The Relationship between Perceptual Learning Style Preferences and Depth of Vocabulary Knowledge

Is'haaq Akbarian*[1]
Mohammad Afzali-Shahri[2]
Javad Ghasemi-Rezveh[3]
Mahmood Salimi[4]

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Abstract

Learners differ in the manner of understanding, organizing, and retaining information or experience. Therefore, this study investigates the relationship between perceptual learning style preferences and depth of vocabulary knowledge of 235 tertiary EFL learners (male = 89, female = 146) from two Iranian universities. The learners' responses on Perceptual Learning Style Preference Questionnaire (Reid, 1984) showed that kinesthetic, auditory, visual, and tactile modalities were found to be the major categories while individual and group styles appeared to be minor. Fur-

[1] Associate Professor, Department of English Language and Literature University of Qom, Qom, Iran, (Corresponding author); i-akbarian@qom.ac.ir; ishaaq.akbarian@gmail.com
[2] MPhil, Department of English Language and Literature University of Qom, Qom, Iran; m-afzali@qom.ac.ir
[3] MA Student, Department of English Language and Literature University of Qom, Qom, Iran; javadghasemi1@yahoo.com
[4] Assistant Professor, Department of English Language and Literature University of Qom, Qom, Iran; m.salimi@qom.ac.ir

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thermore, the data from the Word Associates Test (WAT, Read, 2000) revealed that the participants' mean scores on tactile style significantly correlated with WAT and its constituent parts (synonym and collocation). Despite the negative tendency towards group activities, the high-group learners had more major preferences than the low-group learners. Moreover, the mean scores of males' auditory style was under the cut-off point for a major learning style and lower than that of females. However, males outscored females on WAT, synonym, and collocation. Yet, tactile modality significantly correlated with WAT, synonym, and collocation for females. Group learning was the least preferred style by the participants. Thus, in teaching vocabulary, especially depth dimension, different teaching techniques and materials should be provided selectively to attend to the learners' diverse learning styles.

Keywords: Learning Styles, Perceptual Learning Style Preferences, Vocabulary Knowledge, Vocabulary Depth, Gender.

Introduction

Vocabulary acquisition is central to second or foreign language (L2/FL) learning (Nation, 2001). Leaners' success or failure in their communication skills is highly correlated with vocabulary knowledge (Akbarian, Farajollahi, & Jiménez Catalán, in press; Akbarian, 2018; Nation, 2001). Several researchers (e.g., Akbarian, 2010a & b; Milton, 2009; Qian, 2002; Read, 2000) define vocabulary knowledge as what it means to know a word with two dimensions: a) *breadth* specifies an individual's number of words or vocabulary size and b) *depth* indicates how well an individual knows a specific word. Researchers have argued for "the complexity and multi-dimensionality of word knowledge and have suggested that knowing a word well should mean more than knowing its individual meanings in particular contexts." (Nassaji, 2004, p. 112). One widely used measure of vocabulary depth is the Word Associates Test (WAT) (Read, 1993, 2000), measuring such components as paradigmatic, syntagmatic, and analytic ones. Concerning the construct validity of vocabulary depth, Milton (2009) declares that there are "no clear, comprehensive and unambiguous definitions to work with" (p. 150). One possible factor affecting vocabulary learning and, more specifically, vocabulary depth is the role of learning styles (Tight, 2010), related in turn to the learners' learning differences (Naserieh & Anani Sarab, 2013).

Since the mid-1960s, there has been a paradigm shift from the behaviorist (stimulus-response) to more cognitive approaches in language learning, resulting in several studies (Reid, 1987; Rossi-Le, 1989) on individual differences (e.g., age, anxiety, aptitude, motivation, sex, self-esteem, language learning styles and strategies), more specifically, how and why a learner learns a new language with a varying degree of success. Reid (1987) has indicated that learner characteristics have a significant role in the success rate. To connect these two separate areas, studies have addressed the relationship between vocabulary knowledge and vocabulary learning strategies (Shen, 2010; Zhang & Lu, 2015) and learning styles (Tight, 2010).

Ehrman (1996) claims that many learning difficulties emerge from learning style mismatches. However, the significance of learners' styles is frequently disregarded from the start of instructing/learning programs in an EFL setting, for example, in Iran. In addition, students are not aware of their styles, either (Naserieh & Anani Sarab, 2013).

Across Asia, little emphasis has been placed on vocabulary learning in university curricula (Fan, 2003), which holds true about Iran as well. In the Iranian language-learning context, "in teaching vocabulary for ESP/EAP at tertiary level, no systematic approach is adopted to help the university students notice sufficiently the dimensions of vocabulary knowledge, as expected" (Akbarian, 2010a, p. 392), resulting in a superficial knowledge of words. One possible explanation may be the mismatches between the learners' learning styles and the way materials are presented to them.

Literature Review

Individual differences predict L2 learning success (Dörnyei, 2005); and since language learning styles and strategies have the greatest influence on performance in L2 (Oxford, 1989), language learners' awareness should be raised about them (Reid, 1996).

Learning styles are described as "the variations among learners in using one or more senses to understand, organize, and retain experience" (Reid, 1987, p. 89). There are at least 20 style dimensions, of which perceptual preferences are identified based on how we take in information (Oxford & Anderson, 1995). In this respect, "sensory/perceptual preference refers to the sensory modality with which the learner is most comfortable and through which most perception is channeled for that individual" (Oxford et al., 1991, p. 7). Reid's (1984) Perceptual Learning Style Preferences Questionnaire (PLSPQ) is a well-known learning-style assessment instrument, used in ESL (Rossi-Le, 1995; Stebbins, 1995) and EFL fields (DeCapua & Wintergerst, 2005; Wintergerst et al., 2001).

Generally speaking, individuals use four perceptual learning channels to receive information with one or more of these preferences being dominant over otehrs (Naserieh & Anani Sarab, 2013). Patterns of perceptual style preferences are determined by diverse cultural backgrounds (Earley & Ang, 2003; Ehrman & Leaver, 2003: Joy & Kolb, 2009; Reid, 1987, 1995; Rossi-Le, 1989, 1995). Joy and Kolb (2009), for example, discovered that culture had a role in shaping the learners' styles.

Reid (1984) developed PLSPQ to identify the students' preferences (viz., visual, auditory, kinesthetic, tactile, group, and individual) in L2 learning classrooms. Visual learners prefer reading and need the visual stimulation of video and written directions to function well. Auditory learners enjoy the oral learning channel preferring engagement in discussions and conversations. However, tactile learners like to touch objects and enjoy making something for the class project and drawing related to language learning. Kinesthetic students prefer

activities requiring movement and frequent breaks in the classroom such as TPR activities and games. Group learners tend to work with others whereas individual learners learn best while working alone (Reid, 1995). Many studies also identify *major, minor*, and *negligible* learning styles (Naserieh & Anani Sarab, 2013).

