

# Creative Potential and Practised Creativity: Identifying Untapped Creativity in Organizations

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This study examines the construct validity of creative potential and practised creativity, two overlooked aspects of creativity that may be useful for identifying untapped creative resources in organizations. Results of an exploratory factor analysis (EFA) and a confirmatory factor analysis (CFA) utilizing structural equation modelling techniques provide some initial evidence in support of the construct validity of these concepts. These findings appear to have important managerial implications for increasing creativity and overall organizational effectiveness. The results presented here also suggest some directions for future research aimed at examining the relationships between creative potential, practised creativity and other variables of interest.

Creativity and innovation are critical competencies for 21st-century organizations seeking to lead or adapt to change (Amabile, 1988; Woodman, Sawyer & Griffen, 1993). Individual creativity is often presented as an essential component for facilitating organizational innovation (Amabile, 1988; Woodman, Sawyer & Griffen, 1993), which generally refers to the implementation of creative ideas in an organizational context and is imperative for long-term organizational success and survival (Kanter, 1983; Utterback, 1994; Amabile et al., 1996; Tushman & O'Reilly, 1997). However, creativity is an elusive and complex construct that is somewhat difficult to define. Although theorists do not entirely agree upon a single definition, consistent concepts appear across most existing definitions. Guilford (1950) stated that 'the creative person has novel ideas' and will submit 'uncommon, yet acceptable, responses' (p. 452). Likewise, Sternberg and Lubart (1999) define creativity as 'the ability to produce work that is both novel (i.e., original, unexpected) and appropriate (i.e., useful, adaptive concerning task constraints)' (p. 3). Similarly, Barron and Harrington (1981) use the terms 'novel', 'originality', and 'far-reachingness' in their definition of creativity (p. 442). Finally, Martindale (1989) suggested that creativity 'must be original, it must be useful or appropriate for the situation

... and it must actually be put to some use' (p. 211). Given the common themes across these definitions, it appears that the value of creativity in organizations may relate to an ability to harvest novel yet appropriate ideas in order to increase organizational efficiencies, solve complex problems and improve overall effectiveness.

The United States Department of Defense (DoD) is an example of an organization that acknowledges the importance of leveraging the creativity of workforce members in order to transform its culture and business practices. The DoD's ability to fulfil its mission of averting enemy terrorization depends in large part on the extent to which it can develop new capabilities. The DoD has acknowledged the importance of change within the military and supporting organizations. Indeed, creativity and innovation have been identified by the Office of the Secretary of Defense (OSD) as ranking among the most effective means for facilitating the changes necessary for maintaining a competitive advantage.

In this article we examine two somewhat overlooked aspects of creativity, creative potential and practised creativity, that may be useful for identifying untapped creative resources in competitive organizations like the DoD. Thus, the primary purpose of the present study is to examine the construct validity of

creative potential and practised creativity using an exploratory factor analysis (EFA) along with a confirmatory factor analysis (CFA) utilizing structural equation modelling techniques. We will also examine the discriminant validity (e.g., Campbell & Fiske, 1959) of these constructs relative to the similar construct of organizational support for creativity.

We first review several key dimensions of creativity before narrowing our focus to the concepts of creative potential and practised creativity. We then examine the construct validity of these concepts using data gathered within one strategic command of the DoD. We conclude with a discussion of the implications of our findings and make some suggestions for future research. The current study has the potential to serve as a catalyst for future research examining the relationships between creative potential, practised creativity and other variables of interest by providing an initial reliability assessment of items intended to measure these constructs.

### Key Creativity Dimensions

Individual creativity has been measured in a number of different ways, ranging from the assessment of the characteristics and personality traits of highly creative individuals to the measurement of creative products and achievements. A number of models based on comprehensive reviews of creativity theory and research have been developed that describe individual creativity dimensions (e.g., Amabile, 1988; Woodman & Schoenfeldt, 1989; Ford, 1996). Knowledge, divergent thinking (cognitive style), personality, autonomy and intrinsic motivation are recurring factors in each of these models. In particular, research findings suggest that domain-specific *knowledge* is a necessary prerequisite for effective creative functioning (Weisberg, 1999). Essential knowledge and information is often embedded in social networks, which become important components in facilitating individual creativity (Kijkuit & van den Ende, 2007; Leenders, van Engelen & Kratzer, 2007). The knowledge aspect of creativity has been assessed directly by measures such as intelligence tests (Brown, 1989) and indirectly by factors such as years of education (Simonton, 1992). Likewise, Hocevar and Bachelor (1989) include *divergent thinking* (cognitive style) and *personality* inventories as two of the eight categories they used for classifying over 100 measures of creativity. The concept of *autonomy*, as it relates to creativity, has been studied primarily in the context of work environment assess-

ments (e.g., Amabile et al., 1996; Cummings & Oldham, 1997; Shalley, Gilson & Blum, 2000).

