

# Field-Dependence/Independence Cognitive Style and Performance on the IELTS Listening Comprehension

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## Abstract

The present study explores the relationship between field-dependence/independence cognitive style and listening comprehension ability. Participants were 200 (152 female and 48 male) English students enrolled in universities and language institutes in Mashhad, Iran, who responded to the Group Embedded Figures Test (GEFT) and the IELTS listening comprehension. They were divided into field-dependent and field-independent groups according to the scores gained in the GEFT. The result of the study suggests that test-takers' cognitive styles influences on their listening and task performance. Field-independent participants outperformed field-dependent participants in IELTS listening comprehension and all of the listening tasks. The finding also indicates that field-independency correlates more positively with test-takers successes in IELTS listening comprehension compared to field-dependent ones. More specifically, field-independency correlates more significantly with fill-in-the-gap questions, i.e., form-completion, note-completion and sentence-completion tasks compared to field-dependent test-takers. Field-dependency cognitive style, however, correlates more significantly with multiple choice and matching questions compared to field-independency cognitive style.

**Keywords:** Field-dependence/independence, Cognitive style, Listening comprehension, The IELTS, Listening tasks

## 1. Introduction

Cognitive styles are defined as ‘information processing habits representing the learner’s typical mode of perceiving, thinking, problem solving, and remembering’ (Messick 1984, p. 61). Human cognition, including cognitive styles is highly relevant to many important educational concerns involving teaching and learning. A variety of motivational and environmental factors influences learning, and cognition represents the core of learning process. Compared to variables such as the affective and physiological factors, cognitive styles seem to be the most relevant to those associated with academic achievement (O’Brien, Butler & Bernold, 2001). But the influence of cognitive styles goes beyond learning to include the interpersonal, social and psychological functioning of individuals (Kahtz & Kling, 1999).

As a cognitive style, the field dependence-independence (FDI) construct is among the most widely studied constructs. The FDI describes two contrasting ways of information processing. Individuals are positioned along a continuum running from extreme field-dependence (FD) to extreme field-independence (FI). Those located towards the FD end of the continuum have difficulty in separating information from its contextual surroundings whereas FI individuals have less difficulty in accomplishing the same task (Guisande, Paramo, Tinajero & Almeida, 2007). The educational implications of field-dependence/independence (FDI) have been explored mainly in the areas of second- language acquisition, mathematics, natural and social sciences (Coffield, Moseley, Hall & Ecclestone, 2004). Field-dependence/independence cognitive style is assessed by Group Embedded Figures Test (GEFT) developed by Witkin, Dyk, Faterson and Goodenough (1971). The test requires learners to outline a simple form in larger complex figure.

The present study examines the relationship between field-dependence/independence cognitive style and performance on the listening comprehension section of International English Language Testing System (IELTS). The IELTS which tests English proficiency across the globe has been one of the pioneers in measuring the four skills in English and developed its first valid test over the past 21 years and continues to set the standard for English language testing today. Close to 6000 organizations and more than 1.4 million test takers around the world trust and recognize the IELTS as a secure, valid and reliable indicator of true-to-life ability to communicate in English for education, immigration and professional accreditation.

The IELTS listening comprehension goes beyond the simple multiple choice items. In fact a variety of listening task is applied, including multiple choice, short-answer question, sentence completion, notes/form/table/ flow-chart completion, labeling a diagram/ plan/map, classification and matching (Cambridge, 2009; official IELTS website). While this great variety enriches the measurement of listening comprehension ability, it poses the question: Do test takers’ cognitive styles relate to their performance on this highly-standard test?

The research question dealing with the type of cognitive style required to perform well on the listening tests has an educational implication. The designers and administrators of English tests have tried to respect the diversity of test takers and make it fair to anyone who sits the test. This research may indicate in which ways changes are necessary in order to make an English listening test a fair measure of test takers’ listening ability. Moreover, it helps test takers be

aware of the importance of cognitive styles on their performance on listening tests and thus, they can do further practices to control the effect of their cognitive style or benefit from it. They can also choose a test most appropriate for them, considering the task type used in different tests.

## 2. Literature Review

Bunch of researches have been done to explore the effect of field-dependence/independence cognitive style on foreign language learning. These studies reveal some interesting points about field-dependent/independent students and their difference in mastering language skills and tasks. It seems that field-independence cognitive style correlates positively and significantly with success in language classrooms (Chapelle & Robert, 1983; Brown, 2000; Salmani-Nodushan, 2009). But field-dependence cognitive style may not be necessarily a disadvantage because field-dependent individuals can perform better in social aspect of language (Dornyei, 2005; Salmani-Nodushan, 2006).

