Nina Pološki Vokić*

The Potency of Managerial Work Redesign for Raising Creative Performance: A Student Sample Experiment**

Abstract

The paper explores the potency of managerial work redesign (MWR) for raising employees' creative performance, based on the job crafting theory that emphasizes changes in task, relational and cognitive task boundaries for adapting a job locally during the work process. Grounded in the interactionist approach, the joint effect of three job redesign types is considered, as they typically occur simultaneously. The hypotheses were tested through a laboratory experiment conducted in four phases on a sample of 88 full-time graduate students, and creative results were quantified using three creative performance indicators: number of ideas, number of novel ideas, and novelty ratio. Managerial work redesign was found to contribute significantly to each of the explored creativity outcomes. Moreover, the creativity traits of a person were not found to be a requirement for fully benefiting from MWR interventions, implying that MWR is a potential tool for increasing employees' creative outcomes no matter of creative predispositions. The study is one of the first quantitative studies testing the impact of MWR mechanisms on creative performance through experimental design.

Keywords: managerial work redesign, creativity, creative performance, creativity traits, experiment, student sample
(JEL: M10, M12, M50)

Introduction

Employee creativity, i.e., the production of novel and useful ideas (Amabile, 1988), involves creative solutions to business problems, creative changes to job processes, creative business strategies, etc. (Perry-Smith & Shalley, 2003), and, therefore, the ability of organizations to foster, develop and use the creative potential of their employees became a necessity (e.g., Amabile, Conti, Coon, Lazenby, & Herron, 1996; Dorenbosch, van Engen, & Verhagen, 2005). Namely, employee creativity is

* Prof. Dr. Nina Pološki Vokić, University of Zagreb, Faculty of Economics & Business, Department of Organisation and Management, Trg J. F. Kennedyja 6, 10 000 Zagreb, Croatia. E-Mail: npoloski@efzg.hr.

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a main ingredient of innovative work behaviour (IWB)[1], and a starting point and an important part of the innovation process[2] (e.g., de Jong & den Hartog, 2010; West, 2002).

Consequently, starting from the job demands-resources (JD-R) theory (Bakker & Demerouti, 2007), precisely the notion that employees respond more innovatively to higher levels of job demands (e.g., Janssen, 2000) and the notion that adequate organizational and social job resources nurture innovative behaviour (e.g., Chang et al., 2013), it is relevant to explore antecedents to employees' creative behaviour, as it enables a better understanding of creativity that resides in an organization's workforce (e.g., Hammond et al., 2011; Janssen, 2000). Studies of antecedents of creative and innovative behaviour of employees are multiple. However, antecedents under managerial control, which are of substantial value for organizations as supervisors have the potential to encourage employees to carry out innovative activities (Janssen, 2005), have not received the attention of researchers they deserve (e.g., Pieterse, van Knippenberg, Schippers, & Stam, 2010).

In this paper, the perspective that it is through organizational practices that managers can promote, stimulate and support employees' creative and innovative behaviour (e.g., Bysted & Jespersen, 2014) is adopted, together with the perspective of the importance of job design for employees' creative and innovative endeavours (e.g., De Spiegelaere, Van Gyes, & De Witte, 2015). More precisely, the paper deals with the potency of managerial work redesign (MWR) interventions for raising employees' creativity in terms of their creative performance, as this potential antecedent of employee creativity has not been elaborated. Namely, although job design itself showed direct effects on creative performance and is identified to promote employee involvement in creative activities (e.g., Dorenbosch et al., 2005), and managerial support exerts a significant and positive impact on innovative performance (e.g., Cohen & Levinthal, 1990), the power of MWR interventions in raising employees' creative performance has not yet been neither theoretically nor empirically explored. Moreover, it is highly relevant to explore creative performance, as creative ideas are necessary for IWB (West, 2002). This early idea development stage in the innovation process[3] is important because if employees

1 IWB is defined as a self-initiated creation, introduction and application of original or adopted ideas related to organizational practices, processes and products/services within a work role, group or organization, to significantly benefit individual, group, organization or wider society (based on Chang, Hsu, Liou, & Tsai, 2013; Hammond, Neff, Farr, Schwall, & Zhao, 2011; and Scott & Bruce, 1994).

2 Creativity is not the same as innovation. Creativity focuses on problem or opportunity recognition and the generation of creative solutions, while innovation refers to the successful implementation of creative ideas at the organizational level (e.g., Amabile, 1988; Oldham & Cummings, 1996).

3 For example, Bysted and Jespersen (2014) as well as West (2002), identify two different behaviours that can be linked to distinct stages of the innovation process – idea development and idea application.

do not begin the process, it does not matter which other factors may operate to facilitate it, for there will be nothing to facilitate (Unsworth & Clegg, 2010).

