THE CORRELATION BETWEEN METACOGNITIVE AWARENESS AND THINKING STYLES OF PRE-SERVICE EFL TEACHERS

Research Article

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Abstract

Metacognition is an umbrella term encompassing thinking and memory, learning, motivation, and cognitive development as indicated by Metcalfe & Shimamura (1994). As is generally believed, metacognition has direct linkage with higher order thinking skills, which is all about regulating and functioning on cognitive processes of learning. According to Livingstone (2003: 2), "activities such as planning how to approach a given learning task, monitoring comprehension, and evaluating progress towards the completion of 'that' task is metacognitive in nature." As to the educational practices, learners thinking styles and metacognitive awareness should be attached importance in the sense that both are considered influential factors on learning and thinking. Therefore, the current study aims to scrutinize this possible relationship that takes place in foreign language education specifically. For this purpose, a representative group of 121 pre-service EFL teachers enrolled in English Literature Department was the participant group of this study. *Thinking Styles Inventory (TSI)* and *Metacognitive Awareness Inventory (MAI)* were used to collect data. The results were statistically analyzed through the application of SPSS 22.0 version. Based on the findings of the study, it can be said that the participants have a moderate level of metacognition, the most prominent thinking styles are *legislative, judicial, monarchic,* and *anarchic* thinking styles, and *legislative, executive, monarchic,* and *internal* thinking styles predict metacognition.

Keywords: metacognitive awareness, thinking styles, pre-service EFL teachers, English language teaching

1. Introduction

There is no doubt that metacognitive awareness or metacognition are essential constructs in second or foreign language learning (Efklides, 2014; Panadero, 2017; Ohata & Fukao, 2014; Öz, 2015). In particular, Öz (2016; 110) stated that "understanding the nature of metacognitive awareness and ways of developing and regulating this knowledge in L2 learners is of great importance in dealing in detail with self-regulated and self-determined language learning."

The concept of thinking styles was introduced to the literature in 1988 by American psychologist Robert Sternberg. His theory came to be known as "mental self-government", in which he claimed that one can control or manage his or her daily activities in many different ways, which are called "thinking styles". As such, thinking style can be defined as a "preferred way of thinking" (Yong, 2012; 63). Specifically, thinking styles come to mean "what a person prefers to do and how he/she likes to do it" (Betoret, 2007, p. 220). There are 13 thinking styles categorized into 5 groups proposed by Sternberg: function (legislative, executive, and judicial),

form (monarchic, hierarchic, oligarchic, anarchic); level (global and local); scope (internal, external); and leaning (liberal, conservative).

Metacognition is generally defined as the ability to understand and monitor one's own learning process. It is generally viewed as an essential element in learning and plays a crucial role in the development of learner autonomy (Wenden, 1991; Wilkins, 1996). "Metacognitive Awareness enables person to plan, sequence and monitor his or her learning so that the improvements can be seen directly in performances" (Kallio et al, 2017). As such, metacognitive awareness can be viewed as one of the most important elements in fostering learning and learner autonomy. The significance of metacognitive awareness stems from the fact that it provides opportunity for "individuals to plan, sequence, and monitor their learning in a way that directly improves performance" (Schraw & Dennison, 1994; 460).

In literature, there is a tendency to separate knowledge of cognition (metacognitive knowledge) and regulation of cognition (metacognitive regulation) (Aydin & Ubuz, 2010; Schraw & Dennison, 1994; Tanner, 2012; Young & Fry, 2008). According to Schraw and Dennison (1994), these two components of metacognition, knowledge of cognition and regulation of cognition, work in tandem and this enables students to enhance academic performance. Schraw and Moshman (1995) categorized knowledge of cognition into three sub-dimensions which are *declarative knowledge, procedural knowledge,* and *conditional knowledge. Declarative knowledge* refers to cognition as students' awareness of themselves. *Procedural knowledge* covers learning procedures/strategies, and *conditional knowledge* encompasses the situations under which a specific strategy is the most efficient. In the present study, metacognition is considered as comprising of knowledge of cognition and regulation of cognition.

On the other hand, *regulation of cognition* refers to mental processes which are vital for students to plan, monitor, and evaluate their own learning. *Planning* is related with the ways students plan their cognition through setting goals, selecting strategies, and scheduling time and strategies. According to Schraw and Moshman (1995, p. 355), *mentoring* is "on-line awareness of task comprehension and task performance". Evaluation is about assessments of regulatory processes.

1. *Knowledge of cognition*: explicit knowledge concerning ourselves as learners, procedural knowledge about strategies (including how and where to use which strategy), etc. (Sadler-Smith, 2012)

2. *Regulation of cognition*: the ability to plan (selection of correct strategies and the effective use of cognitive resources), manage information, monitor development, correct performance errors (debugging), and evaluate the process. (Sadler-Smith, 2012)

When it comes to thinking styles, they are viewed as significant behavioral variables by researchers. Sternberg's self-government theory (1997) holds that thinking styles are, in very broad terms, the ways of people or individuals about thinking the environmental affairs.