Reid (1987) concluded that (1) ESL students often differ from native speakers in their perceptual learning styles, (2) ESL speakers from different languages have their own style preferences, and (3) learners differ in their learning styles as a results of other variables, such as sex, length of time spent in the U.S., major field, and level of education. With 147 adult immigrants studying English at college level, Rossi-Le (1989) reported strong preferences for tactile and kinesthetic styles, supporting Reid's (1987) findings. Moreover, in that study, only males significantly preferred tactile learning.

Working with 331 students at five universities, Melton (1990) replicated Reid's (1987) work in either Chinese or English and found no significant variation in students' answers in the questionnaire language. Chinese students appeared to have multiple major styles such as kinesthetic, tactile, and individual. Visual and auditory were found to be their minor styles, while group learning was negative. For males, tactile and individual learning emerged as major, auditory and kinesthetic learning as minor, and group learning as negative. Moreover, it was observed that females preferred auditory and kinesthetic learning significantly more than males. All students regarded tactile learning a major style and group learning a negative preference, while all except graduates chose individual learning as the second major preference. Also, the students studying English for 10 to 13 years were significantly more auditory than those studying for 2 to 6 years.

In a similar vein, Wang (1992) found that Chinese undergraduate students prefer kinesthetic style the most and group style the least. Learning styles were affected by length of time learning English and were related to EFL achievements. Also, Hyland (1993) replicated Reid (1987) with 405 Japanese students from eight universities, using a questionnaire in either Japanese or English. Consistent with Reid's (1987) findings, Japanese students exhibited no major style, but had multiple minor styles, and considered visual and group learning as negative. The questionnaire language did not significantly affect the answers. Plus, males demonstrated weaker preferences than females in each modality.

In another replication, Stebbins (1995) confirmed Reid's (1987) main findings. For example, ESL students strongly preferred kinesthetic and tactile styles, compared to native speakers. The least preferred modality by most participants was group learning. Japanese students did not apparently have strong style preferences and similarly, Arabic and Korean students had their multiple styles, while Spanish speakers strongly preferred kinesthetic style.

Peacock (2001) explored the relationship between style preferences and several variables among 206 EFL students at a university in Hong Kong. The data, collected through PLSPQ, interviews, and tests, showed that the participants preferred kinesthetic and auditory, and disfavored individual and group

styles. Moreover, low-proficient learners preferred group work. Regarding the discipline, humanities students significantly preferred auditory and individual styles compared to science students who showed a negative preference for individual style and a minor preference for group style. Humanities students selected individual learning as minor and group learning as negative. Elsewhere, from the departments of English, Management of Information, and Mechanical Engineering, Shen (2010) showed that Taiwanese university students preferring group style performed better in lexical inferencing.

Yet in another relevant study, among 710 Korean students, females significantly preferred kinesthetic and group styles over males, and the students with overseas experience revealed auditory and kinesthetic styles as major preferences. The fourth-year students were more inclined to auditory modality than the first-year students were. Age and major fields did not show a difference (Isemonger & Sheppard, 2003). For Iranian EFL students, auditory, visual, kinesthetic, and tactile styles were found to be major whereas group and individual styles were minor. Males, however, selected group style as major (Riazi & Mansoorian, 2008).

In the same line, Naserieh and Anani Sarab (2013) studied style in relation to gender, age, and discipline among 138 Iranian graduate students and found that kinesthetic, tactile, and auditory modalities are seen as major, visual ones as minor, and group styles as negative. Males preferred individual work, whereas females favored group activities. Moreover, learners, aged 23 and under, were more auditory-oriented. It was also observed that students in technical fields favored tactile and students in social and humanities majors favored kinesthetic style.

Tight (2010) explored style matching and L2 vocabulary acquisition among 128 English undergraduates learning concrete nouns in Spanish. Learners studied 36 words through three conditions (matching, mismatching, and mixed modality). The findings showed that style matching significantly promoted retention, and that learners with different styles were equally successful at L2 vocabulary acquisition, especially through visual and mixed modality learning. In another study, investigating the relationship between vocabulary learning strategies and vocabulary breadth and depth of 150 Chinese freshmen, Zhang and Lu (2015) found that strategies focusing on the forms and associative meanings of words significantly enhanced both vocabulary breadth and depth.

The literature surveyed above illustrated that learners, in general, have different preferences. More importantly, there is an association between style preference and different factors; variables, such as nationality, gender, language proficiency level, culture, major of study, age, task involvement, and aspects of language learning provoke different associations with different style preferences.

Jiménez Catalán (2003), however, claims that "sex as a variable has received little attention in the fields of second language learning/teaching" (p. 55). Only a few studies have addressed individual factors, for instance, sex and learning

styles (Ehrman & Oxford, 1989; Oxford, 1995; Reid, 1987). In this respect, the present research aims tackle another aspect of this issue by answering the following research questions (RQs):

1) Is there any relationship between Iranian EFL learners' perceptual learning style preferences and their depth of vocabulary knowledge?
2) Do Iranian EFL learners with different levels of vocabulary depth prefer different perceptual learning styles?
3) Is there any interaction between gender and learning style preferences with regard to different levels of the depth of vocabulary knowledge?

Method

Participants

Two hundred thirty five EFL students [aged 18–46, M = 89 (37.87%), F = 146 (62.13%)], selected through availability sampling from two Iranian universities, participated in this study. They were majoring in English Literature (N = 116, M = 57, F = 59) and English Translation (N = 119, M = 32, F = 87).

Instruments

Other than a background questionnaire, data collection instruments were as follows:

Perceptual Learning Style Preference Questionnaire (PLSPQ)

Developed by Reid (1987), PLSPQ is a self-reporting questionnaire with five-point Likert scales ranging from strongly disagree (1) to strongly agree (5). The participants read the statements in the questionnaire and decide whether they strongly disagree, disagree, are undecided, agree, or strongly agree and mark the answer that best applies to their study of English. It includes 30 random statements, 5 items for each style about how students learn best when they use four perceptual learning styles (Auditory, Kinesthetic, Visual, and Tactile) and two social preferences (Individual and Group). Taking 20 minutes to answer, PLSPQ is widely used with non-native speakers (DeCapua & Wintergerst, 2005; Naserieh & Ananisarab, 2013) and is neither long, nor time-consuming to complete (Wintergerst et al., 2001).