Based on Wrzesniewski and Dutton's (2001) job crafting theory, which postulates that changing task, relational and cognitive task boundaries as types of job redesign enables the local adaptation of jobs, the paper investigates the implications of MWR interventions by which managers simultaneously alter tasks, relationships and the meaning of work during the work process in order to raise employee creativity. Managerial work redesign is thereby defined as a strategy that managers apply within the context of a defined job[4], making adjustments and alterations to jobs to fit business requirements with employees' needs and skills (using Oldham & Fried, 2016). It is an on-the-job process by which a manager concurrently modifies an employee's tasks, duties, social interactions, and the way the employee looks at his/her job, with the purpose of changing the substance and the meaning of work (using Wrzesniewski & Dutton, 2001).

The purpose of the study is to verify Berg, Dutton and Wrzesniewski's (2008) thesis that managers can reorganize, restructure and reframe tasks to make employees' jobs more fulfilling and engaging, which enhances employees' motivation to behave creatively. More precisely, grounded in the interactionist perspective/approach (see Oldhman & Cummings, 1996) and owning to both the exploratory and descriptive nature of the research (see Robson, 2002), the joint effect of three previously mentioned job redesign types is considered, as they typically occur simultaneously in contemporary organizations. Additionally, as creativity traits – genetically and environmentally determined distinguished characteristics which enable an individual to create something new – are proven to be relevant for employee creativity (e.g., Oldham & Cummings, 1996), seven attributes of creative capability are considered as potential predictors or moderating variables. Finally, to make sure the findings hold irrespective of individual attribute variables, ten demographic characteristics were included in the analysis as control variables.

Instead of cross-sectional design and self- or supervisor-reporting, academics point to the need for experimental and longitudinal designs in the area to provide causal evidence (e.g., Chen, Li, & Leung, 2016; Oldhman & Cummings, 1996; Pieterse et al., 2010) and to the need for more objective measures of creative performance (Hammond et al., 2011). Therefore, a laboratory experiment with student participation was conducted, while creative results were objectivized. The experiment was conducted on a sample of final-year full-time graduate management students. Creativity tasks given to students were business problems related to student life, and their creative results were quantified using three creative performance indicators: number of ideas, number of novel ideas, and novelty ratio.

4 The expression "the context of defined job" is taken from Wrzesniewski and Dutton (2001) who use it to imply that the job is framed by a job description (a written document that describes tasks, duties and responsibilities of a position) which is not going to be altered.

Literature Review and Hypotheses Development

The Relevance of Managerial Work Redesign for Creative Performance

MWR refers to the on-the-job work redesign from the manager's side, more precisely, the local adaptation of a job during the work process, compared to the off-the-job design of core job dimensions – skill variety, task identity, task significance, autonomy and feedback (Hackman & Oldham, 1976), performed predominantly by job design experts. Building on the Wrzesniewski and Dutton (2001) job crafting theory, three types of MWR that alter work content and work identity could be identified – changing task boundaries, changing relational boundaries, and changing cognitive task boundaries. Managerial task redesign refers to redesigning the boundaries of someone's job by taking on more or fewer tasks, expanding or diminishing the scope of tasks, increasing or decreasing time for task accomplishment, or altering the way employees perform tasks. Managerial relational redesign implies changing the relationships at work by encouraging more or less interaction with colleagues and clients/customers, as well as altering the nature of employees' interactions with other stakeholders. Managerial cognitive task redesign involves changing the way employees think about their jobs, which could be accomplished by encouraging employees to perceive their jobs as adding value to organizational mission and strategic goals fulfilment, not to think about separate individual tasks they perform but to view their tasks as a collective whole, and to reason which organizational, client or broader public problems are being solved because of their contribution. An altered task, either physically or cognitively, and relational configurations, or both, change the design and social environment of the job, which, in turn, results in a more positive and meaningful work experience (Wrzesniewski & Dutton, 2001).

Numerous organizational variables related to organizational context, supervisors and the job itself enhance creative and innovative outcomes of employees. Research has shown that organizational context variables that are beneficial for employees' creative and innovative performance are, for example, supportive internal climate (e.g., Alpkan, Bulut, Gunday, Ulusoy, & Kilic, 2010; Bysted & Jespersen, 2014; Hammond et al., 2011), information sharing (e.g., Veenendaal & Bondarouk, 2015), and high-quality HRM practices, such as stimulative jobs, recruitment and selection of top-performers, performance-based rewarding and training and development for enhancing creativity (e.g., Dorenbosch et al., 2005; ur Rehman & Ahmad, 2015). Considering supervisors, studies demonstrated that their support (e.g., Janssen, 2005; ur Rehman & Ahmad, 2015; Veenendaal & Bondarouk, 2015; Wang, Fang, Qureshi, & Janssen, 2015), as well as their noncontrolling, participative (transformational) and charismatic leadership style (e.g., Chen et al., 2016; Kang, Solomon, & Choi, 2015; Oldham & Cummings, 1996; Pieterse et al., 2010) is effective in spurring employee creative and innovative performance. Finally, various job design aspects were found to have an important role in improv-

ing employees' creative performance. For example, employees produce the most creative and innovative work when they work on complex and challenging jobs (e.g., Amabile, 1988; Oldham & Cummings, 1996; Scott & Bruce, 1994), when they have the autonomy over work processes (e.g., Abstein & Spieth, 2014; Bysted & Jespersen, 2014), when positive interpersonal communication and relationships present (e.g., Baer & Oldham, 2006; Chang et al., 2013), and when a group diversity is welcomed (e.g., Amabile et al., 1996; Perry-Smith & Shalley, 2003).