*Intrinsic motivation* is another key concept that may be related to creativity (e.g., Maslow, 1970; Deci & Ryan, 1985; Amabile et al., 1994; Deci & Flaste, 1995; Bandura, 1997; Herzberg, Mausner & Snyderman, 2003). Some research has suggested that creativity may be positively related to intrinsic motivation and negatively related to extrinsic motivation (e.g., Amabile et al., 1994). Several key factors may influence intrinsic motivation including self-determination (e.g., Deci & Ryan, 1985), competence (e.g., Bandura, 1997), autonomy (e.g., Hackman & Oldham, 1975; Cummings & Oldham, 1997; Shalley, Gilson & Blum, 2000), challenge (e.g., Locke et al., 1984; Bandura, 1997; Shalley, Gilson & Blum, 2000), task involvement (e.g., Hackman & Oldham, 1975; Csikszentmihalyi, 1996) and interest (e.g., Bandura, 1997). Additionally, Tierney and Farmer (2002) have suggested that creative self-efficacy, defined as 'the belief one has the ability to produce creative outcomes' (p. 1138), is another key factor influencing intrinsic motivation and creativity.

In contrast, certain extrinsic factors have been posited to restrict creative performance by undermining intrinsic motivation. These factors include an expected evaluation (Amabile, 1979; Shalley & Oldham, 1985; Shalley, Oldham & Porac, 1987; Shalley, 1995), a contracted-for reward (Amabile, Hennessey & Grossman, 1986), restricted choice (Amabile & Gitomer, 1984), surveillance, unrealistic deadlines, competition (Amabile, 1982, 1985, 1988; Deci & Ryan, 1985; Shalley & Oldham, 1997) and goal setting (Shalley, Oldham & Porac, 1987; Shalley, 1995). Of the extrinsic motivators thought to undermine creativity, the effects of both expected evaluation and rewards on creativity appear to be particularly complex. Indeed, research examining the relationship between expected evaluation and creativity has yielded somewhat inconsistent results (Amabile, 1996). Task complexity (Shalley & Oldham, 1985), the level of task motivation, the amount of time spent on a creative project, the individual's personality, the type of pre-task activity, the individual skill level (Amabile, 1996) and the goal-setting method (Shalley, 1995; Shalley, Oldham & Porac, 1987) may all affect the impact of expected evaluation on creativity. Furthermore, research suggests that when evaluation is work-focused, constructive, and 'conveys positive recognition of competence and valued work' (Amabile, 1996, p. 152), creativity may actually be enhanced. Much like the findings on expected evaluation, the use of rewards in the context of creativity has also resulted

in inconsistent findings (Eisenberger & Cameron, 1998). For instance, some research suggests that competency-based rewards may not necessarily undermine creativity because this type of reward may be viewed as a tribute to one's skills and abilities rather than as an inducement to complete the given task (e.g., Rosenfield, Folger & Adelman, 1980).

Research also suggests that when intrinsically motivated people are able to work in an environment that allows them autonomy and includes challenging activities, they are likely to be more involved (Csikszentmihalyi, 1996; Bandura, 1997) and more creative (Deci & Ryan, 1985; Eisenberger, Fasolo & Davis-LaMastro, 1990; Amabile et al., 1994; Shalley, 1995; Cummings & Oldham, 1997). In addition, people tend to produce more creative work when they perceive encouragement from management to solve problems creatively (Amabile et al., 1996, Tierney & Farmer, 2004). The work environment, as *perceived* by the individuals in the workplace, is perhaps the most critical influence in determining the ultimate creativity of those individuals (Amabile, Burnside & Gyskiewicz, 1999).

In summary, it seems fair to suggest that creativity is more likely to occur when an individual has certain characteristics or innate skills and abilities (e.g., Hinton, 1970; Woodman & Schoenfeldt, 1989; Simonton, 1992; Tierney & Farmer, 2002), has domain specific knowledge embedded within social networks (e.g., Weisberg, 1999; Kijkuit & van den Ende, 2007; Leenders, van Engelen, & Kratzer, 2007), is intrinsically motivated (e.g., Amabile et al., 1994), and perceives a work environment that supports creativity (Cummings, Hinton & Gobdel, 1975; Woodman, Sawyer & Griffen, 1993; Amabile, 1996). In short, creativity is a complex construct with multiple dimensions that must be carefully assessed in order to create a true and accurate composite of an individual's creative capacity (cf. Woodman & Schoenfeldt, 1989; Feldhusen & Goh, 1995).

## Creative Potential and Practised Creativity

Almost four decades ago, Hinton (1968) noted an important distinction between creative potential and actual creative output. Hinton suggested that if the individual's creative output is inhibited by the environment then the individual will not be able to utilize his/her creative potential (Scott, 1965; Hinton, 1968; George & Zhou, 2001). Moreover, this inability to utilize creative potential will most likely go unnoticed because there will be nothing to measure or observe (Hinton, 1968). Unfortu-

nately, little attention has been paid to this distinction over the years since Hinton's original observations. Although Tierney and Farmer (2002) recently presented a measure of creative self-efficacy that assesses a portion of the distinction that Hinton identified, little or no empirical research has examined the concepts of creative potential and practised creativity.

