

Mediating Effect of Meta-cognition between Locus of Control and Self-efficacy

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Abstract

Meta-cognition is the knowledge and cognition of cognitive phenomena, including the control of ones own memory, comprehension, and thought processes. Meta-cognition is similar to self-awareness, which is the understanding of oneself, and affects people's attitudes and behaviors. This study demonstrated the mediating effect of meta-cognition between internal locus of control and self-efficacy. Internal locus of control refers to the steady faith that any outcome is related to one's own efforts. Self-efficacy is a collection of personal strong belief that one individual can achieve his or her own goals. In this study, if a person has a tendency to adopt an internal locus of control, meta-cognition is improved, and self-efficacy can in turn be increased if meta-cognition is improved. This study conducted an empirical analysis through questionnaires conducted on 260 university students. The results of the research demonstrated that there is a highly positive correlation between meta-cognition, control position, and self-efficacy. In addition, this study emphasized that positive meta-cognition with internal locus of control can lead to positive attitudes and behaviors, and positive results.

Keywords: *meta-cognition, locus of control, self-efficacy*

1. Introduction

Meta-cognition is the process of recognizing whether or not you are aware of the processes or methods needed to solve problems on your own, and continuously recognizing the pros and cons of this perception [1]. Meta-cognition can be influenced by the individual's locus of control [2][3]. The locus of control refers to the degree that people trust and believe they can control what happens in their lives [4], and this differs from person to person [5]. Some people believe that the outcome of work or tasks they are undertaking depends primarily on their own actions. Essentially these people think that they have the ability to control and solve problems by themselves [4]. On the other hand, there are the others who believe external factors limit the amount of influence they have on achieving outcomes, and that they are limited with what they can achieve because of such external causes [4]. When people's control position is intrinsic, they tend to grasp their abilities better and there is a high possibility of meta-cognition.

Moreover, meta-cognition can affect individual self-efficacy. Self-efficacy refers to the belief that individuals can reach their goals [6]. As meta-cognition involves understanding oneself through self-awareness, it can also increase the expectation that one can succeed in something, which leads to higher self-efficacy.

In this study we show that meta-cognition is influenced by internal locus of control and influences self-efficacy. Further, the mediating effect of meta-cognition is also explained here, which contributes to highlighting the importance of meta-cognition.

2. Theoretical background

2.1. Meta-cognition

Meta-cognition is a process whereby someone assesses what they know and do not know, develops a critical awareness of their thinking and learning and develops strategies for problem-solving [1][7]. Meta-cognition can play an important role in cognitive processes and general problem-solving activities through knowledge of the individual's cognitive processes, the outcome of cognition, and everything which is related to this [1]. Meta-cognition has the function of helping an individual understand their cognitive processes, assisting them to plan, perform and evaluate better, and allowing them to correct and adjust their thinking and problem-solving capabilities in the context of learning new things [8].

2.2. Locus of control

Locus of control is generally divided into two; internal locus of control and external locus of control [9]. Internal locus of control refers to the attribute that one person believes that he or she has control over things or can make things happen. [10]. On the other hand, the external locus of control position refers to a passive view that people believe and trust that they are under the control of other people or many external factors, regardless of their actions [11]. Those who have an internal locus of control position believe that they can do almost anything themselves [10]. On the other hand, those who have an external locus of control position tend to believe that the outcome of work often depends purely on luck and adopt the attitude that they are not in control of the situations they find themselves in [11].

2.3. Self-efficacy

Self-efficacy refers to people's strong belief and trust in their ability to succeed in tasks. Self-efficacy is enhanced whenever an individual successfully achieves his or her goals [6]. Those who with high self-efficacy are more likely to trust that they will be able to successfully complete what they are doing, and will make more effort and actively look for solutions when challenged or facing difficult problems. Conversely, when self-efficacy is low, such effort is absent and challenging situations are viewed negatively. Individuals with low levels of self-efficacy often appear helpless, and have an impaired sense of accomplishment. Thus, self-efficacy is an important factor in explaining differences in motivation, attitudes, learning, and task performance among individuals [12].

2.4. Locus of control and meta-cognition

Locus of control varies from person to person [9]. If a person shows an external locus of control, he/she will not try hard to change the outcomes of the tasks facing them as they tend to think that success or failure depends on mere luck, and if he/she fails, he/she will adhere to the result [10]. On the contrary, if a person has some kinds of internal locus of control, he or she believes in himself or herself, trusts in their level of competency, and tries to achieve success through their own efforts [10]. If someone believes that all outcomes are due to external factors, then there is less reason for them to try and understand their abilities and capabilities. As such, a person with internal locus of control will be much more likely to adopt the process of meta-cognition and monitor their own abilities than a person with external locus of control [13]. Therefore, internal locus of control is positively related to meta-cognition [14].

