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## THE ROLE OF BRAIN DOMINANCE IN THE PEDAGOGICAL STRATEGIES USED BY IRANIAN ELT TEACHERS

*Research Article*

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# THE ROLE OF BRAIN DOMINANCE IN THE PEDAGOGICAL STRATEGIES USED BY IRANIAN ELT TEACHERS

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## Abstract

This study aimed to investigate the role of Iranian ELT teachers' brain dominance in the pedagogical strategies they employ and reveal in which ways brain dominance as a cognitive factor can influence the way teachers perform in their language classrooms. To this end, data were gathered from 74 ELT teachers in higher education institutes in Shiraz, Iran, who were selected to partake in the study through availability sampling. The participants were asked to fill in two questionnaires, the first one determined their brain dominance, and the second one examined the pedagogical strategies they used in their teaching settings. Analysis of data gathered via descriptive as well as inferential statistics revealed that teachers' brain dominance did not have any effects on their use of teaching strategies. Based on the results, it can be claimed that teachers can employ any strategy type they find more useful in their language classes regardless of their brain dominance, as a cognitive style.

*Keywords:* Brain dominance, cognitive style, Iranian ELT teachers, pedagogical strategies

## 1. Introduction

Among the several factors affecting teachers' way of teaching such as gender, age, teaching experience, and academic background, cognitive factors such as brain dominance are believed "to make an impact on the way teachers teach foreign languages" (Dreyer & Oxford, 1996, p. 37). In this vein, Gurney (2007), proposed five key factors in effective teaching which include teacher's pedagogies, classroom activities, assessment activities, effective feedback and effective interaction between the teacher and the students. Also, Oxford (1990a) believed that one of the ways with which variation within student performance can be explained is whether their teachers' styles are met by the student.

In the realm of brain dominance in TEFL, the term hemisphericity is used to show the tendency of an individual to rely on brain dominance more than the other, regardless of the cognitive nature of the task demands (Alptekin & Atakan, 1990). Though individuals might have the capacity to use both hemispheres of their brain, it is possible that one hemisphere takes the lead or becomes the dominant part based on the very individual's dominant hemisphere (Leng & Hoo, 1997). Besides, despite the fact that some individuals prefer either right- or left-brain dominance when processing the information, some individuals can be whole-brain dominant and might depend equally on both hemispheres of their brain which can bestow them certain priorities in the instructional processes and environments on the part of both the learner and the teacher (Dugler, 2012). Left-brained individuals are different from right-brained ones in terms of how they function in different contexts (Leng & Hoo, 1997). Based on Kok (2010), the left-brained individuals have an edge over the right-brained ones in terms of logical, analytical, mathematical and also linear processing of information, while right-brained ones benefit from visual, auditory, holistic and non-linear information processing.

Hergenhahn and Olson (2005) maintained that each of the functions of human's body are controlled by each of the hemispheres "evenly but in a crossed fashion" (p. 145). That is, the right hemisphere is in control of the left side of the body, and the opposite is true about the

left hemisphere of the brain. In a parallel fashion, Brown (2007) believed the left hemisphere is associated with logical, analytical thought, with mathematical and linear processing of information. He maintained “the right hemisphere perceives and remembers visual, tactile and auditory images; it is more efficient in processing holistic, integrative and emotional information” (p.125). Moreover, Krashen (as cited in Brown, 2007) emphasized “left hemisphere is superior to the right in judging temporal order, deciding which of the two stimuli was presented first” (p.70).

Morris (2005) stated that left brainers, being teachers or learners, are more convenient in the classroom. The reason is that in traditional schooling, emphasis is placed on analyzing different elements of languages, something that left brainers are good at. Revel (as cited in Oflaz, 2011) accentuated that in many language classrooms, left brainers are favored. On the contrary, in these contexts, right brain dominant learners are suffocated by teachers. “Creativity, something that right brainers are said to be good at, is seriously impaired” (Oflaz, 2011, p.1509).

### 1.1. Learning Strategies

Learning strategies have been defined by Wenden and Rubin (1987) as “any sets of operations, steps, plans, routines used by the learner to facilitate the obtaining, storage, retrieval, and use of information” (p.19). According to Dunn (1984), learning style represents every individual’s biologically and experientially motivated characteristics which may foster or inhibit achievement. Different authors have proposed different classifications for language learning strategies (e.g., O’Malley, Chamot, Stewner-Manzares, Kupper, & Russo, 1985; Oxford, 1990a; Stern, 1992). Their studies mostly used Oxford’s (1990a) categorization considered as “the most comprehensive classification of learning strategies” (Ellis, 1994, p. 539). Oxford (1990a) divided LLSs into two major categories of *direct* and *indirect* strategies: Direct strategies directly involve the L2, whereas indirect strategies “do not directly involve the subject matter itself, but are essential to language learning nonetheless” (Oxford, 1990b, p. 71). Oxford (1990a) specified language learning strategies as follows:

-*Memory strategies* help learners associate one L2 item or concept with another but do not inevitably involve deep understanding.

-*Cognitive strategies* allow the learner to manipulate the language material in direct ways through reasoning, analysis, note-taking, summarizing, synthesizing, outlining, reorganizing and practicing.

-*Compensatory strategies* help the learners make up for missing knowledge.