Consequently, it can be deduced that the potential role of MWR for employee creativity is rooted in the job demands-resources (JD-R) perspective (Bakker & Demerouti, 2007) in general and specifically in the organizational practice perspective and job design perspective of IWB. Firstly, the JD-R perspective was found to be relevant for employee innovativeness (e.g., Chang et al., 2013; De Spiegelaere et al., 2015; Dorenbosch et al., 2005; Janssen, 2000). For example, Janssen (2000) states that higher levels of job demands trigger innovative responses, while Chang et al. (2013) stress that overall levels of innovative behaviour rise as job resources increase. Next, the organizational practice perspective of IWB implies that mechanisms applied by managers support employees' innovative efforts (e.g., Alpkan et al., 2010; Bysted & Jespersen, 2014; Chen et al., 2016; Janssen, 2005; Oldham & Cummings, 1996). For example, Janssen's (2005) results suggest when supervisors are perceived as being supportive of employee innovation, employees feel encouraged to use their influence to carry out innovative activities at work, whereas supervisors perceived as not being supportive inhibit them from doing so. Finally, the job design perspective of IWB stresses the central role of job configuration in explaining employee innovativeness (e.g., De Spiegelaere et al., 2015; Dorenbosch et al., 2005; Hammond et al., 2011; Oldham & Cummings, 1996; Ramamoorthy, Flood, Slattery, & Sardessai, 2005). For example, as found by Dorenbosch et al. (2005), a multifunctional job design promotes employee involvement in innovative activities through increased feelings of ownership for work-related issues and problems.

Aligned with the aforementioned, MWR could be expected to foster creative achievements of employees at work. Hence, the following hypothesis is set up: *Hypothesis 1: MWR interventions enhance creative performance.*

The Relevance of Creativity Traits for Creative Performance in the MWR Environment

Apart from organizational variables, such as MWR, employees' creative performance is attributed to numerous personal variables, such as employee demographics (e.g., Hammond et al., 2011; Montani, Odoardi, & Battistelli, 2014; Scott & Bruce, 1994), personality (e.g., Chen et al., 2016; Montani et al., 2014), intrinsic motivation (e.g., Amabile et al., 1996; Oldham & Cummings, 1996) and percep-

tions (e.g., Alpkan et al., 2010; Chang et al., 2013; Janssen, 2005; Veenendaal & Bondarouk, 2015).

Concerning personality, especially creativity traits – immanent characteristics of an individual related to creativity – were found to have an enhancing effect on employee creative and innovative outcomes. According to Zhu, Djurjagina and Leker (2014), creativity enhances the number of ideas submitted by employees, while Oldham and Cummings (1996) indicate that employees produce the most creative work when they have appropriate creativity-relevant personal characteristics. Creatively relevant personal characteristics that were revealed as related to creative performance of employees are, for example, creative personality (e.g., Hammond et al., 2011; Oldham & Cummings, 1996), internal locus of control (Chen et al., 2016), intuitive problem-solving style (Scott & Bruce, 1994), learning goal orientation (Montani et al., 2014), openness to experience (e.g., Baer & Oldham, 2006; Hammond et al., 2011), personal initiative (e.g., Frese, Van Gelderen, & Ombach, 2000; Unsworth & Parker, 2003), and self-efficacy (e.g., Chen et al., 2016; Hammond et al., 2011).

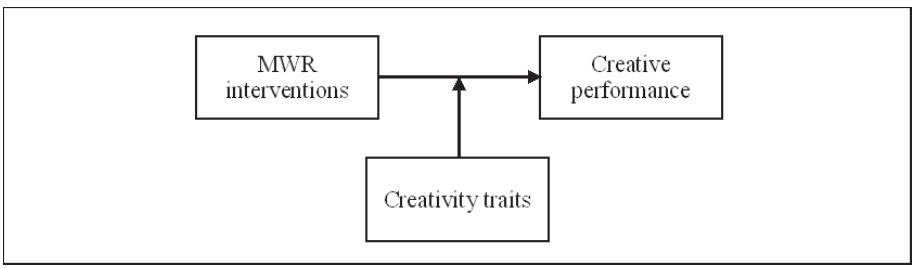
Hammond et al. (2011) highlight that creative personality plays a direct relationship in the prediction of an employee's innovative performance. According to Chen et al. (2016), internal locus of control has a substitutional moderating effect on the relationship between supervisor support and employee innovative behaviour via intrinsic motivation, implying the positive effect of internal locus of control on employees' innovative behaviour. Scott and Bruce (1994) provided theoretical evidence that an intuitive problem-solving style is positively related to innovative behaviour. Montani et al. (2014) stress that their results about the positive link between learning goal orientation and innovative behaviour are consistent with prior research showing that people who are attracted by difficult and challenging tasks are more likely to develop new ideas. According to Baer and Oldham (2006), research suggests that employees high on the openness to experience personality dimension have access to a variety of different approaches and perspectives and, therefore, should be more likely to exhibit high creativity in response to intermediate pressure. Frese et al. (2000) stress that personal initiative, as a proactive personal characteristic, is crucial for the translation of creative ideas into successfully implemented innovations, while Unsworth and Parker (2003) indicate that it is an important driver of innovation. Chen et al. (2016) found that general self-efficacy showed an enhancement moderating effect, such that it amplified the mediated relationship between supervisor support and employee innovative behaviour via intrinsic motivation.

