Exploring a relationship between creativity and public service motivation

Kwangho Jung, Seung-Hee Lee & Jane E Workman

Published online: 15 May 2018.

Submit your article to this journal

Article views: 372

View related articles

View Crossmark data

Citing articles: 3 View citing articles

THE OPERATIONAL RESEARCH SOCIETY

Taylor & Francis
Taylor & Francis Group

Check for updates

Exploring a relationship between creativity and public service motivation

Kwangho Jung[a], Seung-Hee Lee[b] and Jane E Workman[b]

[a]Korea Institute of Public Affairs, The Institute of Information, Knowledge, and Policy, Graduate School of Public Administration, Seoul National University, Gwanak-gu, South Korea; [b]Fashion Design and Merchandising, Southern Illinois University, Carbondale, IL, USA

ABSTRACT

This study, relying on seemingly unrelated regression(SUR) model, tests whether or how public service motivation(PSM) is related to creativity. Creativity may be related to public motivations including attraction to public interest, civic duty, and sacrifice. These PSM subfactors involve the propensity for risk-taking to solve common problems and public issues. This study compares how male and female Korean and US college students differ in PSM and creativity and shows that PSM significantly affects creativity. Country differences rather than gender differences had a more significant effect on the relationship between PSM and creativity. A systematic investigation is needed of the relationship between PSM and creativity considering cultural differences and educational systems across various countries. Further study is also required to collect panel data to identify a causal impact of PSM on creativity.

1. Introduction

Knowledge production is dependent on various factors (e.g., individuals, organisations, communities, cultures, and nations). Diverse mechanisms to promote individual creativity involve the knowledge production process. An endogenous approach to knowledge production emphasises individual motivations such as internal or external incentives (Zhang & Sundaresan, 2010) and citizenship (Chang, Liao, Lee, & Lo, 2015), while an exogenous approach focuses on macro factors including cultural and national differences (Vines, Jones, & McCarthy, 2015). Research has addressed how economic incentives, trust, and collaboration are associated with the knowledge production and sharing process (Chakravarti, He, & Wagman, 2015; Sedighi et al., 2017). What is still unknown is how incentives and creativity involve sustainable knowledge management. Also unknown is how PSM is related to creativity, which is a critical factor for sustainable knowledge production. Research on a relationship between PSM and creativity remains largely untouched.

The global society faces a digital age where creativity plays a key role in education, organisations, and business (Pink, 2006). The global economy and environment increasingly require creative thought and strategy (Mazzucato, 2011; Nijkamp, 2003; Weerawardena & Mort, 2006). Creativity is a key growth engine of the digital economy. Many theories of creativity address why individuals or societies differ in creativity. Creativity research has four key dimensions: cognitive process, capacity, motivation, and context. This paper focuses on motivations associated with creativity. Research has examined relationships between intrinsic motivation and creativity. Intrinsic motivation can promote creativity (Forgeard, 2015; Gerhart & Fang, 2015), whereas extrinsic motivation (e.g., paying for grades) devalues the importance of the creative process. Encouraging creativity through extrinsic motivations ignores how intrinsic values (e.g., public motivations) can influence creativity. Open and social innovations result from public motivation for the common good (Jung, Lee, & Workman, 2016). Intrinsic and prosocial motivations can promote creativity and productivity (Grant & Berry, 2011). Personality traits related to public values, self-sacrifice, and civic duty are related to creative attitudes and can have a positive effect on creativity. Although previous studies identify the effects of intrinsic values on creativity (Forgeard, 2015; Gerhart & Fang, 2015), research has not yet provided empirical evidence on how creativity is associated with public motivations.

This study tests whether or how public service motivation (PSM) is related to creativity. The conceptual instrument of PSM developed by Perry (1996) has been applied to various research areas including public performance, ethical activity, and job satisfaction. However, many areas strongly associated with PSM have been neglected. For instance, PSM may influence the innovation process and creativity through mediating mechanisms including intrinsic incentives and creative attitudes. In addition, PSM may dismantle bureaucratic barriers to creativity in organisations (Borins, 2000).

CONTACT Kwangho Jung ✉ kwjung77@gmail.com 🖳 Graduate School of Public Administration, Seoul National University, 1 Gwanak-ro, Gwanak-gu, Seoul 08826, South Korea

Scant research has examined a relationship between creativity and PSM. Research in organisational behaviour has studied relationships between creativity and innovation (Amabile, 1988, 1997; Rank, Pace, & Frese, 2004) without clarifying what motivations facilitate creative and innovative attitudes. Research on the relationship between ethics and entrepreneurship associated with creativity did not identify what kind of ethics affects innovative and creative attitudes (Berman & West, 1998; Bernier & Hafsi, 2007).

This study explores how creativity may be related to public motivations including attraction to public interest, civic duty, and self-sacrifice. These PSM dimensions involve propensity for risk-taking to solve common problems and public issues. Individuals with higher PSM explore complicated issues, social dilemmas, and economic crises; exploring appropriate solutions calls for creativity. Further, those with higher PSM promote creative attitudes and ideas through cooperation and self-sacrifice (Alves, Marques, Saur, & Marques, 2007; Perry-Smith & Shalley, 2003).

The composition of this paper is as follows. First, we examine intrinsic motives that affect creativity, specifically, how good motives with purposeful awareness can influence creativity. Second, we examine the relationship between good motivation (i.e., PSM) and creativity. Third, we describe the data, research methodology, analysis, and econometric model for the hypotheses, and provide explanations for hypotheses. Finally, we provide implications of the empirical findings and challenges for further research.

2. Critical review: what motivations are related to creativity

2.1. Intrinsic motivations and creativity

Research has explored both intrinsic and extrinsic motivations that affect creativity. What is still debated is whether intrinsic or extrinsic motivation is more important across various tasks and contexts. Researchers have concluded that intrinsic motivation is a more powerful factor in creativity than extrinsic motivation. Intrinsic factors include affect, values for certain goals and missions, and self-realisation. For example, positive affect is closely related to creativity (Amabile, Barsade, Mueller, & Staw, 2005) and prosocial behaviours are conducive to creativity (Amabile, 1997; Wilkinson, 2015).

Intrinsic elements become more important to promoting creativity because organisational environments often contain risk and uncertainty. This complex environment demands a higher level of normative motives (e.g., cooperation and civic virtues) and affective motivation (e.g., self-sacrifice and compassion) to stimulate creativity. In a complex and uncertain environment, creativity might be better realised as a result of greater public interest values.

