

Creativity and innovation at work: The role of work characteristics and personal initiative

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In this longitudinal study, we examined the role of work characteristics (creative requirement, job control, coworker and supervisor support) and personal initiative for teachers' idea generation, idea promotion, and idea implementation. Eighty-nine teachers responded to two surveys with an interval of two weeks. Hierarchical regression analyses showed that creative requirement and job control predicted idea generation, whereas support from coworkers and the supervisor predicted idea promotion. Coworker and supervisor support, as well as teachers' personal initiative, predicted idea implementation.

Creatividad e innovación laboral: el rol de las características del trabajo y la iniciativa personal. En este estudio longitudinal se analizó el papel de las características del trabajo (requisitos creativos, control sobre el trabajo, apoyo por parte del supervisor y los compañeros de trabajo) y la iniciativa personal en la generación, promoción e implementación de ideas entre profesores. Ochenta y nueve profesores respondieron a las dos encuestas con un intervalo de dos semanas. Los resultados de los análisis de regresión mostraron que los requisitos creativos y el control laboral predecían la generación de ideas, mientras que el apoyo de los compañeros y el supervisor se relacionaban con la promoción de ideas. Por otra parte, el apoyo de los compañeros y el supervisor, así como la iniciativa personal del profesorado predecían la implementación.

Employees' creativity and innovation have been recognized as important performance outcomes as they enable organizations to adjust to shifting environmental conditions and take advantage of opportunities (Shalley, Zhou, & Oldham, 2004). From a positive occupational health psychology perspective (Bakker, Rodríguez-Muñoz, & Derks, 2012), studying creativity and innovation is also important as these behaviors indicate that an employee is optimally functioning and flourishing (Seligman & Csikszentmihalyi, 2000) and they can be seen as indicators of active mental health (Binnewies, Ohly, & Niessen, 2008; Warr, 1987). Studying indicators of active mental health (e.g., work engagement, creativity) goes beyond examining negative health outcomes (e.g., psychosomatic complaints, burnout). Particularly, research on teachers – which is the sample of interest in our study – has a long tradition in studying teacher burnout compared to the few studies examining positive indicators of active mental health (e.g., Hakanen, Bakker, & Schaufeli, 2006; Prieto, Soria, Martínez, & Schaufeli, 2008).

The aim of our study was to examine creative requirement, job control, support from coworkers and supervisors as organizational factors and personal initiative as a personal characteristic predicting the creativity and innovation of teachers. Our study extends prior research by investigating the different processes of innovative

work behavior, namely idea generation, idea promotion, and idea implementation as separate outcomes instead of subsuming them into one outcome variable. Distinguishing between the different processes of innovative work behavior is important for theory and practice. First, such an approach stimulates theory refinement as various predictors may be differentially related (in terms of direction and size) to the different processes of innovative work behavior. Consequently, we can gain a deeper understanding of how personality and workplace characteristics influence innovation. Second, organizations may seek for interventions targeting rather a specific process of innovation (e.g., the implementation of ideas) than innovation in general. Knowledge about the antecedents of the different processes of innovative work behavior is needed to develop such tailored interventions.

Creativity and innovation

Creativity and innovation are closely related concepts and often described as different stages of innovative work behaviors (Anderson, De Dreu, & Nijstad, 2004). Creativity is defined as the production of novel and useful ideas, while innovation is defined as the implementation of ideas (Amabile, 1996). According to Janssen (2000) and Scott and Bruce (1994) innovative work behavior consists of *idea generation* (creativity), *idea promotion*, and *idea implementation*. *Idea generation* means to develop novel and potentially useful ideas (Amabile, 1996). *Idea promotion* refers to behaviors that aim at selling an idea to others and finding supporters for an idea (Janssen, 2000). *Idea implementation* involves behaviors directed at the realization of ideas at work, for example by «producing a prototype or model of the innovation that

can be experienced and ultimately applied within a work role, a group or the total organization» (Janssen, 2000, p. 288).

