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Brain Dominance and Language Learning Strategy Usage of Turkish EFL Learners

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Efforts of maximizing the effectiveness of foreign language instruction have lately begun to draw upon neurolinguistic research. Basically, knowledge of brain functions of learners can help teachers and curriculum designers utilize more effective teaching procedures. For this purpose, identification of learner strategies as they relate to neurolinguistic phenomena becomes paramount. This study replicated previous studies for 172 Turkish EFL learners using Oxford's (1990) scale "Strategy Inventory for Language Learning". The results indicated that the strategy used most frequently by the sample population is Metacognitive Strategies, followed by Cognitive Strategies while the least used strategy was found Affective Strategies. Based on the calculated scores, 41.3 % of the sample were found to be right-brain dominant while 37.8 % were left-brain dominant and 20.9 % were bilateral dominant. The results suggested a significant correlation between right brain dominance and memory strategies and cognitive strategies, and a correlation between whole brain dominance and social strategies.

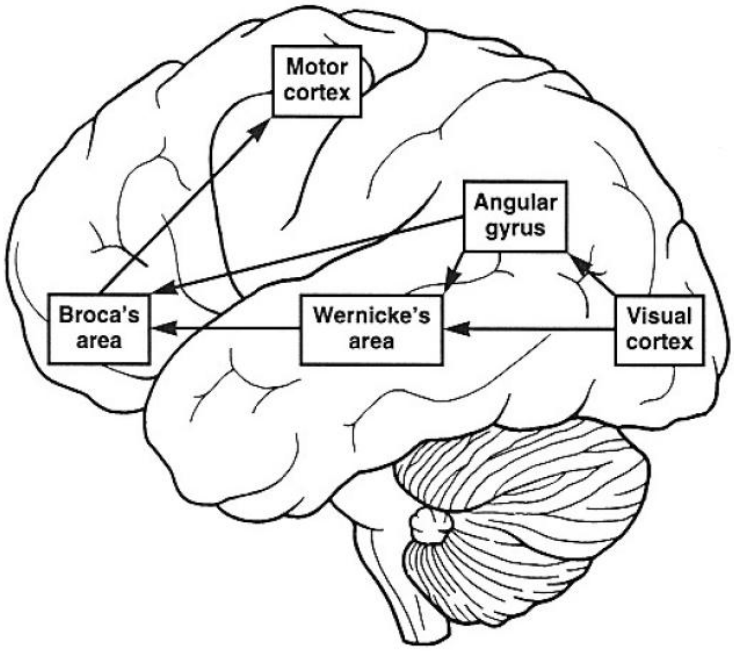
1. Introduction

Understanding brain behavior has been a significant phase of exploring the learning process. Brain behavior has especially been associated with learning styles and personality traits (Saleh, 2001). Investigation into an individual's brain behavior and relating it to his performances came primarily in the form of examining functions of the various parts of the individual's brain. Studies tapping this area of research preferred various terminology such as brain hemisphericity, brain dominance, split brain research, hemisphere specialization research, or lateralization in the research literature (Saleh, 2001; Baynes & Long, 2007). Basically, the tendency of an individual to process information through left or right hemisphere (or even both in combination) has been the focus of such studies.

Brain Dominance Research

In identifying the brain dominance, many studies employed Lesion, Wada, and fMRI (Functional Magnetic Resonance Imaging) tests (Ramsey et al., 2001; Gibson, 2002; Baynes & Long, 2007; Ahlsén, 2011; Schnelle, 2010). Clinical signs of language lateralization were obtained either through evaluating the effects of brain lesions or by inactivating one of the hemispheres at a time (the Wada test). Broca's and Wernicke's areas were identified as the two areas in the left hemisphere for the language functions.

Figure: Locations of Broca's and Wernicke's aphasia



(Stillings et al, p. 309, 1998)

Inactivation of the Broca's area was found to be related to the loss in the expressive language functions whereas inactivation of Wernicke's area was identified as the region for receptive language functions.

Table 1: Two types of aphasia: Broca's and Wernicke's

	BROCA'S APHASIA	WERNICKE'S APHASIA
	(Expressive Aphasia)	(Receptive Aphasia)
1	It prevents a person from producing speech.	It causes loss of the ability to understand language.
2	Patient can produce relevant and meaningful speech.	Speech is largely clear but often meaningless.
3	Patient can understand spoken and written language.	Patient has great difficulty in understanding speech.
4	Words are not properly formed.	Sentences are longer, with words inflected and derived properly.
5	Speech is slow and broken.	Speech is continuous, fluent and rhythmic.
6	Ability to name objects is poor.	Words used have no relationship: "word salad".

(Celik, 2007)

Inactivation of the left hemisphere resulted in loss of language production and comprehension. Lesion and Wada studies have consistently indicated that the majority of subjects are left-hemisphere dominant for language. On the other hand, more recent studies make use of the advances in technology such as fMRI and PET (Positron Emission Tomography). More recent studies focus on more detailed analysis of language processing in the brain. Even the reactions of brain towards different language tasks are subject to analysis in detail (Ramsey et al., 2001). Before proceeding to the location of language in brain hemispheres, it is appropriate to provide a greater representation of the functions of the left and right hemispheres of the brain. The following table (adapted from Celik, 2007) presents a list of the functions of the left and the right hemispheres of the brain:

Table 2: Division of labor between the two hemispheres

DIVISION OF LABOUR BETWEEN THE HEMISPHERES

	LEFT HEMISPHERE	RIGHT HEMISPHERE
1	Language – Speech	Seeing – Locating (Visuospatial)
2	Verbal Sounds: words, consonants	Non-verbal Sounds: barking, whistling
3	Analytical Processing: seeing the details in a picture	Holistic Processing: seeing the bigger picture
4	Listening - Reading	Metaphor – Poetry – Humor
5	Writing – Speaking	Music, Intonation, Rhythm
6	Abstract Words – *loyal*, *freedom*	Concrete Words – *desk*, *jacket*
7	Calculation	Recognition
8	Thinking	Attention, Emotion
9	Word puzzles	Art – Colors
10	Logical: Cause and Effect	Drama
11	Good with numbers	Face recognition
12	Factual	Imaginative

(Celik, 2007)

As seen in Table 2, the two hemispheres are associated with different functions. However, both hemispheres work together, though at most times one is more involved in some mental functions than the other. The left hemisphere carries out more mental functions for some people, who are classified as 'left hemisphere dominant' and vice versa. Most people in the world use their right hands. For instance, *sodium amobarbital* tests have shown that more than 95 % of right-handed people have their speech localized in the left hemisphere while about 70 % of the left-handed people exhibited the same pattern. The remaining 30 % or so show evidence of bilateral speech representation (Springer & Deutsch, 1998, 130). This relationship, however, is not symmetrical. This does not mean that the opposite holds true for left-handed people. Left hemisphere is dominant for more than 60 % of left-handed people.