2.2. Public service motivation and creativity

Creativity can be powerful and effective when there is a strong motive, such as a good public purpose or sense of public mission. In order to take risks and achieve success creatively even in uncertainty, public motivations with good purpose are needed. Public intrinsic motivations can generate creative attitudes or capability. Creativity can emerge from such public motivations as moral values (e.g., justice, equality, and tolerance), empathy, compassion, and concern for public interest. We theorise that PSM is related to creativity because PSM is a dispositional trait that involves intrinsic motivation. Thus, individuals with higher (vs. lower) creativity may have higher PSM.

Various sub-elements composing PSM can generate creativity (e.g., public interest, civic duty, and self-sacrifice likely are positively associated with creativity). Sub-elements of PSM are positively related to intrinsic incentives (Dewett, 2007), risk-taking, imagination, flexibility, and nonconformity. However, little research has studied the effect of altruistic or prosocial motivations on creativity to raise public interest and common good. Each PSM sub-dimension may provide a unique contribution to intrinsic motivations: rational (i.e., instrumental motives of public participation), normative (i.e., civic duty and patriotism), or affective (i.e., self-sacrifice, compassion, and other prosocial behaviours). This study examines what motivational variables are associated with the publically positive intrinsic factors that influence creativity.

First, attention to and willingness to improve the public interest can lead to creativity. Those who are interested in public values or who want to increase public interest are likely to pursue innovative ways of thinking to accomplish their goals. Political and social difficulties related to public interest require creative solutions because there are many competing interests to consider. In order to resolve these complex interests, new methods are needed – a process that contributes to producing positive creative solutions to social problems based on the public interest. For example, creative designs on websites of 'Design Swan' and 'Public Interest Ads' are intended to promote public interest (see the website of creative public design at https://www.designswan.com/tag/advertisement or http://www.boredpanda.com/creative-ambient-public-interest-ads/). Few studies have explored a relationship between public interest and creativity (Sacchetti & Sugden, 2010). We test whether a positive orientation for public interest is related to creativity and if so, how.

Second, willingness to take risks is intrinsic to creative endeavours. Embracing uncertainty and new ways can disrupt a stable, comfortable life sacrificing potential benefits of an established and predictable lifestyle. Self-sacrifice allows an individual to pursue something new. A person with a strong self-sacrifice mentality can think creatively, address new challenges and complex problems, and produce creative results.

Third, civic virtue provides a foundation that encourages creativity. The more civic virtues a society has, the more creative individuals it produces. Complex social problems can be solved by finding solutions through civic virtues such as tolerance, sacrifice, concessions, and sharing. Creative problem solving can be generated through positive interactions with others and cross-fertilisation of ideas (Perry-Smith & Shalley, 2003). Citizens who ascribe to civic virtues have more interest in challenges of the community and a stronger desire to solve its problems. Civic virtues create positive expectations and desires for new things needed to solve community problems. In summary, individuals with high civic virtues are likely to have high creativity.

2.3. Control variables and contexts

Many motivational factors influence creativity (Runco, 2004). Certain personality traits are linked to creative performance and can predict creativity (e.g., Baer & Kaufman, 2008; Wolfradt & Pretz, 2001). For example, 'openness to experience' and 'divergent thinking' (i.e., willingness to try new ideas) can interact to generate creative productivity (Baer & Oldham, 2006; George & Zhou, 2001). Within a particular domain, interest and involvement in new ideas or products can lead to greater creativity. For example, the greater an individual's interest and involvement in the domain of fashion, the more likely that individual is to be creative. People who are open to new experiences have greater interest and acceptance of new innovations (Florida, 2002). Open-minded people have greater tolerance for other people's religion, political beliefs, and values (Silvia, Nusbaum, Berg, Martin, & O'Connor, 2009). In a society, the increased presence of citizens who are tolerant, interested in new things, and open to innovation will lead to greater acceptance of new and creative ideas or products. This acceptance serves as a basis for creativity.

The functions that foster creativity vary by situation (Kaufman & Sternberg, 2006). Each situation depends on culture, socialisation processes, and socio-economic environment. These factors, operating simultaneously, influence creativity. In particular, culture and gender are important structural variables. The motivational factors that affect creativity may vary by cultural values (e.g., individualism or collectivism) or by gender. How the social educational environment cultivates creativity can vary by culture and gender as well.

There are many studies of creativity-related motives. However, no study has explored relationships between creativity and PSM. In this paper, we use empirical data to examine how sub-dimensions of PSM are related to creativity and how relationships between creativity and PSM vary by country and gender.

3. Research Hypotheses and Research Methods

3.1. Research hypotheses and empirical model

Based on the above discussion, hypotheses were proposed (Figure 1). We propose that creative personality groups will differ in PSM (e.g., higher creativity group will score higher on commitment to public service than lower). Higher creativity is related to greater public interest, stronger self-sacrifice tendency, and stronger civic duty tendency.

Relationships between PSM and creativity may differ between South Korea and the USA and between men and women. We explore how relationships between PSM and creativity vary between US and Korean college students and between genders. There are several reasons for these group comparisons.

The impact of PSM on creativity may vary across different cultures. Relying on Hofstede's (2001) theory of cultural dimensions, culture may play a significant role in US and Korean students' creativity and public motivations. Korea has higher uncertainty avoidance than the USA. Tolerance of uncertainty and creativity are positively correlated. According to Zhang and Sundaresan (2010), Americans displayed higher scores on a measure of creative potential than Chinese. There may be differences in creativity between individualistic culture (e.g., USA) and collectivist culture (e.g., Korea). Culture is a major factor in an institution-based theory of PSM (Ritz & Brewer, 2013). There may be significant relationships between creativity and gender. Many studies have explored gender differences in creativity. Several studies (e.g., Costa, Terracciano, & McCrae, 2001; Misra, 2003; Wolfradt & Pretz, 2001) found that females score higher on creativity scales (e.g., openness to experience, story creativity, and creative problem solving). Costa et al. (2001) examined gender differences within 26 cultures and found that women scored higher than men on openness to aesthetics, feelings, and actions. Men scored higher than women on openness to ideas. There were no differences on openness to fantasy or values.

