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The metacognition levels of students: a research school of physical education and sports at Anadolu University

DILEK SOLMAZ YALıZ

AU. Eskişehir, Turkey

ABSTRACT

Solmaz, D. (2014). The metacognition levels of students: a research school of physical education and sports at Anadolu University. *J. Hum. Sport Exerc., 9*(Proc1), pp.S398-S408. The aim of this research was to find out the perceived metacognition level of Physical Education and Sports School students at Anadolu University and to identify whether metacognition levels display significant differences in terms of various variables. The subject population sample was 416 Anadolu University Physical Education and Sports School students. "The Meta-Cognitions Questionnaire (MCQ-30)" developed by Cartwright-Hatton and Wells and later developed the 30-item short form (MCQ-30) was used. The MCQ-30 which was adapted into Turkish by Tosun and Irak is a four point agreement scale (Tosun & Irak, 2007). Each item in this scale is analyzed separately ranging from "(1) strongly disagree" to "(4) strongly agree." In the data analysis, "arithmetic mean, standard deviation, t-test and ANOVA" were used. As a result of this study there was no significant difference between their genders for uncontrollableness and danger, cognitive awareness, cognitive confidence and the positive beliefs. On the other hand there is significant difference between their genders for need to control thinking. ($p<0.05$). Yılmaz (2007) and Semerci & Elaldı's (2011) findings corresponded to the results of this research. There is no significant difference between their departments for uncontrollableness and danger, cognitive awareness, cognitive confidence, need to control thinking and the positive beliefs. There was no significant difference between their class levels for the positive beliefs, cognitive confidence and need to control thinking. On the other hand, there was significant difference between their class levels for uncontrollableness and danger and cognitive awareness ($p<0.05$). The result of this study is supported with literature (Demir & Özmen, 2011). **Key words**: PHYSICAL EDUCATION, STUDENTS, UNIVERSITY.

Corresponding author. AU. Eskişehir, Turkey
E-mail: dilekyaliz@anadolu.edu.tr
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INTRODUCTION

Thinking is the mental process of the presentation of knowledge. The act of thinking is to transfer arrangement of knowledge in a way of new and different form when it is intended for solving a problem, responding a question or guiding to reach a goal (Çubukçu, 2004). The main feature that distinguishes humans from other creatures is the ability to think. In other words, all people think intrinsically. Thinking, metacognition and learning is the constant transformation into different aspects of the same phenomenon. At this point, metacognition is an integral part of the thinking process (Demir & Özmen, 2011).

Metacognition is included not only on the basis of just thinking, but also all thinking skills are getting into at the same time. Individual's making a decision to steps which he will do while he is working, developing an attitude about work, planning about work in his mind, reviewing his plan constantly and skills of constantly editing the disconnect points are located into the concept of metacognition. In this process, individuals gain better control about thinking and feeling by reflecting and evaluating their own thinking processes (Demir & Özmen, 2011).

Metacognition, in the most sense, is defined as "thinking about thinking" (Anderson, 2002). In his a research about children's abilities of advanced memory in 1976, Flavell used the term of metamemory and has given this concept to the literatüre (Hacker & Dunlosky, 2003; Jager et al., 2005; Karbalaei, 2010). Flavell who improved his studies in 1979 restructured his theory in a way including metacognition (Özsoy, 2008). In the literature, various definitions of the concept of metacognition is reached.

Flavell (1979) defined metaconition as individul's discovering his abilities, controlling them and mobilizing the cognitive processes which he has them to learn in high level. Brown (1978) who did many researches about metacognition after Flavell defined metacognition as awareness and regulation of thinking processes which students used in structured learning and problem-solving situations. Wellman (1985) defined metacognition as a cognition of individual's cognition; Butterfield, Albertson and Johnston (1995) defined metacognition as understanding the factors affecting the cognition and monitoring and controlling the cognition in company with small modals; O'Neil and Abedi (1996) defined metacognition as individual's inspecting periodically whether it was reached the goal or not and carrying out different strategies after selecting them if they were necessary.

Conducted researches have indicated that metacognitive skills have significant impact on students' achievement and students with high level of metacognition are more successful. On the other hand, it is observed that there is an increase on the level of students' achievement with metacognition strategies instruction. Therefore, metacognition can be used as a useful tool in the development of students.