Creative requirement and innovative work behavior

Creative requirement is «the perception that one is expected, or needs, to generate work-related ideas» (Unsworth, Wall, & Carter, 2005, p. 542). Thus, creative requirement is the individual perception of both explicit requirements (being told to be creative) and other cues (a response to task demands; Unsworth et al., 2005). As creative requirement refers to an individual perception it differs both between different job groups (e.g., employees in an R&D department versus production workers) and within a job group. Considering our sample of teachers, we assume teachers to have different perceptions regarding the requirement to be creative.

On the basis of goal-setting theory, we argue that creative requirement fosters idea generation, idea promotion, and idea implementation. As creative requirement constitutes a perceived norm to be creative (determined by both externally shared beliefs and internal perceptions) it represents an employee's goal to be creative. Shalley (1995) showed that specific creative goals foster creativity as they drive employees to spend more effort in creative problem solving and thus result into a higher quantity and quality of creative ideas. In other words, creative goals inherent in employees perceiving high creative requirement drive idea generation. In addition, we propose that creative requirement fosters idea promotion. The perception of creative requirement is at least partly shared by coworkers (Shalley, Gilson, & Blum, 2000). Consequently, employees perceiving a high level of creative requirement should be expected to be more creative and coming up with new ideas should be socially accepted by coworkers and supervisors, thus making it more likely that employees communicate their ideas at work. Moreover, we argue that employees with a high perception of creative requirement show more idea implementation at work. Shared social norms to be creative should raise organizational acceptance and appreciation of idea implementation making it more likely that an employee actually works on implementing generated ideas.

Prior studies showed that a high level of creative requirement relates to higher creativity (idea generation) and innovation (Scott & Bruce, 1994; Shalley et al., 2000; Unsworth et al., 2005). We are not aware of any study that investigated the discrete effects of creative requirement on idea generation, idea promotion, and idea implementation. Taken together, we state

Hypothesis 1: Creative requirement are positively related to a) idea generation, b) idea promotion, and c) idea implementation.

Job resources and innovative work behavior

We focused on job control and support for creativity from coworkers and supervisors as job resources because both are well-established predictors of creativity and innovation (Hammond, Neff, Farr, Schwall, & Zhao, 2011; Shalley et al., 2004). Job control characterizes how much influence an employee has over sequence, time frame, and content of one's work tasks (Jackson, Wall, Martin, & Davids, 1993). Coworker and supervisor support for creativity refers to the level of help and encouragement offered when developing creative ideas (Madjar, Oldham, & Pratt, 2002).

Job control offers action opportunities to experiment at work and thereby enables employees with the freedom to generate, communicate and implement creative ideas (Frese, Teng, & Wijnen, 1999; Ohly, Sonnentag, & Pluntke, 2006). Moreover, job control is associated with learning opportunities and increased task-relevant knowledge (Holman & Wall, 2002; Leach, Wall, & Jackson, 2003). Task-relevant (i.e., domain-specific) knowledge, is important for idea development and implementation (Amabile, 1996). Moreover, experiencing job control is a positive experience which is perceived as energizing and thereby raises work motivation (Saavedra & Kwun, 2000).

Considering empirical evidence, the meta-analysis of Hammond et al., (2011) confirmed a positive effect of job control on creativity and innovation. We are not aware of any study that examined distinct effects of job control on idea generation, idea promotion, and idea implementation. In sum, we propose

Hypothesis 2: Job control is positively related to a) idea generation, b) idea promotion, and c) idea implementation.

Coworker and supervisor support for creativity provides an employee with instrumental and emotional support when generating, communicating and implementing creative ideas (Madjar et al., 2002; Oldham & Cummings, 1996). The more an employee is supported by coworkers and supervisors, the more expertise, social networks and material resources are available when developing creative ideas (Oldham & Cummings, 1996; Scott & Bruce, 1994). In addition, coworker and supervisor support for creativity involves emotional support, i.e., showing concern for an employee's doubts and fears (Madjar et al., 2002; Oldham & Cummings, 1996). Moreover, a high level of support for creativity indicates that generating, communicating, and implementing creative ideas is socially accepted and may even result into appreciation and rewards (Baer & Oldham, 2006).

