very similar to the problems and solutions for work environments for supporting comfort, health and safety. One reason may be that a work environment that results in a positive mood not only supports employee creativity (Isen et al., 1987; Amabile et al., 2005;

Davis, 2009), but also supports employee comfort, health and safety; i.e. positive mood may not only mediate or moderate the relationship between work environment and creativity, but also the relationship between work environment and comfort, health and safety. Hence, part of existing ergonomics knowledge on work environments for comfort, health and safety could be readily applied to foster creativity and innovation in organisations, although further studies are needed to explore this. Some studies indicate that under certain circumstances *negative* mood can foster creativity (e.g. George and Zhou, 2002, 2007) and other studies suggest that a *misfit* between a person's reality and vision can produce a creative tension (Chang et al. 2009), illustrating the complex relationship between work environment fit, misfit and creativity.

The Creativity Development Quick Scan (CDQS) can be used during business process and work environment changes in organisations, as a tool to make organisations more creative. In particular step 3 of the proposed change process is critical because in this step the discussion with management and employees is undertaken to gain understanding of the CDQS results, to make interpretations, and to determine opportunities for improvements. This step fits with the participatory ergonomics approach that is common in ergonomics (e.g. Noro and Imada, 1991; Haines et al. 2002). Our proposed participative approach to improve the work environment for creativity links as follows to the nine dimensions of Haines' et al. (2002) Participatory Ergonomics Framework: *Permanence*: Temporary; *Involvement*: Full direct participation, *Level of influence*: depending on the organisation: Entire organization, Department or Work group/team; *Decision*: Group consultation; *Mix of participants*: Operators, Line management, Senior management, External advisor; *Requirement*: dependent on organisation: Compulsory or Voluntary; *Topics addressed*: Physical design/specification of equipment/workplaces/work tasks, Design of job teams or work organization, Formulation of policies or strategies; *Brief*: Problems identification, Solution development; *Role of ergonomics specialist*: Initiates and guides process, Acts as expert, Available for consultation. Hence, step 3 of the CDQS approach can be considered as a special case of the general participatory ergonomics approach. Although CDQS turns out to be a simple and practical tool that is appealing for both researchers and practitioners, the instrument has also limitations. For example,

for each element of the work environment only one question is asked to the employee. If CDQS would include more items per element, it would gain reliability but it would lose its attractiveness as a quick scan. Furthermore, the instrument has been validated in only one study, and more validation studies are desirable with different groups of workers.

Our approach for improving the work environment for enhancing employee creativity differs from the approach to build dedicated physical spaces for stimulating group creativity (e.g. Moultrie et al. 2007). In such spaces a groups of people work on a common problem. They are away from their day-to-day work environment in order to interrupt conventional wisdom (Price, 2008), and stimulate “out of the box” thinking. Although such an approach may be effective for team creativity and specific problem solving, our approach focuses on individual creativity during day-to-day work and in the day-to-day work environment. We consider employee creativity as an ongoing process, not limited in time and space, and we envision a role for ergonomics to foster the creativity of all workers.