Creative potential may be defined as the creative capacity, skills and abilities that the individual possesses (Hinton, 1968, 1970). In contrast, practised creativity may be defined as the perceived opportunity to utilize creativity skills and abilities on the job (DiLiello & Houghton, 2006). Practised creativity is different from creative performance, which is measured externally by products or achievements that can be assessed or observed (Hinton, 1968; Amabile, 1996). Practised creativity is also distinct from the related concept of organizational support for creativity, which has been defined as 'an organizational culture that encourages creativity through the fair, constructive judgement of ideas, reward and recognition for creative work, mechanisms for developing new ideas, and active flow of ideas, and a shared vision of what the organization is trying to do' (Amabile, Burnside & Gyskiewicz, 1999, p. 15). A number of important conditions must be present within an organization for its work environment to support individual creativity (e.g., Amabile, 1988; Mumford & Gustafson, 1988; Ford, 1996) and employees with strong creative potential are more likely to actually practise creativity when they perceive strong support from the organization (DiLiello & Houghton, 2006).

When individuals in the workplace perceive themselves as having creative potential but do not perceive the ability to use or practise this potential, then important untapped organizational resources may exist. Being able to identify these untapped resources may be especially beneficial in many organizations in which people are continually being told to 'do more with less'. Among other implications, the ability to use one's creative skills and abilities in the workplace may contribute to job satisfaction and increased retention (e.g., Shalley, Gilson & Blum, 2000). In addition, the organization reaps the benefits of the individual's creative ideas, making the work environment a fertile place to grow, learn and work.

## Method

### *Sample and Procedure*

Primary data were collected from the US Army Contracting Agency (ACA), a strategic

command of the United States Department of Defense, utilizing a web-based survey. The data were gathered as part of a larger study examining a number of creativity-related issues within the ACA. The entire ACA workforce of approximately 1,900 was invited to participate. The total number of respondents to the survey was 693, yielding a response rate of approximately 37%. This response rate was above average compared with previous response rates for federal employee surveys and with response rates for e-mail surveys in general (Sheehan, 2001). The Tailored Design Method (Dillman, 2000) was used to deploy the online survey. Two e-mails were sent to the ACA workforce. The first e-mail included an informed consent notification, the purpose of the study, the approval and sponsorship of the study, confidentiality statement and a link to the online survey. The second e-mail served as a reminder. The reminder e-mail summarized the initial message, added a personal note and provided a four-day extension and a link to the online survey. A response rate check indicated a fairly representative percentage response from each of nine regional offices within the ACA with no indications of any type of systematic non-response bias. The average age of the respondents was approximately 46 and the average job tenure was approximately 12 years. Sixty per cent of the respondents were female. Cases were randomly selected and split into two subsamples. Subsample 1 was used to conduct an exploratory factor analysis and to perform a reliability analysis. Subsample 2 was used to conduct a confirmatory factor analysis using structural equations modelling techniques. List-wise deletion for missing data resulted in final sample sizes of 327 and 335 for subsamples 1 and 2, respectively.

### Measures

#### *Creative Potential*

Six survey items were used to measure creative potential (see Table 1). Creative potential consists in part of personal feelings regarding the ability to be creative, what Tierney and Farmer (2002) call creative self-efficacy. Creative self-efficacy includes feeling good at generating novel ideas, having confidence in one's ability to solve problems creatively, having the knack for developing others' ideas, and finding creative ways to solve problems. Thus, items 1–4 were used with permission from Tierney and Farmer (2002) in order to measure the creative self-efficacy component of creative potential. The remaining two survey items (5 and 6) were developed to reflect two other important aspect of creative

potential: having the talent or expertise to do well in one's work and possessing the ability to take risks by trying out new ideas (cf. Amabile, Burnside & Grysiewicz, 1999). All items were measured using a five-point Likert-type scale ranging from Strongly Agree to Strongly Disagree.

#### *Practised Creativity*

Existing individual creativity theory was utilized to operationalize the concept of practised creativity. Based on the distinctions identified by Hinton (1968, 1970), five survey items (7–11) were developed that describe a variety of opportunities in the workplace to use one's expertise, creativity skills and abilities (see Table 1). All items were measured using a five-point Likert-type scale ranging from Strongly Agree to Strongly Disagree.

#### *Perceived Organizational Support*

Perceived organizational support was measured for the purpose of assessing the discriminant validity of the practised creativity construct. Six survey items from 'Keys: Assessing the Climate for Creativity' were used with permission from the Center for Creative Leadership (Amabile, Burnside & Grysiewicz, 1999) to represent perceived organizational support (see Table 1). All items were measured using a five-point Likert-type scale ranging from Strongly Agree to Strongly Disagree.

