

# **An Investigation of Learning Styles as Sources of Bias in Second Language Grammar Tests**

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## **ABSTRACT**

The present study investigated the role of learning styles as sources of bias in English grammar tests. Based on this aim, first, 158 intermediate EFL learners were selected from among 324 language learners of a private language institute in Urmia (Iran) as the participants of the study based on their results on a proficiency test. Next, these participants respectively completed the Reid's (1987) Perceptual Learning Style Preference Questionnaire (PLSPQ) and took the grammar test of the study to determine their learning styles and grammar test performance during two sessions in a one-week period. Standard multiple regression was employed for data analysis. Based on the results, there was a significant positive correlation between the learners' group preference learning style modality and their grammar test performance. That is, only the group preference learning style modality significantly contributed to the explanation of the variance in the results of the grammar test. It was argued that, the learning styles may be systematic sources of test bias in test validation. The results of the study may provide a number of guiding principles for EFL teachers, syllabus designers, and testing specialists.

**KEYWORDS:** individual learner differences, learning styles, test bias, test performance

## Introduction

The study of individual learner differences has a long history and these differences have been among the extensively investigated areas in language teaching (Ellis, 2008). The learner differences include the “enduring personal characteristics that are assumed to apply to everybody and in which people differ by degree” (Dörnyei, 2005, p. 4). As Ellis (2008) noted, the early studies of these individual differences, which were conducted before the beginning of the field of Second Language Acquisition (SLA), focused on designing specific testing instruments such as the *Modern Language Aptitude Battery* (Carroll & Sapon, 1959). According to him, these studies tried to determine the individuals who had a high level of language aptitude and were likely to be successful in learning a second or foreign language. According to Horwitz (2000, p. 527), as a result of these early studies, language learners were called “good and bad, intelligent and dull, motivated and unmotivated.”

However, as Segalowitz (1997) argued, the more recent studies of the learner differences have tried to determine why some of the learners are more successful in comparison with the others. According to him, these studies (e.g. Brown & Perry, 1991; MacIntyre & Gardner, 1994; Mangubhai, 1991; Oxford & Ehrman, 1993) can be considered to be complementary to the mainstream research in SLA. As Horwitz (2000, p. 532) noted, as a result of these studies the language learners were called “integratively and instrumentally motivated, anxious and comfortable, field independent and field sensitive, auditory and visual.”

As Skehan (1989) argued, a large number of the studies on individual learner differences have tried to determine the correlations between specific individual differences such as intelligence and achievement in second language learning. However, as Bachman (1990) stated, these differences can be regarded as sources of *test bias*. According to him, these differences are separate from the language ability which different language tests try to measure and affect the learners’ test performance. In discussing the validity of the language tests, he argued that:

Even though the test scores may appear to provide a valid indication of ability for the group of interest, there may be systematic differences in the test performance that are the result of differences in individual characteristics other than the ability being tested, of test takers (p. 271).

A review of the related literature (e.g. Dunn, Dunn, & Price, 1991; Ehrman, 1996; Ehrman, Leaver, & Oxford, 2003; Ehrman & Oxford, 1995; Oxford & Ehrman, 1993; Reid, 1987; Van Zwanenberg, Wilkinson & Anderson, 2000) shows that, among the individual learner differences, learning styles have been studied by various SLA researchers. However, some of the studies of learning styles (e.g. Bailey, Onwuegbuzie, & Daley, 2000) have employed specific instruments of the field of psychology such as Kolb’s (1984) Learning Style Inventory which are not specifically designed for the field of second language acquisition. Furthermore, a large number of these studies (e.g. Ehrman, 1994; Sternberg & Grigorenko, 2001) have tried to determine the relationship between the learning styles and second language achievement and have ignored their role as sources of test bias. In the English as a Foreign Language (EFL) context of Iran, the same gaps are apparent in the related literature of the learning styles. More specifically, there is a lack of research regarding the role of learning styles as bias factors in different kinds of language tests such as the grammar tests (Ajideh & Gholami, 2014).

The present study tried to deal with the mentioned gaps (e.g. Moenikia & Zahed-Babelan, 2010; Srijongjai, 2011; Van Zwanenberg, Wilkinson, & Anderson, 2000) of the literature regarding the learning styles. Based on this aim, it examined the EFL learners' learning styles as bias factors in their English grammar test performance. More specifically, the present study tried to answer the following research question: Is there any relationship between the intermediate EFL students' learning styles and their grammar test performance?