In a pilot study with Chinese students, Cheng (1997) demonstrated the reliability of .81 for Reid's (1984) PLSPQ using Cronbach's alpha. Reid (1995) also classified styles as either major, minor, or negligible (or negative). Major style (above 17.91) is the strongest learning style preference, minor (between 15.91 and 17.90) means learners can still function, and negligible (below 15.90) is the one which may cause the learner difficulty.

Depth of Vocabulary Knowledge Test

Originally called Word Associates Test (WAT) and developed by Read (1993), WAT measures synonymy, polysemy, and collocation. It includes 40 items, with two boxes each having four words; one to three of the words in each box can be synonymous with the adjective or its potential noun collocates. Each item should have four correct responses, as follows, hence reducing the chances for guessing: a) one correct answer in the left and three in the right box, b) two right answers in each box, or c) three in the left and one in the right box. See an example:

Sudden

beautiful	quick	surprising	thirsty		change	doctor	Noise	school

The total number of correct answers for the left box is 73 and for the right box is 87, (i.e., 160, in total). Read (2000) and Qian (2002) reported the reliability of this instrument as .92 and .89, respectively. WAT takes 45 minutes to answer.

Data Collection and Analysis

The participants voluntarily responded to the instruments. We calculated the frequencies and percentages, along with the descriptive statistics for the sum of the five items in each learning style in PLSPQ. The total possible score for each style preference was 25 points (1–5 points per item, five items per modality). Moreover, the researchers practiced several examples of WAT for the participants' familiarity. The maximum possible score on WAT (i.e., vocabulary depth) was 160 (73 on synonyms and 87 on collocations).

Cronbach's alpha estimated the internal consistency of the questionnaire items. Multiple regression analyses were then performed to investigate the relationship between one or more independent variables (i.e., styles) and the dependent variable (i.e., WAT).

Results

Cronbach's alpha values for the questionnaire and its subscales are as follows: PLSPQ (.75), visual (.52), auditory (.52), kinesthetic (.74), tactile (.67), individual (.79), and group (.86). Visual and auditory subscales did not reach an acceptable alpha level, as also evidenced by Naserieh and Anani Sarab (2013), reporting the following alpha values: visual (.50), auditory (.59), kinesthetic (.64), tactile (.69), individual (.82), and group (.79).

Table 1 demonstrates a general profile of the participants' pattern of learning style preferences and their scores on WAT. As for major styles, it can be viewed that the participants showed more dominant preferences for kinesthet-

ic (*M* = 18.72), visual (*M* = 18.59), auditory (*M* = 18.25), and tactile (*M* = 18.12) styles; they mostly prefer learning by doing exercises, reading a lot, and listening to a lecture, hence indicating their active involvement in language learning. Moreover, the participants' individual (*M* = 17.20) and group (*M* = 16.24) styles were found to be minor.

Table 1.
Correlation Matrix and Descriptive Statistics of the Measured Variables

	Mean	*SD*	Min	Max	WAT	Synonym	Collocation	Type
Kinesthetic	18.72	3.49			.131	.105	.140	Major
Sig.					.023*	.054	.016*	
Visual	18.59	2.81			.054	.085	.023	Major
Sig.					.204	.098	.365	
Auditory	18.25	2.84			-.018	-.007	-.026	Major
Sig.					.392	.459	.345	
Tactile	18.12	3.52			.180	.152	.187	Major
Sig.					.003**	.010**	.002**	
Individual	17.20	4.29			.113	.100	.112	Minor
Sig.					.042*	.063	.044*	
Group	16.24	4.60			-.085	-.107	-.057	Minor
Sig.					.098	.051	.194	
WAT	77.07	28.82	0	160				
Synonym	34.94	14.15	0	73				
Collocation	42.12	16.33	0	87				

* $p < .05$. ** $p < .01$.

The mean score on WAT was 77.07 (*SD* = 28.82, *Max* = 160), demonstrating a slightly lower mean gain than the mid-score. The participants' means on *synonym* and *collocation* parts of WAT were 34.94 (*SD* = 14.15, *Max* = 73) and 42.12 (*SD* = 16.33, *Max* = 87), respectively.

Table 2 presents a comparison of the means reported in this study with the ones found in other studies conducted in the Iranian context using Reid's (1984) questionnaire (e.g., Naserieh & Anani Sarab, 2013; Riazi & Mansoorian, 2008). Surprisingly, the results are not identical but reveal the same general pattern in these researches as there is an adaptation of Reid's scoring scales.

Table 2.
Learning Style Preferences in Different Studies in Iran

Style preferences							
Study	*N*	Visual	Auditory	Kinesthetic	Tactile	Individual	Group
Current study	235	18.59 (Major)	18.25 (Major)	18.72 (Major)	18.12 (Major)	17.20 (Minor)	16.24 (Minor)
Riazi & Mansoorian (2008)	300	18.73 (Major)	18.96 (Major)	18.80 (Major)	19.16 (Major)	16.44 (Minor)	17.50 (Minor)
Naserieh & Anani Sarab (2013)[a]	138	13.04 (Minor)	13.71 (Major)	14.49 (Major)	14.36 (Major)	12.17 (Minor)	10.99 (Negative)

Note: 17.91 and above = major; 15.91 - 17.90 = minor; 15.90 or less = negligible. The current study and Riazi and Mansoorian followed these scales.

a. Based on Reid's (1995) scoring procedure.

Similar to the works conducted by Riazi and Mansoorian (2008), and Naserieh and Anani Sarab (2013), our participants' auditory, kinesthetic, and tactile styles were found to be major. However, the visual style was also major in our study and in Riazi and Mansoorian (2008), but minor in Naserieh and Anani Sarab (2013). Individual style was minor in all the three studies whereas group style was negative (i.e. the least dominant) in Naserieh and Anani Sarab's (2013) study, but minor in the current study and Riazi and Mansoorian's (2008), meaning that learning in a group may cause the learners difficulty.

RQ1: *What is the relationship between the scores on PLSPQ and WAT?*

No learning style had a highly meaningful relationship with WAT. EFL learners' tactile (r = .180, p < .01), kinesthetic (r = .131, p < .05), and individual (r = .113, p < .05) styles were only weakly correlated with WAT; more tactile-oriented Iranian EFL learners are a bit more likely to have a slightly higher score on WAT (Table 1).

The relationship between tactile style and WAT, and its elements was significant. However, there was a very weak correlation between kinesthetic and individual styles and collocations, but not synonyms (r = .100; p = .063). However, even though four of Iranian EFL learners' style preferences were major (Table 2), the correlation coefficients demonstrated no strong association with WAT, synonyms, and collocations.

