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# Relationship between thinking styles and the academic achievement of occupational therapy students in Iran

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## Abstract:

**BACKGROUND:** Thinking styles' effect on academic achievement is a challenging topic that has been raised with very different results in previous studies. Since thinking styles are influenced by the contexts, this study was conducted in the context of the occupational therapy, which is one of the disciplines in the rehabilitation sciences in Iran and its educational studies are still developing. The purpose of this research is to study thinking styles and their relationship with the educational achievement of occupational therapy students at Shiraz School of Rehabilitation Sciences.

**METHODS:** This was a descriptive correlational study conducted at Shiraz School of Rehabilitation Science in 2015. As sampling was considered by the census of all students in the 2<sup>nd</sup>–4<sup>th</sup> year of Bachelor of Occupational Therapy, demographic data questionnaire and the "Short form of Wagner-Sternberg Thinking Styles Inventory (1992)" were distributed among all 78 students. Students' academic achievement was also considered by grade point average obtained from the educational office at school. The data were analyzed by descriptive and analytic statistics utilizing SPSS21 software. Pearson's correlation coefficient and linear regression tests were used for data analysis.

**RESULTS:** Forty-two students participated in this study with their personal consents. The results revealed that hierarchic ( $18.47 \pm 2.54$ ) and external ( $18.47 \pm 3.23$ ) were the dominant thinking styles of the occupational therapy students, followed by judicial, legislative, oligarchic, executive, conservative, liberal, monarchic, anarchic, local, global, and internal thinking styles. In addition, there was no correlation between any of the thinking styles and students' achievement ( $P = 0.354$ ). Thinking styles predicted only 4.9% of changes in academic achievements in this study.

**CONCLUSION:** Thinking styles could predict only limited amount of the academic achievements of occupational therapy students. Furthermore, as the dominant thinking styles of the occupational therapy students are hierarchic and external, it seems that occupational therapy students prefer to have a hierarchy of academic goals and seek tasks that provide them with the opportunity to interact with the others.

## Keywords:

Education, occupational therapy, thinking

## Introduction

Researchers in the field of education attempt to identify variables that may directly or indirectly affect learners' academic achievement.<sup>[1,2]</sup> It was revealed that a set of individual and environmental factors including cognitive and non-cognitive factors affect academic achievement.<sup>[3,4]</sup>

For example, there has been a great deal of research on the relationship between intelligence and academic achievement, but the summarization of those studies has shown that it is not possible to explain the variance of academic achievement solely on the basis of cognitive ability. Therefore, in recent decades, intellectual styles, especially thinking styles, have been considered as a determining variable

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in academic achievement.<sup>[1,5,6]</sup> Thinking styles are individual preferences of how to use his/her intelligence and talents. Although intelligence refers to what one can do, the style of thinking refers to what one prefers to do.<sup>[3,5,7]</sup> In fact, thinking style refers to the individuals' preferred methods of information processing and utilizing them in task performance.<sup>[8]</sup> Theorists concur that each person may have a special, distinct method of encoding, storing, and information processing in his/her mind, and it seems that a person whose thinking styles comply with social expectations in certain circumstances can show more success.<sup>[9]</sup>

Although it was revealed that Sternberg *et al.* in their studies considered that the legislative and judicial styles are correlated with the final examination's score and individual projects, there are a set of controversy results with regard to the relationship between thinking styles and academic achievement.<sup>[1,10,11]</sup> For example, Safari *et al.* found a relationship between internal, external, conservative, and liberal thinking styles with the academic performance of the students in Kermanshah University of Medical Sciences.<sup>[9]</sup> Richmond *et al.* mentioned that internal and hierarchical thinking scores positively and legislative and anarchic thinking scores negatively predict academic performance in online learning.<sup>[11]</sup> Bodaghi *et al.* showed that there is only a positive and significant relationship between hierarchical thinking styles and academic achievement, and it can be predicted based on thinking styles.<sup>[12]</sup>