## Review of Related Literature

### *Learning styles*

Learning style constitutes "a general predisposition, voluntary or not, toward processing information in a particular way" (Skehan, 1991, p. 288). It involves "an individual's natural, habitual, and preferred ways of absorbing, processing, and retaining new information and skills" (Reid, 1995, p. viii). It can be argued that the learning styles are "broad preferences for going about the business of learning" (Ehrman, 1996, p. 49) and reflect "the totality of psychological functioning" (Willing, 1987, p. 29). As Keefe (1979) stated, these styles involve:

The characteristic cognitive, affective and physiological behaviors that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment...learning style is a consistent way of functioning that reflects underlying causes of behavior (p. 4).

Dörnyei (2005) argued that the learning styles should be distinguished from abilities and aptitudes since "they do not reflect innate endowment that automatically leads to success" (p. 122). As he further explained:

Styles are not yet another metaphor for distinguishing the gifted from the untalented but rather they refer to *personal preferences*. These preferences are typically bipolar, representing a continuum from one extreme to another (e.g. being more global vs. being more particular) and no value judgment is made about where a learner falls on the continuum: One can be successful in every style position -only in a different way (p. 122).

Moreover, as Snow, Corno, and Jackson (1996) noted, learning styles should be distinguished from learning strategies. According to them, the main difference between these constructs stems from the consistency in their use. As they further argued, learning strategies are more situation-dependent while styles are used consistently regardless of the types of the learning tasks. In a similar vein, Riding (2000) argued that, since the styles depend on the individuals' physiological characteristics, they remain fixed and are consistently employed across a variety of tasks. On the other hand, as he noted, learning strategies can be deductively learnt in order to be employed based on situational requirements. Furthermore, as Sternberg and Grigorenko (2001) stated, the required amount of consciousness for the use of the learning styles is different from the amount which is essential for the strategies. More specifically, while the learning styles are based on the physiological predispositions and are employed unconsciously, the strategies stem from the individuals' explicit knowledge and are employed consciously based on the requirements of the various tasks.

Finally, as Dörnyei (2005) noted, another important point is related to the determinative power of the learning styles. According to him, the notion of *preference* which underlies the

various definitions of learning styles needs to be elaborated since it may connote a mild and flexible predisposition or a strong and immutable need. In an effort to deal with this problem of definition, Ehrman (1996) stated that “for most of us, a preference is just that— something we find more comfortable but can do another way if circumstances require it” (p. 54). However, as she further explained, for some individuals, these preferences are more firmly fixed and may not change based on situational requirements. As she concluded, the learning styles constitute preferences that may range from mild predispositions to demanding needs.

The related literature shows that learning styles are among the attractive areas in the field of applied linguistics (e.g. Aliakbari & Qasemi, 2014; Banisaeid & Huang, 2015; Barzegar & Tajalli, 2013; Chavosh & Davoudi, 2016; Ghaedi & Jam, 2014; Pourhossein Gilakjani, & Ahmadi, 2011). However, there is a need for more empirical research regarding the relationship between learning styles and performance on different language tests including the grammar tests (Reid, 1987). As Olsen and Kagan (1992) stated, the learning styles are among the major factors that affect the strategies that are employed by the learners for learning the second language grammar. Similarly, Harel (1992) claimed that learning styles can affect the learners’ performance in pair or group activities and as a result may influence their exposure to various grammatical structures in the second language. Finally, Coelho (1992) argued that learning styles influence the learners’ preference for various group-based activities and may impact the development of their critical thinking skills which are essential for the acquisition of second language grammar.

There are few studies which have investigated the relationship between learning styles and grammar test performance. Moenikia and Zahed-Babelan (2010) investigated the effects of the EFL learners’ learning styles on their grammar test performance. The results of the study showed that there were significant differences among the learners’ test scores with different learning style preferences. Ajideh and Gholami (2014) investigated the EFL learners’ learning styles as predictors of their grammar test performance. The findings of the study revealed that “out of the four learning styles of theorist, activist, reflective, and pragmatist as possible predictors, only reflective and pragmatist styles accounted for a statistically significant portion of the variance in final test performance” (p. 1). However, some of the studies could not find any relationship between these styles and grammar test results. For example, Van Zwanenberg, Wilkinson and Anderson's (2000) study showed that learning styles did not affect the university students’ performance on grammar tests. Similarly Srijongjai (2011) showed grammar test performance was not related to learning style preferences among EFL learners.

