

認知需求與創意績效之間的關連

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摘要

這篇研究以認知需求之文獻為基礎提出：認知需求高之員工，會有較高的創意過程投入，進而激發高創意績效。以問卷調查取得 415 份臺灣公司新產品開發團隊之配對樣本，實證結果顯示：認知需求高的員工可經由提高創意過程投入來增加創意績效。這樣的研究結果能補充了認知需求、創意過程投入、與創意績效文獻之缺口；同時也能給予有關的理論與管理建議。

關鍵詞：認知需求、創意過程投入、創意績效

The Connection Between the Need for Cognition and Creativity Performance

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Abstract

Drawing on need-for-cognition literature, this study proposes that employees with a higher level of creative processes and deliver higher creative performances. This research used a questionnaire survey to collect 415 pairwise responses from new product development teams in Taiwanese companies. Empirical results found that workers with a high need for cognition come up with creative ideas by engaging in creative-relevant processes. This study not only complements relevant literature about the need for cognition, creative process engagement, and creativity performance, but also offers some theoretical and managerial implications.

Keywords: Need for cognition, Creative process engagement, Creativity performance

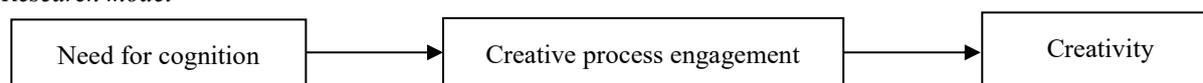
I. Introduction

A National Statistics report by Taiwan pointed out that Taiwanese companies can no longer enjoy the advantage of low cost in production factors that they used to possess over the past decades (<https://www.stat.gov.tw/np.asp?ctNode=492&mp=4>). Instead, firms in Taiwan rely nowadays on successful innovations to maintain competitiveness. Empirical studies by Taiwanese scholars agree with this viewpoint. Fan and Liao (2017) examined the success factors of Taiwanese firms and concluded that successful innovation is the key to business success. Other authors such as Xiong (2009) claimed that being able to innovate forms the basis for companies' competitive advantage. The above findings demonstrate that innovation is important for the success of Taiwanese companies. Management studies in places other than Taiwan also identify successful product innovation as important to company competitiveness. For instance, Artz, Norman, Hatfield, and Cardinal (2010) argue that innovation may improve profitability and help a firm maintain its competitive advantage. Zaefarian, Forkmann, Mitreğa, and Henneberg (2017) mention that successful product innovations improve overall firm performance. The above findings also demonstrate that product innovation is an important factor contributing to company success and performance.

Reviewing the literature about innovation and creativity, Anderson, Potocnik, and Zhou (2014) conclude that employee creativity, defined as an individual who comes up with creative ideas at work, contributes to innovation success. The above finding suggests that Taiwanese companies could nurture employee creativity to facilitate innovation to improve competitiveness. A method that firms may adopt is to identify among their workforce those who possess the potential for creativity and select them to participate in new product development/NPD activities. NPD team members who are creative, as explained previously, can come up with new and useful ideas to facilitate product innovations and, in turn, help companies perform better.

Since the theory of innovation and creativity proposes employee creativity as an important precursor of successful production innovation (Amabile, 1988), much research has been performed to examine factors beneficial to creative ideas at work (Shalley, Zhou, & Oldham, 2004). Previous research has examined personal and contextual factors and how they relate to creativity. Shalley et al. (2014) point out that a factor related to creativity is personality, especially the openness to experience personality. On the other hand, the American Psychological Association dictionary of psychology identifies personality as a stable trait related to human characteristics and behaviors. Combining the above findings, it seems that examining personality factors that may stimulate workers' creativity is worthwhile. These findings offer useful suggestions to practitioners, helping them identify workers with the creative potential to facilitate product innovation to improve firm performance. This kind of research is also of special importance to Taiwanese firms since innovation success forms the basis of Taiwanese firms' competitiveness and profitability (Fan and Liao 2017).