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FIGURES

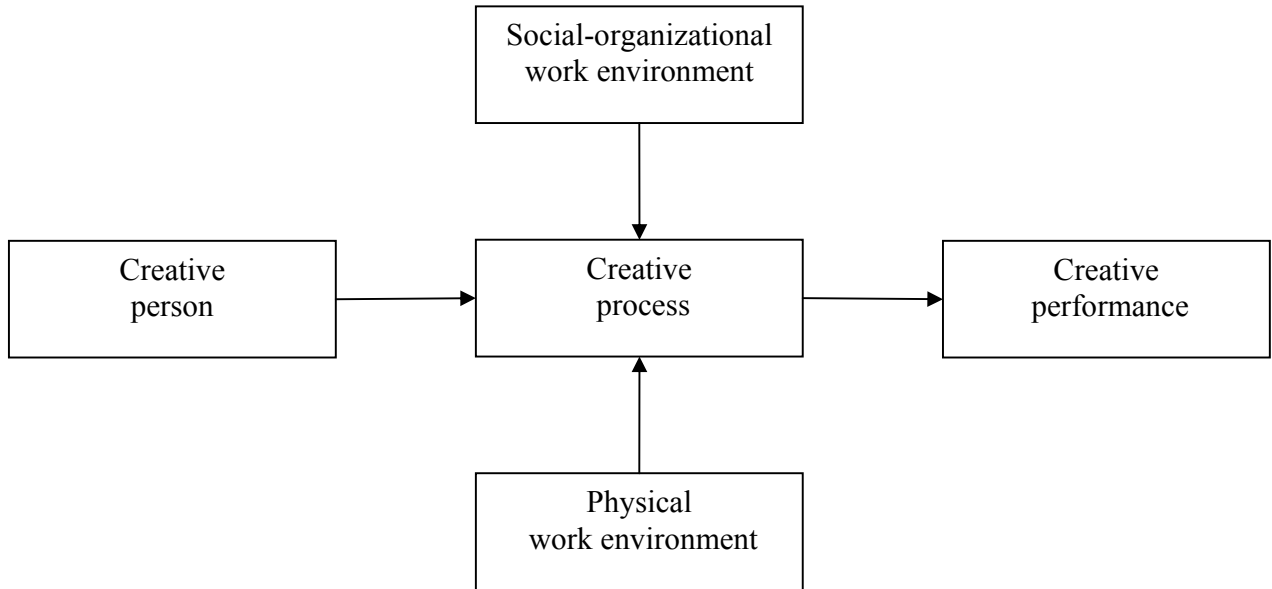


Figure 1. A conceptual model of the relationships between creative person, creative work environment and creative performance.

TABLES

Table 1. Elements of the work environment that can foster creativity

Number	Element	Description
1	Challenging job	The complexity of the job, and how demanding the job is.
2	Teamwork	Working in a group of people towards a common goal, by having interactions with each other.
3	Task rotation	A schedule with a set of different tasks to be performed simultaneously.
4	Autonomy in job	Decision latitude in the job, for example with respect to deciding about the order of work tasks.
5	Coaching supervisor	A supervisor who supports and encourages employees, builds mutual trust and commitment, and provides positive feedback.
6	Time for thinking	The availability of time for idea generation without the time pressure in everyday work.
7	Creative goals	The situation that the employee must produce new ideas according to goals, and with the expectation of evaluation.
8	Recognition of creative ideas	The recognition (e.g. praise, awards) of new ideas.
9	Incentives for creative results	Possibility of rewards (e.g. pay raises, profit sharing, bonuses, promotions) after reaching creative results.
10	Furniture	Furniture (e.g. chairs, tables, cupboards) that are placed in the workplace.
11	Indoor plants/flowers	Natural plants or flowers that are placed in the workplace.
12	Calming colors	Colors that provide a relaxing experience (e.g. green, blue, or blue violet).
13	Inspiring colors	Colors that provide a stimulating experience (e.g. yellow, orange, pink, red, or red violet).
14	Privacy	The possibility of being secluded from the presence or view of others.
15	Window view to nature	Having visual access from the work environment to the outer natural environment (e.g. trees, plants).
16	Any window view	Having visual access from work environment to any outer environment.
17	Quantity of light	The amount of light in the work environment.
18	Daylight	The light coming from the sun into the work environment.
19	Indoor (physical) climate	The temperature, velocity, humidity and composition of the air in the work environment.
20	Sound (positive sound)	Positive sounds (e.g. music, silence, absence of noise).
21	Smell (positive smell)	Positive odors (e.g. fresh air, absence of bad smell).

Table 2. Means, standard deviations, and correlations of the study measures^a

Variable	M	S.D.	1.	2.	3.	4.
1. Creative performance	5.13	1.01				
2. Age	37.5	10.3	0.01			
3. Gender (1=female; 2=male)	1.76	0.43	0.12*	0.13*		
4. Creative personality	6.31	2.77	0.21***	0.12*	0.10*	
5. Work environment	4.43	0.90	0.26***	-0.07	0.01	0.01

*p<0.05, **p<0.01, ***p<0.001 (two-tailed)

^aN = 409

Table 3. Results of regression analyses predicting creative performance ^{a,b}

	Model 1	Model 2
Age	0.01	0.04
Age ²	-0.14**	-0.17***
Gender	0.11*	0.11*
Creative personality	0.20***	0.19***
Work environment		0.28***
ΔR^2	7.2%	7.4%
Partial F	7.88***	34.82***
R ²	7.2%	14.6%
Adjusted R ²	6.3%	13.6%
Model F	7.88***	13.80***

* p<0.05, ** p<0.01, *** p<0.001

^a N=409

^b Standardized regression coefficients are reported for a one-sided test.

Table 4 - CDQS fit scores for the case company in comparison to the mean value of other companies in the database (Case Company=mean score of all employees; Benchmark= mean score of 55 Dutch companies)

	Work environment element	Case Company	Benchmark
1	Challenging job	126	91
2	Teamwork	94	94
3	Task rotation	97	97
4	Autonomy in job	98	104
5	Coaching supervisor	105	97
6	Time for thinking	86	83
7	Creative goals	85	86
8	Recognition of creative ideas	85	87
9	Incentives for creative results	81	84
10	Furniture	148	143
11	Indoor plants/flowers	167	137
12	Calming colours	130	145
13	Inspiring colours	76	117
14	Privacy	99	100
15	Window view to nature	114	108
16	Any window view	160	130
17	Quantity of light	109	107
18	Daylight	100	99
19	Indoor (physical) climate	77	86
20	Sound	88	90
21	Smell	98	95