Figure 1 provides the framework for how P6SM is related to creativity. After controlling for interest in fashion trends and attitudes on openness, we estimate
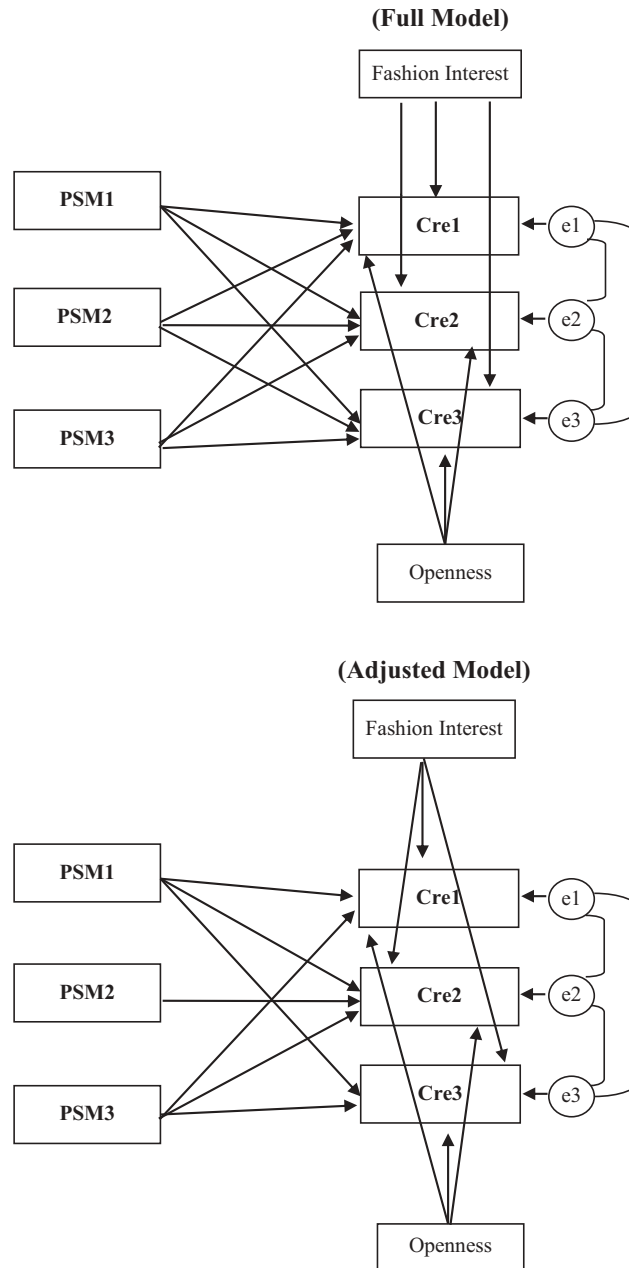
(Full Model)

(Adjusted Model)

Figure 1. Causal mechanism between PSM and creativity.

the effects of PSM on creativity. Further, we explore the relationship between PSM and creativity for country-specific effects between South Korea and the USA and gender differences.

This study uses seemingly unrelated regression (SUR) as the structural equation model framework with no measurement component or latent variables. The SUR model proposed by Zellner (1962) is a special case of the generalised regression model. Three dependent variables represent three dimensions of creativity within three regression models: social creativity, artistic creativity, and cognitive creativity. There are five exogenous variables and three continuous outcome variables. Their Gaussian error terms are assumed to be correlated because three different equations with three dependent variables of creativity are assumed correlated with each other. The SUR model evaluates the strength of that

correlation. Figure 1 shows a path diagram for a SUR model with observed exogenous variables.

<Full Model>

$$\text{Cre1} = \beta_{10} + \beta_{11}\text{PSM1} + \beta_{12}\text{PSM2} + \beta_{13}\text{PSM3} + \beta_{14}\text{Fashion} + \beta_{15}\text{Openness} + e1 \qquad (1)$$

$$\text{Cre2} = \beta_{20} + \beta_{21}\text{PSM1} + \beta_{22}\text{PSM2} + \beta_{23}\text{PSM3} + \beta_{24}\text{Fashion} + \beta_{25}\text{Openness} + e2 \qquad (2)$$

$$\text{Cre3} = \beta_{30} + \beta_{31}\text{PSM1} + \beta_{32}\text{PSM2} + \beta_{33}\text{PSM3} + \beta_{34}\text{Fashion} + \beta_{35}\text{Openness} + e3 \qquad (3)$$

where Cre1, Cre2, and Cre3 represent three dimensions of creativity

(social, artistic, and cognitive);

PSM1, PSM2, and PSM3 represent three factors of public service motivation

(public interest, self-sacrifice, and civic duty);

Fashion is measured by degree of interest in new fashion styles and trends (5-point Likert scale); Openness is measured by degree of acceptance of different political values and religions (5-point Likert scale); and e1, e2, and e3 represent each regression equation and are correlated with each other.

3.2. Measurements of public service motivation and creativity

The analysis model clarifies relationships between PSM and creativity. Both PSM and creativity involve sub-dimensions to upper-level concepts. Factor analysis was used to identify the sub-dimensions that comprise PSM and creativity. Based on extracted factors, we analysed the mechanism by which PSM affects creativity using SUR model. The logical framework of measurement of PSM and creativity is as follows.

First, the purpose of this study is to analyse the factors of PSM. PSM is defined as "an individual's predisposition to respond to motives grounded primarily or uniquely in public institutions and organizations" (Perry & Wise, 1990, p. 368). PSM includes a wide range of motives and actions in the public domain that are intended to do good for others and shape the well-being of society (Perry, 1996). High PSM is related to greater levels of altruism, behaviour directly intended to help other people, conscientiousness, and willingness to be indirectly helpful to others (Kim et al., 2012). Factor analysis revealed three public service motives: public interest (PSM1), self-sacrifice (PSM2), and civic virtue (PSM3). Tables 1 and 2 display statistical values for factor analyses. Standardised factor scores (range = 20–100) were calculated for use in analysis.

Second, there has been much discussion on how to measure and organise creativity. This study uses an 8-item domain-specific creativity checklist (CP; Kaufman & Baer, 2004). Using a Likert-type scale (1 = not at all; 5 = extremely), participants rated their creativity in the following domains: science, managing interpersonal relationships, writing, art, interpersonal communication, solving personal problems, mathematics, and crafts. Creativity scores were calculated based on factor analysis of these eight items. Results of factor analysis show three creativity factors (Table 3): social (Cre1), artistic (Cre2), and cognitive (Cre3). Tables 1 and 3, and Appendices 1, 2, and 3 provide information about measurement scales of the sub-dimensions of creativity.