Thinking styles are grouped under five broad categories. These are *functions, forms, levels, scopes, and leanings.* Each thinking styles under these five categories are as follows:

1. Functions: legislative, executive, and judicial

2. Forms: monarchic, oligarchic, and hierarchical

3. Level: anarchic, locals, and global

4. Scopes: internal and external

5. Leanings: liberal and conservative

Studies indicate that thinking styles correlate with problem-solving, decision-making, academic achievement, etc., and variables such as culture, gender, age, field of study, record of service, parents' styles, etc. affect individuals thinking styles. Research indicates that students with legislative thinking style have a potential to have high self-efficacy in innovation and invention. Students with judicial thinking style are adept at assessment and judgment in suitable cultural and situational context.

In addition, of the 13 thinking styles legislative, executive, and judicial styles tend to come to fore. The legislation style is about re-creating, imagining, devising, and planning. The executive style carries out the actions prescribed by the legislative thinking style; and the judicial is responsible for judging, evaluating, and comparing.

Furthermore, Sternberg claims that people tend to organize their daily activities based on their thinking styles. Yet, thinking styles should not be viewed as fixed constructs; rather, they are preferences, not abilities (Sternberg, 1997; Lee & Tsai, 2004). This means that such styles may change based on the situation (Apaydin & Cenberci, 2018). Another important point is that it is possible to teach, measure, and change thinking styles (Zhang, 2002; Dinçer, 2009). Thus, teachers or practitioners may benefit from the findings of studies conducted on thinking styles, and according to Lee and Tsai (2004), what matters is to provide conducive environments for various thinking styles.

2. Literature Review

There are studies that focus on thinking styles relative to other variables. Tuzer (2016), for example, focused on thinking styles in relation to age, gender, educational background and no statistically significant relation was found. In another study, Çelik (2016) worked on 11th grade students, comparing their learning styles to thinking styles. That study found correlation between judicial thinking styles and repetition and organization strategy, between the global thinking style and the understanding of monitoring comprehension strategies.

Thinking styles were also studied in relation to variables such as literacy self-sufficiency, reflective thinking, and thinking needs. Çınar (2016), for example, investigated the correlation between thinking styles and reflective trends and found the correlation between the judicial thinking and investigative reflective style was high. The study also found that there was strong positive correlation between hierarchical thinking and investigative reflective thinking styles and between hierarchical thinking and intrinsic reflective thinking styles.

Research on thinking styles studied them relative to academic achievement, or gender. The relation between thinking styles and its relationship with academic achievement was studied by Nazarifar et al (2011), who found that the students enrolled in psychology and educational sciences departments turned out to have higher in the executive thinking style while engineering students were higher in the legislative thinking style. In that study, male students were found to have higher levels of legislative thinking style. In regard to gender, Khosravi (2010) figured out that gender predicts legislative, executive, and judicial thinking styles.

In a recent study, Teng (2019) worked on the relation between metacognition and its relationship with the writing skill at tertiary level. The results of this study indicated that there was strong positive correlation between EFL writing performance and sub-dimensions of metacognition, namely declarative knowledge, procedural knowledge, conditional knowledge, planning, monitoring, and evaluating.

Sungur and Senler (2009) worked on high school students and found that Turkish high school students have more declarative and conditional knowledge rather than procedural knowledge and debugging strategies. Raoofi et al. (2014) found that metacognitive interventions have the potential to enhance language performance.

The relation between learner autonomy in EFL reading and metacognitive strategies was studied by Sarıçoban and Alyas (2016). This study found remarkable correlation between most metacognitive reading strategies and reading autonomy. In another study, Sarıçoban (2015) investigated metacognitive awareness and the higher order thinking process of pre-service EFL teachers. This study found that pre-service EFL teachers had positive attitudes towards their metacognitive awareness in their academic studies.

One very relevant study was conducted by Heidari and Bahrami (2013). They studied the relationship between thinking styles and metacognitive awareness of Iranian EFL university students enrolled in English Literature, English Translation, and English Language Teaching. The results of this study indicated significant positive correlation between hierarchical, anarchic, and external styles and metacognitive awareness.

When it comes to research on thinking styles, it can be said that it has produced various insights. In the first place, their relationship with academic achievement has been indicated by a number of studies (Bernardo, Zhang, & Callueng, 2002; Cano-Garcia & Hughes, 2000; Zhang, 2000; Zhang & Sternberg, 2000). In particular, the findings of Zhang's study (2004) indicated that thinking styles were more influential than other factors included in that study in academic success. A similar finding was reported by Fan et al. (2010), who showed that thinking styles predicted academic achievement more than personality traits and motivation in hypermedia-based learning environments.

There are also other insights gained from research on thinking styles. Workman (2004), for example, discovered a correlation between global thinking style and better performance in computer-aided education. Some other studied (Fan et al., 2010; Zhang & Sternberg, 2000) found that thinking styles offer more precision value than ability, personality, and achievement motivation in predicting academic achievement. Cano-Garcia and Hughes's (2000) study figured out that executive, and internal styles best predicted academic achievement among a Spanish middle school students, whereas the legislative thinking style was negatively correlated with academic success. Another interesting finding is reported by Zhang and Sternberg (2000). They indicated that thinking styles related to creativity (legislative, judicial, hierarchical, global, and liberal) had significantly negative correlations with academic achievement while thinking styles that required conformity (executive, conservative, monarchic, and local) correlated with academic achievement.