This study adds to the relevant literature by investigating how a personality factor – need-for psychology – may stimulate creativity. The American Psychological Association dictionary of psychology identifies the need for cognition as “a personality trait reflecting a person's tendency to enjoy engaging in extensive cognitive activity (<https://dictionary.apa.org/personality>). This trait primarily reflects a person's motivation to engage in cognitive activity.... Individuals with a high need for cognition tend to develop attitudes or take action based on thoughtful evaluation of information”. Other authors treated creative process engagement as a person involves in creativity-relevant processes (Reiter-Palmon & Illies, 2004); it involves three parts: identifying problems, searching for information and encoding, and idea generation (Zhang and Bartol, 2010). This study combines the literature on the need for cognition and creativity to show that a person with a high need for cognition may take creativity-relevant processes to generate creativity. The research model is shown in Figure 1.

Figure 1*Research model*

Examining the need for cognition makes a person engage in creative processes, which makes him creative (Reiter-Palmon & Illies, 2004), this study adds to our knowledge. Before this study, some researchers find the need for cognition is good for creativity. Rostan (2010) finds the need for cognition positively helps students do longer in drawing tasks. Dai, Tan, Marathe, Valtcheva, and Pruzek (2012) find the need for cognition increases creative potential. Nevertheless, other researchers find the need for cognition is not good for creativity. For instance, Antes and Mumford (2009) and Hester, Robledo, Barrett, Peterson, Hougen, Day, & Mumford (2012) do not find a significant relationship between the need for cognition and the creative process. Watts, Steele, & Son (2017) examine the inconsistent findings and conclude that such results may be due to differences in study design such as observational or experimental, and differences in sample characteristics such as studying working people or students. As such, findings from this study may complement the need for cognition literature by providing evidence from Taiwan demonstrating how the need for cognition can help creativity among working people.

This study complements the relevant literature by verifying the mechanism through which the need for cognition may stimulate creativity. Previously, Pan, Shang, and Malika (2021) examined Chinese researchers and find the need for cognition may improve creativity. Examining Korean workers, Hahn and Lee, (2017) also find the need for cognition can help creativity. Wu, Parker, and de Jong (2014) examined workers in Dutch research and consultancy organizations and find the need for cognition increases innovative behaviors, i.e., an individual's thinking of creative ideas and implementing these creative ideas at work. These studies support the beneficial influence of the need for cognition on individual creativity. But, limited research has explicated the mechanism, through which path, the need for cognition may stimulate new idea generation. This study proposes that the need for cognition may instigate individuals into creativity-relevant processes in thinking of new and useful solutions that may enrich the need for cognition and the creativity literature by explicating how the need for cognition may prompt creativity.

This study can also provide useful advice to practitioners. Since the need for cognition is regarded as a lasting personality (Pan et al., 2021), managers of new product development teams may test relevant workers' level of need for cognition and consider using such results as an index for selecting suitable workers for their new product development teams. As explained previously, persons with a high need for cognition may think creatively in new product development to facilitate product innovations and, in turn, expect better firm performance.

II. Theories and hypotheses

The need for cognition is a person engages in effortful cognitive actions (Cacioppo, Petty, Feinstein, & Jarvis, 1996). Previously, Soubelet and Salthouse (2017) examine whether the need for cognition is the same for different ages and conclude that it remains the same across the lifespan. As the American Psychological Association dictionary of psychology recognize personality as a set of stable characteristics in human behaviors, Gärtner, Grass, Wolff, Goschke, Strobel, & Strobel (2021) mention in the abstract section of their research into the executive function that "need for cognition refers to a personality trait describing the relatively stable intrinsic motivation of individuals to invest cognitive effort in cognitive endeavors." Examining the need for cognition in leaders, Carnevale, Inbar, and Lerner (2011) also stated in the abstract section of their paper that

“the personality factor of need for cognition may moderate decision makers' susceptibility to bias, as could personality factors associated with being a leader”. In developing an indirect measure of the need for cognition, Fleischhauer, Strobel, Enge, & Strobel (2013) stated in the abstract part of their paper that “The personality trait, need for cognition, refers to individual differences in cognitive motivation and has proven to be an extraordinarily useful descriptor and predictor in the context of information processing”. In their study about the need for cognition and creative, Pan et al. (2021) introduced the need for cognition as a trait by mentioning that “The need for cognition is a personality trait that reflects the extent of an individual’s tendency to engage in and enjoy effortful thinking”. The above studies suggest that the need for cognition is recognized as an enduring personality in personality literature.