Regarding prior empirical studies, there is meta-analytical evidence for a positive effect of coworker and supervisor support on creativity and innovation (Hammond et al., 2011). Again, we are not aware of any study that investigated discrete effects of coworker and supervisor support on idea generation, idea promotion, and idea implementation. In sum, we propose

Hypothesis 3: Coworker and supervisor support is positively related to a) idea generation, b) idea promotion, and c) idea implementation.

Personal initiative and innovative work behavior

Personal initiative is one form of proactive behavior (Parker & Collins, 2008) referring to «a behavior syndrome resulting in an individual's taking an active and self-starting approach to work and going beyond what is formally required in a given job» (Frese, Kring, Soose, & Zempel, 1996, p. 38). Personal initiative involves to overcome barriers and persist in the face of obstacles (Frese et al., 1996).

Creative behavior often implies to deviate from the routine way of working (Ford, 1996) which is effortful and may be associated with negative experiences, such as feelings of uncertainty. Developing creative ideas frequently involves periods of frustration as no progress is made (Lubart, 2001). In a similar way, communicating creative ideas may evoke negative feedback and implementing creative

ideas can fail (Frese et al., 1999). In sum, generating, promoting, and implementing ideas require a lot of effort and persistence. We propose that employees characterized by a high level of personal initiative have more motivation and persistence to engage in and pursue idea generation, communication, and implementation.

Prior research revealed that personal initiative is positively related to generating ideas and submitting them to a suggestion system (Frese et al., 1999). Moreover, personal initiative is positively related to the quality of creative ideas (Binnewies, Ohly, & Sonnentag, 2007). We are not aware of any study that examined the discrete effect of personal initiative on idea generation, idea promotion, and idea implementation. Taken together, we state

Hypothesis 4: Personal initiative is positively related to a) idea generation, b) idea promotion, and c) idea implementation.

Method

Procedure and sample

We conducted a two-week longitudinal study in a sample of teachers. Three different recruitment strategies were pursued: First, we approached schools by personal contacts. If the contact person agreed, information flyers were distributed among coworkers. Second, we approached a number of schools by phone asked to forward information flyers. Third, we contacted teachers by a professional online portal.

After participants registered for participation, they received the Time 1 Survey and two weeks later the Time 2 Survey by mail. Surveys were sent back at no costs. To encourage participation, participants received a feedback report and participated in a raffle to win one of three 20 Euro book vouchers.

In total, 122 teachers registered for participation (45 percent recruited by the internet portal). Usable Time 1 and Time 2 surveys were provided by 89 teachers. Most teachers were female (55.1 percent) and they were on average 42 years old ($SD = 12.34$). Teachers came from different school types with 25.8 percent working at primary schools, 38.2 percent at secondary schools (e.g., high schools), 33.7 percent at vocational schools and 2.2 percent at schools for children with special needs. Participants taught on average 19 teaching hours per week ($SD = 7.7$).

Measures

We assessed predictor and control variables at Time 1 and outcome variables at Time 2. All items were presented in German.

Creative requirement was measured with a single item (cf. Shalley et al., 2000). The item was «Creativity is part of my job requirements» and had to be answered on a five-point Likert scale ranging from «1= not true at all» to «5= very true». Prior research showed that this item correlates with an objective evaluation of creativity requirements (Shalley et al., 2000).

Job control was assessed with the five-item scale from Semmer, Zapf, and Greif (1996). A sample item was «How much can you influence the way how you accomplish your tasks?» Items had to be answered on a five-point Likert scale ranging from «1= very little» to «5= a great deal». Cronbach's alpha was .75.

Coworker and supervisor support for creativity was measured with the seven-item scale from Madjar et al., (2002). The scale

captures both support from coworkers and the supervisor. Sample items were: «My supervisor discusses with me my work-related ideas in order to improve them», «My coworkers other than my supervisor are almost always supportive when I come up with a new idea about my job». Items had to be rated on a 7-point Likert scale ranging from «1= not true» to «7= very true» Cronbach's alpha was .87.

Personal initiative was assessed with a seven-item scale capturing a person's general tendency to show proactive behavior at work (Frese, Fay, Hilburger, Leng, & Tag, 1997). A sample item was «I actively attack problems at work.» Cronbach's alpha was .84.