There are no studies that focus on language learning process from the perspective of thinking styles. Similarly, there is very limited research that focuses on the relation between thinking styles and metacognition, although they are close psychological factors. As such, the present study aims at investigating the relation between thinking styles and metacognition in relation to pre-service EFL teachers. The present study aims to answer the following research questions:

1. What are the levels of metacognitive awareness of the participants in terms of knowledge of cognition, and (2) regulation of cognition?

2. What are the levels of metacognitive awareness of the participants in language learning process with special knowledge *(a) declarative knowledge, (b) procedural knowledge, (c) contextual knowledge, (d) planning, (e) information management strategies, (f) comprehension monitoring, (g) debugging strategies, and (h) evaluation?*

3. Which thinking styles are prominent among the participants of the study?

4. Which thinking style or styles predict knowledge of regulation as a component of metacognition?

5. Which thinking style or styles predict regulation of cognition as a component of metacognition?

3. Methodology

The present study is a quantitative study. It uses descriptive analysis to lay out the general overview and then uses regression analysis to see which variable(s) predict the dependent variable, which is metacognition.

3.1. Data Collection

In the present study, the data collection tools were used: (1) Thinking Styles Inventory (TSI), and (2) Metacognitive Awareness Inventory (MAI). Nearly 40-45 minutes were given to the participants to fill in the questionnaires.

1.1.1. Data collection tools

Two questionnaires were used in the present study to collect data: (1) Thinking Styles Inventory (Sternberg & Wagner, 1992), and (2) Metacognitive Awareness Inventory (Schraw & Dennison, 1994).

1. Thinking Styles Inventory: This inventory was designed by Sternberg and Wagner (1991). It is a comprehensive tool containing 104 items. There are 13 subscales (given below), with 8 items each.

Table 1. *Key characteristics of each thinking style*

	Thinking style	Key characteristics	Tasks preferred
functions	Legislative	Like doing thinks in on their own way. They prefer to work on tasks that require creative strategies.	Like doing science project, writing, poetry stories or music, and creating original artworks.
	Executive	Like to be told what they should do or how they should do it. They prefer to work on tasks with clear instructions and structures	Like to solve problems, write papers on assigned topics, do artwork from models, build from designs, learned assigned information.
	Judicial	Prefer tasks that enable them to analyze, judge, and evaluate thinks and ideas	Like to critique others, write critical essays, give feedback and advice
forms	Monarchic	Prefer to work on tasks that allow complete focus on one thing at a time	like to immerse self in a single project, whether art, science, history
	Oligarchic	Prefer to work on multiple tasks in the service of multiple objectives, without setting priorities	Like to devote sufficient time to reading comprehension items to may not finish standardized verbal ability tests
	Hierarchical	Like to prioritise tasks and distribute attention to them according to their value	like to budget time for doing homework so that more time and energy is devoted to important assignments
	Anarchic	Prefer to work on tasks without norms and instructions. They like	Write an essay in stream of consciousness form in conversation, jump from one point

levels	Locals	flexibility about what, where, and how to work	to another, start things but don't finish them.
		Local people prefer to work with details. They tend to notice the trees more than the forest. (Focus on concrete ideas)	Write an essay describing the details of a work of art and how they interact.
	Global	Prefer to deal with wide and frequently abstract questions. They tend to see the forest more than the trees inside (Focus on abstract ideas)	Write an essay on the global message and meaning of a work of art
scopes	Internal	Are usually introverted, reserved people with fewer social connections than others; as a result, prefer to work alone (Enjoy working independently)	Prefer to do science or social studies projects on their own
	External	Tend to be extroverted, open, and with greater social and interpersonal inclinations (enjoy working in groups)	Prefer to do science or social studies project with other members of a group
Leanings	Liberal	Prefer to work on tasks that involve novelty and ambiguity (use new ways to deal with tasks)	Prefer to figure out how to operate new equipment even if it is not the recommended way, prefer open-class setting
	Conservative	Prefer to work on traditional tasks that must follow similar rules and procedures to these previously used (use traditional ways to deal with tasks)	Prefer to operate new equipment in traditional way, prefer traditional classroom settings.

2. Metacognitive Awareness Inventory (MAI): This questionnaire was developed by Schraw and Dennison (1994). It includes 52 items assessing various facets of metacognition. There are two main categories in this inventory: (1) Knowledge of cognition, and (2) regulation of cognition. There are seventeen items measuring knowledge of cognition, and the remaining thirty-four items measure regulation of cognition. Knowledge about cognition consists of three sub-dimensions, namely:

(1) declarative knowledge (8 items),

(2) procedural knowledge (4 items), and

(3) conditional knowledge (5 items).

Regulation of knowledge includes five sub-dimensions:

(1) Planning (7 items),

(2) information management strategies (10 items),

(3) comprehension monitoring (7 items),

(4) debugging strategies (5 items), and

(5) evaluation (6 items).