However, in discussing the relationship between learning styles and second language test performance there is a need to take account of the learners’ personal characteristics such as their age and gender (Reid, 1987). Moreover, the results of the empirical studies on learning styles may be influenced by the choice of the instruments which are employed for determining these styles (Ellis, 2008).

### ***The test bias factors***

According to Bachman (1990), learners’ scores on different language tests may be influenced by four categories of factors including *communicative language ability*, *test method facets*, *personal attributes*, and *random factors*. As he noted, while the random factors are “largely unpredictable and temporary” (p. 164), the test method facets and personal attributes affect the test takers’ test performance regularly. As he explained:

Random factors and test method facets are generally considered to be sources of measurement error and have thus been the primary concern of approaches to estimating reliability. Personal attributes that are not considered part of the ability tested, such as sex, ethnic background, cognitive style, and prior knowledge of content area, on the other hand, have traditionally been discussed as sources of test bias or test invalidity (p. 166).

According to Farhady (1982), the studies of test bias are essential in the process of test validation since their results may lead to the redefinition of the construct of *language ability*. Moreover, as Bachman (1990) argued, these studies “raise questions about the extent to which language abilities as constructs are independent of the content and context of the language use elicited in their measurement” (p. 279). More specifically, as he explained, the test bias studies may provide a better understanding of the measurement value of language tests, the characteristics of successful language learners, and the role of individual learner differences in the process of test validation. He concluded that although some empirical studies have tried to determine the role of specific personal attributes such as cognitive styles (e.g. Chapelle, 1988; Chapelle & Roberts, 1986) and background knowledge (Alderson & Urquhart, 1983; Erickson & Molloy, 1983) as test bias factors, there is a lack of research regarding the other personal characteristics including learning styles.

## **Methodology**

### ***Design of the study***

According to Creswell (2011), the correlational design is one of the main research designs in the quantitative approach to research. An examination of the purpose, data collection, and data analysis of the present study shows that it employed a quantitative approach with a predictive correlational design in which the learning styles were the predictor variables and the learners' performance on the grammar test was the criterion variable.

Based on the design of the study, the researchers employed the Standard Multiple Regression Test to answer the research question of the study. As Pallant (2007) stated:

Multiple regression is based on correlation, but allows a more sophisticated exploration of the interrelationship among a set of variables. This makes it ideal for the investigation of more complex real-life, rather than laboratory-based research questions (p. 146).

In explaining the Standard Multiple Regression, she noted that:

In standard multiple regression, all the independent (or predictor) variables are entered into the equation simultaneously, each independent variable is evaluated in terms of its predictive power, over and above that offered by all the other independent variables (p. 147).

### ***Participants***

In the present study, 158 intermediate EFL learners were selected from among 324 language learners of a private language institute in Urmia (Iran) as the participants of the study based on their results on the Objective Placement Test (Lesley, Hansen, & Zukowski, 2003). The

selected participants were male, ranged in age from 15 to 26, and had 2 to 3 years of language studies in the language institute. They were from Urmia and were native speakers of Azeri. According to Runyon, Coleman, and Pittenger (2000), in language studies, the individuals whose scores on the proficiency test fall within 1 Standard Deviation (SD) below and above the mean value of the group are regarded to be at the intermediate proficiency level. Therefore, in this study, in order to select the participants, first, the researchers determined the mean value of the 324 language learners' results of the proficiency test of the study. Second, they selected the learners whose scores were within 1 Standard Deviation (SD) below and above the mean value of the group.

### ***The instruments of the study***

#### ***Proficiency test***

The present study tried to determine the relationship between the intermediate EFL learners' learning styles and their test performance. The Objective Placement Test, from *New Interchange Passages Placement and Evaluation Package* (Lesley, Hansen, & Zukowski, 2003) was employed to select the participants of the study. This test consisted of four parts: Listening, Grammar, Vocabulary, and Reading. The Listening section involved 20 recorded items. The Grammar section had 30 items. The Vocabulary section consisted of 30 items and the Reading section had 20 items.