-*Metacognitive strategies* are used for managing the learning process overall.

-*Affective strategies* refer to recognizing one’s mood and anxiety, feelings, rewarding for good performance, and using deep breathing or positive self-talk.

-*Social strategies* aid the learner work with others and understand the target culture as well as the language (Oxford, 1990a, p. 16).

### 1.2. Brain Dominance

Based on Tendero (2000), the interest in working on the area of special parts of hemisphere has lately augmented. The term hemisphericity generally refers to cognitive information processing and is related to the left or the right hemisphere (Bavand Savadkoohi, Hassani, & Rahmani, 2013), which is associated with the activity on the part of the left or right cerebral hemisphere.

Regarding hemispheric dominance and laterality, Steinberg (1993) explained that the brain controls the body by division of labor. The LH controls the right side of the body, while the

RH controls the left side, however, the body cannot serve two masters: one side must take charge. This phenomenon, where one hemispheric is the major or controlling one is called dominance, hence, the term hemispheric dominance.

Alptekin and Atakan (1990) pointed out that usually one side of brain is specialized for different kinds of activities or tasks. According to Tendero (2000, pp.8-9), Left brain thinking is “the essence of academic success and intelligence as it is, presently measured; right-brain thinking is the essence of creativity”. In contradiction to Steinberg, the two hemispheres must function in a balance and integrated manner for wholesome human functioning to occur and for mental and physical health to be likewise in balance.

### **1.3. Empirical Studies**

Breien-Pierson (1988) conducted a study on the role of hemisphericity on the student’s writing and found that the right-brained students would act better on their free and creative writings compared with the left-brained learners who preferred writing research papers and book reports. Moreover, Beck (2001) and Dugler (2012) studies on hemisphere dominance revealed that the left-right mode preference shows the way a learner receives information. Their findings indicated that learners tend to reach higher levels of performance when they are taught the ways that are compatible with their right or left mode preferences.

In the area of language learning, Alptekin and Atakan (1990) and Tendero (2000) demonstrated no significant relationship between second language achievement and hemispherecity. On the opposite, Oflaz (2011) and Tufekci and Demirel (2008) examined the effects of right and left brain dominance on learners’ academic achievement and language learning and found significant differences between the achievement of right and left brain students on English tests. Oflaz (2011) examined the effect of right and left brain dominance in language learning and academic achievement. According to the results, brain dominance has an influence on the achievement of the learners in the English classrooms. Also, right brained students who were good at responding to demonstration instructions and visuals displayed a good performance in the vocabulary section. Finally, it was concluded that teachers should be equipped with tools to identify the teachers and learners’ learning styles and brain dominance to help them become aware of their teaching styles. They should also find the effective strategies for their own classrooms tailored to the students’ brain dominance mode and ultimately, assign activities to them accordingly.

Ozgen, Taraglu, and Alkan (2011) determined the brain dominance and learning style profiles of pre-service mathematics teachers and the relationship between them. They concluded that regardless of their own brain dominances and learning style profiles, teachers should be sensitive to learning needs of their individual students with different structures. Providing the opportunities for the learners to make use of their brain hemispheres together facilitates learning based on the idea that it makes whole brain more flexible and effective.

Bavand Savadkouhi, Hassani and Rahmani (2013) did a study on the effect of hemispheric dominance on learning vocabulary strategies among Iranian EFL learners. The results indicated that teaching vocabulary strategies had an important role on student’s vocabulary knowledge and the point that left-brained learners, after receiving instructions on vocabulary strategies, did better in learning vocabulary in comparison with right brained learners.

Shirlin and Ramesh (2014) investigated student teachers in colleges of education whose results demonstrated that most of the learners were left-brained learners and thus their teaching performance was greater than those who were integrated and right-brained learners.

Weisi and Khaksar (2015) investigated the effect of hemispheric dominance on Iranian EFL learners’ creativity in writing. They examined a homogeneous group of 50 junior and senior English translation students by first administering the Hemispheric Dominance Test by

Venkataraman (1988) and concluded that the right brain dominant learners had better performance in their creativity in writing test.

Considering the relevant literature, few studies have so far examined the impact of the aforementioned variable on the teaching side in the EFL context of Iran. To this end, this study intends to fill the gap within the literature by examining if teachers' brain dominance and cognitive styles would influence the teaching strategies they utilize while teaching in language classrooms. It is within the scope of this study to specify if teachers' brain dominance would be a determining factor in the strategies they use in language classrooms. Accordingly, this study aims to provide answers to the following questions:

1. What pedagogical strategies do left-brained, right-brained and whole-brained Iranian EFL teachers use?
2. Does Iranian EFL teachers' brain dominance play any role in the pedagogical strategies they use to teach their students?

## 2. Methodology

### 2.1. Participants

The participants in this study originally consisted of 80 male and female EFL teachers who were teaching in higher education institutes in Shiraz, Iran. They held MA and PhD degrees in English, and their age ranged from 27 to 50.