Idea generation, idea promotion and idea implementation were measured at Time 2 with items from the individual innovation behavior scale from Holman, Totterdell, Axtell, Stride, and Port (2005). Participants were instructed to rate their idea generation, idea promotion and idea implementation considering the last two weeks. Items were answered on five-point Likert scales ranging from «1= not true at all» to «5= very true». *Idea generation* was measured with three items from Holman et al., (2005) and two additional, self-developed items: «I came up with new ideas», «I had ideas, how to change things at work», «I found new ways to accomplish my work», «I had new ideas, how to improve my work» (new item), «I had new ideas that could be beneficial for my organization» (new item). Cronbach's alpha was .82. *Idea promotion* was assessed with the following three items: «I introduced my ideas to others», «I proposed to do things differently», «I made a suggestion to change things at work». Cronbach's alpha was .82. *Idea implementation* was assessed with three items from Holman et al., (2005) and two additional, self-developed items: «My suggestions for improvements were accepted», «My ideas were implemented», «My proposals to do things differently were executed», «I successfully implemented my ideas» (new ideas) and «My ideas that were beneficial for the organization were implemented» (new items). Cronbach's alpha was .88. We ran Confirmatory Factor Analyses (CFAs) to test if idea generation, idea promotion, and idea implementation items were best represented by three factors. The three-factor model ($\chi^2 = 127.6$, $df = 62$) fit the data better than a one-factor model ($\Delta\chi^2 = 214.2$, $df = 3$, $p < .001$) and all possible two-factor models ($\Delta\chi^2 \geq 68.61$, $df = 2$, $p < .001$).

Results

Table 1 displays, means, standard deviations, and correlations between study variables. We ran hierarchical regression analyses to test our hypotheses. Table 2 shows the results. Age and gender were entered as control variables in the first step, creative requirement, job control, support for creativity from coworkers and supervisors, and personal initiative were entered in the second step.

In Step 1 of the regression analysis predicting idea generation neither age nor gender were significant predictors. Step 2 explained an additional 24 percent of the variance with creative job requirements ($\beta = .21$, $p < .05$) and job control ($\beta = .32$, $p < .01$) positively predicting idea generation while coworker and supervisor support and personal initiative were not significant predictors. Consequently, Hypotheses 1a and 2a were supported, while Hypotheses 3a and 4a were disconfirmed.

Regarding idea promotion as an outcome, Step 1 revealed that age and gender were not significant predictors. Step 2 explained

an additional 12 percent of the variance in idea promotion with support from coworkers and supervisors being the only significant predictor ($\beta = .24, p < .05$). Thus, we found support for Hypothesis 3b while Hypotheses 1b, 2b, and 4b were not supported.

Predicting idea implementation neither age nor gender were significant predictors. Step 2 explained an additional 14 percent of the variance in idea implementation with coworker and supervisor support ($\beta = .21, p < .05$) and personal initiative ($\beta = .32, p < .01$) positively predicting idea implementation while creative job requirements and job control were not related to idea implementation. Taken together, we found support for Hypotheses 3c and 4c while Hypotheses 1c and 2c received no support.

Additional analyses

As prior research found personal initiative to moderate the relationship between workplace characteristics and innovation (Daniels, Wimalasiri, Cheyne, & Story, in press), we conducted some further moderation analyses. Specifically, we tested if

personal initiative moderates the relationship between workplace characteristics (creative requirement, job control, coworker and supervisor support) and innovative work behavior (idea generation, idea promotion, idea implementation). Results from additional hierarchical regression analyses revealed that none of the nine tested interaction terms were significant.

Discussion

The aim of this study was to examine if creative requirement, job control, and support for creativity as well as personal initiative predict teacher’s idea generation, idea promotion, and idea implementation. Our results point out that it is valuable to examine idea generation, promotion, and implementation as separate outcomes as they were predicted by different factors. Concerning idea generation, i.e., starting the innovative process, it is important that employees perceive that there is a need for being creative (high creative requirement) and that they have the necessary freedom to develop creative ideas (high job control).