#### ***Learning style questionnaire***

In order to examine the participants' learning styles, Reid's (1987) Perceptual Learning Style Preference Questionnaire (PLSPQ) was employed. This questionnaire involves 30 items which are scored on a 5-point Likert scale ranging from *strongly agree* to *strongly disagree*. According to Reid (1987), this questionnaire investigates the language learners' *perceptual* and *social* learning styles. The perceptual styles involve four learning modalities including: *visual*, *auditory*, *kinesthetic*, and *tactile* learning styles while the social styles involve two kinds of preferences: *group preference* and *individual preference*. Each of these learning styles is measured by 5 items of the questionnaire and a score of 5 is given to *strongly agree* and a score of 1 is given to *strongly disagree*. However, she did not include the complete results of the factor analysis of this instrument in her study. As she concluded, based on her data analysis, the instrument has satisfactory reliability (Cronbach alpha = .86) and validity indices.

#### ***The grammar test of the study***

A 40-item researcher-made multiple-choice grammar test was employed in the present study. The items of this test were based on the reading texts of *Intermediate Select Readings* (Lee & Gundersen, 2011). That is, the researchers extracted the grammar points of these reading texts and developed the test items accordingly. More specifically, they made a list of the grammatical structures that were employed in the texts of the book and developed the test items based on these structures. In order to guarantee the reliability and validity of this test, the researchers piloted it with 75 male EFL learners with similar characteristics to the participants of the main study. More specifically, the researchers correlated the results of the selected 75 learners on this test with their results on the grammar section of the Objective Placement Test to determine the empirical (concurrent) validity of the test. The results of the analysis showed that, the empirical validity index of the test was .78 which, as Harris (1969) stated, is regarded to be satisfactory for researcher/teacher-made tests. Moreover, a test-retest method was employed for determining the reliability of the test items. That is, the selected learners took the test twice during a one month period and their results were correlated. Based

on the results, the reliability index of the grammar test was .84 which, as Harris (1969) stated, is regarded to be satisfactory for researcher/teacher-made tests.

### ***The procedure of the study***

In this study, first, 158 intermediate EFL learners were selected from among 324 language learners of a private language institute in Urmia (Iran) as the participants of the study based on their results on the Objective Placement Test ( $M= 46.78$ ,  $SD= 4.66$ ). Second, the participants completed the PLSPQ for the determination of their learning styles. The administration of this questionnaire took about 15 minutes. Finally, the grammar test of the study was administered to the participants in order to assess their second language grammar test performance. It took the participants about 45 minutes to answer the items on this test. The present study did not have any treatment sessions and as a result the researchers administered the questionnaire and the test of the study to the participants during two sessions in a one-week period. The Statistical Package for the Social Sciences (SPSS) Version 20 was employed in data analysis.

### **Data analysis**

Before analyzing the data of the study, the researchers asked professor Julie Pallant for her advice regarding the appropriate statistical test. She stated that based on the aims of this study, the Standard Multiple Regression should be employed for analyzing the collected data. Moreover, they emailed professor Joy Reid and asked her regarding the relationship among the learning style modalities in her questionnaire. Professor Reid noted that each of these modalities can be regarded as a variable in the study. Based on the input, a Standard Multiple Regression test was run between the participants' results on the learning style inventory and their performance on the grammar test. The results of the correlation between the learning styles and the grammar test is reported in Table 5 under the column Standardized Coefficients. In the regression analysis, first, the assumption of multicollinearity had to be checked. In order to check this assumption, the collinearity diagnostics including Tolerance and Variance Inflation Factor (VIF) were determined. According to Pallant (2007):

Tolerance is an indicator of how much of the variability of the specified independent is not explained by the other independent variables in the model. If this value is very small (less than .10), it indicates that the multiple correlation with other variables is high, suggesting the possibility of multicollinearity. The other value given is the VIP, which is just the inverse of the Tolerance value (1 divided by Tolerance). VIF values above 10 would be a concern, indicating multicollinearity (p. 156).

The Tolerance and VIF values of the regression model for the grammar test are provided in Table 1.

Table 1  
*The collinearity diagnostics of the learners' learning styles and grammar test performance*

Model	Tolerance	VIF
Visual Learning Style	.929	1.077
Auditory Learning Style	.931	1.074
Kinesthetic Learning Style	.965	1.036
Tactile Learning Style	.894	1.119
Group Preference Learning Style	.936	1.069
Individual Preference Learning Style	.786	1.273

As Table 1 shows, all of the Tolerance values of the model were more than .10, and all of the VIF values were less than 10. Therefore, the multicollinearity assumption was not violated. Moreover, in order to determine the outliers, the Mahalanobis distance value was checked. As Pallant (2007) noted, for a model with 6 independent variables this value should not exceed “22.46” (p. 157). The results of residuals statistics for this model are provided in Table 2.