The answers given to MAI range from never or almost never true of me to always or almost always true of me. The reliability level of the inventory was calculated as .90 by Schraw & Dennison, (1994), who also validated the two-factorial structure of the inventory. For the present study, the reliability values were as follows: ,833 for knowledge cognition, ,867 for regulation of knowledge, ,883 for thinking styles inventory, and ,907 for total reliability. The results are given below.

Table 2. *Reliability analysis of the two instruments*

Sub-scales	number of items	Cronbach's alpha value
Knowledge of cognition	17	,833
Regulation of knowledge	35	,867
Thinking Styles Inventory	102	,883
Total	154	,907

3.2. Participants

The participants of the study were 121 English Language and Literature department students. The number of male students were 27 (%22,3) and female students 90 (%74,4). The number of 1_{st} grade students is 39, 2_{nd} grade students 33, 3_{rd} grade 25, and 4_{th} grade students is 20. Four students failed to provide their grade level.

Table 3. *Characteristics of the participants*

		grade				Total
		1st grade	2nd grade	3rd grade	4th grade	
gender	female	27	24	19	20	90
	male	12	9	6	0	27
Total		39	33	25	20	117

4. Findings

The levels of metacognitive awareness. In order to present the overall situation in terms of thinking styles and metacognition level, descriptive statistics were utilized. Then, to see which thinking style or styles predict metacognition, regression analysis was conducted. First of all, we will present the findings regarding metacognition with its sub-dimensions.

4.1. Findings as to Metacognition

Findings regarding metacognition are firstly presented as a whole in Table 4. Then, each dimension is presented separately.

Table 4. *Findings about knowledge about cognition and regulation of knowledge*

Variables	Low		Moderate		high	
	f	*%*	*f*	*%*	*f*	*%*
Knowledge about cognition	**54**	**48,21**	5	5	53	47,32
Declarative knowledge	46	40	14	12,12	**55**	**47,82**
Procedural knowledge	47	40,17	20	16,5	**50**	**42,73**
Conditional knowledge	**48**	**41,73**	20	16,5	47	40,86
Regulation of knowledge	53	47,74	4	3,3	**54**	**48,64**
Planning	49	42,60	12	9,9	**54**	**46,95**
Information management strategies	47	40,51	15	12,4	**54**	**46,55**
Comprehension monitoring	48	41,37	11	9,1	**57**	**49,13**
Debugging strategies	49	41,88	18	14,9	**50**	**42,73**
Evaluation	50	44,64	12	9,9	50	44,64

Table 4 indicates that the participants rated themselves rather low in terms of knowledge of cognition (n=54). Under this category, the participants also rated themselves low in terms of conditional knowledge. Items in conditional knowledge category cover issues like when people learn best, different strategies used by participants, the ability to motivate oneself and use one's intellectual strengths. Therefore, in terms of issues like this the participants seem to have a low level of cognition. When it comes to regulation of knowledge, the participants rated themselves high (n=54). Under this category, the participants rated themselves rather high in terms of planning (n=54), information management strategies (n=54), comprehension monitoring (n=49,13), and debugging strategies (n=50). When it comes to evaluation, the participants rated themselves equal between low (n=50) and high (n=50). Debugging strategies cover issues like asking others when there is need, changing strategies when one fails to understand, re-evaluating the assumptions when one gets confused, and revising new information

4.1.1. Declarative knowledge

This section also provides a detailed analysis of the findings regarding the subcategories of metacognition. A careful analysis of Table 5 indicates that teacher candidates almost agree about their capacities in terms of declarative knowledge. They, however, strongly agree that they learn more when they are interested in the topic under discussion (M=4,56), and they understand their intellectual strengths and weaknesses (M=3,99). It is also important to know the kind of information for learning (M=3,89). They think that they are effective judgers of how well they understand something (M=3,82). They are aware of their teachers' expectations from them to learn (M=3,80) and they believe to have control over how well they learn (M=3,67). On the other hand, they moderately agree about their abilities in organizing information (M=3,53) and remembering information (M=3,56). Relying on these findings, it can be said that they need to be trained in how to organize and recall the information during their in-classroom studies, though they have strong interest in the subject matter.

4.1.2. Procedural knowledge

As to the procedural knowledge, the participants of the current study have reported that they have moderately agreed on their effective use of leaning strategies (M=3,74). The findings are presented in Table 4. They seem to be aware of the strategies they use (M=3,88) and utilize the ones that worked previously (M=3,77), and had a specific purpose for each of the strategy they employ (M=3,74). Another striking finding obtained in the study is that they feel undecided to determine which strategy is helpful for their own learning (M=3,58).

Table 6. *Descriptive statistics about procedural knowledge*

items	N	Minimum	Maximum	Mean	Std.
I try to use strategies that have worked in the past	117	1,00	5,00	3,7778	,81061
I have a specific purpose for each strategy I use.	117	1,00	5,00	3,7436	,83205
I am aware of what strategies I use when I study	117	1,00	5,00	3,8889	,79630
I find myself using helpful learning strategies automatically.	117	1,00	5,00	3,5812	,88317
TOTAL				3,74	

4.1.3. Contextual knowledge

Contextual knowledge of the participants seems to be at a moderate positive level (M=3,74). They agree to learn best when they have background knowledge about the topic (M=4,21), use different learning strategies depending on the context of situation (M=3,77), and thus become self-motivated (M=3,66). However, they are not certain about their use of intellectual strengths to compensate for their weaknesses (M=3,46) and know when each strategy they use will be most effective (M=3,56). These findings simply indicate the importance of background knowledge and the activation of schemata theory in understanding new information they need for their language learning studies. That means individuals need to establish a link between their prior knowledge and the new information.