Because of a noticeable contribution of creativity-relevant characteristics of an employee as moderating variables of his/her creative performance, it is expected that the potency of MWR will be higher when the creative predispositions of an individual are present. Therefore, the following is hypothesized: *Hypothesis 2: MWR*

interventions' positive impact on creative performance is more apparent when creativity traits are present.

Figure 1 summarizes the proposed research model by visually presenting the proposed hypotheses.

Figure 1. Proposed Model



Methodology

Although long ago Oldhman and Cummings (1996) pointed out the need for longitudinal studies and controlled experiments that address employees' creative performance, the majority of IWB studies have a cross-sectional design (e.g., Chang et al., 2013; Pieterse et al., 2010; Yuan & Woodman, 2010) which precludes the interpretation of a causal relationship among job resources and creative or innovative behaviour. Consequently, to explore the causal inference between the MWR and employee creativity, this research uses an experimental design.

Following the standard student-based experimental study procedure (see Černe, Herstad, Dysvik, & Škerlavaj, 2014), an experimental study of quasi-MWR interventions and students' creative performance was designed, whereas students' "jobs" were enriched by real-time manipulations, and creative performance was measured by three objective indicators of students' creativity. The experiment of four phases was conducted on a student sample during a human resource management course at the Faculty of Economics and Business – Zagreb (FEB-Zg).

Sample

Participants were 88 final-year full-time graduate students with a management major, which makes the 69.8 % of the population of graduate management program students at FEB-Zg during the academic year 2016/2017. Participation in the experiment was completely voluntary, and students had the right to stop participating in the experiment at any time without giving a reason. Their informed consent was obtained, and they were debriefed about the true purpose of the experiment immediately at the end of it (as called for by Christensen, Johnson, & Turner, 2014). They were given extra points for participation.

Respondents were not anonymous, as this was necessary to match their outputs from each phase of the experiment, but confidentiality was assured. The age of the participants ranged from 22 to 37 years, while the mean age was 25.1 years (SD = 2.7). Among participants, 64.8 % were female, 17.0 % were members of a student association, 23.9 % had participated in a student competition, 9.1 % had experienced a student exchange program, 90.9 % had a work experience and 58.8 % a relevant work experience for their studies, 47.7 % have volunteered, while their GPAs were 3.39 at undergraduate and 4.30 at the graduate level.

Measures and Instruments

Most studies assessed employee creativity as a standalone construct or a part of the IWB with subjective ratings (Hammond et al., 2011) – by self-ratings (e.g., Bysted & Jespersen, 2014; Zhu et al., 2014), immediate supervisor ratings (e.g., Baer and Oldham, 2006; Wang et al., 2015) or both (Pieterse et al., 2010), which implies a significant lack of objective rating sources in academic research. Although subjective measures are widely accepted and used in scientific research, and individual employees are best placed to rate their own creative performance because they are aware of the subtle things they do in their jobs (Veenendaal & Bondarouk, 2015), the use of self-reports, as well as supervisor-reports on creative performance is questionable. Namely, employees may be tempted to see themselves as innovators (Dorenbosch et al., 2005), and a common method variance occurs when predictors are as well self-reported (Hammond et al., 2011), while supervisor reports raise the question of whether managers have full insight into their subordinates' behaviour. Furthermore, different typologies of creative performance are present in the literature. Predominantly, creative ideas are evaluated based on their novelty/originality and relevancy/usefulness (e.g., Amabile et al., 1996; Oldham & Cummings, 1996), where novelty can be relative or absolute (Hammond et al., 2011).