On the one hand, identifying the personal factors of learners appropriate for a particular profession, and on the other hand, adapting education process according to the students' characters and needs can result in effective and efficient health sciences education.<sup>[1,13]</sup> This is probably very important in the field of health sciences education, which require awareness to many personal factors, abilities, and skills to have ultimate teaching-learning process.<sup>[14]</sup> The review of the literature revealed that thinking styles and their relationship with the academic performance of occupational therapy students have not been investigated in Iran so far. Since thinking styles are influenced by culture and social context,<sup>[1]</sup> this study was conducted in the context of occupational therapy in Iran. Occupational therapy is one of the newest disciplines in the group of rehabilitation sciences in Iran, which its special educational studies are still developing. One of the most important requirements in occupational therapy is the long-lasting and extensive interpersonal interactions with the clients and families. Thus, it seems that having a social thinking style will help occupational therapists to be more successful in their profession. Furthermore, by studying the relationship between thinking styles

and students' academic achievement, we may acquire a better perspective in the education planning and management. Hence, this research was conducted at Shiraz School of Rehabilitation Sciences to study the thinking styles of occupational therapy students and investigate the relationship between thinking style and academic achievement of these students.

## Materials and Methods

This was a descriptive, correlational study. Sampling was performed in the form of a census of the entire 2<sup>nd</sup>-4<sup>th</sup>-year female and male students of occupational therapy at the Rehabilitation School of Shiraz University of Medical Sciences. The inclusion criteria were being 2<sup>nd</sup>-4<sup>th</sup>-year students of Bachelor of Occupational Therapy and consenting to participate in the study. The research took place from October to December 2015.

The researcher-designed demographic data questionnaire and the "Short form of Wagner-Sternberg Thinking Styles Inventory (1992)" were distributed among all 78 students at school. Students' academic achievement was considered by the grade point average (GPA) obtained from the educational office at school.

The short form of Wagner-Sternberg Thinking Style Inventory (1992) was designed by Sternberg and Wagner and includes 104 questions. This questionnaire measures 13 thinking styles. The questionnaire asks the individual to answer the questions on a seven-point scale. Each person's thinking style is determined by the set of scores he/she gains in each part of the questionnaire. Sample of questions include:

1. When making decisions, I like to rely on my own ideas and methods
2. When writing opinions or discussing them, I follow the formal rules of presentation
3. When writing opinions or discussing them, I like to criticize other people's ways.<sup>[15,16]</sup>

In his/her categorization of thinking styles, Sternberg applied the subjective metaphor of self-government, thereby choosing the terms of government to explain his/her intended concepts. The pattern of Sternberg's thinking styles includes three functions, four forms, two levels, two scopes, and two tendencies. The three most important functions of government are legislative (creative), executive (implemented), and judicial (evaluative). The four forms of government are monarchic, hierarchic, oligarchic, and anarchic. The two levels of government are global and local. The two scopes are internal and external. The two tendencies are conservative and liberal.<sup>[1,5,17]</sup>

Each thinking style has a specific feature. For example, legislative thinking people like to do things on their way. They are also interested in creating and designing things. In other words, these people make their own rules. Judicial thinking individuals (evaluative mind) would like to evaluate rules and procedures and would prefer issues in analyzing and evaluating existing affairs and ideas. Executive thinkers like to follow the rules and prefer issues that are prestructured. They also like the complicated process of doing paperwork and rigid regulations. They like to solve problems posed by others. People with hierarchical thinking believe in the necessity of prioritization and have a hierarchy of goals because they know that all goals are not always achievable or at least partially achieved. The oligarchic individual is similar to hierarchical individuals in their desire to do more than one task within a given time frame, but in contrast, they are motivated by a number of often conflicting goals that seem to be of equal importance. The monarchic person has a one-dimensional mind and does not want to do anything else while doing a task or solving a problem. These people like to deal with only one problem at a time. The anarchic individual is motivated by a combination of needs and goals that are difficult for him/her and the others to sort out. They seem to be dealing with issues at random. Global thinking individuals prefer to deal with relatively large and abstract subjects. They ignore or dislike details, while individualists with local thinking styles require attention to detail. They are more pragmatic about the situation. Individuals with an internal thinking style are involved in internal affairs. They are introverted, are task-oriented, and like to work alone. On the other hand, external thinkers are extroverted, popular, and social. They are often socially sensitive, understanding what is happening to others. Individuals with a liberal thinking mindset tend to disregard existing rules and procedures and make the most of change and look for situations that are somewhat obscure and unknown. Conservative people, in contrast, like to stick to current rules and procedures, see the slightest change, avoid ambiguous situations as much as possible, and enjoy familiar situations in their work and professional lives.<sup>[1,5,18,19]</sup>