## Results

### *Exploratory Factor Analysis: Subsample 1*

An exploratory factor analysis (EFA) with principal components extraction and varimax rotation was performed on the 17 items intended to measure creative potential, practised creativity and organizational support for creativity utilizing the data from Subsample 1. A critical value of 0.40 was chosen as the cut-off point in determining whether an item defined a factor and the 'eigenvalue greater than one test' and the scree test were used to define factors (Gorsuch, 1974). As anticipated, three interpretable factors emerged as shown in Table 1. Each of the three factors demonstrated good scale reliability with coefficient alphas of 0.84, 0.84 and 0.94, respectively. All factor loadings exceeded 0.40 and all items loaded unambiguously on the correct factors with no cross-factor loadings greater than 0.40.

### *Confirmatory Factor Analysis: Subsample 2*

In order to further assess construct validity, a confirmatory factor analysis (CFA) was

Table 1. Exploratory Factor Analysis Results (Subsample 1 Data)

Factor loadings	1	2	3
<b>Factor 1: Creative Potential</b>			
<b>Scale <math>\alpha = 0.84</math></b>			
1. I feel that I am good at generating novel ideas.	0.776		
2. I have confidence in my ability to solve problems creatively.	0.842		
3. I have a knack for further developing the ideas of others.	0.648		
4. I am good at finding creative ways to solve problems.	0.833		
5. I have the talent and skills to do well in my work.	0.685		
6. I feel comfortable trying out new ideas.	0.671		
<b>Factor 2: Practised Creativity</b>			
<b>Scale <math>\alpha = 0.84</math></b>			
7. I have opportunities to use my creative skills and abilities at work.		0.700	
8. I am invited to submit ideas for improvements in the workplace.		0.744	
9. I have the opportunity to participate on team(s).		0.707	
10. I have the freedom to decide how my job tasks get done.		0.660	
11. My creative abilities are used to my full potential at work.		0.712	
<b>Factor 3: Perceived Organizational Support</b>			
<b>Scale <math>\alpha = 0.94</math></b>			
12. People are recognized for creative work in this organization. (KEYS-35)			0.859
13. Ideas are judged fairly in this organization. (KEYS-42)			0.852
14. People are encouraged to solve problems creatively in this organization. (KEYS-49)			0.801
15. This organization has a good mechanism for encouraging and developing creative ideas. (KEYS-61)			0.864
16. People are encouraged to take risks in this organization. (KEYS-62)			0.739
17. Rewards are given for innovative and creative ideas.			0.844

Note:  $N = 327$ . Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

performed on the data from subsample 2 utilizing LISREL 8 (Jöreskog & Sörbom, 1993). More specifically, three competing models were examined. Model 1 consisted of all items loading onto a single creativity factor. Model 2 specified the loading of the first six items onto a creative potential factor and the remaining items, including the six perceived organizational support items, onto a second 'organizational creativity' factor. Model 3 contained three factors: creative potential, practised creativity and perceived organizational support for creativity, with individual items loading onto the factor they are purported to measure. An increase in fit from Models 1–3 would provide evidence in support of the construct validity of creative potential and practised creativity, as well as support for the discriminant validity of practised creativity relative to perceived organizational support for creativity.

In accordance with the recommendations of Hoyle and Panter (1995), the following fit indexes were used to assess the fit of the three models: chi-square ( $\chi^2$ , e.g., Bollen, 1989a), the goodness-of-fit-index (GFI, Jöreskog & Sörbom, 1981), the non-normed fit index (NNFI, Bentler & Bonnett, 1980), the incremental fit index (IFI, Bollen, 1989b), and the comparative fit index (CFI, Bentler, 1990). The use of multiple fit indexes is generally advisable in order to provide convergent evidence of model fit. The values of GFI, NNFI, IFI and CFI range from 0 to 1.0, with values closer to 1.0 indicating a well-fitting model (Bentler & Bonnet, 1980; Hoyle & Panter, 1995).

Descriptive statistics and intercorrelations among indicator variables are presented in Table 2. Fit indexes for the covariance structure models tested are shown in Table 3. The one-factor model demonstrated a fairly poor fit

Table 2. Means, Standard Deviations, and Intercorrelations among Indicator Variables (Subsample 2 Data)