Table 2

*The residuals statistics of the regression model of the learners' learning styles and grammar test performance*

	Minimum	Maximum	Mean	Std. Deviation	N
Mahal. Distance	1.256	12.252	5.962	2.409	158
Cook's Distance	.000	.141	.007	.016	158

Based on Table 2, the maximum value of the Mahalanobis distance (12.252) was less than 22.46, and this assumption was not violated. Finally, in order to check the remaining assumptions, the Cook's distance value was determined. As Pallant (2007) noted, this value should be less than 1. As Table 2 shows, the maximum value of the Cook's distance (.141) was less than 1. Therefore, none of the assumptions was violated. Since all of the assumptions of the Multiple Regression were present, the regression model of the learners' learning styles and grammar test performance was evaluated. Table 3 below provides these results.

Table 3

*The regression model summary of the learners' learning styles and grammar test performance*

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.408	.166	.133	3.713

As shown in Table 3, this model explains 0.166 (i.e. *R Square* value) of the variance of the learners' performance on the grammar test. That is, this model explains 16.6 percent (*R Square* value multiplied by 100, by shifting the decimal point two places to the right) of the variance in the grammar test performance. However, to check the statistical significance of the predictive power of the model, the results of the ANOVA test of the model had to be checked. The results of this test are provided in Table 4.

Table 4

*The ANOVA test of the regression model of the learners' learning styles and grammar test performance*

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	415.395	6	69.233	5.023	.000
Residual	2081.447	151	13.784		
Total	2496.842	157			

As Table 4 shows, the predictive power of the model was not equal to 0 since the p-value of the ANOVA test .000 (marked as *Sig.*) was less than the level of significance .05.

Finally, in order to determine the contribution of each of the independent variables to the prediction of the variance of the grammar test results the *Standardized Coefficients* had to be checked. These results are provided in Table 5.

Table 5

*The coefficients of the regression model of the learners' learning styles and grammar test performance*

Model	Unstandardized Coefficients	Standardized Coefficients	t	Sig.



	B	Std. Error	Beta		
(Constant)	18.147	2.294		7.912	.000
Visual Learning Style	.072	.072	.077	1.000	.319
Auditory Learning Style	.049	.063	.060	.773	.441
Kinesthetic Learning Style	-.114	.062	-.138	-1.819	.071
Tactile Learning Style	.074	.059	.098	1.251	.213
Group Preference Learning Style	.291	.064	.348	4.534	.000
Individual Preference Learning Style	-.060	.059	-.086	-1.026	.307

An examination of Table 5 shows that the largest Beta coefficient is .348 which is for the Group Preferences Learning Style variable. Therefore, it can be argued that this variable makes the strongest unique contribution to explaining the results of the grammar test when the variance explained by all other variables in the model is controlled. Moreover, since the p-value for this variable .000 (marked as *Sig.*) was less than the level of significance .05, it was argued that this variable made a statistically significant unique contribution to the prediction of the grammar test results. The significant contribution of the Group Preferences Learning Style to the explanation of the results of this test is graphically depicted in Figure 1.

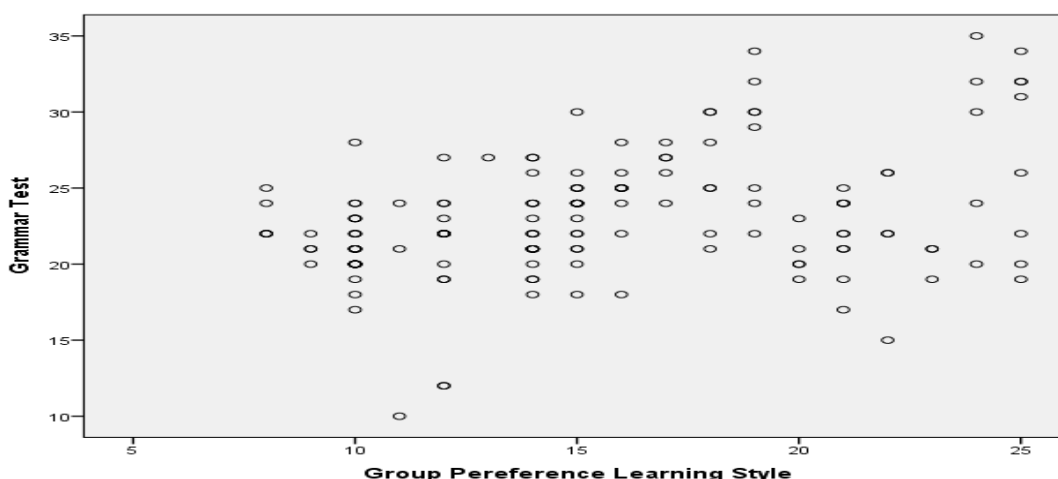


Figure 1: The correlation between the learners’ group preferences learning style and grammar test performance