Persons with high levels of need for cognition possess an inquiring mind, hold a more positive attitude toward problem-solving, and actively search for information in the environment (Cacioppo et al., 1996; Ringberg & Reihlen, 2008). Low need for cognition individuals possess information heuristically; they are not interested in making sense of their experience (Evans, Fabrigar, Kirby, and Evans, 2003). Previous authors argue that the need for cognition is good for creative ideas at work. Because individuals with the need for cognition access information from the environment and organize relevant data in a meaningful way, individuals with a high need for cognition are good at connecting information with old experiences to form new insights (Dollinger, 2003). As such, they are more likely to recombine relevant knowledge and form creativity.

Moreover, persons of need for cognition like cognitive actions like idea elaboration and assessment. They will have a better understanding of the condition (Kearney, Gebert, and Voelpel 2009). When employees bump into problems at work such as facing difficulty in new product development processes, individuals with a high level of need for cognition, because they like complexity and enjoy thinking, are more likely to persist and come up with creative solutions (Wu et al., 2014). Examining scientific research team members, Pan et al. (2020) find the need for cognition helps creativity. The above findings show that the need for cognition can stimulate creative solutions at work. Nevertheless, extant scholarship has not examined the mechanism through which the need for cognition may enhance creative idea generation. This study complements scholarly knowledge about how the need for cognition may stimulate creativity at work by proposing creative process engagement mediates this relation.

Creative process engagement is an individual does creativity-relevant actions like “problem identification”, “information searching and encoding”, and “alternative generation” (Reiter-Palmon & Illies, 2004). This study follows Mumford & Gustafson (1988) and argues that new idea generation is the result of cognitive and motivational processes. This study proposes that a high need for cognition person is intrinsically motivated to do things that relate to creative process engagement. The need for cognition literature indicates that when bumped into a problem at work, high need for cognition employees like idea elaboration and evaluation, habitually evaluating the problem they have on hand with the new information accessed and encoded from their environment to form new understanding. Oftentimes, such new understanding prompts employees with a high need for cognition to re-examine and redefine their problems. They will also spend more time understanding the problem from multiple perspectives (Cacioppo et al., 1996) which constitutes the first of creative process engagement – “problem identification” (Kearney et al., 2009).

Scholars also point out that high need for cognition persons will process information thoroughly in their environment, consider problems from various angles, and actively seek out relevant knowledge in numerous domains (Cacioppo & Petty, 1984). The above activities are the second part of the creative process engagement- “information searching and encoding” (Reiter-Palmon & Illies, 2004; Zhang & Bartol, 2010). Need for cognition people will search for information, reason, and solve the problem to deal with problems in the world (Cacioppo,

Petty, & Morris, 1983). When bumped into a problem at work, high need for cognition employees can access a wider range of knowledge to come up with ideas. These activities belong to the third component of the creative process engagement- “idea and alternative generation” (Reiter-Palmon & Illies, 2004; Zhang & Bartol, 2010).

The creativity literature further argues that creative ideas generation is a dynamic and iterative process, resulting from several rounds of information search, knowledge integration, and problem redefining (Amabile & Mueller, 2008); new and useful ideas emerge after repeating the above processes several times (Mumford, Mobley, Reiter-Palmon, Uhlman, & Doares, 1991). Because employees with a need for cognition like exploring their surroundings to access relevant information (Cacioppo et al., 1996), are prompted by their nature to engage in information-search and problem (re)identification activities, which help them generate creative ideas. In this way, this study thinks that a high need for cognition persons are intrinsically motivated to take on activities related to the three components of creativity-relevant processes: “problem identification”, “information searching and encoding”, and “idea generation” (Reiter-Palmon & Illies, 2004). This study therefore proposes:

Hypothesis 1: The need for cognition is positively related to creativity process engagement.