Speech sounds are processed in the left hemisphere, while music and non-linguistic sounds, such as animal sounds and noise are processed in the right hemisphere. As far as human vocal language is concerned, the left hemisphere deals with semantic, syntactic and pragmatic

information while the right hemisphere is more engaged in limited words. Besides, some of the language related processes take place in the right hemisphere. For instance, understanding the meaning of intonation (e.g. rising tone of a question), interpreting emotional intentions (e.g. anger, sarcasm), or understanding social meanings (e.g. whispering) are credited for being located outside of the traditional language areas (i.e. left hemisphere) (Steinberg et al., 2001).

Left hemisphere is known to process verbal, abstract, analytical information in a linear, sequential manner. It concentrates on differences and contrasts, sees small parts that represent the whole, and is concerned with reasoning abilities such as maths and language. Therefore, left brain has a local nature. On the other hand, right hemisphere processes non-verbal, concrete, and spatial information. Right brain gives attention to similarities in patterns, and looks at from a holistic perspective. For that reason, right brain is found to have a global bias. Artistic abilities such as music and graphics are among the functions of the right brain. However, it is necessary to bear in mind that the right and the left hemispheres are not completely independent and there are fibers (*corpus callosum*) that connect these halves, but a person is believed to rely on one halve of the brain more than the other, and his brain dominance is assumed to determine his preferences, style, personality characteristics, or even career choices. For instance, in a study conducted by Saleh (2001) it is reported that students majoring in education, nursing, communication, and law were right brain dominant, while the students majoring in business/commerce, engineering, and science were left brain dominant.

An individual's preference of one of the left or right hemispheres over the other brings some differences in terms of instructional processes as well. A person's dominance on the left or right hemisphere of brain is accepted to display the following specific differences in his behavior (Brown, 2000, p. 119):

Table 3: Left and Right Brain characteristics

Left Brain Dominance	**Right Brain Dominance**
Intellectual	Intuitive
Remembers names	Remembers faces
Responds to verbal instructions and explanations	Responds to demonstrated, illustrated, or symbolic instructions
Experiments systematically and with control	Experiments randomly and with less restraint
Makes objective judgments	Makes subjective judgments
Planned and structured	Fluid and spontaneous
Prefers established, certain information	Prefers elusive, uncertain information
Analytic reader	Synthesizing reader
Reliance on language in thinking and remembering	Reliance on images in thinking and remembering
Prefers talking and writing	Prefers drawing and manipulating objects
Prefers multiple choice tests	Prefers open-ended questions
Controls feelings	More free with feelings
Not good at interpreting body language	Good at interpreting body language
Rarely uses metaphors	Frequently uses metaphors
Favors logical problem solving	Favors intuitive problem solving

Although individuals are either Left or Right brain dominant in processing a piece of information, some can be dependent equally on both hemispheres: Whole brain dominant (i.e Bilateral). Whole brain dominance can bring advantages on the part of the learner in instructional processes.

Language Learning Strategies

As with language learning, a number of factors are found to affect language learning. Therefore, language learning literature presents a significant amount of research on variables affecting language learning. Especially the learner related variables have been subject of study for many researchers (Brown, 2001; Cohen & Dörnyei, 2002). Johnson (2001) introduces such variables in three categories of individual differences: cognitive, affective, and personality. According to this division, intelligence, and aptitude (ability specific to language learning and different from general intelligence) represent the cognitive differences among learners. Affective differences are related to feelings, and are mainly associated with motivation and attitude. As the term suggests, personality variables are concerned with the personality of the learner, and whether a person is extrovert or introvert can be given as one of the distinguishing characteristics of a learner. However, variables that affect language learning may sometimes not be classified or termed in exactly the same words, and the factors assumed to influence learning may be expressed differently. For instance, in the same fashion Cohen & Dörnyei (2002) draw attention to age and gender, language aptitude, motivation, learning styles, learner strategies as the foremost variables to be influential in language learning.

Literature on language learning has established relationships between the cited variables and achievement in learning a language. First, intelligence is one of the commonly agreed factors to affect language learning (Williams et al., 2002). Another factor is the learner beliefs about language learning (Wenden, 1987; Horwitz, 1987; Cohen & Fass, 2001). Attitude and motivation too, as affective factors, have been found to influence success in language learning (Ehrman et al., 2003). Similarly, learning styles of learners have been subjects of study and found to be effective on language learning achievement, especially in parallel with learning strategies (Nam & Oxford, 1998; Cohen, 2001; Ehrman et al., 2003). Among others, learner strategies are also reported in the literature as a noteworthy part of the learner differences, and motivation, styles and strategies are often found to be influential on each other (Nunan, 1990; Cohen, 1995; Cohen et al., 1995; Nunan, 1997; Nam & Oxford, 1998; Wenden, 1998; Chamot & El-Dinary, 1999; Ehrman et al., 2003; Cohen, 2001; Van Blerkom & Van Blerkom, 2004). As a consequence, such investigations on learner variables naturally constitute an indication of focusing more on the learner, and have served understanding the nature of language learning better. Interest in individual differences of a learner led to investigating what methods or techniques are used by the individual in learning a language. Therefore, studies have attempted to differentiate among language learners in terms of strategy usage (O'Malley & Chamot, 1990, p. 149; Stern, 1992, p. 259). Such investigations put forward that studies concentrating on the 'good language learner' contrast with the previous traditional understanding that some people are successful in language learning only because they have an inherent ability for language learning. Likewise, the differences in the mental processing of experts and novices have been the base for the major discoveries in understanding cognition. Accordingly, research on second language learning in classrooms has been advised to aim at distinguishing more efficient language learners from less efficient ones.

Such investigations resulted in a classification within strategy usage and metacognitive knowledge in terms of effective and less effective considerations (Chamot et al., 1996, p. 178; Johnson, 2001, p. 152). Thus, dealing with the processes the learners go through led to an interest in learning strategies as part of this process, and this brought about studies on learning strategies, within the last few decades (Williams and Burden, 1997, p. 144). The significance of learning strategies to language learning can be summarized as; if the strategies that contribute to language learning can be identified clearly, then the learners can be informed about these strategies. Later the learners can internalize and automatise the usage of some beneficial strategies to enhance their language learning (Thompson, 1987).

Parallel with the studies conducted on learning strategies, many interpretations to determine, define and classify the learning strategies can be found in the literature. About identifying and defining the strategies, Bialystock's (1983) statement 'There is little consensus in the literature concerning either the definition or the identification of language learning strategies' can be taken as a view still valid today (cited in Wenden, 1987, p. 7). Learning strategies have been addressed under various names, and are often associated with skills, tactics, plans, and movement to achieve a learning goal (Oxford, 1990; Harris & Grenfell, 2004). Just as the word 'strategy' is associated with special plans and tactics to beat an enemy in a war context, a learner can be viewed to be struggling for overcoming a problem in learning a language.