**Discussion**

The present study tried to determine the relationship between the EFL students’ learning styles and their grammar test performance. More specifically, it tried to determine how much of the variance in the learners’ results on the grammar test can be explained by the learners’ learning styles. The results showed that there was a significant positive correlation between the learners’ Group Preference Learning Style and their grammar test performance. These results are in line with the results of the studies by Moenikia and Zahed-Babelan (2010) and Ajideh and Gholami (2014) who have reported a similar contribution of the learning styles to the explanation of the variance in second language test performance.

According to Coelho (1992), the group-based learning activities are beneficial for the development of the language learners’ critical thinking skills which are essential for learning certain aspects of the language including the grammar points. Moreover, as Harel (1992) argued, in the group-based activities the learners act as resources for each other and can help their group members to focus on the different aspects of the second language including its grammar. Finally, as Olsen and Kagan (1992) stated, in the group-based activities, the

learners have sufficient opportunities to develop different kinds of learning strategies which are helpful for learning the various aspects of the second language including its grammar.

Based on these issues, it can be argued that in the present study the students with a group preference learning style outperformed the others since they were able to develop essential critical thinking skills. Moreover, they were able to take advantage of the linguistic information provided by their group members in classroom activities and developed the necessary learning strategies which are beneficial for learning the various aspects of the language including its grammar. Therefore, it can be argued that the learners' group preference learning style may be a systematic source of test bias and affect the learners' results of the grammar tests of the second language.

Finally, it should be noted that the results of the present study do not support the results of the studies by Van Zwanenberg, Wilkinson and Anderson (2000), and Srijongjai (2011) who did not find any significant correlations between the learning styles and performance on academic tests.

According to Reid (1987), the language learners' personal characteristics such as gender, age, field of study, level of education, and second language learning context may affect their learning style preferences and as a result may modify the relationship between these styles and their academic test performance. Moreover, as Ellis (2008) noted, some of the empirical studies of the learning styles have employed certain instruments of the field of psychology such as Kolb's (1984) Learning Style Inventory. On the other hand, as he explained, the others have used the instruments which have been specifically designed for language studies like Reid's (1987) Perceptual Learning Style Questionnaire. According to him, this issue may lead to different results in the empirical studies.

Based on these issues, it can be noted that, the contrast between the results of the present study and the results of the studies by Van Zwanenberg, Wilkinson and Anderson (2000) and Srijongjai (2011) may be related to the differences in the personal characteristics of the participants and the methodological instruments.

## **Conclusion**

The present study investigated the relationship between the EFL students' learning styles and their performance on second language grammar tests. The results of the study showed that, there was a significant positive correlation between the learners' group preference learning style and their grammar test performance. Based on these results, the EFL teachers are recommended to design various kinds of group-based activities in which the learners can practice the grammatical structures of the target language and can improve their knowledge of these items based on the feedback received from their peers. In addition, the EFL syllabus designers are recommended to design and include certain activities in the EFL textbooks which require the learners to work in pairs or groups for the task performance.

According to Skehan (1989), in the concatenative approach to the study of individual learner differences, the researchers conduct their studies, and then try to develop a theory regarding the relationship between the relevant individual learner difference and test performance based on the results of their studies. As the results of the present study revealed, the concatenative approach may be more informative than a theory-then-research approach in the studies of individual learner differences. Therefore, the language testing specialists are recommended to

adopt a research-then-theory (i.e. concatenative) approach in the studies of the learning styles. Moreover, they are recommended to redefine the construct of second language ability in light of the results of the individual learner difference studies including the present study.