Creative process engagement involves steps: “problem identification”, “information search and encoding”, and “idea generation” (Zhang & Bartol, 2010). Workers who seriously engage in problem identification may attain a better and more accurate understanding of the situations they face; they generate creativity and resolve problems (Henker, Sonnentag, & Unger, 2015). When workers engage in information search, they access relevant knowledge from various sources and can examine their problems from new perspectives to help them form new combinations to solve their existing problems (Reiter-Palmon & Illies, 2004). In this way, identifying the problem thoroughly and searching for relevant information from multiple aspects may help an individual generate useful ideas that other people have not yet used previously (Pan et al., 2021). The above arguments show “problem identification”, “information search and encoding”, and “idea generation”. These three things are the three components of “creative process engagement” (Zhang & Bartol, 2010) is led to creative idea generation.

Previous research also finds that engaging in the creative process may help an individual think creatively (Gilson & Shalley, 2004; Zhang & Bartol, 2010). Examining data collected from two field studies, Cheung, Huang, Chang, and Wei (2020) verify that creative process engagement stimulates creative ideas. Chen, Wadei, Bai, & Li (2020) demonstrate that experienced participative leadership may lead to creative process engagement to stimulate creative thinking. Henker et al. (2015) show that transformational leadership may instigate promotion focus and, in turn, stimulate creative process engagement to increase creativity. Akkan and Guzman (2022) find that “work role identification conflict” relates to creative process engagement to inspire creativity. The above studies provide additional evidence to support that creative process engagement help creativity in work.

Since this study proposes that the need for cognition may prompt creative process engagement (Hypothesis 1) and that creative process engagement may encourage new thoughts, this study combines these arguments to propose that a high need for cognition person may think of creative ideas by engaging in creativity-relevant processes. This study therefore hypothesizes:

Hypothesis 2: Creative process engagement will mediate the relationship between the need for cognition and creativity performance.

III. Methods

1. Samples

This research adopts a questionnaire survey of the subjects from NPD teams in Taiwanese companies. This study also interviewed several managers such as team leaders, and NP development managers to help us

understand whether employees think about creativity in NP development. The interview questions include: (1) Is coming up with creative ideas to solve problems in NP processes important to NP success? (2) If possible, can you give us an example to illustrate? (3) How do you select suitable persons to enter your NP development teams? (4) Do you think selecting people who can come up with creative solutions is an important factor contributing to NP development success? The results of the interview confirmed the hypothesized situation as well as the context of this research.

This study sent questionnaires to new product development team members to collect survey data on their demographic information, “need for cognition”, “creative process engagement”, and control variables. The leaders of these teams were asked to evaluate the members’ creativity performance. Collecting data from different responses could decrease the concern of common method bias. This study finally got 415 pair-wise responses from 107 new product development teams. Following Guthrie (2001), the t-test of response shows no relationship between the early 75% received and the late 25% which provides acceptable non-response bias. Among the sample, 39.5% of the responses are female and 60.5 % are male. In addition, 62.7% of them are 30 years of age or under, 27.2% are aged between 31 to 40, 7% are between 41 and 50, and 3.1% are above 51. Regarding the education level of the responses, 19.5% of them held associate or lower degrees, 75.7% held bachelor’s degrees, and 4.8% held master’s degrees.