The literature provides more detailed definitions of learning strategies as well (O'Malley and Chamot, 1990; Caudery, 1999; Chamot & El-Dinary, 1999; Brown, 2000; Mitchell & Myles; 2002). However, it is worth remembering that trying to understand the learning strategies from single-sentence definitions may not be a valid enough stand to take. Instead, the literature provides the researchers with some more information on the nature of learning strategies. Therefore, in an attempt to have a better understanding of the place and role of learning strategies in language learning, some common features of learning strategies can be listed as follows:

- Learning strategies may either be observable or unobservable (Chamot, 1995, p. 13; Cohen & Scott, 1996, p. 90).

- Learning strategies are used by the learner to make learning effective (Wenden, 1987, p. 7; Stern, 1992, p. 261; Mitchell & Myles, 2002, p. 89).

- Application of well chosen strategies via meta-cognitive strategies contributes to the achievement of a task (Thompson, 1987, p. 54; Oxford, 1996, p. xi; Chamot et al., 1996, p. 178).

- Learning strategies are found to contribute to learning either consciously or unconsciously (Wenden, 1987, p. 7; O'Malley & Chamot, 1990, p. 85; Dreyer & Oxford, 1996, p. 63; Cohen & Scott, 1996, p. 90; Williams & Burden, 1997, p. 144).

- Learning strategies can be used at all levels of proficiency (Okada, Oxford & Abo, 1996, p. 107).

- Learning strategies can be learned (Williams and Burden, 1997, p. 148).

- Learning strategies may be affected by various factors (Wenden, 1987, p. 7).

- Learning strategies are related with problem solving (Wenden, 1987, p. 7; Rubin, 1987, p. 19; Stern, 1987, p. xi; Oxford, 1990, p. 11; Williams & Burden, 1997, p. 149).

Not surprisingly, focusing on the strategies used by good learners has been a starting point for most of the studies to identify learning strategies. Nevertheless, subsequent studies dealt in more detail with the issue. In addition to the identification of these special behaviors of learners, attempts to describe and classify these strategies can be observed. On the way to conceptualize

and systematize the strategies, the studies on learning strategies brought comparison of effective and less effective learners in terms of strategy usage, and the appropriate methodology for providing the students with these strategies into discussion (O'Malley and Chamot, 1990, p. 151).

Many researchers tried to come up with a list of strategies used by learners. Besides, agreeing on a classification of learning strategies has never been so easy. Naiman et al.'s (1978) and Rubin's (1981) studies have been examples of initial attempts to classify learning strategies (cited in O'Malley and Chamot, 1990, p. 4-5). Following attempts to categorize learning strategies can be observed in Chamot's (1987), Rubin's (1987), O'Malley & Chamot's (1990), and Oxford's (1990) studies. Among the others, Oxford's (1990) Strategy Inventory for Language Learning (SILL) has been the most widely used questionnaire on the strategy usage of EFL learners.

To be brief, SILL questionnaire developed for the Defense Institute Foreign Language Center, in Monterey, California was revised later and adopted by many researchers (McDonough, 2001). The same study of Oxford (1990) has been described as a training manual (Johnson, 2001, p. 157), and a starting point and basis for most of the present studies. Oxford divides Language Learning Strategies into two main categories (Direct strategies vs. Indirect strategies) because her classification assumes that some strategies are concerned with the language directly, whereas some provide support indirectly. Then, she divides each category into three groups. Direct strategies are grouped into memory strategies, cognitive strategies, and compensation strategies while Indirect strategies include metacognitive strategies, affective strategies, and social strategies.

2. Method

This study was conducted on 172 undergraduate students studying at Selçuk University, Faculty of Education, Department of English Language Teaching. The participants consisted of 66 2nd year, 60 3rd year, and 46 4th year students. As the study aimed at investigating the relationship between brain dominance and language learning strategy usage of language learners, two instruments were administered to collect data. Brain Dominance Survey (Davis et al., 1994) was used to discover the hemispheric preferences of the participants. Oxford's (1990) Strategy Inventory for Language Learning (SILL) was administered to identify the language learning strategies used by the same participants. The data obtained through the questionnaires were analyzed on the computer by using SPSS statistical program (SPSS 10.0 for Windows). Descriptive statistics such as frequency, mean, standard deviation and percentage were reported. The significance level has been determined as $p<.05$. Besides, Pearson Momentum Correlation Coefficient Test is used to investigate the correlation between brain dominance and language learning strategy usage of language learners.

3. Results

The reliability alpha value is .91, which shows that the data reported by 172 participants are highly reliable and that further statistical analyses are warranted. The strategies used by the students have been identified in 6 groups; direct strategies (i.e. memory, cognitive, and compensation strategies) and indirect strategies (i.e. metacognitive, social, and affective strategies).

Direct Strategies

The first 29 items of the inventory were concerned with strategies that are assumed to affect language learning directly. Therefore, 9 memory strategies, 14 cognitive strategies, and 6 compensation strategies were included in the inventory.

A) Memory Strategies (Items from 1-9)

Among the nine memory strategies, the most often resorted strategy is the thinking of the relationship between what is already known and what is new (Table 4, Item 1). The least often used strategy is the one expressed in item (6): using flashcards to remember new English words.

Table 4: Descriptive Statistics for the Memory Strategies in descending order

	N	Mean	Std. Deviation	Variance
1. I think of relationships between what I already know and new things I learn in English.	172	3.98	.772	.596
3. I connect the sound of a new English word and an image or picture of the word to help me remember the word.	172	3.83	1.078	1.162
9. I remember new English words or phrases by remembering their location on the page, on the board, or on a street sign.	172	3.76	1.029	1.060
4. I remember a new English word by making a mental picture of a situation in which the word might be used.	172	3.72	1.079	1.164
2. I use new English words in a sentence so I can remember them.	172	3.63	1.020	1.040
8. I review English lessons often.	172	3.37	1.009	1.017
5. I use rhymes to remember new English words.	172	2.95	1.176	1.383
7. I physically act out new English words.	172	2.91	1.064	1.133
6. I use flashcards to remember new English words.	172	2.84	1.146	1.314
Average Mean	172	3.44	1.041	1.096

B) Cognitive Strategies (Items from 10-23)

The following 14 strategies in the strategies inventory (SILL) consisted of the cognitive strategies. It can be observed in the table below that 'skimming an English passage, then going back and reading carefully' (Item 18) has been reported as the most frequently used cognitive strategy. On the other hand, 'starting conversations in English' (Item 14) was stated by the students as the least preferred strategy.