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	3.99	0.683	-																
2	4.32	0.602	0.573*	-															
3	3.91	0.730	0.455*	0.388*	-														
4	4.10	0.669	0.571*	0.669*	0.523*	-													
5	4.53	0.573	0.375*	0.500*	0.282*	0.403*	-												
6	4.21	0.686	0.424*	0.512*	0.313*	0.442*	0.457*	-											
7	3.73	0.920	0.193*	0.175*	0.225*	0.271*	0.202*	0.295*	-										
8	3.59	1.03	0.073	0.108**	0.144*	0.163*	0.155*	0.204*	0.594*	-									
9	3.60	1.00	0.071	0.034	0.145*	0.116**	0.124**	0.156*	0.374*	0.471*	-								
10	3.81	0.982	0.110**	0.129**	0.113**	0.154*	0.223*	0.264*	0.495*	0.402*	0.336*	-							
11	3.26	1.04	0.094	0.120**	0.106	0.115**	0.170*	0.250*	0.560*	0.591*	0.419*	0.598*	-						
12	3.26	1.09	0.018	0.022	-0.067	0.028	0.041	0.171*	0.425*	0.438*	0.335*	0.378*	0.478*	-					
13	3.16	1.04	-0.020	-0.001	-0.035	0.045	0.043	0.192*	0.463*	0.474*	0.349*	0.423*	0.496*	0.802*	-				
14	3.37	1.02	0.012	0.026	-0.067	0.035	0.064	0.215*	0.529*	0.509*	0.372*	0.450*	0.533*	0.728*	0.777*	-			
15	3.01	1.06	0.008	0.011	-0.038	0.096	0.029	0.191*	0.418*	0.484*	0.342*	0.411*	0.543*	0.744*	0.800*	0.777	-		
16	2.90	1.05	-0.063	-0.056	-0.056	-0.040	-0.012	0.113**	0.379*	0.411*	0.278*	0.398*	0.412*	0.603*	0.604*	0.662*	0.667*	-	
17	3.04	1.11	0.032	0.020	-0.014	0.051	0.088	0.185*	0.420*	0.404*	0.360*	0.363*	0.475*	0.767*	0.694*	0.674*	0.757*	0.629*	-

Note: N = 335. \* p < 0.01 (two-tailed), \*\* p < 0.05 (two-tailed).

Table 3. Fit Indexes for Covariance Structure Analyses

Model	$\chi^2$	df	GFI	NNFI	IFI	CFI	$\chi^2$ difference	df
1. One-factor model	1204.2	119	0.61	0.62	0.62	0.67		
2. Two-factor model	534.47	118	0.82	0.85	0.87	0.87		
Model 1–2 difference							669.73	1
3. Three-factor model	280.66	116	0.92	0.94	0.95	0.95		
Model 1–3 difference							253.81	2
4. Null	3389.2	136						

( $\chi^2$  [119,  $N = 335$ ] = 1204.2, GFI = 0.61, NNFI = 0.62, IFI = 0.67, CFI = 0.67) The two-factor model yielded substantially better fit than the one-factor model ( $\chi^2$  [118,  $N = 335$ ] = 534.47, GFI = 0.82, NNFI = 0.85, IFI = 0.87, CFI = 0.87), but the three-factor model demonstrated the best fit of the models tested ( $\chi^2$  [116,  $N = 335$ ] = 280.66, GFI = 0.92, NNFI = 0.94, IFI = 0.95, CFI = 0.95). In addition,  $\chi^2$  difference tests (Anderson & Gerbing, 1988; Bollen, 1989a) indicated statistically significant  $\chi^2$  differences between each of the three models. Thus, the three-factor model was retained as the best-fitting model. The standardized solution for this model is shown in Figure 1 with measurement error effects omitted for clarity.

**Discussion**

The results of the present study provide some initial evidence supporting the construct validity of creative potential and practised creativity. EFA results suggested a clear factor structure for each construct with high factor loadings and virtually no significant cross-loadings for any of the items. The reliability of the items used to measure each construct was also quite good, with coefficient alphas of 0.84 for each of the constructs. CFA results provided additional evidence in support of the construct validity of these concepts. A three-factor model with factors for creative potential, practised creativity and organizational support for creativity showed superior fit over competing one- and two-factor models, indicating reasonably effective measurement, fairly clean factor structures and evidence of discriminant validity.

These results suggest important implications for organizational decision makers. The difference between creative potential and practised creativity could represent important untapped resources that could boost innovation, productivity and job satisfaction if utilized. In the past, this type of untapped

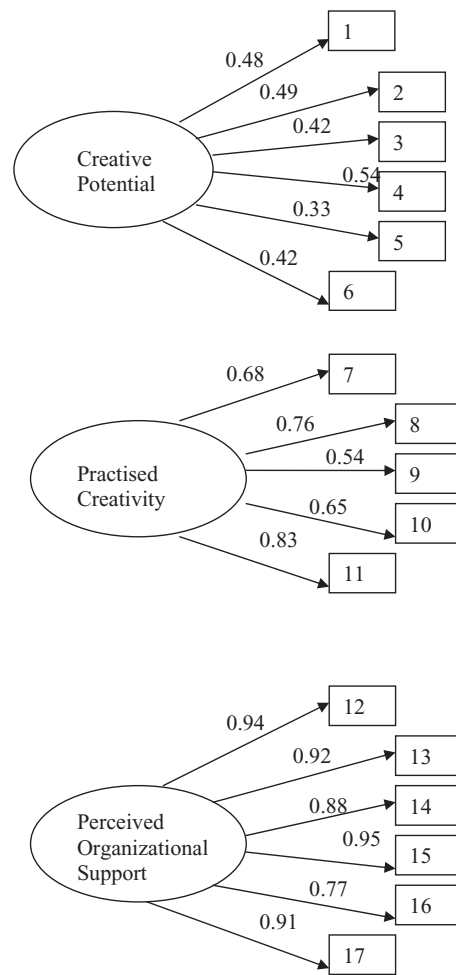


Figure 1. Confirmatory Factor Analysis Results: Three-Factor Model  
 Note:  $N = 335$ . All parameter loadings were significant at the  $\alpha = 0.05$  level.

creative potential was largely invisible because there was nothing to measure aside from creative outcomes such as songs, poems, patents, numbers of suggestions, etc. By measuring and considering employee perceptions of their own creative potential and practised creativity,

organizational leaders may effectively assess the existing creativity gap within their organization. Organizational leaders could then utilize this information to design interventions aimed at tapping into these dormant creative resources, resulting in a win-win situation, in which employees experience more freedom to exercise their creative potential thus increasing innovation, satisfaction, productivity and organizational effectiveness.