Note that (a) the correlation between tactile style and collocation was slightly higher than the correlation of this style with WAT and synonym, and (b) the correlation between tactile style and synonym was lower than its correlation with WAT and collocation; the highest correlation was the one between tactile style and collocation, and the lowest between tactile style and synonym. As for the predictive power of PLSPQ on WAT, Table 3 shows the model summary for tactile style and WAT, r = .180, R^2 = .032, i.e., a slightly significant relationship.

Table 3.
Model Summary for Style Preferences and WAT, Synonym, and Collocation

	Dependent variable	Predictors	R	R^2	Adjusted R^2	SEE
Model 1	WAT	1. Tactile	180[a]	.032	.028	28.41
Model 2	Synonym	1. Tactile	.152[a]	.023	.019	14.03
		2. Tactile, Group	.208[b]	.043	.035	13.91
Model 3	Collocation	1. Tactile	.187[a]	.035	.031	16.08

The adjusted R is .028, suggesting that tactile style and WAT actually overlap one another to a very low extent: tactile style has about .032 percent explained variance in WAT or vice versa. Table 4 illustrates the percentage of increase in the independent variable (tactile style), and the resultant change in the dependent variable (WAT), showing that we obtained a = 50.363 for the intercept and b = 1.474 for the slope. Consequently, for each percentage of in-

crease in WAT scores, the scores on tactile style change *b* (1.474) units. Comparing the Beta value under standardized coefficients (.180 in Table 4), we can see that tactile style contributes very weakly to the prediction of WAT. In other words, the extent to which the participants favor studying with the tactile style can only slightly influence their vocabulary depth.

Table 4.
Regression Analysis for Tactile Preference and WAT

Dependent Variable	Predictors		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
			B	Std. Error	Beta		
WAT	1	Tactile	50.363	9.736		5.173	.000
			1.474	.527	.180	2.795	.006
Synonym	1	Tactile	23.891	4.806		4.971	.000
			.610	.260	.152	2.344	.020
	2	Tactile	28.924	5.278		5.480	.000
			.734	.264	.183	2.778	.006
		Group	-.448	.202	-.146	-2.218	.027
Collocation	1	Tactile	26.447	5.509		4.800	.000
			.865	.298	.187	2.899	.004

Table 3 reveals an (admittedly small) increase in R^2 from model 1 to model 2, which indicates that the latter model fits the data somewhat better than the former. That is, tactile along with group style explained about .043 percent of the variance in synonym or vice versa.

Consequently, in model 1 (Table 4), we obtained a = 23.891 for the intercept (dependent variable) and b = .610 for the slope (independent variable); for each percentage of increase in synonym scores, the scores on tactile style change *b* (.610) units. However, in Model 2, the percentage of increase in tactile and group styles and the resultant change in synonym shows that we obtained a = 28.924 for the intercept and b = .734 (tactile), b = -.448 (group) for the slope. Thus, for each percentage of increase in synonym scores, the scores on tactile style change *b* (.734 and -.448) units, hence not contributing similarly.

Comparing the Beta values under standardized coefficients in model 1 (.152 in Table 4), we can observe that tactile makes very little contribution to the prediction of synonym. However, in model 2, we see that tactile (.183) and group (-.146) styles slightly contribute to the prediction of synonyms, though negatively in the case of group style.

Finally, tactile style (adjusted R^2 = .031) is alone a significant predictor as it accounts for 3.1 percent of the unique variance in collocation. Tactile style and collocation have about 3.5 percent shared variance. Group style was *not* added to the model since collocation does not provide any significant variance to the variable. The percentage of increase in tactile style and the resultant change in the dependent variable shows that we obtained a = 26.447 (t = 4.800) for the intercept and b = .865 (t = 2.899) for the slope. Thus, for each percentage of

increase in collocation scores, the scores on tactile style change b (.865) units. Considering the Beta value (.187, Table 4), tactile style contributes very weakly to the prediction of collocation.

RQ2: *Do learners with vocabulary depth levels (low and high) have perceptual learning style preference?*

We then divided the participants (*N* = 235) into two groups, based on their rounded mean (*M* = 77.00) scores on WAT, which was very close to their median (78). Therefore, the participants with the mean of 77 or lower on WAT were put into the low group and those averaging 78 or above were regarded as the high group.

Low-group learners showed more dominant preferences for visual (*M* = 18.59), auditory (*M* = 18.42), and kinesthetic (*M* = 18.31) styles (i.e., major) (Table 5). For instance, they were found to prefer reading, listening to lecture, and experiential learning. The mean scores of tactile, group, and individual styles were 17.12, 16.66, and 16.61, respectively, which can be considered as minor, indicating that participants can still learn by doing exercises or work either in a group or individually. Results on WAT showed that the mean score of the low-group learners was 52.87 (*SD* = 15.87, *Max* = 77).

On the other hand, the high-group learners demonstrated more dominant preferences for kinesthetic (*M* = 19.13), tactile (*M* = 18.72), visual (*M* = 18.58), and auditory (*M* = 18.09) (major category), indicating the participants' active involvement in language learning. Moreover, the participants' individual style (*M* = 17.79) was minor, indicating that the participants could work individually. However, the high-group learners had the least preference for group modality (*M* = 15.83), which is a negative category. Their means on WAT was 100.67 (*SD* = 16.26).

Table 5.
Descriptive Statistics for Styles across Groups

	Low (*N* = 116)		High (*N* = 119)	
Style preferences	Mean	*SD*	Mean	*SD*
Auditory	**18.42**	2.94	**18.09**	2.75
Tactile	17.51	3.63	**18.72**	3.32
Kinesthetic	**18.31**	3.66	**19.13**	3.28
Visual	**18.59**	3.13	**18.58**	2.48
Individual	16.61	4.12	17.79	4.39
Group	16.66	4.18	15.83	4.97
WAT[a]	52.87	15.87	100.67	16.26

a. WAT (min = 9, max = 77) for low group. WAT (min = 78, max = 140) for high group.

The correlation results for the low group reveal that only individual (*r* = .184, *p* < .05) and group (*r* = -.228, *p* < .01) styles were weakly correlated with WAT. Two things are particularly worth noting: (a) Individual style (*M* = 16.61) is least preferred by the low group and only weakly correlated with WAT, and

(b) the second least dominant style (i.e. the group style, which is a minor type) was negatively correlated with WAT. For the high-group learners, however, only individual style was significantly correlated with WAT (r = -.169, p < .05) (Table 6).