Consequently, following Montani et al. (2014) advice to obtain expert evaluations of the quantity and quality of creative ideas, this paper introduces three creativity indicators of the student creative performance of the objective nature: number of ideas (NI), number of novel ideas (NNI), and novelty ratio (NR = number of novel ideas/number of ideas). The novelty of ideas (novel or not) was assessed by the consensus of two academic raters working together, where an idea was considered novel if not a typical solution to a problem. As participants were given the initial creativity (IC) task and the experimental creativity (EC) task, a total of six indicators were used in the analysis – NI_{IC}, NNI_{IC}, NR_{IC}, NI_{EC}, NNI_{EC}, and NR_{EC}. The initial creativity task was used to collect three indicators of initial creative performance of students (independent variables NI_{IC}, NNI_{IC}, NR_{IC}), while the experimental creativity task yielded three indicators of student creative performance under experimental conditions (dependent variables NI_{EC}, NNI_{EC}, NR_{EC}).

Table 1 presents the origin, number of items and internal consistency reliabilities (Cronbach's alphas) of seven scales used in the study for assessing creativity-relevant personal characteristics as potential predictors or moderating variables. All constructs were assessed on a scale from 1 (strongly disagree) to 5 (strongly agree). In addition to seven creativity traits explored, three indicators of students' initial creativity (NI_{IC}, NNI_{IC}, NR_{IC}), as measures of "pre-existing" creativity resulting from inborn and learned traits, served as predictors or moderating variables as well.

Table 1. Origin, Number of Items and Reliability of Predictor Variables

	Predictor variables	Origin	No. of items	α
1	Self-efficacy	Chen, Gully, & Eden (2001)	8	.846
2	Personal initiative	Frese, Fay, Hilburger, Leng, & Tag (1997)	7	.785
3	Networking ability	Ferris et al. (2005)	6	.831
4	Persistence	de Cooman, de Gieter, Pepermans, Jegers, & van Acker (2009)	3	.788
5	Learning goal orientation	Vandewalle (1997)	5	.817
6	Preference for creativity	Aleksić, Černe, Dysvik, & Škerlavaj (2006)	8	.822
7	Creative personality	Kirton (1976)	5	.736

Finally, while predicting creative performance, ten demographic characteristics were included as control variables: age, gender, membership in a student association, participation in a student competition, student exchange experience, presence of any work experience, relevant work experience (work experience in the field of studies), volunteering experience, undergraduate GPA and graduate GPA to date, as typical control variables when conducting research on student samples.

Experiment Design and Procedure

In Phase 1, participants were randomly assigned to either the managerial work redesign (MWR) group (experimental group) or the no-redesign group (control group). Chi-square and Mann-Whitney U tests exhibited no statistically significant differences between the groups related to respondents' demographic characteristics.

In Phase 2, students were assigned to perform the baseline task – the initial creativity task, of which results were used as measures of students' immanent creativity deriving from their genotype and phenotype. As creative performance requires information about a problem and a certain degree of prior knowledge regarding the task at hand (Amabile, 1983 as cited in Černe et al., 2014), the initial creativity task covered a business problem related to student life – the development of FEB-Zg Facebook page:

FEB-Zg management board decided to set up a FEB-Zg Facebook page. You have 10 minutes to individually list elements the page should contain for communicating with various stakeholders (present, future and previous generations of students, general public, etc.). The management board is going to take into account top student proposals.

Phase 3, apart from collecting seven potential predicting or moderating variables related to respondents' immanent creativity and ten demographic characteristics, served as a buffer between the two creativity tasks.

In Phase 4, the MWR manipulation was performed, making MWR a dichotomous variable (0 = not performed, 1 = performed). The redesign group was exposed to the experimental condition of the substantial work task redesign, while the no-redesign group performed under the control condition of the basic work task. The experimental creativity task covered again a student-related topic, this time the development of FEB-Zg student services.

In the control group task, no form of MWR was induced. The task was plain in terms that it was not rich neither in information nor instructions needed for its accomplishment. The available time was shorter (10 minutes), the goals were unclear, the task was carried out without the facilitator's help, it did not mention the role of the FEB-Zg management board, and it did not indicate the significance of resolving the task for the student population. The control task was:

Student organization XYZ originated the initiative for improving services to students that facilitate their studies. They envision that 200 m2 of space should be allocated for this purpose. You have 10 minutes to individually think of various services that should be provided to students. Top suggestions are going to be considered.

The task of the experimental group was developed by combining three MWR interventions – task, relational and cognitive task redesign. Related to task redesign, the experimental task lasted longer (20 minutes), and the objectives of solving the task were clear (minimal number of ideas specified, quality of ideas encouraged). Related to relational redesign, the facilitator's (interactive) help was offered. Related to cognitive task redesign, support from the FEB-Zg management board was guaranteed, and the significance of solving the task for the student population was emphasized. The experimental task was:

The FEB-Zg management board accepted the initiative of XYZ student organization that students should be provided with various services that facilitate their studies. They provided 200 m2 of space and financial support for it (together with sponsors). The Board expects from you as many creative ideas as possible (minimally eight, but more are preferred), especially those that facilitate group work/projects. You have 20 minutes to individually think of various services that should be provided to students. The Board is going to accept student proposals following the belief that the best way to start the project is to listen to students and their needs. You are free to ask for the facilitator's support, as her role is to smooth the idea generation through her advice and help, as managers in organizations do. Finally, keep in mind that you are helping the student population; in other words, your ideas are supporting not only your colleagues' but also future students' learning process and student life in general.