Genesee and Hamayan (1980) reported significant and positive correlation between FI and French listening comprehension skills. In another study, Richards, Fajen, Sullivan, and Gillespie (1997) suggested that FI and FD individuals apply different strategies in listening and reading comprehension. Ahmady (2002) also studied the effect of FD/ FI on the use of listening comprehension strategies and he concluded that FD and FI learners benefited from different strategies.

Johnson, Prior, and Artuso (2000) found that FD people performed better on L2 communicative tasks rather than formal aspects of language proficiency. Salmani-Nodoushan (2006) who tried to find the effect of field-dependence/independence on communicative language tests made the same conclusion. He reported that field-dependent learners performed better than field-independent ones. This result is consistent with the literature that described FD individuals are more successful in social activities.

Blanton (2004) investigated the influence of cognitive style on standardized reading tests. She found that cognitive style had more impact on students' performance on a standardized test of reading comprehension than did ethnicity or gender. Type of the tasks used in the test had a profound effect on the performance of the field-dependent students. She concluded that field-dependent students performed better when the reading tests were multiple-choice un-timed than the other kinds of tests and in fact this type of reading test provided more accurate estimation of their reading comprehension skills and decreased differences in test performance between field-dependent and independent students. Salmani-Nodoushan (2007) examined the relationship between field-dependence/independence and EFL reading performance. Based on the results, cognitive styles had the strongest effect on test performance when test takers were most proficient. The results also revealed that success with more holistic or more analytic reading tasks correlated with FD/I cognitive style. In fact, scores on holistic tasks correlated positively with FD style and negatively with FI styles. By contrast, scores on analytic tasks correlated positively with FI style and negatively with FD style.

Tinajero and Paramo (1998) studied the role of sex and intelligence in the relationship between field-dependence/independence cognitive style and second language acquisition. They identified that field-independent girls showed higher achievement levels than field-dependent ones but this difference among boys was not significant. This finding suggested the intervention of sex roles. He found that those boys that were field-dependent and even were not more intelligent might achieve the strongest academic performance.

Salmanian (2002) studied the relationship between field-dependence/independence cognitive style and performance on global and local questions of listening comprehension and also listening comprehension in general. He concluded that there was no relationship between FD/I and the students' performance on global questions but there was a relation between FD/I and the students' performance on local questions. FI students answered local questions better than global ones but this difference did not exist among FD students.

Hsueh-Jui and Liu (2008) reported on the interrelationship between learners' listening strategy used across listening ability and cognitive style. Their findings indicated that both listening strategy deployment and learning styles could be a predictor for listening ability.

### *2.1 Purpose of the Study*

This study is carried out to determine whether FD/I cognitive styles relate to the performance of IELTS listening test examinees.

Q1: Is there a significant difference in the performance of field-dependent and field-independent individuals on the IELTS listening comprehension?

Q2: Is there a significant relationship between field-dependence/independence cognitive style and performance on different listening tasks of the IELTS?

H<sub>1</sub>. There is no significant difference in the performance of field-dependent and field-independent individuals on the IELTS listening comprehension.

H<sub>2</sub>. There is no significant relationship between field-dependence/independence cognitive style and performance on different listening tasks of the IELTS.

## **3. Method**

### *3.1 Participants*

This study was conducted in Mashhad, Iran. The participants of the study comprised two hundred persons, one hundred fifty two females and forty eight males. They were selected from English students of universities and advance levels of private language institutes. The average age of the participants was twenty three. Those students who were selected from institutes were all in advanced courses (CAE, CPE or advance IELTS courses). Those who were selected from universities were all English students (English translation, literature and teaching field).

### 3.2 Instruments

#### 3.2.1 The GEFT

First, the group embedded figure test (GEFT) was administered. Developed by Witkin, Oltman, and Raskin (1971), the GEFT is the most widely accepted test of measurement for the cognitive styles of field-independence and field-dependence (Blanton, 2004). During the 15-minute timed test, the participants must locate a previously seen simple figure hidden within a larger, more complex figure and trace them in red pencil directly over the lines of the complex figures. The reliability of the GEFT was established as .82 by administering the parallel forms of the test with the same time limits. The Spearman-Brown prophecy formula was used to correct correlations for both males and females. Comparing the parallel test to the Embedded Figures Test established the validity of the GEFT (Blanton, 2004). As it is pointed out in Salmani-Nodoushan (2007), the GEFT has acceptable split-half reliability. In addition, internal consistency and construct validity of the GEFT are satisfactory.