Table 7. *Descriptive statistics about contextual knowledge*

items	N	Minimum	Maximum	Mean	Std.
I learn best when I know something about the topic	116	1,00	5,00	4,2500	,91247
I use different learning strategies depending on the situation	117	1,00	5,00	3,7778	,78905
I can motivate myself to learn when I need to.	117	1,00	5,00	3,6667	1,07479
I use my intellectual strengths to compensate for my weaknesses.	117	1,00	5,00	3,4615	,82565
I know when each strategy I use will be most effective.	116	1,00	5,00	3,5690	,78268
Total	115			3,74	

4.1.4. Planning

As is known, planning is an important stage in the learning process as well as the effective use of learning strategies and employing actions in the classroom. The participants have surprisingly reported almost a moderate level of planning phase in their own learning process (M=3,68). They obviously read instructions carefully before beginning a task (M=3,88), think about what they really need to learn before beginning a task (M=3,82), and set specific goals before that task (M=3,72). Most importantly, they believe that they should think of several ways to solve a problem (M=3,87). However, there is a striking finding in asking themselves questions about the material before they begin the task (M=3,54) and organize their time to best accomplish their goals (M=3,47). An appropriate speculation can be made about the importance of planning a task and setting it in motion for the best learning to take place. Any learners should plan in advance, set their own goals, and act accordingly.

Table 8. *Descriptive statistics about planning*

items	N	Minimum	Maximum	Mean	Std. Deviation
I pace myself while learning in order to have enough time	117	1,00	5,00	3,4786	,89634
I think about what I really need to learn before I begin a task.	117	1,00	5,00	3,8205	,79454
I set specific goals before I begin a task.	116	1,00	5,00	3,7241	,88057
I ask myself questions about the material before I begin.	117	1,00	5,00	3,5470	,97817
I think of several ways to solve a problem and choose the best one.	117	1,00	5,00	3,8718	,76043
I read instructions carefully before I begin a task.	116	1,00	5,00	3,8879	,90190
I organize my time to best accomplish my goals	117	1,00	5,00	3,4786	1,06349
TOTAL	115			3,68	

4.1.5. Information management strategies

According to social constructivist theory, it is important to reach knowledge, construct and use it for one's specific goals. This section of the study is simply about employing information management strategies. Surprisingly enough, the overall finding obtained in the current study indicates a highly unexpected level of that strategy use by the learners (M=3,60). They simply report only a favorable strategy use in focusing on the meaning and significance of new information (M=3,91) by paying attention to the importance of the new information (M=3,87). They seem to slow down when they encounter new information (M=3,74) and try to translate this new information into their own words (M=3,78). They have a moderate level of strategy use in creating their own examples to make the new information meaningful (M=3,65). They try to break studying down into smaller units (M=3,65) and establish relationship between what he reads and what he already knows and use the organizational structure of the text to help them learn (M=3,58). They try to focus on overall meaning rather than specifics (M=3,31). Lastly, they report that they are almost undecided to make use of visual techniques such as pictures or diagrams to help understand new information (M=2,96). It can be speculated that the participants prefer to employ bottom-up strategies for their own learning. They try to see

the whole focusing on the parts of it; they attach importance to details to attain the gist at the end.

Table 9. *Descriptive statistics about information management strategies*

items	N	Minimum	Maximum	Mean	Std
I slow down when I encounter important information	117	1,00	5,00	3,7436	,88233
I consciously focus my attention on important information.	117	1,00	5,00	3,8718	,76043
I focus on the meaning and significance of new information.	117	1,000	5,000	3,91453	,772062
I create my own examples to make information more meaningful.	117	1,00	5,00	3,6581	1,09986
I draw pictures or diagrams to help me understand while learning	117	1,00	5,00	2,9658	1,18126
I try to translate new information into my own words.	117	1,00	5,00	3,7863	1,07342
I use the organizational structure of the text to help me learn.	116	1,00	5,00	3,5862	,90476
I ask myself if what I'm reading is related to what I already know.	117	1,00	5,00	3,5812	,91198
I try to break studying down into smaller steps.	117	1,00	5,00	3,6581	,87259
I focus on overall meaning rather than specifics.	117	1,00	5,00	3,3162	1,16449
Total	116			3,60	

4.1.6. Comprehension monitoring

In language learning studies, comprehending a text plays the utmost important role in understanding the overall meaning. Therefore, learners should carefully employ comprehension strategies in order to best understand the message given in the text for them. That will also help them understand the real life in which they are involved. To do so, they need to consider several alternatives to a problem before they answer (M=3,76). At this vein, they report that they almost believe the effectiveness of checking options to solve a problem (M=3,69). They need to understand the relationships between ideas in a text (M=3,57). For this purpose, they specifically need to analyze the usefulness of comprehension strategies during their learning process (M=3,53). They are almost undecided to check their comprehension through their studies by giving regular pauses (M=3,10). However, there is another unexpected and striking finding obtained in the study regarding asking themselves questions about how well they are doing while learning something new (M=2,13). These findings once again attach importance of employing comprehension strategies in dealing with any types of texts, either oral or written in order to become successful users of the target language for their problems.