Table 1. *Teachers' Age Range in the Study*

Age	25-30	30-35	35-40	Above 40
Number of Teachers	15	27	20	18

All participants had English teaching experience of more than five years and were all native speakers of Persian. They were asked to participate in the study voluntarily as they were given the purpose and ensured that the information would be kept confidential. The sampling method was first availability and then snowball non-probability sampling as the researcher had access to about twenty teachers first. The distribution of the rest of questionnaires to other teachers in other institutes was done by these twenty teachers. Due to the fact that some teachers finally did not return all questionnaires, the number of participants reached 74 for the final analysis.

### 2.2. Instruments

The first instrument used in this study was a questionnaire constructed by Davis (1994). The questionnaire aimed at determining the extent to which people are right-brained, left-brained or both-brained dominant. The questionnaire consists of 15 Likert type items and has been reported to enjoy a high index of reliability (.76) by Saleh and Irannejad (2003). In this test, if EFL teachers have more *A* responses than *B* ones, they are left-brained. If they have more *B* responses than *A* ones, they are right-brained, and if the number of *A* and *B* responses are the same, they are whole-brained. Meanwhile, the reliability of this questionnaire was estimated by the researcher through Cronbach's alpha and showed to be 0.78 in the present study.

The second instrument used in this study was a questionnaire on teachers' strategy use originally constructed by Khabiri and Jazebi (2010). It includes 50 items with a five-point Likert-scale. The reliability of this questionnaire was previously estimated through Cronbach's alpha. Khabiri and Jazebi (2010) indicated that Strategy Inventory for Language Teaching (SILT) had a reliability of 0.89, which can be viewed as a good index of reliability. They also maintained that the questionnaire was valid regarding its content. In the current

study, the reliability of SILT estimated through Cronbach's alpha showed to be 0.82.

### 2.3. Data Collection and Analysis Procedures

80 EFL Iranian teachers were asked to take part in the study by first, answering Davis' questionnaire of brain dominance to show if they were left- or right- or both-brained. Next, the questionnaire constructed by Khabiri and Jazebi (2010) was used to assess the teachers' strategy use. All the data collection process was done through emails and meeting the teachers in person. The availability sampling was used to collect the data and to increase the number of participants, some colleagues were asked to hand in the questionnaires to other teachers to fill out and return. The whole process of data collection took about three months, and finally 74 ones were taken for data analysis. To analyze the collected data, descriptive statistics (such as mean, standard deviation, percentage, frequency) as well as One-way ANOVA were used to check if EFL teachers' brain dominance could influence the pedagogical strategies they use during their teaching.

### 3. Findings

To determine the extent to which the individuals are right-brained, left-brained or both-brained dominant, descriptive statistics on teachers' brain dominance were collected.

Table 2. *Descriptive Statistics for Teachers' Brain Dominance*

	Frequency	Percentage	Valid Percent	Cumulative Percent
Left-Brained	42	56.8	56.8	56.8
Right-brained	15	20.3	20.3	77
Whole-Brained	17	23	23	100
Total	74	100	100	

As shown in Table 2, of all the teachers participating in the study (n=74), 42 teachers were left-brained (n=42), 17 teachers whole-brained (n=17), and the remaining 15 teachers were right-brained (n=15).

In order to answer the first question, descriptive statistics on all the responded items with respect to their left-, right-, whole- brained dominance were checked, the mean scores were calculated, and the highest one and the lowest one were determined, respectively. The teachers' strategy questionnaire consisted of six parts, the first of which was related to vocabulary teaching strategies.

Table 3. *Descriptive Statistics for First Part of Teachers' Strategies Use and Brain Dominance*

Item	Left-Brained		Right-Brained		Whole-Brained	
	SD	Mean	SD	Mean	SD	Mean
1. In my teaching I make relationships between what my students already know and the new things they learn in English.	0.85	2.92	0.73	2.05	0.72	2.72
2. I encourage my students to use new English words in a sentence or I use them in a sentence so that the students can remember them.	0.72	4.20	0.74	2.10	0.73	2.75
3. By writing a new word on the board, I ask the students to connect the sound of the new word and the image or picture of the word to help them learn and remember the word.	0.72	4.20	0.80	3.70	0.70	2.75
4. I ask the students to make a mental picture of a sentence in which the new English word might be used.	0.70	3.80	0.75	4.10	0.68	3.76

5. I practice and emphasize the rhythm to help students remember new words.	0.61	4.30	0.80	3.70	0.80	3.70
6. I use flash cards to make students remember new English words.	0.70	3.80	0.86	3.84	0.80	4.10
7. I physically act out the new English words to the students.	0.68	4.16	0.80	3.80	0.70	3.80
8. I review previous English words in the class before the new ones.	0.70	3.80	0.90	3.62	0.80	4.00
9. I ask the students to remember new English words or phrases by remembering their location on the page, on the board, or on a street sign.	0.80	3.80	0.70	3.80	0.79	3.98
<b>Total mean</b>		<b>3.89</b>		<b>3.73</b>		<b>3.87</b>

As shown in Table 3, the highest mean score of teachers with left-brained dominance with regard to using pedagogical strategies was (M=4.30) for Item 5, which says *I practice and emphasize the rhythm to help students remember new words*, and for the right-brained teachers, it was Item 4 (M=4.10), which reads *I ask students do make a mental picture*. For whole-brained teachers, the highest mean score for strategy use was Item 6 (M=4.10), which says *I use flash cards....*

The second part of the strategy was regarding teachers' strategies for pronunciation instruction.