Although the results reported here suggest exciting implications for unleashing creative resources, this study is nevertheless subject to certain limitations. First, the present sample was relatively homogeneous, consisting entirely of members of the Army Contracting Agency within the United States Department of Defense. We have argued that such a sample is especially appropriate for creativity research because organizations such as the DoD take a keen interest in tapping all creative resources available in order to sustain a competitive advantage. Nevertheless, it remains to be seen whether the concepts examined here would demonstrate a similar degree of construct validity in other samples of interest. Second, all items were self-reported and collected in a single survey at a single point in time, thus raising concerns regarding measurement issues such as response set and social desirability biases. Nevertheless, despite some inherent weaknesses, self-report data is widely used in behavioural research, particularly in the measurement of personality, cognition and other unobservable behavioural processes. In addition, studies generally support the validity of self-reports as a substitute for many types of objective and subjective data (e.g., Crockett, Schulenberg & Petersen, 1987). Finally, although this study assessed the construct validity of these constructs, including an examination of discriminant validity, it did not examine convergent validity. Convergent validity occurs when scores on a given scale designed to measure a certain construct correlate with scores on another instrument designed to measure the same construct (e.g., Campbell & Fiske, 1959). An examination of convergent validity was impossible in the current study because there are no other known measurement items available for measuring these constructs.

Future research should focus on the further examination of the construct validity of these concepts, particularly across other organizational samples of interest. Construct validation is not something that can be accomplished in a single study, but rather is a process that requires an accumulation of evidence (Messick, 1995). Future research should also examine the relationships among creative

potential, practised creativity and organizational support for creativity by specifically testing the hypothesis that individuals with strong creative potential are more likely to practise creativity when they perceive strong support from the organization (DiLiello & Houghton, 2006). Such research could help to provide a framework that would aid organizations such as the DoD in assessing and reducing the gap between creative potential and practised creativity. By cultivating environments that support creativity, modern organizations may be able to tap into heretofore idle creative potential in order to face a wide array of 21st-century challenges.

## References

- Amabile, T.M. (1979) Effects of External Evaluation on Artistic Creativity. *Journal of Personality and Social Psychology*, 37, 221–33.
- Amabile, T.M. (1982) Children's Artistic Creativity: Detrimental Effects on Competition in a Field Setting. *Personality and Social Psychology Bulletin*, 8, 573–8.
- Amabile, T.M. (1985) Motivation and Creativity: Effects of Motivational Orientation on Creative Writers. *Journal of Personality and Social Psychology*, 48, 393–9.
- Amabile, T.M. (1988) A Model of Creativity and Innovation in Organizations. *Research in Organizational Behavior*, 19, 123–67.
- Amabile, T.M. (1996) *Creativity in Context*. Westview Press, Boulder, CO.
- Amabile, T.M. and Gitomer, J. (1984) Children's Artistic Creativity: Effects of Choice in Task Materials. *Personality and Social Psychology Bulletin*, 10, 209–15.
- Amabile, T.M., Hennessey, B.A. and Grossman, B.S. (1986) Social Influences on Creativity: The Effects of Contracted-for Reward. *Journal of Personality and Social Psychology*, 50, 14–23.
- Amabile, T.M., Hill, K.G., Hennessey, B.A. and Tighe, E. (1994) The Work Preference Inventory: Assessing Intrinsic and Extrinsic Motivational Orientations. *Journal of Personality and Social Psychology*, 66, 950–67.
- Amabile, T.M., Conti, R., Coon, H., Lazenby, J. and Herron, M. (1996) Assessing the Work Environment for Creativity. *Academy of Management Journal*, 39, 1154–84.
- Amabile, T.M., Burnside, R.M. and Grysiewicz, S.S. (1999) *User's Manual for KEYS: Assessing the Climate for Creativity. A Survey from the Center for Creative Leadership*. Center for Creative Leadership, Greensboro, NC.
- Anderson, J.C. and Gerbing, D.W. (1988) Structural Equation Modeling in Practice: A Review and Recommended Two-Step Approach. *Psychological Bulletin*, 103, 411–23.
- Bandura, A. (1997) *Self-Efficacy: The Exercise of Control*. W.H. Freeman & Co., New York.
- Barron, F. and Harrington, D.M. (1981) Creativity, Intelligence, and Personality. *Annual Review of Psychology*, 32, 439–76.