Questionnaires about PSM and creativity were distributed and collected in large lecture classes between January and April 2017. Participants were 225 Koreans (90 women, 135 men; mean age = 23.29; range = 18–30) from a large university in Seoul, South Korea and 221 US

Table 1. Description of variables.

Variable	Definition
Cre1	Social creativity (Qc3, Qc6, Qc7)
Cre1_score	Sum of Qc3, Qc6, and Qc7
Cre2	Artistic creativity (Qc4, Qc5, Qc9)
Cre2_score	Sum of Qc4, Qc5, and Qc9
Cre3	Cognitive creativity (Qc2, Qc8)
Cre3_score	Sum of Qc2 and Qc8
PSM1	Public interest (Qp4, Qp5, Qp6, Qp10, Qp11)
PSM2	Self-sacrifice (Qp12, Qp13, Qp14, Qp15)
PSM3	Civic duty (Qp7, Qp8, Qp9)
Fashion	Often read detailed articles about latest ideas, trends, and developments in fashion.
	1 = not at all true of me; 5 = completely true of me
Open	Degree of appreciating and accepting similarities and differences in beliefs, appearances, and lifestyles.
	1 = strongly disagree; 5 = strongly agree
Gender	Male = 0; Female = 1
Country	South Korea = 1; USA = 2
Qp4	Equal opportunities for citizens are very important. 1 = not at all true of me; 5 = completely true of me
Qp5	It is important that citizens can rely on the continuous provision of public services.
Qp6	The interests of future generations should be taken into account when designing public policies.
Qp7	I am willing to go great lengths to fulfil my obligations to my country.
Qp8	The phrase 'duty, honour, and country' stirs deeply felt emotions.
Qp9	It is my responsibility to help solve problems arising from interdependencies among people.
Qp10	I feel sympathetic to the plight of the underprivileged.
Qp11	I get very upset when I see other people being treated unfairly.
Qp12	Considering the welfare of others is very important.
Qp13	I am prepared to make sacrifices for the good of society.
Qp14	I am willing to risk personal loss to help society.
Qp15	People should give back to society more than they get from it.
Qc2	Rate your creativity in the area of science 1 = not at all creative; 5 = extremely creative.
Qc3	…managing interpersonal relationships
Qc4	…writing
Qc5	…art
Qc6	…interpersonal communication
Qc7	…solving various personal problems
Qc8	…mathematics
Qc9	…crafts (e.g., woodworking, sewing, building things)

Table 2. Factor analysis for PSM.

				$N = 446$
Variable	Factor1	Factor2	Factor3	Uniqueness
Qp4	**.831**	.143	.115	.276
Qp5	**.862**	.019	.112	.245
Qp6	**.752**	.054	.193	.395
Qp7	.090	.182	**.862**	.217
Qp8	.083	.203	**.854**	.223
Qp9	.222	.414	**.545**	.483
Qp10	**.676**	.406	036	.377
Qp11	**.640**	.457	−.042	.379
Qp12	.525	**.661**	002	.288
Qp13	.099	**.801**	.338	.234
Qp14	.116	**.782**	.344	.256
Qp15	.096	**.741**	170	.412

Method: principal-component factors; retained factors = 3
Rotation: orthogonal varimax (Kaiser off); number of parameters = 33

Factor	Variance	Difference	Proportion	Cumulative
Factor1	3.237	0.354	0.270	0.270
Factor2	2.883	0.788	0.240	0.510
Factor3	2.096	.	0.175	0.685

LR test: independent vs. saturated
Chi-sq (66) = 2666.36; Prob>chi-sq
  <0.0001

Table 3. Factor analysis of creativity.

Variable	Factor1	Factor2	Factor3	N = 446 Uniqueness
Qc2	−.027	.161	**.785**	.333
Qc3	**.838**	−.057	−.039	.326
Qc4	.274	**.562**	−.266	.481
Qc5	−.056	**.875**	−.049	.270
Qc6	**.870**	.010	−.018	.238
Qc7	**.742**	−.021	.206	.403
Qc8	.073	−.084	**.852**	.276
Qc9	−.063	**.754**	.308	.312

Method: principal-component factors; retained factors = 3

Rotation: oblique promax (Kaiser off); number of parameters = 21

Factor	Variance	Proportion	Rotated factors are correlated
Factor1	2.277	0.285	
Factor2	1.940	0.243	
Factor3	1.606	0.201	

LR test: Independent vs. saturated

Chi-sq (28) = 772.03; Prob>chi-sq < 0.0001

students (112 women, 107 men; 2 missing data; mean age = 21.36; range = 18–30) from a large Midwestern university. Reliability was acceptable for all scales for both countries (Appendix 2). Empirical analyses included descriptive statistics, Cronbach's alpha reliability, (M) ANOVA, and SUR. Statistical package program of STATA13 was used to conduct statistical analyses.

4. Empirical results

We test the impact of PSM on creativity with three sub-dimensions correlated with each other, that is, three regression models with three creativity

dimensions. We examine how three subfactors of PSM are related to three dependent variables of creativity, after controlling for two variables: interest in fashion and openness. Table 4 shows that residuals of regression equations between Equation (1) and Equation (2) and between Equation (1) and Equation (3) are statistically cross-correlated, implying that the SUR model can provide more efficient estimations than ordinary least squares (OLS) regression. The SUR model provides three main empirical results. First are statistical results from the whole American and Korean college student sample (Table 4). These results illustrate a common part beyond country differences between South Korea and the USA and gender differences. Second are the effects of PSM on creativity comparing two countries (Table 5). Third is examining gender differences in a relationship between PSM and creativity (Table 6).

Table 4 shows the impact of three public service motives on creativity (Appendix 4 contains results of a full model). There were significant relationships between social creativity and PSM1 (public interest), PSM2 (self-sacrifice), and PSM3 (civic duty), where all p-values are below .05 (Table 4). Greater public interest, stronger self-sacrifice, and higher civic virtue are all positively related to higher social creativity. In sum, PSM appears to enhance the social creativity needed to solve complex social problems.

Next is the impact of PSM on cognitive creativity. There are significant relationships between cognitive creativity and PSM2 and PSM3, where all p-values are below .05. Higher self-sacrifice attitude and stronger

Table 4. Empirical results of SUR model (Whole Group).