Data Analysis

Besides computing Cronbach's alphas and using descriptive statistics to calculate students' average creative performance scores, Chi-square and Mann-Whitney U tests (depending on the nature of variables) were used for exploring the potentially significant differences between the control and the experimental group, both in terms of variability in respondents' demographic characteristics and obtained experimental data. For assessing the relevance of control and predictor/moderating variables in different phases of the analysis, Mann-Whitney U tests, Kruskal-Wallis tests and Pearson correlations (depending on the nature of variables) were used. Both linear and hierarchical regression modelling was used for revealing the potency of MWR for creative performance, while hierarchical regression modelling was used for assessing a potential predictor/moderator role of creativity traits in the MWR environment. Finally, a multivariate analysis of variance (MANOVA) was used for the manipulation check. MANOVA showed the expected main effects of the no-redesign/redesign manipulation on respondents' creative performance ($F = 10.067$, $p < .001$).

Results

Table 2 exhibits that students in the experimental group were equally creative as students in the control group during the initial creativity task (no statistically significant differences between the groups were revealed) but considerably more creative during the experimental task. Their scores on the experimental task are better in absolute terms, as well as statistically significantly better.

Table 2. Descriptive Statistics and Statistically Significant Differences in Respondents' Creative Performance During Initial and Experimental Tasks by Groups

Creative ideas	Experimental group		Control group		Mann-Whitney U tests	
	M	*SD*	*M*	*SD*	*U*	*p*
NI_{IC}	8.20	2.51	7.59	2.79	1088.0	p =.313
NNI_{IC}	2.75	1.66	2. 27	1.73	1167.5	p =.090
NR_{IC}	0.33	0.19	0.30	0.18	1095.0	p =.288
NI_{EC}	7.25	2.53	3.41	1.96	1683.5	p <.001
NNI_{EC}	3.16	2.16	0.91	1.03	1614.5	p <.001
NR_{EC}	0.42	0.24	0.27	0.28	1322.5	p <.005

Note. n = 44 for each group. NI_{IC} = number of ideas in the initial creativity task; NNI_{IC} = number of novel ideas in the initial creativity task; NR_{IC} = novelty ratio in the initial creativity task; NI_{EC} = number of ideas in the experimental creativity task; NNI_{EC} = number of novel ideas in the experimental creativity task; NR_{EC} = novelty ratio in the experimental creativity task.

Related to control variables, only student exchange and work experience were found to be statistically significantly related to the novelty ratio, while the remaining eight

demographic characteristics were not found to be statistically significantly related to any of the three experimental creativity indicators. Related to ten potential predictor variables (seven creativity traits and three initial creative performance indicators), NI_{EC} was not statistically significantly related to any of the predictor variables explored; NNI_{EC} was statistically significantly correlated with two variables (preference for creativity and NNI_{IC}); while NR_{EC} was statistically significantly correlated with three variables (networking ability, learning goal orientation, and preference for creativity).

The potency of the MWR for raising creative performance was further explored through linear regression modelling. As Table 3 demonstrates, when MWR was added and a regression with two predictors rerun, arguments exhibit that MWR is a relevant variable in all three cases. When MWR as a second predictor entered the models, not only that all initial creative performance indicators' betas become smaller (and are fairly small), but the NI_{EC} and NR_{EC} models becomes significant (with significant MWR betas), while in the NNI_{EC} model a significant NNI_{IC} beta becomes insignificant (while MWR beta is significant) and Model 2 predicts NNI_{EC} to a statistically significantly greater degree ($p < .001$).

Table 3. Linear Regression Modelling Exhibiting the Effect of MWR on Creative Performance

	NI_{EC}		NNI_{EC}		NR_{EC}	
	Model 1	*Model 2*	*Model 1*	*Model 2*	*Model 1*	*Model 2*
NI_{IC} / NNI_{IC} / NR_{IC} (β)	.196	.122	.228*	.153	.164	.142
MWR (β)	-	.638***	-	.537***	-	.272*
F	3.423	33.352***	4.729*	21.398***	2.380	4.732*
R^2	.038	.440	.052	.335	.027	.100
ΔR^2	-	.402	-	.283	-	.073