Table 10. *Descriptive statistics about comprehension monitoring*

items	N	Minimum	Maximum	Mean	Std
I ask myself periodically if I am meeting my goals.	116	1,00	5,00	3,4138	,94242
I consider several alternatives to a problem before I answer	117	1,00	5,00	3,7607	,77292
I ask myself if I have considered all options when solving a problem.	117	1,00	5,00	3,6923	,81433
I periodically review to help me understand important relationships.	117	1,00	5,00	3,5726	,85416
I find myself analyzing the usefulness of strategies while I study.	117	1,00	5,00	3,5385	,93346
I find myself pausing regularly to check my comprehension.	121	1,00	4,00	3,1074	,60279
I ask myself questions about how well I am doing while learning something new.	117	,00	5,00	2,1368	1,95601
Total	116			3,31	

4.1.7. Debugging strategies

In language learning studies, the most problematic issues the learners usually fear about their mistakes and how to effectively cope with them. Mistakes are inevitable part of language learning process in the sense that one can also learn form their own mistakes. The findings obtained in this current study once again attach importance on the awareness of one's own mistakes (M=3,95). The participants have reported that they should stop and reread when they get confused (M=4,24), stop and go back over new information that is not clear (M=4,00), ask others for help when they do not understand something (M=3,92), simply change strategies when they fail to understand (M=3,87), and as a last resort re-evaluate their assumptions when they get confused (M=3,73). One can speculate that the best learning can take place through one's own mistakes simply because these mistakes reflect and help self-learning strategies; thus, improves self-confidence. It is crystal clear that mistakes function as a diagnostic procedure in nature; they help learners to see their own strengths and weaknesses and find ways to overcome them.

Table 11. *Descriptive statistics about debugging strategies*

Items	N	Minimum	Maximum	Mean	Std.
I ask others for help when I don't understand something.	117	1,00	5,00	3,9231	1,11536
I change strategies when I fail to understand	117	1,00	5,00	3,8718	1,03839
I re-evaluate my assumptions when I get confused	117	1,00	5,00	3,7350	,73570
I stop and go back over new information that is not clear.	117	1,00	5,00	4,0085	,87588
I stop and reread when I get confused	117	1,00	5,00	4,2479	,85001
Total	117			3,95	

4.1.8. Evaluation

Evaluation seems to be the end step of learning process; however, this is not the case. The learner should be open to new learnings that can be realized through the possible best evaluation. It may lead you to new learnings or revise the topic under discussion once again to see your own weak points. Thus, it is spiral and a dynamic process. Keeping all these in mind, the findings indicate that they need to reconsider the importance of evaluation in their own learning process (M=3,65). They report that they become aware of how well they accomplish their goals and know how well they did once they finish a task or a test (M=3,70). They try to find an easy way to do things (M=3,67), try to summarize what they have learned and so see how much they have learned (M=3,62), and see if they have considered all the options before they solve a problem (M=3,61). Therefore, the results are said to contribute to the ultimate importance of evaluation process in order to see one's own learning and progress.

Table 12. *Descriptive statistics about evaluation*

items	N	Minimum	Maximum	Mean	Std. Deviation
I know how well I did once I finish a test.	116	1,00	5,00	3,7069	,90426
I ask myself if there was an easier way to do things after I finish a task	117	1,00	5,00	3,6752	,93614
I summarize what I've learned after I finish.	116	1,00	5,00	3,6293	1,06755
I ask myself how well I accomplish my goals once I'm finished	117	1,00	5,00	3,7094	,78849
I ask myself if I have considered all options after I solve a problem.	116	1,00	5,00	3,6121	,83167
I ask myself if I learned as much as I could have once I finish a task.	117	1,00	5,00	3,6239	,83796
Total	114			3,65	

4.2. Findings Regarding Prominent Thinking Styles

One of the aims of the study was to determine which thinking styles are common and prominent among the participants of the study. Table 13 gives the statistical information about this issue. We can understand from the table that the most prominent thinking styles among the prospective L2 teachers are legislative (n=53, 46,49%), judicial (n= 54, 48,21%), monarchic (n=53, 46,90%), and anarchic thinking styles (n=50, 45,87%). The thinking styles that were found to be low are executive (n=55, 49,54%), hierarchic (n=51, 45,94%), oligarchic (n=54, 48,64%), global (n=53, 46,90%), internal (n=55, 49,10%), external (n= 54, 49,54%), liberal (n=50, 46,72%), and conservative (n=55, 49,54%).