#### 3.2.2 IELTS Listening Comprehension

The second instrument of the study was the disclosed listening comprehension section of the IELTS from Cambridge IELTS7 (2009). The test consisted of four sections. The first two sections were concerned with social needs. The final two sections were concerned with situations related to educational or training contexts. A variety of tasks were applied. Test takers heard the recording once only and answered the questions as they listened. The test took 40 minutes and ten minutes at the end for test takers to transfer their answers to the answer sheet.

### 3.3 Procedures

During the data collection phase, the GEFT was administered within fifteen minutes and in another session of forty minutes the IELTS listening comprehension was given to the same students who took the GEFT. The researcher was present in each session and administered both tests under standard conditions. After collecting all data the items of the IELTS and the GEFT were analyzed, participants were divided into field-dependent and field-independent groups according to the scores gained in the GEFT. The scores were imported into SPSS software for *t*-statistic analysis and a comparison between the performance of two groups in each listening task was conducted. Then correlations between the test scores were estimated. In addition, correlations between scores obtained in each listening task and GEFT scores were calculated.

## 4. Results

The mean score of the IELTS is 23.43 with standard deviation of 6.726 ( it is presented in table 4.1 in appendix). In the 25 items GEFT, the mean score is 16.60 with standard deviation of 4.672 while in the 18 items GEFT the mean score is 9.65 with standard deviation of 4.709. The mean *p*-value of the GEFT was also acceptable (0.53). So none of the tests used as the instruments of this study were too easy or too difficult for the participants. The mean  $r_{pbi}$  of the IELTS was 0.29 and of the GEFT was 0.44. Both of them fell in acceptable range which indicated the tests did discriminate between low and high groups of participants.

The IELTS listening comprehension was highly reliable ( $\alpha = 0.846$ ). This high level of reliability is shared by the GEFT ( $\alpha = 0.787$ )

The participants were divided into field-dependent and field-independent groups according to Ling and Salvendy's method (2000). Those gained scores 12 or more in the GEFT grouped as FI (field-independent) and those gained scores 11 and less grouped as FD (field-dependent). The total number of participants is 200. 122 individuals (61%) were FD and 78 ones (39%) were FI. It can be seen that the number of FD participants is considerably higher than the number of FI participants (table 4.2)

The results of the comparison between performance of FI and FD groups in the IELTS listening comprehension revealed that the mean score of field-independent group was higher than field-dependent group (table 4.3). For FI groups  $M = 27.03$  and  $SD = 6.561$  while for FD group  $M = 21.09$  and  $SD = 5.746$ . Listening tasks of the IELTS in this study were "note Completion", "form completion", "multiple choice", "sentence completion" and "matching". In all listening tasks there were differences in the mean scores for FD and FI groups. In fact, field-independent group outperformed field-dependent group in all the listening tasks.

To find out whether these differences in the mean scores of two groups were significant or not, the independent-samples *t*-test analysis was conducted (table 4.4). According to the results of *t*-test, all of the mean differences between FI and FD groups were statistically significant. In fact, the mean score of FI group was significantly higher than the mean score of FD group and field-independent group outperformed field-dependent group in all the listening tasks.

The correlation coefficient between FI group's GEFT scores and the IELTS scores was 0.364 which was significant at the 0.01 level (table 4.5). It means 12 percent of field-independent participants' performance was explained by their cognitive style. Correlation between FD participants GEFT scores and the IELTS scores was also significant. The correlation coefficient was .284. So 7 percent of field-dependent test takers performance related to their cognitive style. Field-independence cognitive style correlated more significantly with the IELTS listening comprehension than field-dependence cognitive style.

Considering performance of FD and FI group in different listening tasks of the IELTS, some interesting results obtained. The scores obtained in the GEFT by FI group correlated positively and significantly with their scores in note completion task. Correlation coefficient was .330 that means 10 percent of field-independent performance related to their cognitive style. The GEFT scores of FD group were proved to have no significant correlation with this note completion scores. So field-independence cognitive style correlated significantly with note completion listening task while field-dependence cognitive style did not.

For FI group, the GEFT scores and form completion scores were also correlated significantly. Correlation coefficient was .252 that means 6 percent of FI test takers performance was explained by their cognitive style. In FD group, the GEFT scores had no significant correlation with form completion scores. Again field-independence cognitive style correlated more significantly with form completion listening task than field-dependence cognitive style.

In contrast, this was field-dependence cognitive style which proved to have significant correlation with multiple choice listening scores. The GEFT scores obtained by FI group correlated positively and significantly with multiple choice scores with correlation coefficient of .273 which means 7 percent of FD participants performance related to their cognitive style. For FI group, there was no significant correlation between the scores obtained in the GEFT and multiple choice task. So field-dependence cognitive style correlated significantly with multiple choice task while field-independence cognitive style did not.