Table 1
Means, standard deviations, and correlations between study variables

	M	SD	1	2	3	4	5	6	7	8
1 Age	42.07	12.34								
2 Gender ^a	1.45	0.50	.18							
3 Creative requirement	4.61	0.76	-.03	-.05						
4 Job control	3.91	0.58	.07	-.02	.23*					
5 Coworker and supervisor support	4.12	1.14	-.21*	.07	.14	.01				
6 Personal initiative	3.58	0.59	-.08	-.14	.22*	.30**	.20			
7 Idea generation	3.23	0.76	-.15	-.01	.32**	.40***	.14	.63***		
8 Idea promotion	3.11	0.98	-.01	.00	.20	.09	.27*	.44***	.55***	
9 Idea implementation	2.96	0.91	-.09	-.04	.13	.14	.29**	.49***	.40***	.62***

Note: N= 89; * p<.05; ** p<.01; *** p<.001; ^a 1= female, 2= male

Table 2
Hierarchical regression analyses predicting idea generation, idea promotion and idea implementation

Outcome variable	Idea generation		Idea promotion		Idea implementation	
	Step 1	Step 2	Step 1	Step 2	Step 1	Step 2
Age	-.15	-.16	-.01	.04	-.08	-.04
Gender ^a	.02	.06	.01	.02	-.02	.01
Creative requirement		.21*		.14		.02
Job control		.32**		.01		.07
Coworker and supervisor support		.06		.24*		.25*
Personal initiative		.13		.12		.23*
F	1.02	4.78***	0.08	1.80*	0.35	2.45*
R ²	.02	.26	.00	.12	.01	.15
Δ F		6.53***		2.70*		3.48*
Δ R ²		.24		.12		.14

Note: N= 89; ^a p<.10; * p<.05; ** p<.01; *** p<.001; ^a 1= female, 2= male

These results are in accordance with the assumptions that having specific creativity goals and being empowered by job control drive teachers’ motivation to develop creative ideas at work. Contrary to our expectations and to prior research (Frese et al., 1999; Madjar et al., 2002), neither support for creativity nor personal initiative was related to increased idea generation. One explanation may be the specific nature of a teacher’s job. Teachers’ creative ideas may often concern methods of teaching. As teachers’ usually prepare lessons alone at home, support from coworkers and supervisors may not be as important for generating ideas as it is in other professions. Similarly, teachers’ tasks may offer many opportunities to develop creative ideas. Personal initiative as an internal motivational driver might not be as important as external motivational factors, such as a high level of creative requirement and job control.

Considering idea promotion as an outcome, we confirmed only support from coworkers and supervisors as a significant predictor. Thus, getting support for creative ideas, i.e., working in an environment in which an employee feels psychologically safe to communicate (Edmondson, 1999), is most important for selling one’s idea to others. Perceiving a high level of creative requirement, having a high level of job control, and showing a high level of personal initiative are not related to idea promotion. One explanation may be that ideas are most often promoted in meetings

and personal discussions with colleagues. In such situations, perceived support for creativity may be most salient while other workplace characteristics (creative requirement and job control) as well as teachers' personal initiative may not be salient and thus less important.

Regarding idea implementation, we found that both support for creativity and personal initiative promoted idea implementation. Our results indicate that idea implementation depends on both the social environment the internal motivation and persistence. Teachers with low social support for creativity may be afraid of negative evaluations from coworkers and supervisors and therefore refrain from idea implementation. As for idea promotion, the feeling that creative ideas are valued and experiencing the environment as psychologically safe is important for idea implementation. Because implementing ideas is an effortful task often associated with problems and negative feelings persons with a high level of personal initiative are more likely to persist.

Surprisingly, job control was not a predictor of implementing creative ideas at work. This result may also be specific for our teacher sample as the mean level of job control was rather high. High levels of job control are also associated with higher complexity and increased demands (e.g., concentration demands, self-regulation demands; Langfred & Moye, 2004). Therefore, the costs of high job control may outweigh the positive effects resulting into a non-significant relationship. Idea implementation was also not predicted by creative requirement. Maybe, once an employee developed a creative idea the perceived (internal and external) norm becomes less important as the employee already achieved the goal to generate a creative idea.