Table 5: Descriptive Statistics for the Cognitive Strategies in descending order

	N	Mean	Std. Deviation	Variance
18. I first skim an English passage (read over the passage quickly) then go back and read carefully.	172	3.96	1.782	3.174
22. I try not to translate word-for-word.	172	3.69	1.100	1.211
12. I practice the sounds of English.	172	3.65	.927	.860
11. I try to talk like native English speakers.	172	3.64	1.025	1.051
23. I make summaries of information that I hear or read in English.	172	3.58	1.082	1.170
16. I read for pleasure in English.	172	3.55	1.039	1.079
13. I use the English words I know in different ways.	172	3.54	.951	.905
19. I look for words in my own language that are similar to new words in English.	172	3.50	1.040	1.082
10. I say or write new English words several times.	172	3.40	1.101	1.212
20. I try to find patterns in English.	172	3.40	.934	.872
17. I write notes, messages, letters or reports in English.	172	3.35	1.029	1.059
15. I watch English language TV shows spoken in English or go to movies spoken in English.	172	3.33	1.087	1.182
21. I find the meaning of an English word by dividing it into parts that I understand.	172	3.32	1.058	1.119
14. I start conversations in English.	172	3.19	1.056	1.115
Average Mean	172	3.50	1.086	1.220

C) Compensation Strategies (Items from 24- 29)

The next 6 Items (Items from 24- 29) were labeled as the compensation strategies in the inventory. Evaluation of the students' preferences of compensation strategies indicated that if students can't think of an English word, they prefer using a word or phrase that means the same thing (Item 29) over the other compensation strategies. The least preferred compensation strategy has been reported as 'making up new words if they do not know the right ones in English' (Item 26).

Table 6: Descriptive Statistics for the Compensation Strategies in descending order

	N	Mean	Std. Deviation	Variance
29. If I can't think of an English word, I use a word or phrase that means the same thing.	172	4.14	.833	.694
24. To understand unfamiliar English words, I make guesses.	172	3.90	.866	.749
27. I read English without looking up every new word.	172	3.88	1.022	1.043
25. When I can't think of a word during a conversation in English, I use gestures.	172	3.77	.975	.951

28. I try to guess what the other person will say next in English.	172	3.38	.998	.997
26. I make up new words if I do not know the right ones in English.	172	3.33	1.154	1.332
Average Mean	172	3.73	.974	.961

Indirect Strategies

The last 21 items of the SILL questionnaire consisted of strategies which are thought to be assisting language learning indirectly. For that reason, 9 metacognitive strategies, 6 affective strategies, and 6 social strategies were incorporated in the inventory as indirect strategies.

D) Metacognitive Strategies (Items from 30-38)

Results indicated that 'Paying attention when someone is speaking English' (Item 32) was the most commonly used metacognitive strategy, while 'planning' (Item 34) was reported as the least chosen metacognitive strategy by the students.

Table 7: Descriptive Statistics for the Metacognitive Strategies in descending order

	N	Mean	Std. Deviation	Variance
32. I pay attention when someone is speaking English.	172	4.33	.808	.654
33. I try to find out how to be a better learner of English.	172	4.13	.883	.779
38. I think about my progress in learning English.	172	4.09	.919	.845
31. I notice my English mistakes and use that information to help me do better.	172	3.76	.794	.630
37. I have clear goals for improving my English skills.	172	3.75	.980	.961
35. I look for people I can talk to in English	172	3.58	1.092	1.193
36. I look for opportunities to read as much as possible in English.	172	3.57	.980	.960
30. I try to find as many ways as I can to use my English.	172	3.49	.921	.848
34. I plan my schedule so I will have enough time to study English.	172	3.27	1.119	1.252
Average Mean	172	3.77	.944	.902

E) Affective Strategies (Items from 39-44)

In the affective strategies group, 'encouraging oneself to speak English even when he/she is afraid of making a mistake' (Item 40) was the most often used strategy, while 'writing down feelings in a language diary' (Item 43) was the least preferred strategy.

Table 8: Descriptive Statistics for the Affective Strategies in descending order

	N	Mean	Std. Deviation	Variance
40. I encourage myself to speak English even when I am afraid of making a mistake.	172	3.77	.939	.881
39. I try to relax whenever I feel afraid of using English.	172	3.62	.956	.915
42. I notice if I am tense or nervous when I am studying or using English.	172	3.52	1.172	1.374
41. I give myself a reward or treat when I do well in English.	172	3.44	1.104	1.219
44. I talk to someone else about how I feel when I am learning English.	172	3.16	1.198	1.435
43. I write down my feelings in a language learning diary.	172	2.29	1.183	1.400
Average Mean	172	3.30	1.092	1.204

F) Social Strategies (Items from 45-50)

The last 6 strategies in the SILL inventory consisted of the social strategies. Results showed that 'asking the other person to slow down or say it again if he/she does not understand' (Item 45) has been the mostly preferred strategy over the others. On the other hand, 'practicing English with other students' (Item 47) was reported as the least often used social strategy.

Table 9: Descriptive Statistics for the Social Strategies in descending order

	N	Mean	Std. Deviation	Variance
45. If I do not understand something in English, I ask the other person to slow down or say it again.	172	3.99	.946	.895
49. I ask questions in English.	172	3.61	1.034	1.070
50. I try to learn about the culture of English speakers.	172	3.45	1.215	1.477
46. I ask English speakers to correct me when I talk.	172	3.26	1.211	1.466
48. I ask for help from English speakers.	172	3.16	1.235	1.525
47. I practice English with other students.	172	3.12	1.059	1.121
Average Mean	172	3.43	1.116	1.259

When various groups of strategies are examined (Table 10), Metacognitive Strategies are by far the most often utilized strategy type (M=3.77), followed by Compensation Strategies (M=3.73). Then comes the use of Cognitive Strategies (M=3.50). The rest of the strategy types exhibit close averages: these are Memory Strategies (M=3.44), Social Strategies (M=3.43) and Affective strategies (M=3.30).

Table 10: Descriptive Statistics for Strategies in descending order

	N	Mean	Std. Deviation	Variance
Metacognitive Strategies	172	3.77	.944	.902
Compensation Strategies	172	3.73	.974	.961
Cognitive Strategies	172	3.50	1.086	1.220
Memory Strategies	172	3.44	1.041	1.096
Social Strategies	172	3.43	1.116	1.259
Affective Strategies	172	3.30	1.092	1.204
Average	172	3.52	1.042	1.107

An interpretation of the strategy usage results of this study would be that, metacognitive strategies, compensation strategies, and cognitive strategies are used at a high level, whereas memory strategies, social strategies, and affective strategies are preferred at a medium level by the participants in the sample. To be precise, Oxford (1990, p. 300) grades strategy use averages as 1.0 to 2.4 low level, 2.5 to 3.4 medium level, and 3.5 to 5.0 high level. Accordingly, average use of strategies in total, in the sample, suggests a high level as well.

Brain Dominance

In addition to identifying the language learning strategy use of language learners, the students' hemispheric preferences were investigated. The results indicated that the participants vary in terms of brain dominance types.

Table 11: Brain Dominance

		Frequency	Valid Percent
Right Brain Dominance	10	1	.6
	8	2	1.2
	7	1	.6
	6	1	.6
	5	3	1.7
	4	6	3.5
	3	16	9.3
	2	19	11.0
	1	22	12.8
Total		71	41.3
Whole Brain	0	36	20.9
Total		36	20.9
	-1	24	14.0
	-2	24	14.0

Left Brain Dominance	-3	7	4.1
	-4	4	2.3
	-5	4	2.3
	-6	1	.6
	-8	1	.6
Total		65	37.8
	Total	172	100

As can be observed in Table 11, the number of Right Brain Dominant students is 71, which constitutes 41.3% of total. 65 of 172 students have been found to be Left Brain Dominant, that is, 37.8%. Again it is shown in the table above that 36 of the 172 students have been Whole Brain Dominant (Bilateral), which makes 20.9 %.