Hypothesis 1: Internal locus of control will have a positive relation with high meta-cognition

2.5. Meta-cognition and self-efficacy

The relationship between meta-cognition and self-efficacy suggests that an individual with meta-cognition

can increase his or her belief that self-awareness can find solutions when faced with problems. Further, when meta-cognition is high, people will understand their abilities well, and will be better aware of any shortcomings that they have through a cognitive process of monitoring and evaluation, and will seek to overcome these weak points. Therefore, a person who possesses meta-cognition will become more self-efficacious because of their greater confidence [15]. Furthermore, if meta-cognition is high, an individual will perform better, and such successful experience will enhance self-efficacy [15]. Therefore, we suggest the following hypothesis.

Hypothesis 2: High meta-cognition will have a positive relation with self-efficacy

2.6. Mediating effects of meta-cognition

Meta-cognition is higher if the locus of control is internal [14]. Further, the higher the level of meta-cognition is, the greater the level of self-efficacy is [15]. Therefore, meta-cognition will mediate internal locus of control and self-efficacy.

Hypothesis 3: High meta-cognition will positively mediate internal locus of control and high self-efficacy.

The final research model of the research is showed in Figure 1.

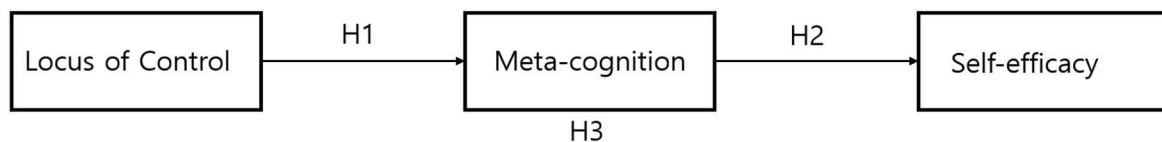


Figure 1. Research model

3. Research Method

3.1. Sampling and Procedures

This study is based on online questionnaire surveys of Korean and Chinese students who are in the university. 270 questionnaires were distributed and 247 completed questionnaires were returned, of which 205 questionnaires were suitable for use (42 questionnaires were incomplete) The demographic characteristics of those surveyed are as follows: Gender - 67 (32.7%) were male and 138 (67.3%) were female; Age of the respondents - 106 (51.7%) were under 20 years old, 87 (42.4%) were in their 20s and 12 (5.9%) were in their 30s or older.

3.2. Measuring Variables

In this study, meta-cognition was defined as the perception of an individual's ability to recognize his/her thought processes and to monitor and control these processes, and the measurement tools of [16][17] were used. The questionnaire has total 11 questions. Second, locus of control was the degree to which one person can control and influence an event [18]. Of the 16 items developed by [18], only 6 items which had validity were used. Third, self-efficacy was defined as people's beliefs and beliefs about their ability to do and perform a task successfully, and the measurement tools of [19][20] were used. The questionnaire is consisted of eight questions. All variables were measured and evaluated using a 5-point Likert scale.

4. Analysis

4.1. Exploratory factor analysis

To analyze the support of our hypothesis we adopted the following methods. First, to verify and confirm the validity of the survey conducted in our study, we did factor analysis. As the result of the exploratory factor analysis about this research, all of the items were well grouped by variables. The Kaiser-Meyer-Olkin measure (KMO), which relates to the sample appropriateness of the factors was very significant by .871. See Table 1.

Table 1. Confirmatory factor analysis

KMO=.871	Factor		
	1	2	3
meta-cognition 1	.443	.231	.155
meta-cognition 2	.634	.266	.004
meta-cognition 3	.508	.262	.066
meta-cognition 4	.647	.196	.000
meta-cognition 5	.556	.025	.146
meta-cognition 6	.685	.103	.020
meta-cognition 7	.743	.040	.062
meta-cognition 8	.662	.119	.146
meta-cognition 9	.581	.217	.124
meta-cognition 10	.598	.177	.084
meta-cognition 11	.555	.226	.138
self-efficacy 1	.361	.508	-.013
self-efficacy 2	.334	.616	.044
self-efficacy 3	.262	.636	.171
self-efficacy 4	.046	.686	.140
self-efficacy 5	.200	.805	.106
self-efficacy 6	.193	.811	-.020
self-efficacy 7	.161	.711	-.013
self-efficacy 8	.137	.757	.075
locus of control 1	.281	.280	.450
locus of control 2	.060	.065	.556
locus of control 3	.247	.038	.606

locus of control 4	.021	-.028	.746
locus of control 5	.111	-.024	.695
locus of control 6	-.010	.158	.709
eigenvalue	4.637	4.392	2.605
% variance	18.547	17.569	10.421
cumulative %	18.547	36.117	46.538

4.2. Correlation analysis

Table 2 is the results of the correlation analysis and reliability analysis. In regards to the reliability analysis, as seen in Table 2, Cronbach's Alpha value of each variable was 0.852 for meta-cognition, 0.873 for self-efficacy, and 0.724 for locus of control. Cronbach's Alpha value of all variables is more than 0.70. Therefore, everything is reliable.