- Bentler, P.M. (1990) Comparative Fit Indices in Structural Models. *Psychological Bulletin*, 107, 238–46.
- Bentler, P.M. and Bonnett, D.G. (1980) Significance Tests and Goodness-of-Fit in the Analysis of Covariance Structures. *Psychological Bulletin*, 88, 588–606.
- Bollen, K.A. (1989a) *Structural Equations with Latent Variables*. Wiley, New York.
- Bollen, K.A. (1989b) A New Incremental Fit Index for General Structural Equation Models. *Sociological Methods and Research*, 17, 303–16.
- Brown, R.T. (1989) Creativity: What Are We to Measure? In Glover, J.A., Ronning, R.R. and Reynolds, C.R. (eds.), *Handbook of Creativity*. Plenum Press, New York.
- Campbell, D.T. and Fiske, D.W. (1959) Convergent and Discriminant Validation by the Multitrait-Multimethod Matrix. *Psychological Bulletin*, 56, 81–105.
- Crockett, L.J., Schulenberg, J.E. and Petersen, A.C. (1987) Congruence between Objective and Self-report Data in a Sample of Young Adolescents. *Journal of Adolescent Research*, 2, 383–92.
- Csikszentmihalyi, M. (1996) *Creativity, Flow and the Psychology of Discovery and Invention*. HarperCollins, New York.
- Cummings, A. and Oldham, G.R. (1997) Enhancing Creativity: Managing Work Contexts for the High Potential Employee. *California Management Review*, 40, 22–38.
- Cummings, L.L., Hinton, B.L. and Gobdel, B.C. (1975) Creative Behavior as a Function of Task Environment: Impact of Objectives, Procedures, and Controls. *Academy of Management Journal*, 18, 489–99.
- Deci, E.L. and Flaste, R. (1995) *Why We Do What We Do*. Penguin, New York.
- Deci, E.L. and Ryan, R.M. (1985) *Intrinsic Motivation and Self-Determination in Human Behaviour*. Plenum Press, New York.
- DiLiello, T.C. and Houghton, J.D. (2006) Maximizing Organizational Leadership Capacity for the Future: Toward a Model of Self-Leadership, Innovation and Creativity. *Journal of Managerial Psychology*, 21, 319–37.
- Dillman, D. (2000) *Mail and Internet Surveys: The Tailored Design Method*, 2nd edn. John Wiley & Sons, New York.
- Eisenberger, R. and Cameron, J. (1998) Reward, Intrinsic Interest, and Creativity: New Findings. *American Psychologist*, 53(6), 676–9.
- Eisenberger, R., Fasolo, P. and Davis-LaMastro, V. (1990) Perceived Organizational Support and Employee Diligence, Commitment, and Innovation. *Journal of Applied Psychology*, 75, 51–59.
- Feldhusen, J.F. and Goh, B.E. (1995) Assessing and Accessing Creativity: An Integrative Review of Theory, Research and Development. *Creativity Research Journal*, 8, 231–47.
- Ford, C.M. (1996) A Theory of Individual Creative Action in Multiple Social Domains. *Academy of Management Review*, 21, 1112–42.
- George, J.M. and Zhou, J. (2001) When Openness to Experience and Conscientiousness are Related to Creative Behavior: An Interactional Approach. *Journal of Applied Psychology*, 86, 513–24.
- Gorsuch, R. (1974) *Factor Analysis*. Saunders, Philadelphia, PA.
- Guilford, J.P. (1950) Creativity. *American Psychologist*, 5, 444–54.
- Hackman, R.J. and Oldham, G. (1975) Development of the Job Diagnostic Survey. *Journal of Applied Psychology*, 60, 159–70.
- Herzberg, F., Mausner, B. and Snyderman, B.B. (2003) *The Motivation to Work*. Transaction Publishers, New Brunswick, NJ (originally published in 1959).
- Hinton, B.L. (1968) A Model for the Study of Creative Problem Solving. *Journal of Creative Behavior*, 2, 133–42.
- Hinton, B.L. (1970) Personality Variables and Creative Potential. *Journal of Creative Behavior*, 3, 210–17.
- Hocevar, D. and Bachelor, P. (1989) A Taxonomy and Critique of Measurements Used in the Study of Creativity. In Glover, J.A., Ronning, R.R. and Reynolds, C.R. (eds.), *Handbook of Creativity*. Plenum Press, New York.
- Hoyle, R.H. and Panter, A.T. (1995) Writing about Structural Equation Models. In Hoyle, R.H. (ed.), *Structural Equation Modeling: Concepts, Issues, and Applications*. Sage, Thousand Oaks, CA, pp. 158–76.
- Jöreskog, K. and Sörbom, D. (1981) *LISREL V: Analysis of Linear Structural Relationships by the Method of Maximum Likelihood*. National Educational Resources, Chicago, IL.
- Jöreskog, K. and Sörbom, D. (1993) *LISREL 8: Structural Equation Modeling with the SIMPLIS Command Language*. Erlbaum, Hillsdale, NJ.
- Kanter, R.M. (1983) *The Change Masters: Innovation and Entrepreneurship in the American Corporation*. Simon & Schuster, New York.
- Kijkuit, B. and van den Ende, J. (2007) The Organizational Life of an Idea: Integrating Social Network, Creativity and Decision-Making Perspectives. *Journal of Management Studies*, 44, 863–82.
- Leenders, R.Th.A.J., van Engelen, J.M.L., Kratzer, J. (2007) Systematic Design Methods and the Creative Performance of New Product Teams: Do they Contradict or Complement Each Other? *Journal of Product Innovation and Management*, 24, 166–79.
- Locke, E.A., Frederick, E., Lee, C. and Bobko, P. (1984) Effect of Self-Efficacy, Goals, and Task Strategies on Task Performance. *Journal of Applied Psychology*, 69, 241–51.
- Martindale, C. (1989) Personality, Situation, and Creativity. In Glover, J.A., Ronning, R.R. and Reynolds, C.R. (eds.), *Handbook of Creativity*. Plenum Press, New York.
- Maslow, A.H. (1970) *Motivation and Personality*, 3rd edn. Revised by Frager, R., Fadiman, J., McReynolds, C. and Cox, R. Addison Wesley Longman, New York.
- Messick, S. (1995) Validity of Psychological Assessment. *American Psychologist*, 50, 741–9.
- Mumford, M.D. and Gustafson, S.B. (1988) Creativity Syndrome: Integration, Application, and Innovation. *Psychological Bulletin*, 103, 27–43.
- Rosenfield, D., Folger, R. and Adelman, H.F. (1980) When Rewards Reflect Competence: A Qualifica-