Relationship between Brain Dominance and Strategy Use

The Brain Dominance Survey (Davis et al., 1994) originally divided the right and left brain dominance into 11 degrees each depending on the answers given to the questions. Left brain dominance is reflected by minus sign (-) while plus sign (+) reflects the right brain dominance degrees. Considering the Brain Dominance Survey specifications, we expected to find out brain dominance degrees to be illustrated in the form of (+1 to +11) right brain and (-1 to -11) left brain dominance degrees. Thus, we hoped to find sufficient frequencies to be able to do some correlations between a specific brain dominance degree and strategy use. However, as table 11 shows, frequencies obtained for the survey's following original brain dominance types were not sufficient.

A score of - 1 to - 3 = Slight preference toward the left
A score of - 4 to - 6 = Moderate preference for the left
A score of - 7 to - 9 = Left-brain dominant
A score of -10 to -11 = Left-brain dominant (very strong)

A score of + 1 to + 3 = Slight preference toward the right
A score of + 4 to + 6 = Moderate preference for the right
A score of + 7 to + 9 = Right-brain dominant
A score of +10 to +11 = Right-brain dominant (very strong)

So, we opted, instead, to collapse nine different brain dominance types into three: Left brain dominance (-8 to -1), Whole brain dominance (0), and Right brain dominance (+1 to +10):

Table 12: Brain Dominance

	Frequency	Valid Percent	Cumulative Percent

Right Brain Dominance	10	1	.6	.6
	8	2	1.2	1.7
	7	1	.6	2.3
	6	1	.6	2.9
	5	3	1.7	4.7
	4	6	3.5	8.1
	3	16	9.3	17.4
	2	19	11.0	28.5
	1	22	12.8	41.3
Whole Brain Dominance	0	36	20.9	62.2
	-1	24	14.0	76.2
	-2	24	14.0	90.1
Left Brain Dominance	-3	7	4.1	94.2
	-4	4	2.3	96.5
	-5	4	2.3	98.8
	-6	1	.6	99.4
	-8	1	.6	100.0
	Total	172	100.0	

Table 13 presents the statistical results of Post Hoc Tests, which enables us to see which of the three types of dominance uses which group of learner strategies.

Table 13: Multiple Comparisons

LSD

Dependent Variable	(I) BRDGRP	(J) BRDGRP	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
MEMORY	1 left brain	2 whole brain	-1.59	1.026	.123	-3.61	.44
		3 right brain	-1.72*	.847	.044	-3.40	-.05
	2 whole brain	1 left brain	1.59	1.026	.123	-.44	3.61
		3 right brain	-.13	1.010	.894	-2.13	1.86
	3 right brain	1 left brain	1.72*	,847	.044	.05	3.40
		2 whole brain	.13	1.010	.894	-1.86	2.13
COGNITIVE	1 left brain	2 whole brain	-2.67	1.535	.083	-5.70	.36
		3 right brain	-2.86*	1.268	.026	-5.36	-.35
	2 whole brain	1 left brain	2.67	1.535	.083	-.36	5.70
		3 right brain	-.18	1.512	.904	-3.17	2.80
	3 right brain	1 left brain	2.86*	1.268	.026	.35	5.36
		2 whole brain	.18	1.512	.904	-2.80	3.17
COMPENSATION	1 left brain	2 whole brain	-.46	.739	.532	-1.92	1.00
		3 right brain	-.81	.611	.188	-2.01	.40
	2 whole brain	1 left brain	.46	.739	.532	-1.00	1.92
		3 right brain	-.34	.728	.637	-1.78	1.09
	3 right brain	1 left brain	.81	.611	.188	-.40	2.01
		2 whole brain	.34	.728	.637	-1.09	1.78
METACOGNITIVE	1 left brain	2 whole brain	-1.20	1.142	.295	-3.45	1.05
		3 right brain	.21	.944	.825	-1.65	2.07
	2 whole brain	1 left brain	1.20	1.142	.295	-1.05	3.45
		3 right brain	1.41	1.125	.212	-.81	3.63
	3 right brain	1 left brain	-.21	.944	.825	-2.07	1.65
		2 whole brain	-1.41	1.125	.212	-3.63	.81
AFFECTIVE	1 left brain	2 whole brain	-.73	.790	.355	-2.29	.83
		3 right brain	-.47	.653	.475	-1.76	.82
	2 whole brain	1 left brain	.73	.790	.355	-.83	2.29
		3 right brain	.26	.778	.734	-1.27	1.80
	3 right brain	1 left brain	.47	.653	.475	-.82	1.76
		2 whole brain	-.26	.778	.734	-1.80	1.27
SOCIAL	1 left brain	2 whole brain	-2.03*	.970	.038	-3.94	-.11
		3 right brain	-1.39	.801	.085	-2.97	.19
	2 whole brain	1 left brain	2.03*	.970	.038	.11	3.94
		3 right brain	.64	.955	.504	-1.25	2.52
	3 right brain	1 left brain	1.39	.801	.085	-.19	2.97
		2 whole brain	-.64	.955	.504	-2.52	1.25
COMBINED	1 left brain	2 whole brain	-8.69	4.658	.064	-17.88	.51
		3 right brain	-7.03	3.849	.069	-14.63	.56
	2 whole brain	1 left brain	8.69	4.658	.064	-.51	17.88
		3 right brain	1.65	4.587	.719	-7.40	10.71
	3 right brain	1 left brain	7.03	3.849	.069	-.56	14.63
		2 whole brain	-1.65	4.587	.719	-10.71	7.40

*. The mean difference is significant at the .05 level.

The table presents results on the relationship between Brain Dominance and Language Learning Strategy usage. In terms of the usage of memory strategies, Right brain dominance suggests a statistically significant difference (1.72*) over Left brain dominance. Again cognitive strategies seem to be preferred by the Right brain dominant learners more than the Left brain dominant learners (2.86*). On the other hand, Whole brain dominance seems statistically to correlate with social strategies (2.03*) over Left brain dominance. However, the table does not

indicate statistically significant correlations with brain dominance and other strategies (compensation, metacognitive, affective strategies).

When we examine the correlation between strategy types, it can be seen in Table 14 that use of each strategy group correlates with use of other strategy types. Again it can be observed that Brain dominance appears to display statistically significant correlations in the usage of memory strategies (.177*), cognitive strategies (.164*), social strategies (.167*), and combined strategy usage (.155*). Nevertheless, the results do not suggest statistically significant correlations between brain dominance and compensation strategies, metacognitive strategies, or affective strategies.