Table 4. *Descriptive Statistics for the Second Part of Teachers' Strategies Use and Brain Dominance*

Item	Left- Brained		Right- Brained		Whole- Brained	
	SD	Mean	SD	Mean	SD	Mean
10. I make the students produce the new English words several times as I write them several times on the board.	0.70	3.80	0.78	3.96	0.80	3.80
11. I draw students' attention to native pronunciation and assist them to ask like native English speakers.	0.73	4.22	0.70	3.80	0.70	3.80
12. I allocate some of my class time to students to practice the sounds of English.	0.80	4.18	0.80	3.80	0.70	3.80
13. I make the students use the English words they learn or know in different ways in the class or I use them in different ways myself.	0.70	3.70	0.70	3.70	0.71	4.06
14. I always start class conversations and discussions in English and encourage the students to start conversations in English.	0.70	3.70	0.78	4.10	0.80	3.80
15. I show English movies in the class or ask the students to watch English TV shows or English movies outside the class.	0.65	4.22	0.70	3.70	0.80	3.80
16. I assign my students to read.	0.64	4.22	0.80	4.00	0.70	4.00
17. I provide my students with notes, messages, letters or reports in English and make them practice.	0.70	4.00	0.70	4.70	0.69	4.20
18. I teach my students to first skim an English passage (read over the passage quickly) and then go back and read it carefully.	0.64	4.30	0.70	4.00	0.70	4.00
19. I ask my students to look for words in their own language that are similar to new words in English.	0.00	0.00	0.66	4.26	0.70	4.00
20. I help my students to find patterns in English.	0.62	4.32	0.70	4.00	0.70	4.00

21. I teach the meaning of new words to my students by dividing the words into parts that they understand.	0.62	4.34	0.70	4.00	0.70	4.00
22. I never translate word for word for many students in the class and I ask them no to do so.	0.65	4.32	0.80	4.00	0.70	4.00
23. As a classroom task, I ask my students to make summaries of information that they hear or read in English.	0.80	4.00	0.58	4.30	0.70	4.00
<b>Total mean</b>		<b>4.26</b>		<b>4.15</b>		<b>4.13</b>

With regard to the second part (Strategies 10-23), the strategy used most often by whole-brained teachers was Item 17 which reads *I provide my students with notes, messages, letters or reports in English and make them practice* (M=4.20), and the strategy used most often by right-brained teachers was also Item 17 (M=4.70) and the strategy used most often by the left-brained teachers were Items 21 and 22 which say *I teach the meaning of new words to my students by dividing the words into parts that they understand*, and *I never translate word for word for many students in the class and I ask them no to do so*. Both items had mean score of (M=4.34).

The third part of this questionnaire indicates teachers' strategies for reading instruction.

Table 5. Descriptive Statistics for the Third Part of Teachers' Strategies Use and Brain Dominance

Item	Left-Brained		Right-Brained		Whole-Brained	
	SD	Mean	SD	Mean	SD	Mean
24. I ask my students to make guesses to understand unfamiliar English words while reading.	0.70	4.28	0.80	3.70	0.70	3.60
25. I teach my students to use inference as a strategy when they are reading in English.	0.70	3.60	0.70	3.60	0.60	4.36
26. I tell my students to make up new words if they do not know the words in English reading.	0.54	4.40	0.70	3.60	0.70	3.60
27. I make the students read English without looking up every new word.	0.54	4.46	0.70	3.60	0.70	3.60
28. I ask my students to guess what the other person will say next when listening to English tapes or videos.	0.70	3.60	0.83	4.14	0.70	3.60
29. I teach my students that when they can't think of an English word, they should think of a word or phrase with the same meaning.	0.59	4.36	0.70	3.60	0.70	3.60
<b>Total mean</b>		<b>4.37</b>		<b>4.14</b>		<b>4.36</b>

With regard to the third theme, left-brained teachers employed Item 27 among the strategies most frequently than the other groups (M=4.46) which reads *I make the students read English without looking up every new word*, and the second group of teachers (right-brained) utilized Item 28 as the highest strategy (M=4.14). Item 28 says *I ask my students to guess what the other person will say next when listening to English tapes or videos* here and the last group who were whole-brained teachers used Item 25 pedagogical strategy as the highest. This items says *I teach my students....*

The fourth part of the questionnaire shows general strategies in language classrooms.



Table 6. *Descriptive Statistics for the Fourth Part of Teachers' Strategies Use and Brain Dominance*

Item	Left-Brained		Right-Brained		Whole-Brained	
	SD	Mean	SD	Mean	SD	Mean
30. I encourage my students to find as many ways as they can to use their English in the class.	0.70	3.60	0.70	3.60	0.67	4.30
31. I guide my students to notice their English mistakes and use that information to help them do better.	0.60	4.40	0.70	3.60	0.70	3.60
32. I make my students pay attention when I speak English or pay English tapes for them.	0.61	4.40	0.70	3.60	0.70	3.60
33. I guide my students to find out how to be a better learner of English.	0.70	3.60	0.70	3.60	0.61	3.85
34. I ask my students to plan their schedules so that they will have enough time to study English.	0.56	4.30	0.70	3.60	0.70	3.60
35. I assign my students to talk to each other in English even outside the class or look for people they can talk to in English.	0.54	4.40	0.70	3.60	0.70	3.60
36. I assign my students to read as much as possible in English.	0.57	4.44	0.70	3.60	0.70	3.60
37. I set clear goals for improving my students' English skill.	0.56	4.30	0.70	3.60	0.70	3.60
38. I ask my students to think about their progress in learning English.	0.70	3.60	0.92	3.60	0.70	3.60
<b>Total mean</b>		<b>4.41</b>		<b>3.60</b>		<b>4.05</b>

