

## A causal model of the relationship between cognitive processes and effective leadership of academic department chairs in Mashhad University of Medical Sciences

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### Abstract

The present study was conducted aiming to investigate the causal relationship between cognitive processes and effective leadership of academic departments' chairs in Mashhad University of Medical Sciences. Using descriptive correlational study method, 40 academic department chairs in Mashhad University of Medical Sciences were studied by census method. Data were collected through computer-based testing of working memory, cognitive flexibility, problem solving, social cognition, creativity design fluency test, Herbst University Leadership Questionnaire (2003), and Analoui Effective Manager Questionnaire (1995). The findings revealed that working memory, cognitive flexibility, and creativity have a relatively high mean value compared to social cognition and problem solving. Also, there is a significant relationship between working memory and creativity with social cognition. Consequently, paying attention to the aspect of social cognitive functions of academic departments' chairs leads to growth and success in the field of executive cognitive functions. According to the findings, the model of predicting effective leadership path of university departments' chairs a weak fit in terms of cognitive processes. It can be said that cognitive processes do not play a significant role in predicting effective leadership of academic departments' chairs in Mashhad University of Medical Sciences.

**Keywords:** Effective leadership, university academic departments' chairs, cognitive processes.



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## **Introduction**

Today, effective leadership is one of the major priorities in distinguishing between successful and unsuccessful organizations (Mokhtari Dinani, Kozechian, Nazarian Madvani, 2017), as organizations need effective leaders to design and implement organizational strategy, manage attitudes and behaviors of the followers, and regulate team processes and organizational performance results (Subramony, Segers, Chadwick, Shyamsunder, 2018). Despite the importance of effective leadership in organizations, more than 90% of the researches on effective leadership in organizations have been conducted in recent years since 2013 onwards. From what can be seen from the theoretical gap in the empirical backgrounds, it can be inferred that a large percentage of researches examine only the general characteristics of effective leadership in different organizations, which also share many similarities with the leadership styles, or a small percentage of these researches examine the factors that are effective and related to effective leadership in work environments such as universities (Madanchian, Hussein, Noordin & Taherdoost, 2017). Studies also show that leadership in higher education is not like other organizations because it represents a unique set of leadership challenges (Anderson, 2015; Ruben & Giglotti, 2017).

Due to their important decision-making position in departments, department heads are among the most prominent influential sectors in various areas of educational management (Seagren, Creswell, Wheeler, 1993). Thus, effective leadership is the main and critical priority among the duties of department heads. Both in theory and practice, the effectiveness of educational administrators provides the basis for individual development of members and thereby improves the educational situation (Baharvand, 2015). Existing evidence suggests that medical universities suffer from weaknesses and difficulties in educational management. The most important of these problems include poor management, planning, coordination, and discipline in education. As Fekri and Sarafinejad (2001) state, the results of their research and other researches indicate the general weakness of the medical education system in the fields of management and planning. Therefore, it is vital to pay attention to the department heads of medical universities in the position of effective leaders as the beating heart of educational management in these universities. However, what is important is the lack of knowledge of the factors that lead to effective leadership. According to Fiedler and Chemers (1974), although we believe that leadership leads to the success and life of organizations, we do not know much about the factors which lead to effective leadership. However, Rubin & Baldwin (2018) claim that, in fact, effective management starts from within and the basis of successful management is

individual effectiveness. Therefore, one of the major concerns of educational organizations in the present century is how to train and select people who have good cognitive skills and high executive functions (Saifi, Ebrahimi Ghavam, Ashaeri, Farrokhi & Dortaj, 2017). Accordingly, cognitive functions that play a significant role in decision-making and behavior of leaders have become one of the central issues in recent leadership studies. These functions can be divided into the following two categories, which are explained in theoretical terms.

A) The first category includes skills such as planning, problem solving, attention, response inhibition, cognitive flexibility, multitasking, and time management. These cognitive abilities are based on logic and function as the link between the behavior and structure of the brain that have become known as cold cognition.

B) The second category of cognitive abilities including desires and beliefs that are mixed with people's emotions are known as hot cognition.