However, there is a need for various empirical studies of individual learner differences in different learning contexts and educational settings in order to make wide-reaching conclusions about the role of these differences as sources of test bias. For instance, the future studies should involve language learners from different mother tongues, and language proficiency levels in order to provide more information regarding the non-linear and variable role of the individual learner differences in the explanation of the variance in second language tests. In addition, the future studies should investigate the individual learner differences (e.g. cultural background, background knowledge, & ethnicity) which were not included in the present study.

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## References

- Ajideh, P., & Gholami, V. (2014). Learning styles as predictors of students' test performance. *English Language Teaching*, 1(3), 1-17.
- Alderson, J. C., & Urquhart, A. H. (1983). The effect of student background discipline on comprehension: A pilot study. In A. Hughes & D. Porter (Eds.), *Current developments in language testing* (pp. 121-127). London: Academic Press.
- Aliakbari, M., & Qasemi, N. (2014). On the relationship between Iranian EFL learners' learning style preference and their gender, proficiency level and achievement score. *International Journal of Pedagogies and Learning*, 7(3), 275-283.
- Bachman, L. F. (1990). *Fundamental considerations in language testing*. Oxford: Oxford University Press.
- Bailey, O., Onwuegbuzie, A., & Daley, C. (2000). Using learning style to predict foreign language achievement at college level. *System*, 28, 115-134.
- Banisaeid, M., & Huang, J. (2015). Exploring Iranian EFL learners' perceptual learning styles preferences, language learning strategy uses and self-regulated learning strategies. *International Journal on Studies in English Language and Literature*, 3(3), 30-40.
- Barzegar, F., & Tajalli, G. (2013). Relationship between learning styles of advanced Iranian EFL learners and their achievement. *Journal of Studies in Learning and Teaching English*, 1(4), 1-21.
- Brown, T., & Perry, F. (1991). A comparison of three learning strategies for ESL vocabulary acquisition. *TESOL Quarterly*, 25, 655-670.
- Carroll, J. B., & Sapon, S. (1959). *The modern languages aptitude test*. San Antonio: Psychological Corporation.
- Chapelle, C. A. (1988). Field independence: A source of language test variance? *Language Testing*, 5(1), 62-82.
- Chapelle, C. A., & Roberts, C. (1986). Ambiguity tolerance and field dependence as predictors of proficiency in English as a second language. *Language Learning*, 36, 27-45.
- Chavosh, H., & Davoudi, M. (2016). The relationship between perceptual learning styles and reading comprehension performance of Iranian EFL learners. *International Journal of English Linguistics*, 6(3), 61-69.
- Coelho, E. (1992). Cooperative learning: Foundation for a communicative curriculum. In C. Kessler (Ed.), *Cooperative language learning: A teacher's resource book* (pp. 31-51). New York: Prentice Hall.
- Creswell, J. W. (2011). *Educational research: Planning, conducting and evaluating quantitative and qualitative research* (4<sup>th</sup> Ed.). New York: Pearson Education.
- Dörnyei, Z. (2005). *The psychology of the language learner: Individual differences in second language acquisition*. Mahwah: Lawrence Erlbaum.
- Dunn, R., Dunn, K., & Price, G. (1991). *Productivity environmental preference survey*. Lawrence: Price Systems.
- Ehrman, M. E. (1994). The type differentiation indicator and adult foreign language learning success. *Journal of Psychological Type*, 30, 10-29.
- Ehrman, M. E. (1996). *Understanding second language difficulties*. Thousand Oaks: Sage.
- Ehrman, M. E., Leaver, B. L., & Oxford, R. L. (2003). A brief overview of individual differences in second language learning. *System*, 31, 313-330.
- Ehrman, M. E., & Oxford, R. L. (1995). Cognition plus: Correlates of language learning success. *Modern Language Journal*, 79(1), 67-89.
- Ellis, R. (2008). *The study of second language acquisition* (2<sup>nd</sup> Ed.). Oxford: Oxford University Press.