Table 14: Correlations

		BRADOMIN	MEMORY	COGNITIV	COMPNSTN	METACOGN	AFFECTIVE	SOCIAL	COMBINED
BRAIN DOMINANCE	Pearson Correlation	1	.177*	.164*	.086	.013	.064	.167*	.155*
	Sig. (2-tailed)	.	.020	.032	.261	.863	.404	.029	.042
	N	172	172	172	172	172	172	172	172
MEMORY	Pearson Correlation	.177*	1	.546**	.242**	.402**	.318**	.414**	.676**
	Sig. (2-tailed)	.020	.	.000	.001	.000	.000	.000	.000
	N	172	172	172	172	172	172	172	172
COGNITIVE	Pearson Correlation	.164*	.546**	1	.444**	.611**	.461**	.560**	.863**
	Sig. (2-tailed)	.032	.000	.	.000	.000	.000	.000	.000
	N	172	172	172	172	172	172	172	172
COMPENSATION	Pearson Correlation	.086	.242**	.444**	1	.441**	.443**	.333**	.608**
	Sig. (2-tailed)	.261	.001	.000	.	.000	.000	.000	.000
	N	172	172	172	172	172	172	172	172
METACOGNITIVE	Pearson Correlation	.013	.402**	.611**	.441**	1	.517**	.573**	.809**
	Sig. (2-tailed)	.863	.000	.000	.000	.	.000	.000	.000
	N	172	172	172	172	172	172	172	172
AFFECTIVE	Pearson Correlation	.064	.318**	.461**	.443**	.517**	1	.494**	.688**
	Sig. (2-tailed)	.404	.000	.000	.000	.000	.	.000	.000
	N	172	172	172	172	172	172	172	172
SOCIAL	Pearson Correlation	.167*	.414**	.560**	.333**	.573**	.494**	1	.759**
	Sig. (2-tailed)	.029	.000	.000	.000	.000	.000	.	.000
	N	172	172	172	172	172	172	172	172
COMBINED	Pearson Correlation	.155*	.676**	.863**	.608**	.809**	.688**	.759**	1
	Sig. (2-tailed)	.042	.000	.000	.000	.000	.000	.000	.
	N	172	172	172	172	172	172	172	172

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

4. Discussion

One of the areas of investigation in this study has been brain dominance type of learners. Results of the research suggested that 41.3% of the students have been found Right Brain dominant, and 37.8% have been Left Brain dominant while 20.9% have been whole Brain dominant. The literature presents a number of studies that show varying results on brain dominance of learners, in different samples. Specifically, these results are significantly different from those of a study conducted in a large university in the southern part of the United States (Saleh, 2001). Brain dominance results of Saleh's (2001) study were as follows: 28.9% of the 429 graduate and undergraduate students were left brain, 24.94% right brain, and 46.15% whole brain dominant. It is reminded in the same study that these results suggest a shift in brain dominance as compared to the earlier studies showed a left brain dominance of a majority of the students in western schools. Such a difference between the 'left dominant' western schools

and 'whole brain dominant' southern schools is suggested that it can be because of the teachers' attitudes towards brain hemisphericity and learning styles, because of teaching methods and learning activities, or because of students' exposure to video games and computer activities might promote their imagination and spatial skills.

On the other hand, another study from a southeastern part of USA reveals results quite different from other studies in USA but similar to the present study. Haulman (1987) conducted a study on 44 students of Oklahoma Community college, in Spanish class, and found that 40% of the students were left brain dominant, 40% right brain dominant, and 20% were whole brain dominant.

Again the results of another study carried out on 44 undergraduate mathematics students in Malaysia present different percentages of brain dominance (Ali & Kor, 2006). In this study, 71% of the students were left brain dominant, while 24% were right brain dominant, and 5% were whole brain dominant. Although, left brain dominance of mathematics students can be explained with the left brain function 'mathematical thinking', the other varying degrees and types of brain dominance in different samples suggest taking some other factors into consideration as well. That is to say, in addition to teaching methods, materials used in learning, and teachers' attitudes, factors such as culture, age seem to be the necessary variables to be studied in brain dominance.

To be brief, 20.9% whole brain dominant students might be interpreted as students are not promoted enough or they can't find the opportunity, to go beyond in terms of using the hemisphere that they are not already actively using. One of the suggestions for further research might be to conduct more studies to be sure about brain dominance of EFL learners in large samples. Then, it might be quite possible to direct language learning research towards developing students' abilities to use their hemispheres that they are not actively using.

The results on strategy usage indicated that the participants used, respectively, metacognitive strategies (M=3.77), compensation strategies (M=3.73), cognitive strategies (M=3.50), memory strategies (M=3.44), social strategies (M=3.43), and affective strategies (M=3.30). Particularly, metacognitive strategies are preferred the most and affective strategies are the least used strategies in this sample, indicating very close results though.

In an attempt to compare these results with studies in other countries, having a look at Bremner's (1999) study reveals that strategy usage of students in Hong Kong is different from that of the sample of Turkish students. Strategy usage of Hong Kong students were found, from the most preferred to the least used, as compensation strategies (M=3.36), metacognitive strategies (M=3.12), cognitive strategies (M=2.97), social strategies (M=2,91) memory strategies (M=2.85), and affective strategies(M=2.76). In addition to the difference found in the variety of the strategies preferred, it appears that Turkish EFL learners use higher levels of strategies than Hong Kong learners.

The same study also reports that 11 strategies were found to be displaying significant association with language proficiency. 9 of these strategies were cognitive strategies (Items 11, 12, 13, 15, 17, 18, 19, 20, and 22), 1 compensation strategy (Item 27), and 1 social strategy (Item 49). In a sense, it might be claimed that EFL learners in the sample seem to be (either consciously or unconsciously) using strategies that are found to be associated with language proficiency.

A more recent study conducted on Taiwanese students revealed that compensation strategies are the strategies used with the highest frequency while the affective strategies are used the

least (Yen and Chou, 2009). Results of the study suggest no significant differences in strategy usage of students in terms of memory, cognitive, social and meta-cognitive strategies.

On the relationship between brain dominance and strategy usage, findings from thisstudy suggested that right brain dominant students preferred memory strategies and cognitive strategies more than the left brain dominant students did. On the other hand, whole brain dominant students seem to use social strategies more than the left brain dominant students. What is significant about these results is that left brain dominance couldn't be found in correlation with any type of language learning strategies. At first sight, these results appear to make it possible to claim that language learning is different from brain functions related to language.

About the correlation between right brain dominance and cognitive strategies and memory strategies, it might be claimed that it is the relationship between 'right brain functions' and these strategies that provide the correlation between right brain dominance and cognitive strategies and memory strategies. For instance, 'holistic' nature of the right brain might be supporting the use of cognitive strategies, or characteristics such as 'visual information' might be in charge in using the memory strategies. However, neither right nor left brain could, singly, be found in correlation with social strategies. Being able to use both hemispheres of the brain (whole brain dominance) seems to be required for using social strategies. On the other hand, one might expect to discover a relationship between Right Brain dominance and usage of affective strategies because right brain is primarily associated with emotional information; however, such a relationship couldn't be identified in this study.