2. Measures

This study used the scales developed in former studies to measure constructs. Every item is rated on a 7-point Likert-type scale from strongly agree to strongly disagree. This study adopted the 18-item scale developed by Cacioppo et al. (1996) to measure the construct of the need for cognition. A sample item is "I would prefer complex to simple problems". The eleven-item scale developed by Zhang and Bartol (2010) was adopted to evaluate the construct of creative process engagement. A sample item is "I spend considerable time trying to understand the nature of the problem". Creativity performance was assessed by the four-item scale developed by Farmer Tierney, and Kung-McIntyre. (2003). A sample item is "this employee seeks new ideas and ways to solve problems".

To rule out alternative explanations, this study included three control variables. Since previous research indicates that openness to experience personality is good for creativity (Shalley et al., 2004), this study involved the responses’ openness to experience as the first control variable and used a four-item scale developed by Donnellan, Oswald, Baird, and Lucas (2006) to measure this construct. Moreover, this study controlled for the workers' intrinsic motivation because intrinsic motivation is also found to be significantly related to creativity (Shalley et al., 2004) and measured it by the four-item scale developed by Tierney, Farmer, and Graen (1999). Finally, employees who work for a long time may think of creative ideas (Shalley et al., 2004), this study controlled for the respondents’ tenure (1: under 2 years, 2: 2-5 years, 3: 5-10 years, 4: above 10 years).

3. Reliability and Validity

The descriptive statistics of all constructs are displayed in Table 1. Since all constructs’ Cronbach α value is bigger than 0.5 that demonstrates acceptable reliability. Composite reliability and average variance extracted (AVE) for all constructs exceed 0.50 which provides sufficient convergent validity (Anderson & Gerbing, 1988). And the value of the correlation of all pairs of constructs is smaller than the square roots of the AVEs which shows support for the proper discriminant validity (Fornell & Larcker, 1981).

Table 1
Reliability, Discriminant Analysis, and Correlation Matrix

Variable	CR	AVE	α	Mean	SD	1	2	3	4	5
1. Intrinsic motivation	0.93	0.76	0.93	4.58	1.18	0.87				
2. Open personality	0.92	0.74	0.93	4.75	1.15	0.68**	0.86			
3. Need for cognition	0.97	0.63	0.97	4.72	0.98	0.81**	0.75**	0.79		
4. Creative process engagement	0.96	0.68	0.96	5.01	0.94	0.71**	0.61**	0.70**	0.82	
5. Creativity performance	0.94	0.79	0.95	4.67	1.13	0.45**	0.49**	0.49**	.53**	0.89

Note: The root square of AVEs is shown on the diagonal line with a boldface.

IV. Results

The hierarchical regression analysis technique is used to test Hypothesis 1. In Model 1 of Table 2, after controlling for tenure, intrinsic motivation, and open personality, the need for cognition has a significantly positive effect on creative process engagement ($\beta=0.30$, $p<0.01$, $R^2=0.75$), and hypothesis 1 is supported. This study follows Hayes (2017) and uses the PROCESS model 4 of the bias-corrected bootstrap analyses technique to test Hypothesis 2. In Model 2 of Table 2, having controlled for tenure, intrinsic motivation, and open personality, the need for cognition has a significantly positive effect on creativity performance ($\beta=0.23$, $p<0.05$; $R^2=0.53$). In Model 3 of Table 2, having controlled for tenure, intrinsic motivation, and open personality, creative process engagement has a significantly positive effect on creativity performance ($\beta=0.42$, $p<0.01$, $R^2=0.57$) while the need for cognition becomes does not have significantly positive effect on creativity performance after the creative process engagement is entered (β changed from 0.23 to 0.11). Moreover, the indirect effect is 0.12 with a 95% confidence interval from 0.06 to 0.20. These results show a complete mediation of creative process engagement between the relationship of the need for cognition and creativity and support Hypothesis 2.