Table 6.
Correlations between Style Preferences and WAT

		Auditory	Tactile	Kinesthetic	Visual	Individual	Group
Low group	*r*	.052	.043	.067	.090	**.184**	**-.228**
	Sig.	.288	.325	.237	.168	**.024***	**.007****
High group	*r*	.057	.096	.050	.112	**-.169**	.151
	Sig.	.269	.150	.295	.113	**.033***	.051

* p < .05. ** p < .01.

Multiple regression analyses display the value of R^2 = .052, meaning that 5.2 percent of the total variance in WAT is explained by group style. The respective corresponding coefficients of determination (adjusted R^2) are reported as .044, indicating a weakly significant relationship between the two variables (r = .228, F change = 6.245, p < .01) (Table 7). Moreover, group style (b = -.865, p = .014) was significant and the coefficient was negative. That is, the more the low-group learners prefer group style, the lower their WAT or depth of vocabulary knowledge will be. We obtained a = 67.277 for the intercept and b = -.865 for the slope. According to the data, for each percentage of increase in WAT scores, the scores on group style change b (-.865) units. Comparing the Beta value under standardized coefficients (-.228 in Table 8), we can figure out that group style contributes very weakly yet negatively to the prediction of WAT.

Table 7.
Model Summary for Group Preference and WAT for Low Group

Model	Dependent Variable	Predictors	R	R^2	Adjusted R^2	SEE
1	WAT	Group	.228[a]	.052	.044	15.53

Table 8.
Regression Analysis for Group Preference and WAT for Low Group

Dependent Variable	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
WAT	1 Group	67.277	5.942		11.321	.000
		-.865	.346	-.228	-2.499	.014

RQ3: *Does gender interact with PLSPQ and WAT?*

Both male and females showed more dominant preferences for kinesthetic (M = 18.56, M = 18.83), followed by visual style (M = 18.43, M = 18.69, respec-

tively). Neither gender identified a negative style but both males and females obtained the lowest mean scores for group style (M = 16.37, M = 16.16, respectively), i.e., minor. However, auditory style was minor for males (M = 17.86) but major for females (M = 18.49). Apparently, gender does not highly influence the participants' style choice, except for the auditory modality (Table 9).

As for WAT, males (M = 84.79) achieved a slightly higher mean than the mid-score (80 out of 160) and females (M = 72.38). Moreover, males obtained a mean of 37.84 for synonym (max = 73) and 46.94 for collocation (max = 87) while females gained a mean of 33.18 on synonym and 39.29 on the collocation section of WAT. Thus, males were found to have obtained slightly higher means than the mid-score for synonym (36.50) and collocation (43.50) in comparison to females.

Table 9.
Descriptive Statistics for Males and Females

	Males (N = 89)		Females (N = 146)	
Style preferences	Mean	*SD*	Mean	*SD*
Auditory	17.86	3.14	18.49	2.63
Tactile	18.38	3.37	17.97	3.61
Kinesthetic	18.56	3.66	18.83	3.39
Visual	18.43	2.65	18.69	2.92
Individual	17.44	4.24	17.07	4.34
Group	16.37	5.01	16.16	4.35
WAT (min = 0, max = 160)	84.79	28.95	72.38	27.81
Synonym (max = 73)	37.84	13.95	33.18	14.04
Collocation (max = 87)	46.94	16.72	39.19	15.42

With regard to the correlations, it was found out that only tactile style was weakly but significantly correlated with WAT and synonym for females (respectively, r =.250 and r = .229, p < .01). However, no style was significantly correlated with WAT or the synonym part in the case of males. The analysis results related to PLSPQ and collocation indicated that no style had a highly meaningful relationship with collocation. Kinesthetic style (r = .199, p < .05) showed a significant correlation for males, but not for females. In contrast, the r value for the females' tactile style (r = .242, p < .01) was significant, while their male counterparts' tactile style (r = .076, p = .239) was not correlated with collocation (Table 10). Thus, more tactile-oriented Iranian EFL female learners are likely to possess a bit more collocation knowledge on vocabulary depth (or a higher score on collocations).

The model summary was not observed for males on WAT, synonym, and collocation. However, Table 11 reports a weak relationship between tactile and WAT for females (r = .250, F change = 9.592, p = .002). From the statistics provided in this table, it could be said that 6.2 percent of the variation in tactile is explained by WAT. The respective corresponding coefficient of determination (adjusted R^2) is reported to be .056. Table 12 presents the unstandardized and standardized coefficient values. As can be viewed, the value for tactile style (b =

1.923, p = .002) is significant and the coefficient is positive, indicating that the more females preferred tactile style, the more their vocabulary depth will increase to some extent. Additionally, we obtained a = 37.820 for the intercept and b = 1.923 for the slope. Therefore, for each percentage of increase in WAT scores, the scores on tactile style change b (1.923) units.

Table 10.
Correlations between PLSPQ and WAT, Synonym, and Collocation among Males/Females

Style preferences	**WAT**				**Synonym**				**Collocation**			
	Males		Females		Males		Females		Males		Females	
	r	Sig.	*r*	Sig.	*R*	Sig.	*r*	Sig.	*r*	Sig.	*r*	Sig.
Auditory	.020	.427	-.007	.468	.016	.440	.007	.468	.021	.424	-.019	.412
Tactile	.042	.349	.250	.001**	-.005	.481	.229	.003**	.076	.239	.242	.002**
Kinesthetic	.172	.054	.121	.073	.118	.135	.109	.095	.199	.031*	.119	.076
Visual	.102	.170	.044	.298	.087	.208	.096	.123	.104	.165	-.008	.463
Individual	.091	.199	.116	.081	.082	.222	.102	.110	.089	.205	.116	.082
Group	-.057	.299	-.117	.080	-.124	.123	-.104	.105	.005	.480	-.115	.083

* p < .05. ** p < .01.

Moreover, it can be said that approximately 5.3 percent of the variance in the knowledge of synonym is explained by the predictor variables. The respective adjusted R^2 = .046 suggests that tactile style and synonym knowledge actually overlap one another to a very low extent for females (r = .229, p = .05). Therefore, the percentage of increase in tactile style and the resultant change in synonym shows that we obtained a = 17.169 for the intercept and b = .891 for the slope. As a result, for each percentage of increase in synonym scores, the scores on tactile style change b (.891) units (Table 12). Accordingly, tactile style contributes very weakly to the prediction of synonym knowledge. In other words, the extent to which females favor studying under the tactile style does not considerably increase their knowledge of synonyms in terms of vocabulary depth.