Note. NI_{IC} = number of ideas in the initial creativity task; NNI_{IC} = number of novel ideas in the initial creativity task; NR_{IC} = novelty ratio in the initial creativity task; NI_{EC} = number of ideas in the experimental creativity task; NNI_{EC} = number of novel ideas in the experimental creativity task; NR_{EC} = novelty ratio in the experimental creativity task.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Finally, Table 4 displays the results of all direct and interaction effects predicting creative performance. In Model 1, the direct relationship between control and potential predictor variables and creative performance was examined. Respondents' creative performance was positively related only to their experience with working for a student association when measured by NNI and NR. In Model 2, the direct effect of MWR on creative performance was exhibited for NI and NNI, but not for NR, while NI_{EC} and NNI_{EC} models became statistically significant when MWR entered the model. The interaction terms explored through Model 3 showed that creativity traits are not functioning as enhancing (moderating) variables of respondents' creative performance in the MWR environment; in other words, MWR

supports the creative performance of both immanently creative and less creative respondents. Additionally, volunteering experience was found to be statistically significantly related to respondents' creative performance in Model 1 and Model 2 when creative performance was measured by NI, and membership in student association were found to be statistically significantly related to respondents' creative performance in Model 2 when creative performance measured by NR.

Table 4. Hierarchical Regression Modelling Exhibiting Direct And/or Interaction Effects of Demographics, Creativity Traits and MWR on Creative Performance

Variables	NI_{EC}			NNI_{EC}			NR_{EC}		
	Model 1	*Model 2*	*Model 3*	*Model 1*	*Model 2*	*Model 3*	*Model 1*	*Model 2*	*Model 3*
Control variables									
Age	-.002	-.029	-.016	-.118	-.138	-.065	-.194	-.200	-.137
Gender[a]	.177	.122	.092	.137	.110	.108	.036	.029	-.011
Student association[b]	.312	-.054	-.090	.420*	.156	.175	.431*	.357*	.354
Student competition[c]	.068	-.082	-.110	.054	-.054	-.069	.121	.091	.057
Exchange program[d]	.250	.106	.092	.229	.121	.121	-.094	-.125	-.104
Relevant work experience[e]	-.077	.099	.159	.065	.187	.259	.004	.039	.158
Volunteering[f]	.188	.255*	.258*	.089	.139	.118	-.162	-.149	-.155
Undergraduate GPA	.270	.178	.135	.100	.040	.069	-.019	-.038	-.064
Graduate GPA	.048	.030	.076	.048	.037	.142	.050	.046	.162
Predictor variables									
Self-efficacy	.203	-.203	-.470	.126	-.163	-.433	.132	.054	-.437
Personal initiative	-.154	-.162	-.359	.038	.020	-.846	.019	.013	-.797
Networking ability	.113	.186	-.213	.128	.180	.086	.050	.065	-.189
Persistence	-.094	-.152	.226	-.125	-.170	.558	-.105	-.118	.602
Learning goal orientation	-.053	.213	.725	.093	.286	.824	.144	.196	1.231
Preference for creativity	.425	.115	-.207	.446	.231	-.439	.402	.343	-.004
Creative personality	-.124	-.050	.097	-.279	-.221	.509	-.322	-.306	.091
NI_{IC}	.111	.082	-.203						
NNI_{IC}				.141	.097	.025			
NR_{IC}							.179	.169	.374
Managerial work redesign									
MWR[g]		.832***	.586		.615***	.679		.170	.530
Interaction terms									
MWR x Self-efficacy			.911			1.135			1.744
MWR x Personal initiative			.421			2.250			2.136
MWR x Networking ability			.734			.069			.516
MWR x Persistence			-.897			-2.052			-1.978
MWR x Learning goal orientation			-1.288			-1.287			-2.476
MWR x Preference for creativity			.980			2.082			1.095

Variables	NI_{EC}			NNI_{EC}			NR_{EC}		
	Model 1	*Model 2*	*Model 3*	*Model 1*	*Model 2*	*Model 3*	*Model 1*	*Model 2*	*Model 3*
MWR x Creative personality			-.531			-2.280			-1.403
MWR x NI_{IC}			.271						
MWR x NNI_{IC}						.011			
MWR x NR_{IC}									-.217
Totals									
F	1.072	8.488***	5.565***	1.438	3.938***	3.057**	1.446	1.457	1.159
R^2	.019	.685	.657	.352	.617	.688	.353	.373	.456
ΔR^2	–	.666	-.028	–	.265	.071	–	.020	.083

Note. Work experience was deleted from the analysis because of missing correlations. NI_{IC} = number of ideas in the initial creativity task; NNI_{IC} = number of novel ideas in the initial creativity task; NR_{IC} = novelty ratio in the initial creativity task; NI_{EC} = number of ideas in the experimental creativity task; NNI_{EC} = number of novel ideas in the experimental creativity task; NR_{EC} = novelty ratio in the experimental creativity task.
[a] female = 1, male = 2; [b, c, d, e, f, g] no = 0, yes = 1.
* p <.05; ** p <.01; *** p <.001.

Discussion

Theoretical Implications

This study is the first attempt to theorize and empirically assess the impact of managerial work redesign (MWR) mechanisms on employee creativity outcomes. As the potency of MWR for raising creative performance is demonstrated, the research contributes to the literature on individual creativity in organizations.