When we look at the researchers conducted about metacognition (Swanson, 1990; Schraw & Denisson, 1994; Tunçman, 1994; O'Neil & Abedi, 1996; Deosete et al., 2001; Soydan, 2001; Sperling et al., 2002; Bendixen & Hartley, 2003; Çiçekçioğlu, 2003; Namlu, 2004; Muhtar, 2006; Çakıroğlu, 2007; Özcan, 2007; Immekus & Imbrie, 2008; Tüysüz et al., 2008; Yavuz, 2009; Ponnusamy, 2010; Demir & Özmen, 2011), we can indicate that they are overall about with metacognition and intelligence, academic achievements in various fields (Turkish, science, history, mathematics), cognitive abilities, epistemological beliefs, problem solving and mathematic, making decision, reading comprehension and learning, teacher training, developing the scale.

Since being a person who can adapt to changes and developments of the world, use the necessary knowledge's by choosing from swiftly increasing information, use the lifelong learning is possible by learning about learning, being developed the high level of thinking abilities of students will provide great contribution to realization of education's goals (Özer, 2001). For all of these reasons, the investigation of students' higher cognitive level is very important. Research is also particular important in terms of realization with physical education and sport sciences students. Because it is necessary for students before beginning to work to acquire a habit of questioning their thinking processes and therefore it is necessary also to have metacognitive skills which are abilities of evaluation and organizing thoughts. In addition, students with metacognitive knowledge and skills by taking responsibility for their own learning, will be more actively participating people in tasks carried out by them. Therefore, it is said an important issue that this study offers data related to learning skills to physical education and sport academy students, is a source for researches that will be then, provides contribution to field by obtained results and draws attention to metacognitive skills and strategies.

In accordance with the importance and justifications stated above, determining the level of metacognition of students who are aware of their own cognitive processes and determining whether metacognition grade levels differ significantly from their genders, education departments and level of class or not is the main purpose of this research.

MATERIAL AND METHODS

Participants

The research group consists of totally 326 students from first, second, third and fourth classes of Physical Education and Sports Teacher Training Department of Physical Education and Sports Education School, Recreation, Coaching and Sport Management Departments in Anadolu University in 2012-2013 Academic Year.

Materials

By collecting data of research, it was used "Metacognition Questionnaire-30 (MCQ-30) (The meta-cognitions Questionnaire (MCQ-30)) which was enhanced by Wells and Cartwright-Hatton (2004), translated into Turkish by Tosun & Irak (2008), and studied with validity and reliability studies.

It is requested from individuals that they should rate themselves in the range of 1 to 4 points for each item of MCQ-30. 1-"Strongly disagree", 4-"Strongly agree". The highest score obtained from the scale of 120, the lowest score is 30. Rising the score indicates increasing of metacognitive activity in pathological way.

According to psychometric study measured by Wells and Cartwright- Hatton, items on Metacognition Scale are distributed on five factors and this distribution is identical as in the long form. (1) The Positive Beliefs consist of 1., 7., 10., 20., 23. and 28. items and include positive beliefs about anxiety that helps solving the problem, planning. And also for this factor, anxiety is a desirable trait of personality. (2) Uncontrollableness and Danger include 6., 13., 15., 21., 25., 27. items and it consists of two dimensions. The first one is a belief that person should control his concerns in order to fulfill the human functions and stay safely. The second one is a belief about not controlling to anxiety. (3) Cognitive Confidence include 8., 14., 18., 24., 26. and 29. items and it is about the lack of confidence of one's own memory and attention skills. (4) Need to Control Thinking consists of 2., 4., 9., 11., 16., 22. items and includes requirement of controlling the negative beliefs like things with superstitions, being responsible and punished themes. These beliefs are related to responsible person and punishing him because of results of detrimental consequences which

cannot be controlled. (5) Cognitive Awareness consists of 3., 5., 12., 17., 19. and 30. items and refers to struggle with one's own thought processes, continuously (Tosun & Irak, 2008).

According to Wells and Cartwright-Hatton, MCQ-30's Cronbach alpha value is .93 and Alpha values for factor is in the range .93 to .72. There was a significant correlation between the subscale and these correlations are consistent those in the long version of MCQ-30. Made by Tosun & Irak (2008) Turkish adaptation of it, the Metacognition Questionnaire-30's Cronbach alpha reliability coefficient was .86. In addition, the ratio of the scale of the first half (odd-numbered items) has been .72 and for the second half (even-numbered items) has been .79. Results have shown the high internal consistency of MCQ-30 (Tosun & Irak, 2008).