Internal reliability of Cronbach's alpha in different studies ranged from 0.5 to 0.5. The test-retest reliability was calculated 4 weeks after implementation, and it was between 0.63 and 0.78 indicating acceptable external validity. The internal validity of the questionnaire was studied through confirmatory factor analysis and confirmed by that. The external validity of the questionnaire was assessed by comparing thinking styles with some constructs that are expected to be related to thinking styles. Overall, the results show that validity is acceptable.<sup>[13,20]</sup>

Our research project was initially approved by the Research Committee of the Shiraz University of Medical Sciences. Furthermore, toward adherence to ethical guidelines, the students were informed of the study objectives before commencement, and questionnaires were completed after obtaining written consent. In line with the ethical guidelines, the participants were ensured that (a) the information obtained during the study will be used anonymously and (b) their information will remain confidential and will never be used for or against them anywhere.

The data were analyzed using descriptive-analytic statistics (Pearson's correlation test and linear regression) utilizing SPSS21 Software. Pearson's correlation coefficient and linear regression tests were used for data analysis.

## Results

Forty-two of 78 students were participated in this study with signing the consent form. 72.1% were females and 25.6% were males. Hierarchic ( $18.476 \pm 2.549$ ) and external ( $18.476 \pm 3.232$ ) thinking styles were the dominant thinking styles of the occupational therapy students followed by judicial ( $18.190 \pm 2.098$ ), legislative ( $18.190 \pm 3.194$ ), oligarchic ( $17.904 \pm 2.239$ ), executive ( $17.904 \pm 2.903$ ), conservative ( $17.714 \pm 2.848$ ), liberal ( $17.238 \pm 2.535$ ), monarchic ( $16.952 \pm 2.408$ ), anarchic ( $16.571 \pm 2.037$ ), local ( $16.214 \pm 3.364$ ), global ( $15.690 \pm 3.127$ ), and internal thinking style ( $14.595 \pm 2.947$ ), respectively.

The results of data analysis by linear regression revealed that thinking styles could not significantly predict academic performances of occupational therapy students in the significance level under 0.5 ( $P = 0.354$ ,  $n = 42$ ,  $Df = 13$ ,  $F = 1.163$ ).

Thinking styles could predict only 4.9% of changes in the variance of academic achievement ( $P = 0.354$ ,  $n = 42$ ,  $R^2 = 0.351$ , adjusted  $R^2 = 0.049$ ).

Furthermore, the relationship between thinking styles and academic achievement was calculated by Pearson's correlation coefficient. There was no relationship between any thinking styles and academic achievement in the significance level under 0.05 [Table 1].

## Discussion

The results of this study revealed that hierarchic and external thinking styles were the dominant thinking styles of the occupational therapy students followed by judicial, legislative, oligarchic, executive, conservative, liberal, monarchic, anarchist, local, global, and internal

**Table 1: The relationship between different thinking styles and academic achievement**

Model	Unstandardized coefficients		Standardized coefficients ( $\beta$ )	T	Significant
	B	SE			
Constant	11.917	2.079		5.731	0.000
Legislative	0.159	0.103	0.413	1.538	0.135
Executive	0.073	0.095	0.173	0.774	0.446
Judicial	0.042	0.131	0.072	0.322	0.750
Global	-0.050	0.091	-0.127	-0.543	0.591
Local	0.092	0.084	0.252	1.095	0.283
Liberal	-0.010	0.101	-0.021	-0.100	0.921
Conservative	-0.026	0.109	-0.060	-0.234	0.816
Hierarchic	0.044	0.123	0.091	0.358	0.723
Monarchic	-0.082	0.103	-0.160	-0.790	0.436
Oligarchic	-0.094	0.141	-0.171	-0.667	0.510
Anarchic	-0.011	0.153	-0.018	-0.071	0.944
Internal	0.025	0.091	0.060	0.274	0.786
External	0.022	0.112	0.058	0.196	0.846

SE=Standard error

thinking styles, respectively. There was also no significant correlation between any thinking styles and academic achievement (GPA) in occupational therapy students in this study. In addition, thinking styles predicted only 4.9% of changes in the variance of academic achievement.