Cre1	←	Coefficient	SE	Z	N=446 P>|z|
PSM1		0.115	0.046	2.500	0.013
PSM2		0.141	0.044	3.170	0.002
PSM3		0.141	0.043	3.320	0.001
Fashion		0.135	0.034	4.010	0.000
Open		0.240	0.059	4.040	0.000
Intercept		-1.395	0.266	-5.250	0.000
Cre2	**←**	**Coefficient**	**SE**	**Z**	**P>|z|**
PSM2		0.204	0.044	4.670	0.000
Fashion		0.201	0.033	6.070	0.000
Open		0.246	0.054	4.540	0.000
Intercept		-1.614	0.245	-6.600	0.000
Cre3	**←**	**Coefficient**	**SE**	**Z**	**P>|z|**
PSM1		-0.149	0.050	-3.010	0.003
PSM2		0.099	0.047	2.090	0.037
PSM3		0.137	0.046	2.990	0.003
Fashion		-0.069	0.036	-1.920	0.055
Open		0.040	0.063	0.640	0.523
Intercept		0.032	0.283	0.110	0.909
Var(e.Cre1)		0.837	0.056		
Var(e.Cre2)		0.819	0.055		
Var(e.Cre3)		0.944	0.063		
Cov(e.Cre1*e.Cre2)		0.171	0.040	4.270	0.000
Cov(e.Cre1*e.Cre3)		0.046	0.042	1.100	0.273
Cov(e.Cre2*e.Cre3)		0.117	0.042	2.780	0.006
Log Likelihood = -4922.48					
LR test of model vs. saturated		Chi-sq(2)=0.1	Prob>	Chi-sq=0.953	

Table 5. Empirical results of the SUR model (South Korea and the USA).

Cre1	Group (South Korea, USA)				N = 446
	←	Coefficient	SE	Z	P>|z|
PSM1	Korea	0.198	0.069	2.870	.004
	USA	0.068	0.067	1.000	.316
PSM2	Korea	0.135	0.069	1.960	.049
	USA	0.086	0.070	1.230	.218
PSM3	Korea	0.149	0.071	2.100	.036
	USA	0.115	0.057	2.030	.043
Fashion	Korea	0.161	0.052	3.120	.002
	USA	0.139	0.044	3.130	.002
Open	Korea	0.242	0.083	2.910	.004
	USA	0.189	0.087	2.170	.030
Intercept	Korea	−1.575	0.364	−4.330	.000
	USA	−1.094	0.395	−2.770	.006
Cre2	←	Coefficient	SE	Z	P>|z|
PSM2	Korea	0.144	0.061	2.370	.018
	USA	0.116	0.070	1.660	.096
Fashion	Korea	0.218	0.046	4.690	.000
	USA	0.229	0.046	4.970	.000
Open	Korea	0.299	0.068	4.370	.000
	USA	0.128	0.082	1.560	.119
Intercept	Korea	−2.077	0.311	−6.690	.000
	USA	−0.973	0.370	−2.630	.009
Cre3	←	Coefficient	SE	Z	P>|z|
PSM1	Korea	−0.088	0.071	−1.240	.216
	USA	−0.168	0.075	−2.240	.025
PSM2	Korea	0.140	0.070	2.010	.045
	USA	−0.019	0.078	−0.250	.806
PSM3	Korea	0.197	0.074	2.680	.007
	USA	0.051	0.063	0.810	.420
Fashion	Korea	−0.104	0.052	−1.990	.046
	USA	−0.014	0.050	−0.290	.773
Open	Korea	0.047	0.085	0.560	.578
	USA	−0.009	0.097	−0.090	.927
Intercept	Korea	0.078	0.369	0.210	.832
	USA	0.195	0.441	0.440	.659
Var (e.Cre1)	Korea	0.875	0.082		
	USA	0.765	0.073		
Var (e.Cre2)	Korea	0.714	0.067		
	USA	0.841	0.080		
Var (e.Cre3)	Korea	0.897	0.084		
	USA	0.954	0.091		
Cov (e.Cre1*e.Cre2)	Korea	0.172	0.054	3.180	.001
	USA	0.123	0.055	2.240	.025
Cov (e.Cre1*e.Cre3)	Korea	0.027	0.059	0.450	.651
	USA	0.042	0.058	0.730	.462
Cov (e.Cre2*e.Cre3)	Korea	0.049	0.054	0.910	.363
	USA	0.152	0.062	2.480	.013
Log likelihood =	−4812.8				
LR test of model vs. saturated		Chi-sq(4) = 4.71	Prob>	Chi-sq =	0.319

civic virtue are positively related to higher cognitive creativity. Conversely, there is a negative relationship between cognitive creativity and PSM1 such that stronger public interest is related to lower cognitive creativity. Further research is needed to examine this negative relationship.

Finally, there are mixed results between artistic creativity and PSM. Of the three sub-dimensions of PSM, only those with a strong self-sacrificing spirit (PSM2) have higher artistic creativity. Creative artistic behaviours may be derived from self-sacrifice. However, commitment to the public interest and civic virtue were not related to artistic creativity.

There are differences in the impact of PSM on creativity between US and Korean college students

(Table 5; Appendix 3). First, the impact of civic virtues on social creativity in both countries was statistically significant but the effects of public interest and self-sacrifice on social creativity were different. In Korea, the relationship between public interest and self-sacrifice on social creativity is positive but not in the USA. Further research is needed on why public interest and self-sacrifice are not related to social creativity in the USA.

In Korean students (but not in US students), self-sacrifice and civic virtue were significantly related to cognitive creativity. The impact of self-sacrifice on artistic creativity is significant in Korea but not in the USA. Differences between these two countries can be attributed to cultural differences between the USA

Table 6. Empirical results of SUR model (Male and Female).