Table 13. *Descriptive statistics about thinking styles*

Variables	Low		Moderate		high	
	f	*%*	*f*	*%*	*f*	*%*
Legislative	49	42,92	12	9,9	**53**	**46,49**
Executive	**55**	**49,54**	13	10,7	43	38,73
Judicial	45	40,17	13	10,7	**54**	**48,21**
Monarchic	51	45,13	9	7,4	**53**	**46,90**
Hierarchic	**51**	**45,94**	15	12,4	45	40,54
Oligarchic	**54**	**48,64**	9	7,4	48	43,24
Anarchic	44	40,36	15	12,4	**50**	**45,87**
Global	**53**	**46,90**	11	9,1	49	43,36
Local	49	45,79	9	7,4	49	45,79
Internal	**55**	**49,10**	9	7,4	48	42,85
External	**54**	**49,54**	8	6,6	47	43,11
Liberal	**50**	**46,72**	11	9,1	46	42,99
Conservative	**55**	**49,54**	11	9,1	45	40,54

4.2.1. Thinking styles as predictors of cognition

4.2.1.1. Regulation of cognition

In order to see which thinking styles predict regulation of cognition, standard multiple regression analysis was conducted. The data analysis given in Table 14 indicates that the relation between the thinking styles and regulation of cognition is significant (F=9,051, sig. 000a). The results suggest that the nine thinking styles account for 61,4% (Table 14) of the total variance regulation of cognition. Among the independent variables *executive (sig. 000<.05), monarchic* (sig. 017<.05), *internal (sig. 033<.05),* and *legislative (sig. 041<.05)* were found to be significant predictors of regulation of cognition (Table 14).

Table 14. *Model Summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,784a	,614	,546	10,29920

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: recognition of cognition

Table 15. *ANOVA results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12482,277	13	960,175	9,052	,000a
	Residual	7849,439	74	106,073		
	Total	20331,716	87			

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: recognition of cognition

4.2.1.2. Knowledge of cognition

Knowledge of cognition encompasses issues like understanding one's intellectual strengths and weaknesses, knowing how to organize information, having control over how well one learns. People with *legislative thinking styles* tend to work on tasks that require creative strategies and prefer to choose one's own activities. People with *executive thinking style* like working on tasks with clear instructions and structures and prefers to implement tasks with set guidelines. Those who have *monarchic thinking style* work on tasks that allow complete focus on one thing at a time. And finally, those with an *internal thinking style* work on tasks that allow one to work as an independent unit. This finding indicates that having more creative strategies (legislative), working on tasks with clear instructions (executive), focusing one particular point at a time (monarchic), and working as an independent unit (internal) are important determinants of knowledge of cognition.

Standard multiple regression analysis was run in order to see which thinking styles predict knowledge of cognition. As to the analysis in Table 16 the relation between the thinking styles and r knowledge of cognition is significant (F=7,221, sig. 000a). The results obtained in the study indicate that the thirteen thinking styles account for 55,9% (Table 15) of the total variance knowledge of cognition. Among the independent variables *executive (sig. 001<.05), anarchic* (sig. 018<.05), legislative *(sig. 027<.05),* and *monarchic (sig. 034<.05)* were found to be significant predictors of knowledge of cognition (Table 17).

Table 16. *Model summary*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,748a	,559	,482	5,69665

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: knowledge of cognition

Table 17. *ANOVA results*

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3046,192	13	234,322	7,221	,000a
	Residual	2401,433	74	32,452		
	Total	5447,625	87			

a. Predictors: (Constant), legislative, executive, judicial, monarchic, hierarchic, oligarchic, anarchic, global, local, internal, external, liberal, conservative
b. Dependent Variable: knowledge of cognition

Among the independent variables *executive (sig. 001<.05), anarchic* (sig. 018<.05), legislative *(sig. 027<.05),* and *monarchic (sig. 034<.05)* were found to be significant predictors of knowledge of cognition.

Similar to the thinking styles that predict knowledge of cognition, *executive* and *legislative* thinking styles also predict regulation of cognition. This means that people who can choose one's own activities (legislative) and work on tasks with clear instructions (executive) tend to have a higher level for knowledge of cognition. In addition to those, people who work on tasks that allow complete focus on one thing at a time (monarchic) and work on tasks that allow one to work as an independent unit (internal) tend to have higher levels of knowledge of cognition.

5. Discussion and Conclusion

The primary aim of the present study was to determine the metacognitive levels of prospective L2 teachers, their thinking styles and the relation between them. The results indicated that as for metacognition, the participants seem to have a moderate to low level of competency in knowledge of cognition, which encompasses issue like declarative knowledge, procedural knowledge, and conditional knowledge. Conditional knowledge refers to issues like when people learn best, different strategies used by participants, the ability to motivate oneself and use one's intellectual strengths. Moreover, in regard to regulation of knowledge, the participants have a slightly higher level in terms of planning, information management strategies, comprehension monitoring, and debugging strategies. When it comes to evaluation, the participants rated themselves equal between low and high. Debugging strategies cover issues like asking others when there is need, changing strategies when one fails to understand, re-evaluating the assumptions when one gets confused, and revising new information. In short, with regard to metacognition, prospective L2 teachers can be said to have a moderate level of metacognition.

When it comes to thinking styles, the findings indicated that the most prominent thinking styles among the participants were legislative, judicial, monarchic, and anarchic thinking styles. On the other hand, the less common and less frequent thinking styles were found to executive, hierarchic, oligarchic, global, internal, external, liberal, and conservative.