Another point that didn't show a correlation in this study is that brain dominance couldn't be seen in a correlation with metacognitive strategies, although these strategies are reported to be the most commonly used ones (M=3.77). This finding brings to mind that usage of metacognitive strategies should be somewhere above the specific hemispheric behaviors of the learner. To be precise, metacognition is known to be governing the overall learning process, and that is why metacognitive strategies may be the tools for everyone, regardless of the hemispheric preferences of an individual

One more significant finding from this study was that a correlation between brain dominance and compensation strategies could not be identified. Therefore, it is another topic to be researched, at least whether it is a case similar to metacognitive strategies or not needs to be identified.

Bearing in mind that Bremner's (1999) study on the strategy usage of language learners indicated that a majority of the cognitive strategies used by the students were found in association with language proficiency, a question seems to be asked for further research: If cognitive strategies are related with proficiency and if the right brain dominant students use cognitive strategies, would it be beneficial to encourage the learners to use the right hemisphere?

Just at this point, it is worth reminding that there are also some recent researches that show distinct brain regions for different languages in addition to the previous studies that suggest multiple languages are supported by the same brain mechanisms. To be precise, Simos et al. (2005) report that they found increased right hemispheric activity for Chinese speakers as compared to the English speaking participants in their study. Accordingly, visual information (a function of the right hemisphere) is found to have precedence in Chinese writing system.

Taking such current findings into consideration, investigating the relationships touched in this study from different perspectives might be a useful attempt for understanding the language learning process.

5. Conclusion

Motives underlying this research into brain dominance and language learning strategies were the investigation of whether there is a relationship between brain dominance and language learning strategies. On the one hand, brain hemisphericity is closely related to learning styles, and on the other hand learning styles and strategies are thought to be influential on each other. Therefore, investigation into the possible relationship between brain dominance and language learning strategies appeared to be a significant step to be taken in language learning research. Once a relationship between brain dominance and strategy usage is identified, language learning strategies can be taught to learners in accordance with their brain dominance types and learning styles. The study provided us with expected results as well as surprising ones.

The participants displayed both similarities and differences in the percentage of brain dominance types with learners in other countries. Arising from this research, it appears to be beneficial to conduct similar researches in different contexts and with larger samples in order to learn more about language learners. Metacognitive strategies were the most used strategies, and the affective strategies were the least used ones by the participants in the study. Strategy usage of Turkish EFL learners suggested some differences as well as similarities with learners of other samples. Again, carrying out wider language learning strategy research is likely to be informative for identifying the needs of the learners and empowering the learner in language learning.

Results concerned with the relationship between brain dominance and language learning strategies indicated, even limited, there is some kind of correlation between brain dominance and language learning strategies. Brain dominance was found in a correlation with cognitive strategies, memory strategies, social strategies, and combined strategy usage. Particularly, right brain dominance was found in correlation with cognitive strategies and memory strategies while whole brain dominance was found in correlation with social strategies. Further research on the relationship between brain dominance and language learning strategies is likely to produce results that will contribute to the field of language teaching. Certainly, knowing more about the individual variables will provide the curriculum designers, teachers and learners with more opportunities in facilitating the learning process.

References

Ahlsén, E. (2011). Neurolinguistics. In James Simpson (Ed.), *The Routledge Handbook of Applied Linguistics*. (pp. 460-471). Routledge.

Ali, R. M. & Kor, L. K. (2007). Association between Brain Hemisphericity, Learning Styles and Confidence in Using Graphics Calculator for Mathematics. *Eurasia Journal of Mathematics, Science & Technology Education.* 3 (2), 127-131. Moment.

Baynes, K. & Long, D. L. (2007). Three Conundrums of Language Lateralization. *Language and Linguistics Compass.* 1 (2), 48-70. Blackwell Publishing Ltd.

Bremner, S. (1999). Language Learning Strategies and Language Proficiency: Investigating the Relationship in Hong Kong. *Canadian Modern Language Review,* 55 (4), 490-514.

Brown, H. D. (2000). *Principles of Language Learning and Teaching*. Addison Wesley Longman, Inc. (Fourth edition).

Brown, H. D. (2001). *Teaching by Principles: An Interactive Approach to Language Pedagogy*. Addison Wesley Longman, Inc. (Second edition).

Caudery, T. (January, 1999). [Review of the book *Strategies in Learning and Using a Second Language*]. *Teaching English as a Second or Foreign Language (TESL-EJ),* 3 (4). Available: http://www.kyoto-su.ac.jp/information/tesl-ej/ej12/r10.html [November 27, 2005].

Celik, M. (2007). *Linguistics for Students of English*: *Book II*. Ankara: EDM Publishing.

Chamot, A. U. (1987). The Learning Strategies of ESL Students. In Anita L. Wenden, & Joan Rubin (Eds.), *Learner Strategies in Language Learning* (pp. 71-84). Cambridge: Prentice Hall.

Chamot, A. U. (1995) Learning Strategies and Listening Comprehension. In D. J. Mendelsohn and J. Rubin (Eds.) *A Guide for the Teaching of Second Language Listening*. (pp. 1-14) San Diego, CA: Dominie Press.

Chamot A. U., Barnhardt, S., El-Dinary, P., Robbins, J. (1996). Methods for Teaching Learning Strategies in the Foreign Language Classroom. In Rebecca L. Oxford (Ed.), *Language learning strategies around the world: Cross cultural perspectives.* (Technical Report #13) (pp. 175-188). Honolulu: University of Hawai'i, Second Language Teaching & Curriculum Center.

Chamot, A. U., & El-Dinary, P. B. (1999). Children's Learning Strategies in Langugae Immersion Classrooms. *The Modern Language Journal,* 83 (3), 319-338.

Cohen, A. D. (1995). Second Language Learning and Use Strategies: Clarifying the Issues. (Research Report). EDRS. ED: 393307

Cohen, A. D. (May, 2001). Preparing Teachers for Styles- and Strategies- Based Instruction. *Paper presented at the International Conference on Language Teacher Education, University of Minnesota.*

Cohen, A. D., & Dörnyei, Z. (2002). Focus on the Language Learner: Motivation, Styles and Strategies. In Schmitt, N. (Ed.), *An Introduction to Applied Linguistics*. (pp. 170-190). New York: Arnold.

Cohen, A. D., & Fass, L. (2001, February). Oral Language Instruction: Teacher and Learner Beliefs and the Reality in EFL Classes at a Colombian University. (Research Report #143). EDRS, ED: 459612.

Cohen A. D. & Scott, K. (1996). A Synthesis of Approaches to Assessing Language Learning Strategies. In Rebecca L. Oxford (Ed.), *Language learning strategies around the world: Cross cultural perspectives.* (Technical Report #13) (pp. 89-106). Honolulu: University of Hawai'i, Second Language Teaching & Curriculum Center

Cohen, A. D., Weaver, J. S. & Yuan-Li, T. (1995, October). The Impact of Strategies-Based Instruction on Speaking a Foreign Language. (Research Report,#143) (pp. 3-55). University of Minnesota, Center for Advanced Research on Language Acquisition. EDRS, ED: 394322.