According to cognitive theories, the present study is based on the assumption that individual differences in executive functions lead to different abilities of individuals in regulating and controlling cognitions. Given that the performance of any successful manager is based on the capabilities of his/her brain, it is crucial to determine which cognitive abilities contribute the most to the success of managers. Therefore, the purpose of this study is to predict the effective leadership of university department heads through cognitive processes.

A review of research background showed that the theories related to individual differences of leaders are rooted in according attention to cognitive capacities. Accordingly, Michael et al. (2016) in a study entitled "Cognitive Skills and Leadership Performance: The Nine Critical Skills" state that there is ample evidence that some cognitive skills are important determinants of leadership functions.

## **Methodology**

The present study benefited from correlational researches using the "Structural Equation Modeling" method. The Partial Least Squares (PLS) method was used due to the low number of individuals in the statistical population. The study sample (40 people) was investigated through a census of all the department heads of medical faculties. Instruments used to measure required data were cognitive computer-based testing, working memory (n-back), cognitive flexibility (Stroop), problem solving test (Tower of Hanoi), Reading the Mind in the Eyes Test (social cognition), creativity design fluency test (D-KEFS), Herbst University Leadership Questionnaire (2003), and Analoui Effective Manager Questionnaire (1995).

## Findings

In the findings section, descriptive indicators of cognitive processes and effective leadership of university department heads showed that working memory, cognitive flexibility, and creativity have a relatively high mean compared to social cognition and problem solving. As mentioned earlier, in this study, the Partial Least Squares (PLS) method was used to examine the study question. At first, the correlation of study variables as the basis of structural models was investigated. The correlation matrix of study variables showed that merely the relationships between working memory and social cognition ( $r=0.62$ ), creativity and social cognition ( $r=0.62$ ), and university leadership and effective leaders ( $r=0.78$ ) are statistically significant ( $P \leq 0.01$ ). There are no significant relationships between other variables ( $P > 0.05$ ).

Also, according to the  $Q^2$  criterion the structural models have a moderate fit, but according to the adjusted criteria  $R^2$  and  $R^2$  the amount of variance explained by the endogenous structures of the model based on the predictive structures is at a weak level.

In the study of structural path coefficients, significance levels of coefficients are compared with critical values at 95%, 99% and 999% confidence levels, which include coefficients of 1.96, 2.58, and 3.27, respectively. Structural path coefficients and significance levels corresponding to each of the effective leadership indicators of university department heads are given in Table 1.

**Table 1. Estimation of direct effects and t-values of variables in predicting effective leadership of university department heads**

Variables	Colleagues' perception of university leadership of department heads		University leadership		Effective leaders	
	Path coefficients	t-statistic	Path coefficients	t-statistic	Path coefficients	t-statistic
Working memory	-0.088	0.372	-0.149	0.664	-0.287	1.514
Cognitive flexibility	-0.189	1.026	0.098	0.642	0.057	0.383
Problem solving	-0.057	0.307	-0.045	0.265	-0.172	0.855
Social cognition	0.334	1.310	0.150	0.564	0.239	0.898
Creativity	-0.193	1.049	0.135	0.762	0.049	0.306

\*\* $p < 0.01$  \* $p < 0.05$

The results of estimation of direct effects and t-values of the variables in predicting the effective leadership of university department heads show that in the model of predicting colleagues' perception of university leadership of department heads and the university leadership model variables of social

cognition and problem solving had the highest and lowest path coefficients, respectively. In the model of predicting effective leaders, the highest path coefficient was allocated to working memory and the lowest to creativity. However, coefficients of  $t$  show that in the predictive models for all three indicators of effective leadership of university department heads, none of the predictor variables had a significant role in explaining the criterion variable ( $P > 0.05$ ).

## **Discussion and Conclusion**

The main purpose of this study was to use cognitive processes to predict the effective leadership of university department heads. Based on the findings related to the context and descriptive data of the present study on the existence of a significant relationship between working memory and creativity with social cognition, a review of a number of studies in the field of neuropsychology shows that social cognition skills are essential for the successful development of cognitive executive function activities (Jafari, 2016). Also, according to the main findings of the study, it can be stated that cognitive processes do not play a significant role in predicting effective leadership of department heads of Mashhad University of Medical Sciences. Therefore, it is suggested that other situational factors that affect the performance of leaders should be studied in other researches to cautiously use the results obtained in the field of neuroscience and management and leadership science.

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