Finally, model summary (Table 11) for tactile style and collocation shows a significant relationship (r = .242 p = .003) between the two variables (F change = 8.979, p < .01). The respective adjusted R^2 of .052 suggests that tactile style and collocation overlap one another to a very low extent: about 5.9 percent of the variance in tactile style is explained by the collocation section of WAT or vice versa. We obtained a = 20.613 for the intercept (dependent variable) and b = 1.034 for the slope (tactile style). For each percentage of increase in collocation scores, the scores on tactile style change b (1.034) units. Accordingly, based on the Beta value under standardized coefficients (.242), it can be concluded that tactile style contributes weakly to the prediction of collocation; the females' preference for studying under tactile style will increase their collocation learning in terms of vocabulary depth only to a small extent.

Table 11.
Model Summary for Tactile Preference and WAT, Synonym, and Collocation for Females

Model	Dependent Variable	Predictors	R	R^2	Adjusted R^2	SEE
1	Wat	Tactile	.250[a]	.062	.056	27.02
1	Synonym	Tactile	.229[a]	.053	.046	13.72
1	Collocation	Tactile	.242[a]	.059	.052	15.01

Table 12.
Regression Analysis for Tactile Preference and WAT for Females

Dependent Variable	Predictors	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
WAT	1 Tactile	37.820	11.380		3.323	.001
		1.923	.621	.250	3.097	.002
Synonym	1 Tactile	17.169	5.777		2.972	.003
		.891	.315	.229	2.828	.005
Collocation	1 Tactile	20.613	6.323		3.260	.001
		1.034	.345	.242	2.996	.003

Discussion

Iranian EFL Learners' Perceptual Learning Styles

Unlike Riazi and Mansoorian (2008)'s study, there were lower means for the present study across all modalities except the individual preference despite similar category scales. Our results, though lower, follow the same general patterns. In comparison, except for the auditory style, Naserieh and Anani Sarab's (2013) work had lower means in all learning styles than the current study. The reason might be due to the participants' real performance on modalities. The lower means could also be "an indication of a greater conservativeness in answering the questionnaire on the part of the sample" (Isemonger & Sheppard, 2003, p. 203).

Among the six learning styles, kinesthetic, visual, auditory, and tactile styles (Table 1) were categorized as major preferences, in line with Riazi and Mansoorian (2008) who investigated the preferred style(s) among Iranian male and female EFL students and also Naserieh and Anani Sarab (2013); however, visual style was minor in the last study. Based on the findings of these studies, Iranian learners have multiple major learning styles, probably meaning that Iranian EFL learners are better off in learning languages. Learners "... with mixed modality strengths often have a better chance of success than do those with a single modality strength, because they can process information in whatever way it is presented" (Guild & Garger, 1985, p. 64). Similarly, native speaker research "suggests that the ability of students to employ multiple learning styles results in greater classroom success" (Reid, 1987, p. 101). Also, Reid attributes the results to multiple cultures involved (Arabic and Chinese speakers) as well as to predisposition toward positive responses on questionnaires (e.g., Korean) and, on the contrary, to responding across all the available positive and negative options (e.g., native speakers of English). These very reasons might account

for the multiple major styles of Iranian learners as well. To conclude, if, for instance, the material is presented through auditory or visual channels while the learners' preferred style is kinesthetic or tactile, they can shift to the teaching styles easily. Therefore, Iranian learners should be very successful in learning English because they have four major styles (Table 1).

Kinesthetic as the first dominant and individual as the least preferred style were major and minor, respectively, supporting Naserieh and Anani Sarab (2013). Group preference, the least dominant, was minor. A similar result in the Iranian context was reported in Naserieh and Anani Sarab's research on graduate students, finding this style as a negative type though. Therefore, it seems that Iranian EFL students can still work in group activities, however. Group style preference is detrimental to their English learning when engaging in group activities (Naserieh & Anani Sarab, 2013). Moreover, individual and group preferences were minor but neither style was negligible (Table 1), supporting Riazi and Mansoorian's (2008) findings and contradicting those of Naserieh and Anani Sarab (2013). It means that no style would cause difficulty in learning. One possible reason for the contradiction found for group preference in these studies may be the participants' fields of study at university.

Perceptual learning style preferences in different countries do not demonstrate identical means for each preference. Yet, they generally appear to follow similar patterns. For example, in all studies, group style was the least dominant, negative, except for the current study finding it as a minor type. This suggests that participants in those studies disfavored working with others. Different factors, such as field of study or nationality, might account for the difference found in preferring group style.

Furthermore, participants showed the strongest preferences for kinesthetic and tactile styles in all studies, but not in Hyland's (1993), and Reid's (1987) research with American students. The participants' visual, auditory, kinesthetic, and tactile styles appeared as major in the current study supporting Arabic and Korean participants of Reid's (1987) sample, which can be due to the similarity between the East or Middle Eastern countries. However, the discrepancies appeared to exist mostly in terms of visual and auditory preferences, due to different cultures or contexts within which the studies were conducted. Another possibility is the low internal reliability indexes reported for the two modalities, which can in turn make their scores problematic to interpret.

Hyland's (1993) results from his Japanese sample were compared with those of the Japanese part of Reid's (1987) sample. On all modalities, Hyland's participants showed lower means than Reid's. The second line of explanation is further supported when these two studies follow the same general patterns in as those of the present study compared to Riazi and Mansoorian's (2008) work that reported higher means than the present research, yet following similar patterns in general.

Nevertheless, Iranian EFL learners were majorly tactile in their style preference (current study; Naserieh & Anani Sarab, 2013; Riazi & Mansoorian, 2008), unlike native speakers of English in Reid's study. Therefore, Iranian EFL stu-

dents can be assumed to learn more when making a model of something or when involved in hands-on learning. In other words, they learn better when things are made more tangible. Looking carefully at various data gathered from different studies among cultures or countries, Earley and Ang (2003) argue that culture plays a role in information processing and cognition. Thus, logically, the differences in cultural socialization tend to influence the way an individual learns and produces diverse learning styles (Joy & Kolb, 2009; Reid, 1987).

The Relationship between Learning Styles and WAT

The results of the analyses also revealed that the participants' tactile, kinesthetic, and individual styles were positively related to WAT scores, respectively (Table 1). Nevertheless, only the learners with tactile preference performed well on WAT, possibly due to a slightly higher correlation between the two variables (r = 180; p < .01), when compared to kinesthetic and individual styles. Therefore, Iranian tertiary learners show a tendency toward tactile, kinesthetic, and individual modes with WAT that involve an experiential and practical approach to learning vocabulary depth. They also preferred a style that engaged them working alone in the language learning experience.