Davis, E. C., Nur H. & Ruru S. A. A. (1994, September). Helping Teachers and Students Understand Learning Styles. *Forum*. 32 (3).

Dreyer, C. & Oxford, R. L. (1996). Learning strategies and other predictors of ESL proficiency among Afrikaans speakers in South Africa. In Rebecca L. Oxford (Ed.), *Language learning strategies around the world: Cross cultural perspectives.* (Technical Report #13) (pp. 61-74). Honolulu: University of Hawai'i, Second Language Teaching & Curriculum Center.

Ehrman, M. E., Leaver, B. L. & Oxford, R.L. (September, 2003). A Brief Overview of Individual Differences in Second Language Learning. *System,* 31 (3), 313-330.

Gibson, K. M. (2002, July/August). Learning Styles and Hemispheric Dominance - Right or Left Brain: Which is Dominant in Your Family? Home Education Learning Magazine. Available: http://www.leapingfromthebox.com/art/kmg/learningstyles2.html [May 6, 2007].

Harris, V. & Grenfell, M. (2004). Language-learning Strategies: A Case for Cross-curricular Collaboration. *Language Awareness*, 13 (2), 116-130.

Haulman, A. L. (1987). The Relationship Between Hemisphericity and Foreign Language Performance Among Adult Learners. Doctoral Dissertation, The University of Oklahoma, USA.: UMI Company.

Horwitz, E. K. (1987). Surveying Student Beliefs About Language Learning. In Anita L. Wenden & Joan Rubin (Eds.), *Learner Strategies in Language Learning*. (pp. 119-129). Prentice Hall International (UK) Ltd.

Johnson, K. (2001).*An Introduction to Foreign Language Learning and Teaching*. Malaysia: Pearson Education Limited.

McDonough, S. K. (2001, July). Promoting Self-Regulation in Foreign Language Learners. *The Clearing House*, 74 (6), 323.

Mitchell, R., & Myles, F. (2002). *Second Language Learning Theories*. London: Arnold

Nam, C. & Oxford, R. L. (1998). Portrait of a Future Teacher: Case Study of Learning Styles, Strategies, and Language Disabilities. *System,* 26, 51-68.

Nunan, D. (1990). An Empirically Based Methodology for the Nineties. In Sarinee, Anivan (Ed.), *Language Teaching Methodology for the Nineties.* (Anthology Series#24). EDRS, ED: 366186.

Nunan, D. (1997). Language Teaching and Research. In David Nunan (Ed.), *Classroom Teachers and Classroom Research.* (pp. 13- 21) EDRS, ED: 415692.

Okada, M., Oxford, R. & Abo, S. (1996). Not All Alike: Motivation and Learning Strategies among Students of Japanese and Spanish in an Exploratory Study. In Rebecca Oxford (Ed.), *Langugae Learning Motivation: Pathways to the New Century.* (Technical Report # 11) (pp. 105-119). Honolulu: University of Hawai'i, Second Language Teaching &Curriculum Center.

O'Malley, J. M. & Chamot, A. U. (1990). *Learning Strategies in Second Language Acquisition*. U.S.A.: Cambridge University Press.

Oxford, R. L. (1990). *Language Learning Strategies: What Every Teacher Should Know*. U.S.A: Heinle & Heinle Publishers.

Oxford, R. L. (1996). Why is Culture Important for Language Learning Strategies? In Rebecca L. Oxford (Ed.), *Language learning strategies around the world: Cross cultural perspectives.* (Technical Report #13) (pp. ix-xv). Honolulu: University of Hawai'i, Second Language Teaching & Curriculum Center.

Ramsey, N. F., Sommer, I. E. C., Rutten, G. J. & Kahn, R.S. (2001). Combined Analysis of Language Tasks in fMRI Improves Assessment of Hemispheric Dominance for Language Functions in Individual Subjects. *NeuroImage,* 13 (4), 719-733. Academic Press.

Rubin, J. (1987). Learner Strategies: Theoretical Assumptions, Research History and Typology. In Anita L. Wenden & Joan Rubin (Eds.), *Learner Strategies in Language Learning*, (pp. 15-30). Prentice Hall International (UK) Ltd.

Saleh, A. (2001, June). Brain Hemisphericity and Academic Majors: A Correlation Study – Statistical Data Included. *College Student Jouırnal*, 35 (2), 193-200.

Schnelle, H. (2010). *Language in the Brain.* U.S.A.: Cambridge University Press.

Simos, P. G., Billingsley-Marshall, R. L., Sarkari, S., Pataraia, E. & Papanicolaou, A. C. (2005). Brain Mechanisms Supporting Distinct Languages. *Learning Disabilities Research,* 20 (1), 31-38.

Springer, S.P. & Deutsch, G. (1998) *Left brain – right brain: Perspectives from neuroscience*. New York: Freeman and Company. (Fifth Edition).

Steinberg, D. D., Nagata, H., & Aline, D. P. (2001). *Psycholinguistics: Language, Mind and World.* Malaysia: Pearson Education Limited. (Second Edition).

Stern, H. H. (1987). Foreword. In Anita L. Wenden & Joan Rubin (Eds.), *Learner Strategies in Language Learning*. (pp. xi-xii). Prentice Hall.

Stern, H. H. (1992). *Issues and Options in Language Teaching*. Oxford: Oxford University Press.

Stillings, N. A., Weisler, S. E., Chase, C. H., Feinstein, M. H.,Garfield, J. L., & Rissland, E. L. (1998). Cognitive Science: An Introduction (2nd ed.). Massachusetts Institute of Technology.

Thompson, I. (1987). Memory in Language Learning. In Anita L. Wenden & Joan Rubin (Eds.), *Learner Strategies in Language Learning*. (pp. 43-56). Prentice Hall.

Van Blerkom, M. L. & Van Blerkom, D. L. (2004). Self-Monitoring Strategies Used by Developmental and Non-Developmental College Students. *Journal of College Reading and Learning,* 34 (2), 45- 60.

Wenden, A. L. (1987). Conceptual Background and Utility. In Anita L. Wenden & Joan Rubin (Eds.), *Learner Strategies in Language Learning*. (pp. 3-14). Prentice Hall International (UK) Ltd.

Wenden, A. L. (January, 1998). Learner Training in Foreign/Second Language Learning: A Curricular Perspective for the 21st Century. EDRS, ED 416673.

Williams, M. & Burden, R. L. (1997). Psychology for Language Teachers: A Social Constructivist Approach. UK: Cambridge University Press.

Williams, W. M., Blythe, T., White, N., Li, J., Gardner H. & Sternberg, R. J. (2002). Practical Intelligence for School: Developing Metacognitive Sources of Achievement in Adolescence. *Developmental Review,* 22**,** 162–210.

Yen, S. & Chou, S. (2009). The Effect of MTI on L2 Proficiency and Learning Strategies**.** *Asian EFL Journal*, 11(3), 9-28.