Our study is not without limitations. First, we relied solely on self-reports which is problematic in terms of self-report bias and common method variance (Podsakoff, MacKenzie, Jeong-Yeon, & Podsakoff, 2003). However, we took several steps to reduce these problems. First, we assessed predictor and outcome variables at different times laying two weeks apart. Second, as common method bias should influence all predictor variables in a similar way, we tested them simultaneously in regression analyses additionally controlling for age and gender. The differential pattern of results suggests that common method variance is not heavily inflating all relationships between predictor and outcome variables.

Our measure of creative requirement is a single-item measure and therefore we could not test the reliability of this measure. Although prior research showed that this item is related to an objective evaluation of creativity requirement (Shalley et al., 2000) future research should use a multi-item measure, such as the scale of Unsworth et al., (2005).

The small sample size of our study limits statistical power, particularly for testing moderator effects. However, despite the small sample size and using a longitudinal design we were able to confirm a large part of our hypotheses. Taking into account that we can only detect medium to strong effects with a small sample attaches further value to our results. Specifically, we could explain 12 to 24 percent in the variance of our outcome variables which is comparable to prior research (Hammond et al., 2011), particularly when considering that lagged effects are in general smaller than concurrent effects (Zapf, Dormann, & Frese, 1996).

Moreover the specific sample of teachers may limit generalizations to other working populations. Teachers work

under rather specific working conditions (e.g., partially working alone at home). Future studies with different samples are required to confirm the validity of our findings. However, in our view, examining positive factors which contribute to teachers' creativity and innovation is particularly valuable as the population of teachers is enormous and past research mainly focused on investigating negative factors which contribute to teachers' burnout and illness (Hakanen et al., 2006).

Finally, the design of our study limits us to draw conclusions about the causal pathways between predictors and outcomes. It may also be the case that innovative work behavior increases the perceived need for creativity, job resources, and personal initiative, i.e., there may exist a positive spiral between job characteristics, personal initiative, and innovative work behavior similar to positive spirals which have been confirmed between job resources and work engagement (e.g., Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010).

Our results stress the importance of examining the different processes of innovative work behavior, i.e., idea generation, idea promotion, and idea implementation as separate outcomes. Future research should elaborate the relations between personal and workplace characteristics with the different processes of innovative work behavior by examining potential mediating mechanisms (e.g., intrinsic motivation, self-efficacy beliefs, goal setting, perceived psychological safety). Results from such studies can provide us with more detailed knowledge how different processes of innovative work behavior can be influenced.

Future research may continue our effort and examine the role of job stressors (e.g., time pressure) or affective states (e.g., negative affect) as predictors of the different processes of innovative work behavior. Such an approach may help us in disentangling previous inconsistent findings concerning some predictors of creativity and innovation as predictors such as time pressure or negative affect may be beneficial for one process (e.g., idea generation) while they may even be detrimental for another process (e.g., idea implementation).

Another important point for future research is to develop a suitable study design to test longitudinal and reciprocal relationships. Researchers have to consider the timing of effects which is rather complex as the timing may vary between different ideas and creative projects. Consequently, a design assessing all variables several times over a period of days or weeks (using diary or week-level study designs; e.g., Bakker & Bal, 2010; Binnewies & Wörnlein, 2011) may be most useful to shed further light on the temporal dynamics and causal relationships.

Concerning practical implications, our results indicate that organizations should raise creative requirement and job control to increase idea generation at work, while they should raise support for creativity to foster idea promotion and idea implementation. Moreover, organizations should support employees' personal initiative at work as it promotes idea implementation. Interventions, such as emphasizing the value and importance of creativity and innovation within the organization may benefit employees' innovative work behaviors. In addition, supervisors can be trained to provide supportive, non-controlling feedback and create a climate of psychological safety and trust at work (Binnewies et al., 2008). Moreover, organizations can also offer trainings to increase employees' personal initiative (Searle, 2008) which should in turn foster idea implementation.

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