It was also viewed that only the tactile style significantly correlated with the synonym part of WAT. As the correlation was not statistically high or even moderate, model summary (Table 3) showed that tactile-oriented learners along with those favoring group styles can enlarge their vocabulary, especially on synonymous words. Assumedly, tactile learners might develop mostly the meaning of adjectives or *concrete words* rather than verbs or abstract words. Tactile vocabulary card games, paly, and group activities are good tactics for tactile learners. They learn best through hands-on activities. In contrast to the synonyms section, the collocation part of WAT statistically correlated with tactile, kinesthetic, and individual styles.

Our data suggest that, rather than relying on merely one learning style, learners should be simulated to work with other senses, particularly kinesthetic and tactile modalities. Therefore, by applying diverse vocabulary learning approaches that match different learning styles, the learners would enhance different dimensions of their vocabulary knowledge. This confirms Tight's (2010, p. 817) argument saying "participants of various perceptual learning style preferences appear to be equally capable of lexical learning."

Proficiency Levels on WAT and Style Preferences

Previous studies observed no significant relationship between PLSPQ and TOEFL score (Reid, 1987), TOEIC exam (Isemonger & Sheppard, 2003), and proficiency self-ratings (Naserieh & Anani Sarab, 2013). Our data, however, yielded interesting findings. First, low-group learners had minor preference for group-oriented style; high-group learners were reluctant to work with others or with one or more partners in a learning activity. Such results are in line with

Park's (1997) observation that high achievers preferred group learning. Peacock (2001) also reported that low-proficient learners were more group-oriented than more proficient counterparts. However, our results contradict the findings of Reid (1987), Isemonger and Sheppard (2003), and Naserieh and Anani Sarab (2013). In these studies, low-group learners apparently relied more on group style rather than other modalities in vocabulary learning. The present work, however, found that, for these learners, group style was negatively correlated to WAT (Table 6). Possibly, when they engage in group activities for vocabulary learning, the misunderstanding or misuse of the correct words by the learners causes them to learn dimensions of vocabulary knowledge incorrectly as they are not proficient enough in vocabulary depth to support each other. Apparently, low-group learners should work with other modalities along with group preference to attain more depth knowledge. It is highly recommended that learners of English enlarge their vocabulary, working with all style preferences in order to be able to communicate in the real world. As cooperation and mutual support play an important role in language learning, both groups should be involved in group activity to enhance depth of knowledge.

Second, the low group dominantly favored visual, kinesthetic, and auditory styles as major; mostly preferring reading textbooks along with listening materials while doing things. The results were partially consistent with the findings of Wong and Nunan (2011). However, none of the above-mentioned styles was significantly correlated with the scores on WAT. The two minor styles, i.e. individual and group, were significantly correlated with WAT scores for the low group, though.

Third, it was also viewed that the higher the proficiency of the participants, the higher the preference mean scores for kinesthetic, tactile, visual, and auditory styles, respectively, which tend to involve active engagement for learning. This finding contradicts the results reported by Isemonger and Sheppard (2003), Melton (1990), Naserieh and Anani Sarab (2013), and Reid (1987), who found no differences for PLSPQ and the scores on their tests. Moreover, our high group learned best through the reading and listening approach. In addition, the tactile style was minor for the low group while major for the high group, who prefered "hands-on" learning, such as building models and experiential learning.

Another possible interpretation for the high group's greater vocabulary depth is that this group has more major and higher mean preferences. In other words, the low group had lower mean scores on kinesthetic and tactile style preferences, and thus a lower vocabulary depth.

A quick glance at the nature of the tests in the above-mentioned studies reveals that those authors used general English tests that included all language skills. However, our study only focused on one dimension, i.e., vocabulary depth, probably resulting in these consistencies.

Reid (1987, p. 95) associates more preference of the auditory style with more "in country" exposure to language in the country. In a similar vein, in the

present study, the high group is assumed to have been exposed to English for a longer time than the low group. However, our results rejected Reid's statement because auditory style mean score for the low group was higher than that of the high group, or even we can say that no difference was observed. Similar to Naserieh and Anani Sarab (2013), we did not observe any similar increase in preference for auditory modality, contradicting the results reported by Hyland (1993), Isemonger and Sheppard (2003), and Reid (1987). One explanation is that most of our participants were majoring in English literature with a preference to read novels most of the time rather than listen to audio materials. Another possible explanation might be the role of gender that might mix the results for males and females in this part of the study with no differences. Yet, the discrepancy might be attributed to the differences in the culture, as also maintained by Naserieh and Anani Sarab (2013) who also conducted their study in Iran, a Middle Eastern country. Consequently, this part of the study is a response to Naserieh and Anani Sarab's (2013) call for an investigation into the inconsistencies existing in their area.

Another finding of the present study was that the individual style was minor, but statistically significant, for both groups; however, the high-group's preference mean for individual style exceeded that of the low group. That is, the more proficient the group, the higher their tendency to work individually. High-group learners also tended to be more independent and disfavored working with others, which further supports Collinson's (2000) findings.

Apparently, high-group learners had more preferences when compared to their low group counterparts because of more exposure to language learning. They can thus work with all modalities easily. Overall, the low group had three major styles whereas the high group had four. Thus, as learners enhance vocabulary depth, their learning styles also change. High-group learners can adopt more preferences in learning a new language, especially in the case of vocabulary knowledge. Our findings correspond with Uhrig's (2015) argument that "learning styles are neither congenital nor chronic; they change as a learner develops" (p. 22). Finally, it can be concluded that learners with different perceptual learning styles vary in their academic performance. Our data, therefore, agree with those of Oxford (1990) and Shen (2010).

Gender Differences in Learning Styles and WAT

Considering major styles (viz., kinesthetic, tactile, and visual) for both genders, the results showed that females had slightly higher means than males, except for tactile; males enjoyed learning with their hands through manipulation or resources, such as writing and drawing. To Oxford (1995), "teachers might expect that their tactile and kinesthetic students would more often be males than females" (p. 36). Yet, no greater differences were observed between males and females for tactile and kinesthetic learning preferences in our study. However, supporting Oxford's prediction, males have been reported to indicate a slightly higher preference for tactile modality (Reid, 1987; Rossi-Le, 1989) while females have also been found to prefer kinesthetic and tactile modalities in other

studies (Hyland, 1993; Isemonger & Sheppard, 2003; Melton, 1990). This latter observation, however, partially contradicts Oxford's prediction. Therefore, the findings of the present research is also in contrast with the other part of Oxford's prediction above, that one could expect males to be more kinesthetic-oriented than females.