There were some studies emphasized the correlation between some kinds of thinking styles and academic achievement, and the result of our study was in contrast with them. For example, in the study conducted by Pouratashi *et al.*, it was indicated that executive and external styles had the highest effect on academic performance, respectively, and these effects were positive.<sup>[21]</sup> Bakhshayesh mentioned that there was a relationship between all thinking styles and academic achievement of Azad and State University students of Yazd city. In addition, the hierarchic, global, and conservative thinking styles contributed to predicting students' academic achievement.<sup>[3,22]</sup> Some studies suggested that in examining which thinking styles have more power in predicting academic achievement, a variety of findings have been found that this variation has been partly influenced by the cultural factors and the under study—educational grades.<sup>[1]</sup>

Reviewing previous studies represented that it seems there are some more factors other than thinking style which can influence occupational therapy students' academic achievements. The study was accomplished by Barreiro on 160 college students; it was propounded that cognitive ability is the best predictor for academic achievements. It was also cleared that the correlation between thinking styles and emotional intelligence was significant, but thinking styles did not correlate with academic achievement directly.<sup>[23]</sup> In another study conducted by Lee with the objective to investigate the relationship between the academic achievement of

occupational therapy students (GPA) and learning and study strategies, the results showed a positive correlation between these two variables.<sup>[24]</sup> Study strategies can include three domains of deep, strategic, and surface approaches. A deep approach to study is associated with a desire to understand the meaning of the learning material; a strategic approach to study is represented by effective organization and time management to achieve the highest grades possible; and a surface approach is associated with doing the minimum amount of work to pass examinations driven by fear of failure. Although some studies on students other than occupational therapy showed that deep or strategic approach to study was associated with better academic and clinical fieldwork performance, Brown *et al.* suggested that variables such as age, gender, and year level of enrolment were the best predictors of Australian occupational therapy's academic achievement.<sup>[25]</sup> Bonsaksen mentioned that academic achievement may be a result of multi-factors that include learning environment, students' predispositions, study efforts, cultural factors, and approaches toward studying. Moreover, it is important to increase an occupational therapy student's search for meaning and motivation for academic achievement and to reduce their fear of failure.<sup>[26]</sup> Since some previous studies have pointed out that there were numerous and varied factors affecting academic performance, it seems that examining only one factor related to academic performance faces many shortcomings. On the other hand, it was also clarified that the thinking style may be influenced by time, the environment, and the changing demands of life, which illustrates that it is not a fixed factor during educational courses of students and this issue must be considered during the studies.<sup>[3,27]</sup>

Considering that the dominant thinking style of the occupational therapy students at Shiraz School of

Rehabilitation Sciences is hierarchic and external ones, it seems that the students believe in the necessity of task prioritization and they have a hierarchy of educational goals, as they know that all goals are not always achievable. They are also external thinkers which seem to seek the tasks that can provide them some vast opportunities to interact with others. Hence, they are popular and social and often socially sensitive, understanding what is happening to others. The literature revealed that occupational therapy students prefer hands-on experiences and showed their strength in working in groups to solve problems. They also favored practical problem-solving when dealing with social and interpersonal issues.<sup>[28]</sup> As occupational therapy discipline requires having social interactions between the therapist, clients, and families, as well as executing prioritized treatment plans, it seems that this thinking style among the students is compatible with the needs of this special field.<sup>[29]</sup>

Among the limitations of this study was the limited return rate of the questionnaires distributed among occupational therapy students which may reveal their low concerns or interests to participate in educational studies.

## Conclusion

As the dominant thinking styles of the occupational therapy students are hierarchic and external, they may prefer prioritized and social tasks. It also seems that there are factors other than thinking styles affecting the academic achievement of the occupational therapy students.

It is suggested that other important variables such as emotional intelligence, information processing style, problem-solving style, learning strategies, coping strategies, stubbornness, and resilience would be considered to investigate their relationship with the academic performance of occupational therapy students in future studies. It is also suggested that similar studies would be conducted in the larger sample size of occupational therapy students considering all occupational therapy students in Iran. Further, researchers can investigate the relationship between thinking styles and academic achievement in clinical courses as well as theoretical courses, as it can be different according to the educational contexts.

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## Conflicts of interest

There are no conflicts of interest.

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