As observed in Table 6, the first group of teachers (those with left-brain dominance) had the highest frequency of employing pedagogical strategies (Items 32 & 36, M=4.44). Items 32 and 36 say *I make my students pay attention when I speak English or pay English tapes for them*, and *I assign my students to read as much as possible in English*. The highest mean score for right-brained belonged to Item 38 (M=3.60). The item says *I ask my students to think about their progress in learning English*. Among the items for the last group (whole-brained one), Item 30 which reads *I encourage my students to find as many ways as they can to use their English in the class*, had the highest mean score of all strategies being used.

The fifth part of the questionnaire deals with the strategies teachers use to handle students' feelings in the classroom.

Table 7. *Descriptive Statistics for the Fifth Theme of Teachers' Strategies Use and Brain Dominance*

Item	Left-Brained		Right-Brained		Whole-Brained	
	SD	Mean	SD	Mean	SD	Mean
39. I try to make my students relaxed whenever they feel afraid of using English.	0.65	4.34	0.70	3.70	0.70	3.70
40. I encourage my students to speak English even when they are afraid of making mistakes.	0.53	4.42	0.70	3.70	0.70	3.70
41. I give my students a reward or treat when they do well in English.	0.60	4.38	0.70	3.70	0.70	3.70
42. I guide my students to monitor and notice their nervousness when studying or using English.	0.60	4.38	0.70	3.70	0.70	3.70
43. I ask my students to write down their feelings in a language learning diary.	0.52	4.36	0.70	3.70	0.70	3.70
44. I encourage my students to talk to me about how they feel when they are learning English.	0.50	4.46	0.70	3.70	0.70	3.70
<b>Total mean</b>		<b>4.39</b>		<b>3.70</b>		<b>3.70</b>

As indicated in Table 7, with regard to the fifth theme, the left-brained dominant teachers employed the pedagogical strategy Item 44 as the most frequently used strategy (M=4.46). Item 44 reads *I encourage my students to talk to me about how they feel when they are learning English*. For the right-brained, it was the same as that of whole-brain group.

The last part of the questionnaire deals with the strategies teachers take monitoring students' performances.

Table 8. *Descriptive Statistics for the Sixth Part of Teachers' Strategies Use and Brain Dominance*

Item	Left- Brained		Right- Brained		Whole- Brained	
	SD	Mean	SD	Mean	SD	Mean
45. I tell my students to talk to me about how they practice when they are learning English.	0.70	3.70	0.86	3.94	0.70	3.70
46. I ask my students to correct each other when they talk.	0.70	3.70	0.93	3.68	0.70	3.70
47. I make students practice English with each other.	0.70	3.70	0.70	3.70	0.86	4.08
48. I make the students ask for help from me or other students.	0.70	3.70	1.04	3.60	0.70	3.70
49. I make my students ask their questions in English.	0.53	4.43	0.70	3.70	0.70	3.70
50. I try to make my students learn about the culture of English speakers as they practice learning.	0.70	3.70	0.70	3.70	0.87	4.02
<b>Total mean</b>		<b>4.43</b>		<b>3.72</b>		<b>3.81</b>

As shown in Table 8, regarding the sixth theme of pedagogical strategies used by teachers in classrooms, the first group of teachers (left-brained ones) utilized strategy Item 49 which reads *I make my students ask their questions in English* most frequently (M=4.43); the second group of teachers employed pedagogical strategy Item 45 (Mean=3.94) as highest, and the last group (whole-brained teachers) had the highest mean score for strategy of Item 47 (Mean=4.08). The item reads *I make students practice English with each other*.

In order to see if there were significant differences among teachers' strategies with regard to their brain dominance, a one-way ANOVA was run on the total mean scores of the questionnaire, responded by right-, left-, and whole-brained teachers.

Table 9. *Descriptive Statistics on Total Scores of Teachers' Strategy Use & Brain Dominance*

Brain Dominance	Mean	SD
<b>Right</b>	4.29	0.72
<b>Left</b>	3.22	0.84
<b>Whole</b>	3.41	0.75

Table 10. *One-Way ANOVA to Compare Teachers' Strategy Use Regarding their Brain Dominance*

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	138.133	2	69.067	2.936	.71
Within Groups	987.867	72	23.521		
Total	1126.000	74			

The results of the statistics obtained from one-way ANOVA (Table 10) show that there is no significant difference between the left-, right- and whole-brained teachers with regard to strategies they use as P value is greater than 0.05 (sig= 0.71).