Reliability expresses consistency of questions with each other in a survey and how reflects the scale used the issue interested (Kalaycı, 2008). Reliability analysis of scale used for identifying the level of metacognition of students of Physical Education and Sports School was performed with Alpha Method.

Table 1. *Metacognition Questionnaire-30's Alpha Values.*

	Cronbach Alfa
Metacognition	,85
The Positive Beliefs	,82
Uncontrollableness and Danger	,62
Cognitive Confidence	,84
Need to Control Thinking	,71
Cognitive Awareness	,72

Depending on Alpha coefficients, the reliability of the scale is interpreted in the following way (Kalaycı, 2008):

- 0:00 $\leq$ alpha $\leq$ 0:40 scale is not reliable,
- 0:40 $\leq$ alpha $\leq$ 0.60 is low reliability of the scale,
- alpha $\leq$ 0.80 $\leq$ 0.60 the scale is highly reliable,
- the scale of $\leq$ 1.00 0.80 $\leq$ alpha is highly reliable.

In this study, consequence of repeated analysis of the reliability of the scale reliability is determined ".85", respectively. This value is adequate for research ".70" because it is like a high standard, the scale used in research as a whole, it was concluded that nature. Since this value is a higher than ".70" standard which is adequate for research, it was concluded that that scale can be used in research as a whole. As well, the scale subscales reliability coefficients are determined for the size of positive beliefs is .82, for the size of uncontrollability and danger is .62, for the size of cognitive reliability is .84, for the size of requirement of controlling the thoughts is .71 and for the size of cognitive awareness is .72, respectively. All of the required scale, as well as the size of the alpha value shows that the scale is reliable for determining the level of metacognition of students of Physical Education and Sports School.

Analysis

After implementing as planned the data collection tool used in the study to students, responses to scale have been reviewed individually by the researcher. Very few scale which wasn't marked as needed or left blank were left outside the scope of the assessment. Then, each of scale that will be taken into

consideration are numbered starting from 1. It is adopted giving 1 to option of "I strongly disagree", 2 to option of "I disagree", 3 to option of "I agree", 4 to option of "I strongly agree" for each item of 30 positive regulated items of Metacognition Questionnaire-30. In addition, students' personal information in the survey form has been entered into the computer as a number.

Before beginning the analysis of data related to the study of statistical methods to determine compliance with the SPSS program have analyzed the distribution of the data, the distribution of the kurtosis and skewness were studied. Skewness is a measure of a distribution according to normal distribution whether it is symmetrical or distorted. Kurtosis of the normal distribution curve shows how much it is steep or flat (Özdamar, 2004). Even though in the literature there are no standard values certain accepted, when the normal skewness and kurtosis values are ± 2 and ± 7 intervals, Chou & Bentler (1995) and Curan et al. (1996) stated they show normal distributions. Normal distribution is a cluster that each of which may be defined by a mean and standard deviation of the distribution.

When the Physical Education and Sports School students' Metacognition Questionnaire-30 scores are analyzed in terms of kurtosis and skewness, Chou & Bentler (1995) and Curan et al. (1996) stated that the kurtosis and skewness of the data showed a normal distribution according to the values they said. After analyzed the distribution of data, to analyze data of tests to be used in order to decide whether the examined homogeneous (Levene > 0.05), it is determined that the data are homogeneous.

Data from the computer in the analysis of research to attain the objectives facing the students' metacognitive reading strategies according to their level the scores obtained, the arithmetic mean and standard deviation calculation made to have the students that they use metacognitive reading strategies they receive from their points to their gender, they study sections, grade level, and they graduated high school fields differ according to in order to determine whether to show the operation of the binary cluster has benefited from the test for comparisons, for comparison of more than two sets, ANOVA is used. Statistical analysis for the realization of the significance level was adopted at .05.