Empirical findings show that managers could facilitate creativity at work by redesigning jobs during the work process by simultaneously changing task, relational and cognitive task boundaries (H1 accepted). Firstly, during the experimental creativity session, the creative performance scores of participants under the experimental conditions differed significantly, while during the initial creativity session, they did not differ significantly from the control group scores. Secondly, the positive impact of MWR on the relationship between students' inherent and conditioned creative performance was verified by linear regression modelling. Thirdly, the significant positive effect of MWR on creative performance was confirmed for two out of three creativity indicators by the hierarchical regression modelling.

Furthermore, creativity traits of a person, in particular self-efficacy, personal initiative, networking ability, persistence, learning goal orientation, preference for creativity and creative personality, were not found to be enhancing characteristics for fully benefiting from MWR interventions (H2 rejected). This implies that MWR interventions are beneficial for the creative performance of both immanently creative and less creative personas.

Finally, only two demographic characteristics (student association membership and volunteering experience) sporadically, and none of the seven creativity traits explored exhibited a direct effect on respondents' creative performance, providing additional evidence of the magnitude of MWR's potential. In other words, it is implied that MWR is a mighty tool for increasing employees' creative outcomes no matter their demographics or creative predispositions.

Practical Implications

As innovative performance is vital to organizational competitiveness in an ever-changing business environment, it is crucial to identify how managers can promote subordinate innovativeness (Chen et al., 2016). The conducted experiment indicated that to attain higher levels of creative performance, as a needed ingredient for innovative performance, managers can manipulate the work design within the context of a defined job. This is in line with Unsworth and Parker's (2003) argument that an innovative workforce can be created through organizational interventions, and MWR is, according to the evidence presented in this paper, one of the possibilities.

Presented empirical findings on the role of MWR processes in fostering employee creative performance suggest that combined task, relational and cognitive on-the-job interventions performed by managers are possible interventions for encouraging employee creativity. In line with the Ramamoorthy et al. (2005) conclusion that managers and organizations need to pay close attention to the way in which jobs are designed to promote innovative work behaviours, it is suggested that managers consider the local adaptation of work design to increase their subordinates' creativity.

However, to successfully redesign jobs, managers must be competent in doing it. Both knowledge and experience are needed, and organizations should, therefore, systematically and constantly invest in the development of managers' job design and redesign competencies. As Chen et al. (2016) suggest, training programs can equip managers with the necessary skills to provide support to subordinates to be creative and innovative at work.

Finally, as empirical findings imply, demographics and personality characteristics related to creativity do not relate significantly to creative performance when MWR is present. Consequently, organizational practices related to selection procedures do not have to focus on obtaining better information about candidates' creativity-relevant traits or their potential for creative and innovative performance but on other characteristics relevant to person-organization and person-job fit.

Research Limitations and Future Research

There are several limitations to this study which need to be addressed in future research, and three are reported here.

The foremost limitation is that the experiment conducted with the purpose of exploring the potency of MWR for fostering creative results was conducted on a sample of final-year graduate students. However, a student sample experimental design has been applied earlier for exploring creative performance (e.g., Černe et al., 2014). Also, the use of student samples is considered problematic only when the behaviour studied is specific to one demographic or occupational group (Highhouse & Gillespie, 2009), which is not the case with creative performance as it is relevant for everybody, including students (Černe et al., 2014). An additional argument for using a classroom experiment is that negativities of field studies in work settings associated with resistance to change and strained relationships with co-workers or supervisors are less likely in a classroom setting (Hammond et al., 2011). Nevertheless, although there is a long history of research involving employment situation simulations conducted with students (Alksnis, Desmarais, & Curtis, 2008), to validate results obtained through this research and to assure the generalizability of findings, a field experiment on a sample of employees should be conducted.

The second limitation results from the fact that, potentially, students that participated in the experiment felt the pressure to demonstrate the highest possible levels of performance, thus diminishing the credibility of research findings. This is known as the Pygmalion effect phenomenon, which happens likewise in organizations when supervisors have expectations for creativity that influence creative performance (e.g., Hammond et al., 2011; Scott & Bruce, 1994).

The final accentuated limitation stems from the fact that the analysis is limited to Croatia. Although the research idea is not tied to any cultural dynamics and it is expected that results are culture-general, it would be interesting to replicate the study in other cultures.

Conclusion

Employee creativity and innovativeness in an organizational setting have been argued to be largely motivational issues (e.g., Amabile, 1988; Pieterse et al., 2010). Having in mind that both managerial support and job design are valuable non-material motivation strategies, the MWR stimuli for creative and innovative performance – as a mixture of those two motivation antecedents – certainly deserves attention. In this paper, the MWR intervention was found to contribute significantly to respondents' creative performance. Moreover, neither respondents' creative predispositions nor their demographic characteristics were found to be relevant for obtaining higher levels of creative performance fostered by MWR interventions. All this implies a high relevance of MWR for individual and, subsequently, organizational creativity and innovativeness.

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