#### 4. Discussion

The first research question examined which pedagogical strategies Iranian EFL teachers employ with regard to their brain dominance. With regard to the strategies employed by teachers, left-brained teachers made use of Items 35 and 46 the most frequently which read, respectively, *I assign my students to talk to each other in English even outside the class or look for people they can talk to in English*, and *I ask my students to correct each other when they talk* (M=4.46), and the strategy used the least frequently was Item 1 (M=2.92), which reads *In my teaching I make relationships between what my students already know and the new things they learn in English*. About the right-brained teachers, it can be stated that Item 23 was utilized the most frequently by teachers (M=4.30) which reads *As a classroom task, I ask my students to make summaries of information that they hear or read in English*, and the pedagogical strategy used the least frequently by right-brained teachers were Items 38 and 48 (M=3.60) which read, respectively, *I ask my students to think about their progress in learning English*, and *I make the students ask for help from me or other students*. And finally, the pedagogical strategy utilized most often by whole-brained teachers was Item 25 (M=4.36) which reads *I teach my students to use gestures as a strategy when they can't think of a word during a conversation in English*, and the pedagogical strategy used the least frequently by whole-brained teachers was Item 33 (M=3.85) which reads *I guide my students to find out how to be a better learner of English*.

According to Morris (2005), about the characteristics of right-brained, left-brained and whole-brained teachers, the right brain is better at copying the designs, discriminating shapes, understanding geometric properties, reading faces, music, global holistic processing, understanding metaphors, expressing and reading emotions, but the left brain is better at lingual skills, skilled movement and analytical time sequence processing. Thus, one can predict that the number of left-brained teachers may be much higher than that of right- or whole-brained ones as they are language teachers and their left-brain is more involved in the teaching process.

Based on Brown (2002), a person's dominance on the left or right hemisphere of brain is accepted to display some specific differences in his behaviors. Left-brain individuals are more intellectual, can remember names, can respond to verbal instructions and explanations, can experiment systematically and with control, can make objective judgments, are planned and structured, are analytic readers, prefer established, certain information, rely on language in thinking and remembering, prefer talking and writing, prefer multiple choice tests, can control feelings, are not good at interpreting body language and finally, rarely use metaphors.

The results of the first research question are consistent with the study done by Oflaz (2011) in which he came to the same result, and it was concluded that teachers should be equipped with tools to identify the learners' learning styles and brain dominance to help them become aware of their teaching styles. They should also find the effective strategies for their own classrooms tailored to the students' brain dominance mode and, ultimately, assign activities to them accordingly.

On the other hand, based on the results obtained in this study, brain dominance of teachers has not generally influenced the choice of strategies exploited by the teacher. Accordingly, the results are in line with the study conducted by Shirlin and Ramesh (2014) who concluded that the teaching strategies used by teachers with left-brained dominance was not that much better than that of the whole and the right-brained dominance teachers. Similarly, in the field of learning, Bakhshi, Rashvandi, and Alirezaeian's (2014) study on the writing performance of Iranian EFL learners indicated no significant relationship between brain dominance and Iranian EFL learners' performance in their writing task, which is in line with the results of this study.

Mireskandari and Alavi (2015) investigated the effect of brain dominance on the use of language learning speaking strategies. They examined one hundred forty-two undergraduate students of Shiraz University, Iran. The Hemispheric Dominance Test was employed to categorize participants as right-, left-, and whole-brain dominant, and a Speaking Strategy Questionnaire was administered to evaluate the participants' use of speaking strategies. The results showed that there was a statistically significant difference between the whole-brain dominant participants and both the left brain dominant learners and the right brain dominant learners for using compensation speaking strategies, which is not in line with the results of the current study. In the end, they came to the conclusion that in order to teach and learn more effectively, the instructors and the learners should better understand and appreciate individual differences and how they can affect the learning process.

## **5. Conclusion**

Stevenson and Dunn (2001) were of the opinion that if teachers start to accommodate their teaching styles and preferences during the classroom instruction, the quality of teaching will be expedited. On the other hand, Oxford (1990a) believed that teachers' brain dominance can be considered as a determining factor in their teaching quality and style. However, the results obtained in this study indicated that brain dominance of teachers did not generally influence the choice of strategies exploited by the teachers. In this line, the primary conclusion that can be drawn from the study is that in the EFL context of Iran, Iranian ELT teachers make use of a variety of pedagogical strategies regardless of their brain dominance (e.g. left-brained, or right-brained, and whole-brained). In addition, pedagogical strategies employed by teachers can be similar or different. The right-brained teachers utilized strategies somehow different from left-brained and whole-brained teachers, nevertheless the difference was not statistically significant. In this study, it was revealed that even though teachers with different brain dominance styles made use of different pedagogical strategies in their teaching profession, this difference was not statistically significant, and consequently no significant difference can be observed between the teachers in terms of their brain dominance and pedagogical strategy use. In other words, different teachers with different brain dominance do not employ significantly different pedagogical strategies when teaching in their EFL classrooms. Thus, all teachers, irrespective of their brain dominance, are capable of utilizing different pedagogical strategies in their classrooms for promoting learning.

As a whole, based on the results of this study, Iranian ELT teachers with left-, right- and whole-brain dominance do not employ significantly different pedagogical strategies when teaching in their classes. Also, it can be concluded that teachers with different teaching styles do not differ significantly in terms of the pedagogical strategies they employ in their classrooms while teaching English as a foreign language. Furthermore, the more frequent various strategies are employed by the teacher inside the classroom, the better learning will occur despite the present individual differences among the teachers and learners.