Table 2
Results of Regression Analysis

Independent Variable	Model 1 Creative process engagement	Model 2 Creativity performance	Model 3 Creativity performance
Constant	1.67***	1.92***	1.22***
Control variables			
tenure=2-5 years	0.03	-0.08	-0.10
tenure=5-10 years	0.16	0.00	-0.06
tenure=above 10 years	0.35**	-0.21	-0.35
Intrinsic motivation	0.30***	0.11	-0.02
Open personality	0.11**	0.25***	0.21**
Main effects			
Need for cognition	0.30***	0.23*	0.11
Mediator			
Creative process engagement			0.42***
R^2	0.75	0.53	0.57
$Adj-R^2$	0.57	0.28	0.33
F -value	89.83***	26.11***	28.57***

a. $N = 415$.

b. * $p < .05$; ** $p < .01$ ***; $p < .001$.

V. Discussion

1. Theoretical and practical significance

Previous research finds a positive relationship between the need for cognition and creativity. For instance, Pan et al. (2020) and Hahn and Lee (2017) found the need for cognition can promote researchers' creativity. Madrid and Patterson (2016) examined 220 full-time employees and found the joint effect of openness to experience personality and need for cognition positively predicts creativity. The above findings provide the support needed for cognition to help creativity. However, as explained previously, Watts et al. (2017) pointed out other studies that failed to prove the need for cognition is good for creativity; Watts and colleagues proposed that the inconsistent findings may result from differences in study design and sample characteristics. This study complements scholarly knowledge about how the need for cognition may improve creativity performance among working people.

Another contribution of this survey is demonstrating the mechanism through which the need for cognition can stimulate creative idea generation. Although much research has examined the need for cognition and creativity, this study uses the literature about the need for cognition to systematically argue and demonstrate creative process engagement is the full mediating effect of the "need for cognition" and creativity. Such results provide a stepping stone for future research. Since there are other team-level and organizational-level factors that were known to affect creativity (Anderson et al., 2014; Shalley et al., 2004), the findings of this study lay a foundation that helps later authors to explain in more detail how and why team-level and organizational-level variables may work with the need for cognition to jointly influence "creative process engagement" and improves creativity.

Previous research into antecedents of creative process engagement concentrates on the role of leaders. For example, Chen et al. (2020) proposed and found participative leadership may lead to creative process engagement to stimulate creative thinking. Mahmood, Uddin, and Fan (2019) found transformational leadership brings about creative process engagement. Zhang and Bartol, (2010) found empowering leadership could stimulate creative process engagement to improve creativity. Saeed, Afsar, Cheema, and Javed (2019) found that leader-member exchange increases "innovative work behavior" through "creative process engagement". Finally, Huang, Krasikova, and Liu (2016) found leader's "creative self-efficacy" arouses followers' creativity through encouragement. The only research demonstrating the antecedent of creative process engagement and is not related to the role of leaders is from Cheung et al. (2020), in which the authors demonstrated mindfulness leads to creative process engagement and triggers creativity. Thus, this study also complements the creative process engagement literature. This study identifies the need for cognition as an antecedent to creativity.

As explained previously, the personality literature has recognized the need for cognition as a trait (Carnevale et al., 2011 Gärtner et al., 2021. Fleischhauer et al., 2013). This study demonstrates the need for cognition may trigger creative process engagement to inspire creativity at work. As there exist validated scales for measuring the need for cognition (Cacioppo et al., 1996), managers may utilize such instruments to identify workers with high levels of need for cognition to fill positions that demand creative solutions because workers' high need for cognition do creative process engagement. The findings of this study have significance to managers of new product development teams. The findings of this study may prove useful to NPD team managers in Taiwanese firms in selecting workers with suitable potential in NP development processes to facilitate innovation success and, in turn, expect better firm performance.

2. Limitations and future research opportunities

This study has limitations. This study surveyed employees' creativity performance by managers' subjective ratings. While adopting leader judgment is accepted (Shalley et al., 2004), other authors should measure

performance with objective data. Adopting objective data to measure the dependent variable may allow researchers to design a longitudinal research design. The internal validity of the findings could be greatly enhanced by longitudinal datasets. This said, however, this study systematically tests how the need for cognition stimulates creativity performance that may complement the relevant literature and knowledge in a meaningful way.

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