The fundamental aim of the present study was to see whether there is a correlation between sub-dimensions of metacognition, namely knowledge of cognition and regulation of cognition. The results of the study indicate that the thinking styles that predict knowledge of cognition are *legislative*, *executive*, *monarchic*, and *internal* thinking styles. Depending on these findings, it can be said that preference over activity types, clear instructions, focusing on one thing at a time, working independently are important determinants for regulation of cognition, which covers students' awareness of themselves. learning procedures/strategies, and the situations under which a specific strategy is the most efficient. When it comes to knowledge of cognition, the thinking styles that determine it range from *legislative*, *executive*, *monarchic*, to *internal*. This means in addition to clear instructions, preference over activity types, focusing on one thing at a time and working independently are vital for knowledge of cognition. To sum up, *legislative*, *executive*, *monarchic*, to *internal* are important for metacognition.

The ultimate aim of this study was to scrutinize the possible relationship between thinking styles and metacognitive awareness of Turkish ELL learners. For this purpose, the researchers, at the outset, aimed to see the levels of metacognitive awareness and what type of thinking styles the ELL learners have in their language learning studies. As to metacognitive awareness, eight subdimensions have been investigated. The results have simply indicated that participants almost agree about their capacities in terms of *declarative knowledge, procedural knowledge, contextual knowledge,* and *debugging strategies*. However, as to *planning, information management strategies, comprehension monitoring,* and *evaluation*, they have displayed almost moderate level of capacity in their learning.

The tertiary purpose of the present study was to see which thinking styles predict regulation of cognition and knowledge of cognition. It was found that *executive, monarchic, internal,* and *legislative* thinking styles predict regulation of cognition. On the other hand, *executive, anarchic,* legislative*,* and *monarchic* were found to be significant predictors of knowledge of cognition. Similar results are reported in literature. Heidari and Bahrami (2013) indicated significant positive correlation between *hierarchical, anarchic, and external* styles and metacognitive awareness.

The most striking finding obtained in this study is that executive thinking styles is the ultimate predictor of both knowledge and regulation of cognition. In that sense, one can easily assert that the participants follow the rules and regulations in the discussion of their views with others and/or in writing them. They obviously stick to the most appropriate methods in solving a problem, prefer projects that have a simple and plain structure and purpose, check the procedures and the techniques to employ before launching a project or a study, and prefer their roles which are clearly defined in that project. Moreover, they try to understand how to solve these problems by following these pre-determined rules and regulations.

Relying on the findings of the study, it is recommended that teachers should guide the learners how to plan, help them improve their information strategies, provide them with more comprehension activities and how to evaluate their own learning through a variety of evaluation techniques such as self-evaluation and peer evaluation, which will cultivate their metacognition and improve their thinking styles. They should be guided how to attain, construct, and use knowledge for their real-life needs. Therefore, as language educators we should train our prospective language teachers to foster their creativity through creativity generating activities such as problem-solving, task-based, cooperative learning, etc. However, they should also be supported, helped, and guided by their teachers through scaffolding process.

It must be stated that it is possible to change thinking styles of people. According to literature, students tend to perform better academically when they are taught in accordance with their thinking styles (Negahi, Nouri, and Khoram, 2015). Similarly, as was indicated by Schleifer & Dull (2009), it is also possible to improve metacognition through domain knowledge and expertise. Therefore, we should tailor our instruction so that it channels learners thinking styles correctly and enables metacognition to be developed.

Another significant point is that, according to Veenman, Van Hout-Wolters, and Afflerbach (2006), it is during childhood that metacognition develops and during the education process it becomes more developed. These authors also claimed that regulation of cognition, as one of the main components of metacognition, develops after the other components of metacognition develop. Therefore, further studies can focus on the role of formal education and especially L2 education in the development of students' metacognition.

According to Sternberg & Grigorenko (1995), thinking styles are changeable for tasks. This means that learners' preferred way of may differ from task to task and thus they are "adaptive" (Yong, 2012). In particular, a learner's preferred thinking styles may differ from school subject to school subject. Therefore, future studies can focus on which thinking styles are valid for different school subjects and English as well and whether it is possible to draw certain patterns in these thinking styles. Another important point is that, as was pointed out by Zhang (2001), thinking styles may change with age, gender, or socioeconomic status. Therefore, future studies can focus on the predictive impact of these variables on thinking styles.

What is more, studies on thinking styles seem to provide positive correlations in terms of academic achievement; however, there are also controversial results depending on tests, learning tasks, or specific disciplines under different cultural and educational contexts or specific assessment situations (Fan & He, 2012). Therefore, more research is needed to ascertain their place in the learning process, and language teaching in particular.

One of the limitations of the present study was that it did not dwelled on gender differences or differences in grade levels in terms of thinking styles or metacognition. The reason for this is that the main focus of the study was to determine the overall level of the participants' thinking styles and metacognition and to see the correlation between these two constructs.

Future studies can focus on investigating gender differences or differences in terms of grade level.

6. Conflict of Interest

The authors declare that there is no conflict of interest.

7. Ethics Committee Approval

The authors confirm that the study does not need ethics committee approval according to the research integrity rules in their country.

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