Cre1	Group (Gender) ←	Coefficient	SE	Z	N = 446 P>|z|
PSM1	Male	0.106	0.059	1.800	.072
	Female	0.147	0.073	2.010	.044
PSM2	Male	0.150	0.058	2.580	.010
	Female	0.141	0.069	2.050	.040
PSM3	Male	0.163	0.057	2.860	.004
	Female	0.091	0.065	1.400	.161
Fashion	Male	0.138	0.047	2.960	.003
	Female	0.157	0.052	3.050	.002
Open	Male	0.229	0.075	3.030	.002
	Female	0.263	0.096	2.750	.006
Intercept	Male	−1.305	0.341	−3.820	.000
	Female	−1.645	0.432	−3.810	.000
Cre2	**←**	**Coefficient**	**SE**	**Z**	**P>|z|**
PSM2	Male	0.230	0.059	3.940	.000
	Female	0.154	0.064	2.390	.017
Fashion	Male	0.177	0.047	3.790	.000
	Female	0.179	0.048	3.690	.000
Open	Male	0.265	0.070	3.760	.000
	Female	0.164	0.084	1.970	.049
Intercept	Male	−1.740	0.319	−5.450	.000
	Female	−1.050	0.387	−2.710	.007
Cre3	**←**	**Coefficient**	**SE**	**Z**	**P>|z|**
PSM1	Male	−0.089	0.064	−1.400	.162
	Female	−0.214	0.078	−2.770	.006
PSM2	Male	0.086	0.062	1.390	.164
	Female	0.120	0.071	1.670	.094
PSM3	Male	0.102	0.062	1.650	.099
	Female	0.137	0.069	2.000	.046
Fashion	Male	−0.024	0.050	−0.480	.634
	Female	−0.077	0.054	−1.430	.152
Open	Male	0.075	0.081	0.930	.354
	Female	0.016	0.100	0.160	.870
Intercept	Male	−0.131	0.366	−0.360	.719
	Female	0.065	0.450	0.140	.886
Var (e.Cre1)	Male	0.810	0.073		
	Female	0.857	0.085		
Var (e.Cre2)	Male	0.829	0.075		
	Female	0.762	0.076		
Var (e.Cre3)	Male	0.927	0.084		
	Female	0.926	0.092		
Cov (e.Cre1*e.Cre2)	Male	0.180	0.054	3.350	.001
	Female	0.184	0.058	3.150	.002
Cov (e.Cre1*e.Cre3)	Male	0.060	0.056	1.070	.283
	Female	0.022	0.063	0.350	.729
Cov (e.Cre2*e.Cre3)	Male	0.155	0.057	2.720	.007
	Female	0.093	0.060	1.560	.118
Log likelihood = −4880.8					
LR test of model vs. saturated		Chi-sq(4) = 1.89	Prob>		Chi-sq = 0.755

and Korea. In particular, differences in PSM gave different results.

Overall, there is little difference in relationships between PSM and creativity by gender (Table 6). The effect of PSM on creativity did not differ by gender. However, stronger self-sacrifice impacted social creativity for men but not for women.

The two control variables of fashion interest and openness have a very significant effect on creativity (Tables 4–6). Greater interest in new fashion trends is related to higher social, artistic, and cognitive creativity. The effect of openness on creativity is equally significant.

5. Conclusion and implications

Limited empirical research has addressed how factors such as PSM influence creativity. This study provides empirical findings on the relationship between PSM and creativity with country and gender comparisons showing that PSM positively affects creativity.

Country differences, rather than gender differences, had a significant effect on the relationship between PSM and creativity. Hofstede's (2001) theory of cultural dimensions helps explain the role of culture in US and Korean students' creativity and PSM. The impact of PSM on creativity may be weak or strong because of country-specific differences such as different levels of collectivism and individualism. Future research is required to investigate more systematically the relationship between PSM and creativity due to cultural differences.

Understanding cultural differences as well as gender differences in creativity and PSM can lead to theoretical and practical implications for developing a research agenda in a field of social innovation and entrepreneurship. A relationship between PSM and creativity

provides promising research areas for understanding how to promote open innovation, social innovation, and entrepreneurship (Yun & Park, 2016; Yun, Park, Im, Shin, & Zhao, 2017). Both creativity and PSM can be potential factors to explain how the dynamic model of open innovation can emerge and evolve into complex adaptive systems and evolutionary change in market and society (Yun, Won, & Park, 2016). Some elements of PSM and creativity or a relationship between them can be effective in solving the growth restrictions of capitalism (Yun, 2015). Creativity can also be a useful variable to steer design of 'demand articulation', exploring corporate policies and consumer preferences for an emerging technology and a hidden market niche (Kodama & Shibata, 2015). PSM expands a theoretical framework about individual motivation of a long-term, value-informed mission beyond short-term rewards. This mission-based motivation mechanism can explain how co-creation and open-source movement can be generated through interactions between public motivation and social outcomes (Jung et al., 2016; Von Krogh, Haefliger, Spaeth, & Wallin, 2012). Further, PSM and creativity can be a conceptual base from which to design effective governance rules for sustainable ecosystems for the common good.

This study was limited to data from Korean and US college students. Because the effect of PSM on creativity may depend on organisational contexts and cultures, further research needs a more representative sample of the general population for each country. National surveys allow comparison of PSM factors cross-culturally. Collecting panel data over time will yield information useful in identifying the causal impact of PSM on creativity. Looking at experimental research and cases to see how public service motives affect creativity might yield another explanation about why and how PSM affects creativity. Further, a study of the mechanism that affects PSM and creativity by fashion interest and openness would be interesting.

Disclosure statement

Funding

References

Alves, J., Marques, M. J., Saur, I., & Marques, P. (2007). Creativity and innovation through multidisciplinary and multi-sectoral cooperation. *Creativity and Innovation Management*, 16(1), 27–34).

Amabile, T. M. (1988). A model of creativity and innovation in organizations. *Research in Organizational Behavior*, 10(1), 123–167.

Amabile, T. M. (1997). Motivating creativity in organizations: On doing what you love and loving what you do. *California Management Review*, 40(1), 39–58.

Amabile, T. M., Barsade, S. G., Mueller, J. S., & Staw, B. M. (2005). Affect and creativity at work. *Administrative Science Quarterly*, 50(3), 367–403.

Baer, J., & Kaufman, J. C. (2008). Gender differences in creativity. *The Journal of Creative Behavior*, 42(2), 75–105.

Baer, M., & Oldham, G. R. (2006). The curvilinear relation between experienced creative time pressure and creativity: Moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology*, 91(4), 963–970.

Berman, E. M., & West, J. P. (1998). Responsible risk-taking. *Public Administration Review*, 58(4), 346–352.

Bernier, L., & Hafsi, T. (2007). The changing nature of public entrepreneurship. *Public Administration Review*, 67(3), 488–503.

Borins, S. (2000). Loose cannons and rule breakers, or enterprising leaders? Some evidence about innovative public managers. *Public Administration Review*, 60(6), 498–507.

Chakravarti, A., He, C., & Wagman, L. (2015). Inducing knowledge sharing in teams through cost-efficient compensation schemes. *Knowledge Management Research and Practice*, 13(1), 71–90.