## **6. Implications of the Study**

The present study is significant as it delves into brain dominance as an influential cognitive factor to envisage how much ELT teachers can succeed in their teaching undertaking, considering their brain dominance. Moreover, the study gains significance in that it helps both native and non-native ELT researchers to understand how factors such as teachers' brain dominance patterns may affect their teaching strategies. If such impact exists, as Wong and Nunan (2011) maintain, teachers can teach to compensate for their students' learning deficiencies by employing learning strategies tailored to their own brain dominance.

Due to the existing role of brain dominance in teachers' pedagogical strategies, all the learners, teachers, professors, scholars, and even curriculum writers can benefit from the advantages of this study, and this is true in setting where English is taught as a native or foreign language.

In the TEFL research domain, learning styles and learning strategy use have been greatly assimilated (Jie & Xiaoqing, 2006; Keith, 2010; Lee, 2010; Oxford, 1990a; Wong & Nunan, 2011) and due to their importance in the language learning process, illuminating the connections between them can be of great benefit for the learners, teachers and researchers (Cesur & Fer, 2011). In this vein, ELT teachers in general and EFL teachers in particular may try to adapt their teaching materials and strategies to their own personality types; teachers can become familiar with their own different types of personality traits and facilitate their own instruction. In addition, the findings of this study can be useful for teacher educators. Knowing the teachers' brain dominance and use of strategies, one can introduce newer or more modern kinds of strategies to teachers to employ and choose the most appropriate kinds of strategies to earn maximum learning.

The results of this study are significant for curriculum and materials developers, policymakers as well as institute directors in EFL contexts like Iran. Curriculum writers might devise plans or methods which best suit the needs of their native academia and professors. Policy makers also would figure out what factors would affect teachers' degree of pedagogical strategies use with regard to their brain dominance teaching styles. EFL materials developers can also develop materials in a way that is more appropriate for EFL teachers' teaching styles with different brain dominance. And the last but not the least, institute directors can examine teachers brain dominance adapted to the kind of pedagogical strategies they can employ and to encourage them to use strategies suitable to their styles to gain optimum performance on behalf of both teachers and learners in Iranian EFL context.

Those interested in this topic can replicate the same study using probability sampling methods, which enjoys a higher level of generalization. This way, their data can be generalizable provided that the questionnaire is administered to a larger sample. Moreover, to provide data which delves deeply into the subject of investigation, a mixed methods research is suggested to be done, wherein aside from using questionnaires which are considered to elicit quantitative data, interviews which yield qualitative data can be included. Also, it is suggested that learners' strategies with regard to their brain dominance as well as personality traits such as extraversion/introversion be studied in future. It can also be suggested that other teacher related factors be studied to see if they may affect the type of strategies teachers use in language classes or not.

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## Appendices Appendix A

### Right/Left Brain Dominance Test (constructed by Davis, 1994)

Name \_\_\_\_\_

Which Side Are You On? Circle either "A" or "B" that most accurately describes you.

1. A. At home, my room has organized drawer and closets. I even try to organize other things around the house.

B. At home, I like the "lived-in" look. I clean as I see a need and when I have the time.

2. A. My desk is usually clean and has everything in place.

B. I leave my work out on my desk so I can work as I am inspired by ideas.

3. A. I like using the "tried and true" method.

B. I like creating new methods.

4. A. I follow directions carefully when I build a model, make a craft, etc.

B. I like to build a model my way, making my own creation.

5. A. I complete one project at a time.

B. I like to start many different projects, but do not like to finish them.

6. When I am asked to write a report on a subject, I.....

A. research information, then outline and organize my writing.

B. work in my own self-inspired direction.

7. When I had to do a project in class, I.....

A. used my parents' ideas, a book's illustrated project or modeled another student's project who received an "A+" from my teacher.

B. loved the challenge, and like a "mad scientist," I produced a unique project.

8. When I am in charge of a big job with many people working, I usually...

A. organize, give everyone their responsibilities, make lists, and make sure everyone finishes their part on time.

B. work at my own pace, let others work on the job as they want. I want to take care of needs/problems as they arise.

9. Which of these activities would you like to do the most?

A. planning the details for a trip/project

B. creating an original art form

10. I hate it when other people.....

A. are indecisive about what activities to do when I am with them.

B. plan activities in step-by-step detail when I am with them.

Scoring the Left/Right Brain Test

Add the number of "A" responses.

Write the sum here. \_\_\_\_\_



Add the number of "B" responses.

Write the sum here. \_\_\_\_\_

If you have more "A" responses than "B" responses, then you are left-brained dominate.

This means you.....

- are very rational
- analyze people and situations
- usually favor the subjects of math/science
- are methodical
- are a sequential thinker
- use logical reasoning
- like to work with things that can be seen or touched

**If you have more "B" responses than "A" responses, you are right-brain dominate.**

This means you.....