- Erickson, M., & Molloy, J. (1983). ESP test development for engineering students. In J. Oller (Ed.), *Issues in language testing research* (pp. 280-288). Rowley: Newbury House.
- Farhady, H. (1982). Measures of language proficiency from the learner's perspective. *TESOL Quarterly*, 16(1), 43-59.
- Ghaedi, Z., & Jam, B. (2014). Relationship between learning styles and motivation for higher education in EFL students. *Theory and Practice in Language Studies*, 4 (6), 1232-1237.
- Harel, Y. (1992). Teacher talk in the cooperative language classroom. In C. Kessler (Ed.), *Cooperative language learning: A teacher's resource book* (pp. 153-162). New York: Prentice Hall.
- Harris, D. P. (1969). *Testing English as a second language*. New York: McGraw-Hill.
- Horwitz, E. K. (2000). Teachers and students, students and teachers: An ever-evolving partnership. *The Modern Language Journal*, 84, 523-535.
- Keefe, J. (1979). Learning style: An overview. In J. Keefe (Ed.), *Student learning styles: Diagnosing and describing programs* (pp.1-18). Reston Va: National Secondary School Principals.
- Kolb, D. (1984). *Experimental learning: Experience as the source of learning and development*. New Jersey: Prentice Hall.
- Lee, L., & Gundersen, E. (2011). *Intermediate select readings*. Oxford: Oxford University Press.
- Lesley, T., Hansen, Ch., & Zukowski, J. (2003). *New interchange passages placement and evaluation package*. New York: Cambridge University Press.
- MacIntyre, P. D., & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. *Language Learning*, 44, 283-305.
- Mangubhai, F. (1991). The processing behavior of adult second language learners and their relationship to second language proficiency. *Applied Linguistics*, 12, 268-298.
- Moenikia, M., & Zahed-Babelan, A. (2010). The role of learning styles in second language learning among distance education students. *Procedia-Social and Behavioral Sciences*, 2(2), 1169-1173.
- Olsen, R., & Kagan, S. (1992). About cooperative learning. In C. Kessler (Ed.), *Cooperative language learning: A teacher's resource book* (pp.1-30). New York: Prentice Hall.
- Oxford, R. L., & Ehrman, M. E. (1993). Second language research on individual differences. *Annual Review of Applied Linguistics*, 13, 188-205.
- Pallant, J. (2007). *SPSS survival manual: A step by step guide to data analysis using SPSS for windows* (3<sup>rd</sup> Ed.). Berkshire: McGraw-Hill House.
- Pourhossein Gilakjani, A., & Ahmadi, S. (2011). The effect of visual, auditory, and kinaesthetic learning styles on language teaching. *International Conference on Social Science and Humanity*, 5, 469-472.
- Reid, J. M. (1987). The learning style preferences of ESL students. *TESOL Quarterly*, 21, 87-111.
- Reid, J. M. (1995). Preface. In J. M. Reid (Ed.), *Learning styles in the ESL/EFL classroom* (pp. viii-xvii). Boston: Heinle and Heinle.
- Riding, R. (2000). Cognitive style: A review. In R. Riding & S. G. Rayner (Eds.), *Interpersonal perspectives on individual differences* (pp. 315-344). Stamford: Ablex.
- Runyon, R. P., Coleman, K. A., & Pittenger, D. J. (2000). *Fundamentals of behavioral statistics* (9<sup>th</sup> Ed.). Boston: McGraw-Hill.
- Segalowitz, N. (1997). Individual differences in second language acquisition. In A. de Groot, M. Kroll, & J. Kroll (Eds.), *Tutorials in bilingualism: Psycholinguistic perspectives* (pp. 78-93). Mahwah: Lawrence Erlbaum.
- Skehan, P. (1989). *Individual differences in second language learning*. London: Edward Arnold.

- Skehan, P. (1991). Individual differences in second language learning. *Studies in Second Language Acquisition*, 13(2), 275–298.
- Snow, R. E., Corno, L., & Jackson, D. N. (1996). Individual differences in affective and conative functions. In D. C. Berliner & R. C. Calfee (Eds.), *Handbook of educational psychology* (pp. 243–310). New York: Macmillan.
- Srijongjai, A. (2011). Learning styles of language learners in an EFL writing class. *Procedia-Social and Behavioral Sciences*, 29, 1555-1560.
- Sternberg, R. J., & Grigorenko, E. L. (2001). A capsule history of theory and research on styles. In R. J. Sternberg & L. F. Zhang (Eds.), *Perspectives on thinking, learning, and cognitive styles* (pp. 1–21). Mahwah: Lawrence Erlbaum Associates.
- Van Zwanenberg, N., Wilkinson, L. J., & Anderson, A. (2000). Felder and Silverman's index of learning styles and Honey and Mumford's learning styles questionnaire: How do they compare and do they predict academic performance? *International Journal of Experimental Educational Psychology*, 20(3), 365-380.
- Willing, K. (1987). *Learning styles and adult migrate education*. Adelaide: National Curriculum Resource Center.

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