RESULTS

Table 1. *Personal Characteristics of Students (n = 326)*

	Personal Characteristics	N	%
Gender			
	Girl	92	28.2
	Boy	234	71.8
Departments			
	Physical Education and Sports Teaching	127	39.0
	Sports Management	66	20.2
	Coach Training in Sports	97	29.8
	Recreation and Sports	36	11.0
Class Level			
	1st class	86	26.4
	2nd class	109	33.4
	3rd class	82	25.2
	4th class	49	15.0

As seen in Table 1, 28.2% of the students in the research of the study population were female, 71.8% are male. As regards students studying their departments, Physical Education and Sports Department students consist of majoring 39.0%, Coaching Department students consist of 29.8%, Recreation Department students consist of 20.2% and Department of Sport Management students consist of 11.0% of all population. Education in relation to the class level, 26.4% is for freshman, 33.4% is for sophomores, 25.2% is for third graders and 15.0% is for fourth grade students population of rate involved in the study. According to their graduated high school area, students who graduated from Turkish-mathematics department have the rate of 48.5%, students who graduated from social department have the rate of 20.9% and students who graduated from fitness department have the rate of 12.3% of study. Apart from this, 10.4% of the students graduated from the field of science, 1.8% of them graduated from the field of foreign languages and 6.1% of them graduated from the other areas.

Table 2. *The Metacognition Levels levels according to genders of students (n = 326)*

		N	$\overline{X}$	SS	T	df	P
The Positive Beliefs	Girl	92	14.54	3.64	.66	324	.51(>.05)
	Boy	234	14.25	3.66			
Uncontrollableness and Danger	Girl	92	15.34	2.91	-1.70	324	.09(>.05)
	Boy	234	15.94	2.84			
Cognitive Confidence	Girl	92	13.04	3.69	1.31	324	.19(>.05)
	Boy	234	12.45	3.69			
Need to Control Thinking	Girl	92	14.40	3.93	2.57	324	.01(<.05)
	Boy	234	13.37	3.21			
Cognitive Awareness	Girl	92	17.10	2.84	-1.14	324	.26(>.05)
	Boy	234	17.50	2.89			

According to table 2, there is no statistically difference between mean scores of uncontrollableness and danger, cognitive awareness, cognitive confidence and the positive beliefs of girls and boys students. There is a statistically difference between mean scores of need to control thinking.

Table 3. *The Metacognition Levels according to departments of students (n = 326)*

Source of Variation		df	Sum of Squares	Mean Squ.	F	P
The Positive Beliefs	Between Gr.	3	37.8	12.6	.94(<1)	.42(>.05)
	Within Gr.	322	4300.4	13.4		
	Total	325	4338.2			

Uncontrollableness and Danger	Between Gr.	3	3.6	1.2	.14(<1)	.94(>.05)
	Within Gr.	322	2662.7	8.3		
	Total	325	2666.3			
Cognitive Confidence	Between Gr.	3	83.1	27.7	2.05(>1)	.11(>.05)
	Within Gr.	322	4355.9	13.5		
	Total	325	4439.1			
Need to Control Thinking	Between Gr.	3	26.8	8.9	.82(<1)	.48(>.05)
	Within Gr.	322	3492.1	10.9		
	Total	325	3518.9			
Cognitive Awareness	Between Gr.	3	7.8	2.6	.31(<1)	.82(>.05)
	Within Gr.	322	2687.5	8.4		
	Total	325	2695.3			

According to table 3, There is no statistically difference according to departments of students between mean scores of uncontrollableness and danger, cognitive awareness, cognitive confidence, need to control thinking and the positive beliefs.

Table 4. *The Metacognition Levels according to grade level of students (n = 326)*

Source of Variation		**df**	**Sum of Squares**	**Mean Squ.**	**F**	**P**
The Positive Beliefs	Between Gr.	3	33.0	11.0	.82(>1)	.48(>.05)
	Within Gr.	322	4305.2	13.4		
	Total	325	4338.2			
Uncontrollableness and Danger	Between Gr.	3	111.4	37.1	4.68(>1)	.00(<.05)
	Within Gr.	322	2554.9	7.9		
	Total	325	2666.3			
Cognitive Confidence	Between Gr.	3	101.5	33.8	2.51(>1)	.06(>.05)
	Within Gr.	322	4337.6	13.5		
	Total	325	4439.1			
Need to Control Thinking	Between Gr.	3	31.5	10.5	.97(>1)	.41(>.05)
	Within Gr.	322	3487.4	10.8		
	Total	325	3518.9			
Cognitive Awareness	Between Gr.	3	99.3	33.1	4.11(>1)	.01(<.05)
	Within Gr.	322	2596.0	8.1		
	Total	325	2695.3			

According to table 4, there is no statistically difference according to grade level of students between mean scores of the positive beliefs, cognitive confidence and need to control thinking. There is a statistical difference between mean scores of uncontrollableness and danger and cognitive awareness.