- tion of the Overjustification Effect. *Journal of Personality and Social Psychology*, 39, 368–76.
- Scott, W.E. (1965) The Creative Individual. *Academy of Management Journal*, 8, 211–19.
- Shalley, C.E. (1995) Effects of Coaction, Expected Evaluation, and Goal Setting on Creativity and Productivity. *Academy of Management Journal*, 38, 483–503.
- Shalley, C.E. and Oldham, G.R. (1985) Effects of Goal Difficulty and Expected External Evaluation on Intrinsic Motivation: A Laboratory Study. *Academy of Management Journal*, 28, 628–40.
- Shalley, C.E. and Oldham, G.R. (1997) Competition and Creative Performance: Effects of Competitor Presence and Visibility. *Creativity Research Journal*, 10, 337–45.
- Shalley, C.E., Oldham, G.R. and Porac, J.F. (1987) Effects of Goal Difficulty, Goal-Setting Method, and Expected External Evaluation on Intrinsic Motivation. *Academy of Management Journal*, 30, 553–63.
- Shalley, C.E., Gilson, L.L. and Blum, T.C. (2000) Matching Creativity Requirements and the Work Environment: Effects on Satisfaction and Intentions to Leave. *Academy of Management Journal*, 43, 215–23.
- Sheehan, K.B. (2001) E-mail Survey Response Rates: A Review. *Journal of Computer-Mediated Communication* [WWW document]. URL: <http://jcmc.indiana.edu/vol6/issue2/sheehan.html>.
- Simonton, D.K. (1992) Creativity and Leadership: Causal Convergence and Divergence. In Gryskiewicz, S.S. and Hills, D.A. (eds.), *Readings in Innovation*. Center for Creative Leadership, Greensboro, NC, pp. 29–43.
- Sternberg, R.J. and Lubart, T.I. (1999) The Concept of Creativity: Prospects and Paradigms. In Sternberg, R.J. (ed.), *Handbook of Creativity*. Cambridge University Press, New York.
- Tierney, P. and Farmer, S.M. (2002) Creative Self-efficacy: Its Potential Antecedents and Relationship to Creative Performance. *Academy of Management Journal*, 45, 1137–48.
- Tierney, P. and Farmer, S.M. (2004) The Pygmalion Process and Employee Creativity. *Journal of Management*, 30, 413–23.
- Tushman, M. and O'Reilly, C.A., III (1997) *Winning through Innovation: A Practical Guide to Leading Organizational Change and Renewal*. Harvard Business School Press, Boston, MA.
- Utterback, J.M. (1994) *Mastering the Dynamics of Innovation*. Harvard Business School Press, Boston, MA.
- Weisberg, R.W. (1999). Creativity and Knowledge: A Challenge to Theories. In Sternberg, R.J. (ed.), *Handbook of Creativity*. Cambridge University Press, New York.
- Woodman, R.W. and Schoenfeldt, L.F. (1989) Individual Differences in Creativity: An Interactionist Perspective. In Glover, J.A., Ronning, R.R. and Reynolds, C.R. (eds.), *Handbook of Creativity*. Plenum Press, New York.
- Woodman, R.W., Sawyer, J.E. and Griffen, R.W. (1993) Toward a Theory of Organizational Creativity. *Academy of Management Journal*, 8, 293–321.

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