Another observation made from the data was that females were more auditory-oriented (major), compared to male counterparts (minor), unlike what was reported by previous works (Hyland, 1993; Isemonger & Sheppard, 2003; Melton, 1990; Reid, 1987). Concerning individual and group styles, no differences were detected between the two genders, indicating that both genders can still work either individually or engage in group activities, though the results contradict previous investigations (Hyland, 1993; Isemonger & Sheppard, 2003; Melton, 1990). In the context where the present data has been collected, there is more emphasis on having segregated education, which might account for the difference between the results of our research and the studies above.

As for the Iranian context, no greater performances have been observed for kinesthetic and tactile styles on the part of males (present study, Naserieh & Anani Sarab, 2013), which partially contradicts Oxford's prediction. Unlike Oxford's prediction that men tend to be more kinesthetic- and tactile-oriented than women, Riazi and Mansoorian (2008) did not find any differences in category scales for kinesthetic and tactile modalities in favor of men. Nevertheless, females were found to favor auditory style (major) more when compared to males (minor). This, however, is not consistent with other findings (Naserieh & Anani Sarab, 2013; Riazi & Mansoorian, 2008). The contradictions might be attributed to the context of the studies as those done inside Iran showed more similar results in comparison to the studies conducted outside Iran. Yet, as the location of our own study promotes segregation of males and females in education, the difference in the findings of our study might be more justifiable. This also applies to what comes next.

However, considering minor styles (e.g., individual and group), males obtained slightly higher means than females (Table 9). Both males and females can adapt to working individually or in a group but males can adapt more than females based on their slightly higher means. This does not coincide with Riazi and Mansoorian's (2008) and Naserieh and Anani Sarab's (2013) findings. In these studies, females disfavored working individually and males found it difficult to engage in group activities (Naserieh & Anani Sarab, 2013). Riazi and Mansoorian (2008) found that both groups favored individual style but only males strongly favored engaging in group activities. In contrast to what Naserieh and Anani Sarab (2013) observed, visual style was chosen as major for both genders in our study, as well as Riazi and Mansoorian's (2008).

Generally, the findings reveal the same general patterns, with studies exhibiting similar learning style preferences for both genders (e.g., Park, 2002). However, different results were observed for gender differences (current study; Hyland, 1993; Peacock, 2001), probably due to socialization practices (Guild & Garger, 1985).

In terms of WAT, synonym, and collocation data, males demonstrated slightly higher scores than females. Corrigan (2008) emphasized the decontextualized nature of vocabulary depth. The findings may be related to the greater skills of males in decontextualized knowledge for vocabulary depth as an essential part of their academic career. However, only the tactile style significantly correlated with WAT, synonym, and collocation for females. Kinesthetic style only significantly correlated with collocation for males. The type of collocations used in the present research included combinations of adjectives plus nouns taken from Read's (2000) WAT. Kinesthetic-oriented male learners might treat collocations as single blocks of language more than females by participating in role-plays or doing experiencing, as they are more *concrete* than *abstract learners* (Ehrman & Leaver, 2003). Therefore, apparently, males' awareness has raised toward boosting their collocational knowledge of vocabulary depth.

More interestingly, males had fewer major styles than females in relation to vocabulary depth. Possibly, there is no systematic approach in teaching dimensions of vocabulary knowledge at tertiary level in Iran (Akbarian, 2010a & b). Also, there are not various vocabulary teaching methods with diverse learning styles that suit different learners. As noted earlier, fewer major style preferences and lower means might be indicative of the disappointingly low vocabulary depth for the low group. Thus, although males had fewer major styles than females, they had higher scores on the three tests. Another possible interpretation would be that the mean for tactile style for males is higher than females. The assumption is that high mean score on tactile style does not help males much. However, the statistical correlations for the three tests were significant for females.

Conclusion

Perceptual learning style preferences affect the participants' learning. However, low indexes for these Iranian tertiary students reveal that PLSPs may not be a strong predictor of vocabulary depth leading to FL proficiency. Our findings corroborate what was proposed by Ehrman and Oxford (1995) who have reported that learning styles are only weakly/indirectly correlated with language achievements. Likewise, Tight (2010) believed that "learning style preferences … are neither a boon nor a hindrance to L2 vocabulary learning" (p. 817). When it comes to vocabulary learning, the instructional method is more critical than the learning style (Lee, 1992).

Our findings confirm that Iranians prefer multiple learning styles (major: kinesthetic, tactile, visual, and auditory; minor: individual and group). Not all preferences had a significant role in performing on WAT, though. Therefore, the tendency to apply only one single style to teaching does not work for every student.

Additionally, the language level of the participants seemed to influence their choices of learning styles or vice versa. As learners' learning styles changed (Uhrig, 2015), their vocabulary depth developed to some degree; the

group with fewer major style preferences might have a low level of vocabulary depth. Higher means for tactile and kinesthetic style preferences indicate more vocabulary depth.

Moreover, the negative attitude towards group-oriented learning, especially on the part of high-level learners, might serve as a warning for language teachers. Educators should make efforts to enable their students to become engaged in interactive skills and encourage them to work within groups.

The primary motivation behind instructing is to facilitate learning for both males and females in a way they mostly favor. Thus, gender contributes to the formation of perceptual learning styles, and consequently learning styles influence (the development of or scores on) vocabulary depth competence. We concur with Oxford (1989) that language learning styles could be an important factor influencing performance in L2. However, our findings should not be taken as conclusive due to other complicated individual differences factors, such as motivation and strategies.

The findings, nonetheless, have several implications for classroom practices. Firstly, they draw the teachers' attention to learning styles when teaching vocabulary depth as the match between teaching and students' learning style preferences can influence learners' achievements (Kroonenberg, 1995) and "learning style mismatches are at the root of many learning difficulties" (Ehrman, 1996, p. 50). If Dunn and Griggs (1988) are right that different learning styles "make the same teaching method wonderful for some and terrible for others" (p. 3), then teachers need to be aware of the learners' style preferences and differences in the process of vocabulary teaching in the classroom. Therefore, the obvious merit of identifying a student's learning style is to improve learning.

Our findings can thus help teachers to redesign their classes to respond to students' various style differences. However, as the correlations were low, we do not need to teach vocabulary depth merely based on the learners' learning styles. This dimension should be taught in combination with vocabulary learning strategies in FL contexts (Zhang & Lu, 2015). Curriculum developers and course-book designers, while designing vocabulary exercises and tasks, must provide the teachers and learners with various teaching methods and materials to balance classroom learning opportunities for students with diverse styles.

Researchers can investigate the relationship between learning styles and the approaches to learning vocabulary knowledge, or examine the role of learning style and vocabulary learning strategies on vocabulary breadth and depth, improved through triangulation to complement quantitative or qualitative data.

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