Chang, W. J., Liao, S. H., Lee, Y. J., & Lo, W. P. (2015). Organizational commitment, knowledge sharing and organizational citizenship behaviour: The case of the Taiwanese semiconductor industry. *Knowledge Management Research and Practice*, 13(3), 299–310.

Costa, P., Jr, Terracciano, A., & McCrae, R. R. (2001). Gender differences in personality traits across cultures: Robust and surprising findings. *Journal of Personality and Social Psychology*, 81(2), 322–331.

Dewett, T. (2007). Linking intrinsic motivation, risk taking, and employee creativity in an R&D environment. *R&D Management*, 37(3), 197–208.

Florida, R. (2002). *The rise of the creative class: And how it's transforming work, leisure, community and everyday life*. New York, NY: Basic Books.

Forgeard, M. J. C. (2015). *When, how, and for whom does creativity predict well-being?* (Doctoral Dissertation). University of Pennsylvania.

George, J. M., & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology*, 86(3), 513–524.

Gerhart, B., & Fang, M. (2015). Pay, intrinsic motivation, extrinsic motivation, performance, and creativity in the workplace: Revisiting long-held beliefs. *Annual Review Organizational Psychology and Organizational Behavior*, 2(1), 489–521.

Grant, A. M., & Berry, J. W. (2011). The necessity of others is the mother of invention: Intrinsic and prosocial motivations, perspective taking, and creativity. *Academy of Management Journal*, 54(1), 73–96.

Hofstede, G. (2001). Culture's recent consequences: Using dimension scores in theory and research. *International Journal of Cross Cultural Management*, 1(1), 11–17.

Jung, K., Lee, S. H., & Workman, J. E. (2016). Exploring neglected aspects of innovation function: Public motivation and non-pecuniary values. *Science, Technology and Society*, 21(3), 435–464.

Kaufman, J. C., & Baer, J. (2004). Sure, I'm creative—But not in mathematics!: Self-reported creativity in diverse domains. *Empirical Studies of the Arts*, 22(2), 143–155.

Kaufman, J. C., & Sternberg, R. J. (Eds.). (2006). *The international handbook of creativity* pp. 1–9. Cambridge, UK: Cambridge University Press.

Kim, S., Vandenabeele, W., Wright, B. E., Andersen, L. B., Cerase, F. P., Christensen, R. K., … Palidauskaite, J. (2012). Investigating the structure and meaning of public service motivation across populations: Developing an international instrument and addressing issues of measurement invariance. *Journal of Public Administration Research and Theory*, 23(1), 79–102.

Kodama, F., & Shibata, T. (2015). Demand articulation in the open-innovation paradigm. *Journal of Open Innovation: Technology, Market, and Complexity*, 1(1), 2.

Mazzucato, M. (2011). The entrepreneurial state. *Soundings*, 49(49), 131–142.

Misra, I. (2003). Openness to experience: Gender differences and its correlates. *Journal of Personality and Clinical Studies*, 19(1), 141–152.

Nijkamp, P. (2003). Entrepreneurship in a modern network economy. *Regional Studies*, 37(4), 395–405.

Perry, J. L. (1996). Measuring public service motivation: An assessment of construct reliability and validity. *Journal of Public Administration Research and Theory*, 6(1), 5–22.

Perry, J. L., & Wise, L. R. (1990). The motivational bases of public service. *Public Administration Review*, 50(3), 367–373.

Perry-Smith, J. E., & Shalley, C. E. (2003). The social side of creativity: A static and dynamic social network perspective. *Academy of Management Review*, 28(1), 89–106.

Pink, D. H. (2006). *A whole new mind: Why right-brainers will rule the future*. Westminster, London: Penguin.

Rank, J., Pace, V. L., & Frese, M. (2004). Three avenues for future research on creativity, innovation, and initiative. *Applied Psychology*, 53(4), 518–528.

Ritz, A., & Brewer, G. A. (2013). Does societal culture affect public service motivation? Evidence of sub-national differences in Switzerland. *International Public Management Journal*, 16(2), 224–251.

Runco, M. A. (2004). Creativity. *Annual Review of Psychology*, 55, 657–687.

Sacchetti, S., & Sugden, R. (2011). The public interest in economic development and creativity: A knowledge governance perspective. In B. Dallago & C. Guglielmetti (Eds.), *Local economies and global competitiveness* (pp. 232–241). London, UK: Palgrave Macmillan UK.

Sedighi, M., Lukosch, S., Van Splunter, S., Brazier, F. M., Hamedi, M., & Van Beers, C. (2017). Employees'

participation in electronic networks of practice within a corporate group: Perceived benefits and costs. *Knowledge Management Research and Practice*, 15(3), 460–470.

Silvia, P. J., Nusbaum, E. C., Berg, C., Martin, C., & O'Connor, A. (2009). Openness to experience, plasticity, and creativity: Exploring lower-order, high-order, and interactive effects. *Journal of Research in Personality*, 43(6), 1087–1090.

Vines, R., Jones, M., & McCarthy, G. (2015). Collaborating across institutional and jurisdictional boundaries: Enabling the emergence of a national innovation system through public knowledge management. *Knowledge Management Research and Practice*, 13(2), 187–197.

Von Krogh, G., Haefliger, S., Spaeth, S., & Wallin, M. W. (2012). Carrots and rainbows: Motivation and social practice in open source software development. *MIS Quarterly*, 36(2), 649–676.

Weerawardena, J., & Mort, G. S. (2006). Investigating social entrepreneurship: A multidimensional model. *Journal of World Business*, 41(1), 21–35.

Wilkinson, A. (2015). *The creator's code: The six essential skills of extraordinary entrepreneurs*. New York, NY: Simon and Schuster.

Wolfradt, U., & Pretz, J. E. (2001). Individual differences in creativity: Personality, story writing, and hobbies. *European Journal of Personality*, 15(4), 297–310.

Yun, J. J. (2015). How do we conquer the growth limits of capitalism? Schumpeterian dynamics of open innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 1(1), 17.

Yun, J. J., & Park, K. (2016). How user entrepreneurs succeed: The role of entrepreneur's caliber and networking ability in Korean user entrepreneurship. *Science, Technology and Society*, 21(3), 391–409.

Yun, J. J., Park, K., Im, C., Shin, C., & Zhao, X. (2017). Dynamics of social enterprises—Shift from social innovation to open innovation. *Science, Technology and Society*, 22(3), 425–439.