In regards to the correlation analysis there was a very positive correlation between meta-cognition and locus of control ($r = .311$) at $p < .001$. Meta-cognition also had a very positive correlation ($r = .526$) with self-efficacy at $p < .001$ level. Next, self-efficacy was positively related to locus of control ($r = .232$) at $p < .01$. In the locus of control, positive (plus) numbers mean internal locus of control, and negative (minus) numbers mean external locus of control. This means that if the relationship between locus of control and meta-cognition is positive, people who have an internal locus of control have high meta-cognition. The results show that internal locus of control, meta-cognition, and self-efficacy are positively related, thus, hypothesis 1 and 2 were supported. See Table 2 for details.

Table 2. Correlation analysis

	Cronbach's α	mean	std.	meta-cognition	self-efficacy	locus of control
meta-cognition	.852	3.996	.459	-		
self-efficacy	.873	3.882	.531	.526***	-	
locus of control	.724	3.852	.520	.311***	.232**	-

***: $p < .001$, **: $p < .01$, *: $p < .05$

4.3. Regression analysis

In this study, regression analysis was done to verify hypothesis 3. First, regression analysis was done to confirm the effect of locus of control and meta-cognition on self-efficacy. The results of the regression analysis about this are shown in Table 3.

In Table 3 step 1, self-efficacy and locus of control have a positive relationship ($\beta = .232$, $p < .01$). Next, in step 2, we can see that there is a positive relation between meta-cognition and self-efficacy ($\beta = .503$, $p < .001$). However, there is no relationship between the control position and self-efficacy in step 2 ($\beta = .076$). This implies that self-efficacy is more influenced by meta-cognition. We can also see through this that meta-cognition is the perfect mediator between locus of control and self-efficacy. Thus, hypothesis 3 was supported, and therefore all hypotheses were supported.

Table 3. Regression analysis

dependent variable : self-efficacy					
	step 1		step 2		VIF
	β	t	β	t	
locus of control	.232**	3.400	.076	1.212	1.107
meta-cognition			.503***	8.012	1.107
R^2 (Adjusted R^2)	.054 (.049)		.282 (.275)		
ΔR^2	.054		.228		
F	11.559**		39.674***		

***: $p < .001$, **: $p < .01$, *: $p < .05$

5. Conclusions and Implications

Internal locus of control increases meta-cognition, and meta-cognition increases self-efficacy. Self-efficacy gives individuals the confidence to achieve their goals, and even becomes a driving force in achieving goals [6]. Therefore, meta-cognition as a cause of self-efficacy becomes very important. Meta-cognition is people's ability to know, distinguish and solve between what they know and do not know [1]. Thus, self-efficacy can be enhanced. This research result means that internal locus of control is capable of increasing meta-cognition. This means that it is important for individuals to think that they can solve problems and to have confidence when attempting to do so.

Finally, in order to succeed and an individual should have self-efficacy and self-confidence, meta-cognition and internal locus of control (which is the cause of meta-cognition), and organizations should try and foster these characteristics in their employees. This study has demonstrated this, and in particular, has shown the significance of meta-cognition, a relatively under-studied variable, as a mediation variable. This research has uncovered that meta-cognition is especially important for enhancing the self-efficacy of employees, and as such is a variable that organizations should pay specific attention to.

6. Limitations and Future Research

There are some limitations about this study, which are as follows. First, in this study, we surveyed only students from Korea and China. Thus, this study's results cannot necessarily be extrapolated as being relevant to other countries. Therefore, future studies will need to pay attention to this point and broaden the sample base.

Second, in this study, only locus of control was used as a mediation variable that influences meta-cognition. However, there are many variables that can influence meta-cognition. Future research will need to focus on these variables.

Third, in this study, the research was carried out only using self-efficacy as a factor moderated by meta-cognition. However, there are other variables, such as self-esteem, that can be influenced by meta-cognition. Future research should also examine the relevance of these other variables.

Fourth, in this study, only students were surveyed to measure self-efficacy, meta-cognition, and locus of control. In the future research, therefore, it will be necessary to apply surveys and theories to a wider range of occupations.

Finally, it is necessary to examine how other cognitive factors related to meta-cognition are affected. In addition, we need to investigate the relationship between meta-cognition and other performance-related variables such as stress, burnout, and satisfaction.

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