DISCUSSION

These results have been achieved in this research that is in order to examine whether Anadolu University School of Physical Education and Sports Department students' metacognitive levels differ to students' gender, education departments and grade level or not.

According to their gender, when Physical Education and Sports School students' metacognitive level are analyzed, there is no significant difference on their positive beliefs, uncontrollableness and danger, cognitive confidence and cognitive awareness levels. This result of research is consistent with Turan et al. (2009) studied on different program models that implements five different medical school students in the metacognitive awareness of the 846 on the student and according to gender statistically significant difference cannot find the research results. However, in this study it is served that the female students get higher score in the level of "need to control thinking" than male students and thus a significant difference occurs. To get a high score in this subscale of the scale, people's fearing of consequences which can be happen due to having thoughts and in the extreme to assume responsibility for them, in other words, it expresses negative beliefs is to take control. These results obtained from this study are similar to the results of various studies. One of these studies was conducted in 2011 by the Demir and Özmen. In Demir and Özmen's results of research that has been done, when the girls are compared with male students, it has emerged that at level of "need to control thoughts" they have a higher average score. Similarly, in researches which were evaluated the students' metacognitive levels according to their gender by Saban & Saban (2008), Tosun & Irak (2008), it is observed that girls have higher score of at the level of their control requirements than boys levels. In the research to determine the situation which was studied by Spence et al. (1999), while there were no significant difference between the levels of girls' and boys' metacognitive levels statistically, researches showed that girls' metacognition levels developed than those of boys. In the light of this study, female students are more successful in controlling negative beliefs than male students. The underlying reason for this can be attributed to gender roles installed depending on the cultural structure.

Physical Education and Sports School students' metacognition levels didn't differ by their studying departments. In other words, it can be said that there is no impact on the metacognitive level of students who are studying teaching physical education and sport, recreation and sport management department of a change in coaching.

According to grade level of students of Physical Education and Sports School, there wasn't any significant difference between the metacognition levels, the positive beliefs, cognitive confidence and need to control thinking. Nevertheless, it has emerged a significant difference in the levels of cognitive awareness in terms of uncontrollableness and danger in terms of grade level. Research derived from these findings is consistent with the results of Tosun & Irak (2008)'s have done the research about students' age and cognitive awareness and uncontrollableness and danger subscale total score between negative and significant relationship.

It is seen that metacognition scale in terms of uncontrollableness and danger in the fourth grade is lower than average of the first, second and third grade students. It is an expected result of the falling uncontrollableness and danger level by closer to the final year students of the university. Because their cognitive levels of students, alumni, etc. features increase their self-confidence, it can be interpreted as it will affect in keeping their anxieties under control. This result is consistent with Demir & Özmen (2011)'s findings obtained the research of college students in a variety of top-level variables examined in terms of

cognition which aimed to demonstrate consistency. However, it doesn't coincidence with the results of research which is studied by Semerci & Elaldi (2011), which aimed to determine students' metacognitive beliefs of Faculty of Medicine. Semerci and Elaldi indicated that there was no expected finding about increasing in size of students' uncontrollableness and danger as approaching the final year of university. They interpreted this case that there wasn't any increasing on self-confidence of students and hence they were forced to take control in the form of the concerns.

It is seen in terms of the size of cognitive awareness which is one of the subscale of metacognitive scale the average of fourth grade score is lower than average of the first grade scores. These differences of students can be interpreted that they affects the level of training as their cognitive awareness. On one's own thought processes constantly expressing the hassle of "metacognition" size has an importance for physical education and sports of college students on having higher-level thinking skills.

CONCLUSIONS

As a result, this study has been conducted with students studying in departments of a college of Physical Education and Sports College of Physical Education and Sports Teacher Coaching, Recreation and Sport Management. It is thought that this study will provide significant contributions to literature by comparing with students of other universities departments of Physical Education and Sports of Turkey and including in other faculty and departments' students. Designed quantitative and qualitative researches will improve on the scope of work. In addition, it is necessary to provide environment to develop their level of metacognitive skills of students of Physical Education and Sports School to make a difference in their professional careers in future.

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