Yun, J. J., Won, D., & Park, K. (2016). Dynamics from open innovation to evolutionary change. *Journal of Open Innovation: Technology, Market, and Complexity*, 2(1), 7.

Zellner, A. (1962). An efficient method of estimating seemingly unrelated regression equations and tests for aggregation bias. *Journal of the American Statistical Association*, 57(298), 348–368.

Zhang, Z., & Sundaresan, S. (2010). Knowledge markets in firms: Knowledge sharing with trust and signaling. *Knowledge Management Research and Practice*, 8(4), 322–339.

Appendix 1. Descriptive Statistic

Variable	N	Mean	Standard deviation	Minimum	Maximum
Cre1	446	0	1	−3.51	1.83
Cre1_score	446	73.90	15.57	20	100
Cre2	446	0	1	−2.43	2.09
Cre2_score	446	62.29	18.08	20	100
Cre3	446	0	1	−2.52	2.44
Cre3_score	446	55.90	20.83	20	100
PSM1	446	0	1	−4.14	2.08
PSM2	446	0	1	−2.94	3.17
PSM3	446	0	1	−2.98	2.24
Fashion	446	2.93	1.30	1	5
Open	446	4.17	0.81	2	5
Gender	446	0.45	0.50	0	1
Country	446	1.49	0.50	1	2
Qp4	446	4.24	0.81	1	5
Qp5	446	4.15	0.85	1	5
Qp6	446	4.22	0.83	1	5
Qp7	446	3.28	1.11	1	5
Qp8	446	3.25	1.16	1	5
Qp9	446	3.30	1.00	1	5
Qp10	446	3.89	0.98	1	5
Qp11	446	4.06	0.91	1	5
Qp12	446	3.90	0.94	1	5
Qp13	446	3.38	1.08	1	5
Qp14	446	3.23	1.05	1	5
Qp15	446	3.43	1.13	1	5
Qc2	446	2.64	1.18	1	5
Qc3	446	3.58	1.03	1	5
Qc4	446	3.28	1.10	1	5
Qc5	446	2.96	1.20	1	5
Qc6	446	3.73	0.95	1	5
Qc7	446	3.78	0.87	1	5
Qc8	446	2.95	1.27	1	5
Qc9	446	3.11	1.29	1	5

Appendix 2. Reliability of scales: creativity and PSM

	Items	Average inter-item correlation	Cronbach alpha	N
Cre1	Qc3, Qc6, Qc7	0.51	0.76	446
Cre2	Qc4, Qc5, Qc9	0.35	0.62	446
Cre3	Qc2, Qc8	0.45	0.62	446
PSM1	Qp4, Qp5, Qp6, Qp10, Qp11	0.53	0.85	446
PSM2	Qp12, Qp13 Qp14, Qp15	0.56	0.84	446
PSM3	Qp7, Qp8, Qp9	0.53	0.77	446

Appendix 3.ANOVA analysis by country and gender

Dependent variable: Cre1_score (N=446)				Gender		Total
				Men	Women	
Cre1_score=(Qc3+ Qc6+ Qc7)*(20/3)			South Korea	72.31	70.96	71.78
			USA	75.83	76.37	76.10
			Total	73.85	73.96	73.90
ANOVA	Source	Partial sum of squares	df	MS	F-value	p-value
	Model	2104.0	2	1052.0	4.41	.013
	Country	2102.7	1	2102.7	8.81	.003
	Gender	17.4	1	17.4	0.07	.788
	Residual	105,752.1	443	238.7		
	Total	107,856.1	445	242.4		
Dependent variable: Cre2_score (N=446)				Gender		Total
				Men	Women	
Cre2_score=(Qc4+ Qc5+ Qc9)*(20/3)			South Korea	54.01	62.96	57.56
			USA	64.61	69.64	67.18
			Total	58.66	66.67	62.29
ANOVA	Source	Partial sum of squares	df	MS	F-value	p-value
	Model	15,636.2	2	7818.1	26.28	<.0001
	Country	8553.8	1	8553.8	29.19	<.0001
	Gender	5317.1	1	5317.1	18.15	<.0001
	Residual	129,808.8	443	293.0		
	Total	145,445.0	445	326.8		
Dependent variable: Cre3_score (N=446)				Gender		Total
				Men	Women	
Cre3_score=(Qc2+ Qc8)*(20/2)			South Korea	56.50	48.22	53.22
			USA	60.56	56.88	58.68
			Total	58.28	53.02	55.90
ANOVA	Source	Partial sum of squares	df	MS	F-value	p-value
	Model	7210.9	2	3605.5	8.60	.0002
	Country	4154.7	1	4154.7	9.91	.0018
	Gender	3888.1	1	3888.1	9.27	.0025
	Residual	185,780.3	443	419.4		
	Total	192,991.3	445	433.7		

Appendix 4. Full model

					N = 446
Cre1	←	Coefficient	SE	Z	P>|z|
PSM1		0.117	0.047	2.470	.013
PSM2		0.141	0.044	3.170	.002
PSM3		0.139	0.043	3.200	.001
Fashion		0.135	0.034	4.020	.000
Open		0.239	0.059	4.020	.000
Intercept		−1.392	0.266	−5.220	.000
Cre2	←	Coefficient	SE	Z	P>|z|
PSM1		0.007	0.047	0.150	.882
PSM2		0.205	0.044	4.660	.000
PSM3		−0.012	0.043	−0.270	.784
Fashion		0.202	0.033	6.070	.000
Open		0.242	0.059	4.120	.000
Intercept		−1.601	0.264	−6.070	.000
Cre3	←	Coefficient	SE	Z	P>|z|
PSM1		−0.148	0.050	−2.960	.003
PSM2		0.099	0.047	2.090	.037
PSM3		0.135	0.046	2.920	.003
Fashion		−0.068	0.036	−1.920	.055
Open		0.040	0.063	0.630	.529
Intercept		0.034	0.283	0.120	.903
Var (e.Cre1)		0.837	0.056		
Var (e.Cre2)		0.818	0.055		
Var (e.Cre3)		0.944	0.063		
Cov (e.Cre1*e.Cre2)		0.171	0.040	4.270	.000
Cov (e.Cre1*e.Cre3)		0.046	0.042	1.100	.273
Cov (e.Cre2*e.Cre3)		0.117	0.042	2.780	.006
Log likelihood =	−4922.4				