- are very creative
- are usually emotional
- like to be different from others
- handle situations easily
- like to think abstractly
- enjoy the arts (music, art, drama)
- are a divergent thinker

## Appendix B

### Strategy Inventory for Language Teaching (SILT) Based on SILL Version 7.0 by Oxford (1989)

(Revised by Kjabiri and Jazebi, 2010)

Directions

This form of the STRATEGY INVENTORY FOR LANGUAGE TEACHING is a modified version of SILL (R. Oxford, 1989) and is for teachers of English as a Foreign Language. You will find statements about teaching English to your students. Please read each statement. On the separate worksheet, write the response (1, 2, 3, 4 or 5) that tells HOW TRUE THE STATEMENT IS.

1. Never or almost never true of me.
2. Usually not true of me.
3. Somewhat true of me.
4. Usually true of me.
5. Always or almost always true of me.

NEVER OR ALMOST NEVER TRUE OF ME means that the statement is very rarely true of me.

USUALLY NOT TRUE OF ME means that the statement is true less than half the time.

SOMEWHAT TRUE OF ME means that the statement is true of you about half the time.

USUALLY TRUE OF ME means that the statement is true more than half the time.

ALWAYS OR ALMOST ALWAYS TRUE OF ME means that the statement is true of you almost always.

Answer in terms of how well the statement describes you. Do not answer how you think you should be, or what other people do. There are no right or wrong answers to these statements. Put your answers on the separate worksheet. Please make no marks on the items. Work as quickly as you can without being careless. This usually takes about 20-30 minutes to complete.

EXAMPLE



1. Never or almost never true of me.
2. Usually not true of me.
3. Somewhat true of me.
4. Usually true of me.
5. Always or almost always true of me.

Read the item, and choose a response (1 through 5 as above), and write it in the space after the item.

I actively seek out opportunities to talk with native speakers of English.

\_\_\_\_\_.

You have just completed the example item. Answer the rest of the items on the worksheet.

**Strategy Inventory for Language Teaching**

1. Never or almost never true of me.
2. Usually not true of me.
3. Somewhat true of me.
4. Usually true of me.
5. Always or almost always true of me.

(Write answers on worksheet)

Please fill out this form as a TEACHER

Part A1	1	2	3	4	5
1. In my teaching I make relationships between what my students already know and the new things they learn in English.					
2. I encourage my students to use new English words in a sentence or I use them in a sentence so that the students can remember them.					
3. By writing a new word on the board, I ask the students to connect the sound of the new word and an image or picture of the word to help them learn and remember the word.					
4. I ask the students to make a mental picture of a sentence in which the new English word might be used.					
5. I practice and emphasize the rhythm to help students remember new English words.					
6. I use flash cards to make students remember new English words.					
7. I physically act out the new English words for the students.					
8. I review previous English lessons in the class before the new ones.					
9. I ask the students to remember new English words or phrases by remembering their location on the page, on the board, or on a street sign.					
Part B1					
10. I make the students write the new English words several times or I write them several times on the board.					
11. I like native English speakers.					
12. I allocate some of my class time to students to practice the sounds of English.					
13. I make the students use the English words they learn or know in different ways in the class or I use them in different ways myself.					
14. I always start class conversations and discussions in English and encourage the students to start conversation in English.					
15. I show English movies in the class or ask the students to watch English TV shows or English movies outside the class.					
16. I assign my students to read for pleasure.					
17. I provide my students with notes, messages, letters or reports in English and make them practice.					
18. I teach my students to first skim an English passage (read over the passage quickly) and then go back and read it carefully.					
19. I ask my students to look for words in their own language that are similar to new words in English.					
20. I help my students to find patterns in English.					
21. I teach the meaning of new words to my students by dividing the words into parts that they understand.					

22. I never translate word for word for my students in the class and I ask them not to do so.					
23. As a classroom task, I ask my students to make summaries of information that they hear or read in English.					
Part C					
24. I ask my students to make guesses to understand unfamiliar English words.					
25. I teach my students to use gestures as a strategy when the word during a conversation in English.					
26. I tell my students to make up new words if they do not know the right words in English.					
27. I make the students read English without looking up every new word.					
28. I ask my students to guess what the other person will say next when listening to English tapes or videos.					
Part D					
30. I encourage my students find as many ways as they can to use their English in the class.					
31. I guide my students to notice their English mistakes and use that information to help them do better.					
32. I make my students pay attention when I speak English or play English tapes for them.					
33. I guide my students to find out how to be a better learner of English.					
34. I ask my students to plan their schedule so that they will have enough time to study English.					
35. I assign my students to talk to each other in English even outside the class or look for people they can talk to in English.					
36. I assign my students to read as much as possible in English.					
37. I set clear goals for improving my students' English skills.					
38. I ask my students to think about their progress in learning English.					
Part E3					
39. I try to make my students relaxed whenever they feel afraid of using English.					
40. I encourage my students to speak English even when they are afraid of making mistakes.					
41. I give my students a reward or treat when they do well in English.					
42. I guide my students to monitor and notice their nervousness when studying or using English.					
43. I ask my students to write down their feelings in a language learning diary.					
44. I encourage my students to talk to me about how they feel when they are learning English.					
Part F					
45. I tell my students to ask the other person to slow down or ask the teacher for repeating the tape if they are not able to follow or understand what is said in English.					
46. I ask students to correct each other when they talk.					
47. I make students practice English with each other.					
48. I make the students ask for help from me or other students.					
49. I make my students ask their questions in English.					
50. I try to make my students learn about the culture of English speakers.					