Sentence completion scores had the strongest correlation among the entire listening tasks with the GEFT scores obtained by FI group. The correlation coefficient was .428 that means 17 percent of FI test takers performance was explained by their cognitive style. Although FD group's GEFT scores also correlated with their sentence completion scores but this correlation was considerably weaker than FI group's. The correlation coefficient was .19 that means only 3 percent of FD participants performance related to their cognitive style.

Finally FD group's GEFT scores indicated significant correlation with their matching listening task scores. The correlation coefficient was .277 that means 7 percent of test takers performance related to their cognitive style. In contrast, FI group's GEFT scores had no significant correlation with the matching task scores. Thus field-dependence cognitive style correlated significantly with matching task while field-independence cognitive style did not.

## 5. Discussion and Conclusion

The results of statistical analysis of this study indicated that although field-independent participants outperformed field-dependent ones in all of the tasks, they were strongly better in fill-in-the-gap questions (note completion, form completion and sentence completion) than FD individual. In fact, the most significant difference between FI and FD group is in fill-in-the-gap questions. According to the results of this study, field-dependent test takers are better in multiple choice and matching tasks than in fill-in-the-gap tasks.

There are some possible explanations for different performance of FD and FI individuals in the IELTS listening comprehension. Here the notes, forms and passages were the field and test items were the simple forms embedded in these fields. This can be a clear justification for why FI participants outperformed FD ones in note completion, form completion and sentence completion tasks. The analytic nature of FI people would be the key to their successes in these tasks. By the way of contrast, a holistic approach in matching questions helped FD participants. Those questions like true-false, outlining and elicitation tasks were field-based. These results are in line with the findings of earlier studies (Salmani-Nodushan, 2007).

The findings of this study are important and can help to draw conclusions as to how test takers with quietly similar level of language proficiency perform differently on listening tests. The findings suggest that FDI cognitive style can be a good predictor of academic achievement and it has the great potential for the explanation of academic problems.

The result of the present study is of value to all those involved in foreign language teaching and testing. In education, as Leyu (2001) mentioned, by taking cognitive style of language learners into account, the number of instructional decisions will be greatly increased. According to the

results of this study, Field-independent individuals are superior to field-dependent ones in the IELTS listening comprehension. The potential explanation is that field-independent people can separate relevant items from non-relevant items within the field (Daniels, 1996). It is also argued that field-independent individuals have a higher memory capacity than field-dependent ones that may influence their performance especially on listening tests (Messick, 1978). Since field-independent individuals do not have difficulty disassembling parts from the whole or separating information (Withkin et al., 1977), lack of this ability in field-dependent ones is another reason for their poorer listening achievement. So it seems that field-dependent language learners should receive further training in abilities of analysis and the differentiation between relevant and irrelevant elements of listening materials. They also need to practice on establishment of relation between parts of listening materials they hear. Of course these practices may be applied to training all language learners, but they are particularly helpful when used with field-dependent students.

According to the results of this study, different types of listening task influence the performance of field-dependent and independent individuals in different ways, so special training in various listening tasks will also help both field-dependent and field-independent language learners. Field-dependent individuals need further practices especially on fill-in-the-gap tasks that can be included note completion, form completion, sentence completion and flow-chart completion. In contrast, field-independent ones have to work on their holistic abilities to answer the questions like labeling a diagram/plan/map, classification and matching. In this way, language learners increase their repertoires beyond the reach of their cognitive style.

Educators who are interested in incorporating individual differences in designing the curriculums need to take cognitive styles of the students into account. By applying one of several measures of identifying cognitive style, they can use this information to individualize structuring.

One of the implications of this study relates to selection of an appropriate language test in which they can show better performance taking their cognitive styles into account. It is recommended that those who want to take an international English proficiency test and they can choose among two or more different tests, learn about their cognitive styles and those listening tasks they can have the best performance. In this way they can choose the most appropriate test. Based on the results of the researches, field-dependent candidates who have potential problems in fill-in-the-gap questions can select a test which only includes multiple choice questions.

For the test designers, results of this study imply that a good test is appropriate for test takers of both cognitive styles, so questions and tasks must be designed in a way to be fair to all test takers regardless of their cognitive styles. To do this, test designers can make use of those tasks in which the difference between the performance of field-dependent and field-independent test takers is the least. A well-designed test is expected to minimize, if not eradicate, the effects of extraneous factors on test results.



In what follows, the researchers have considered limitations of the present study and also some suggestions for further research:

- 1) In this study, the IELTS listening comprehension was chosen as the instrument for testing participants' listening abilities. The study can be replicated using other international English tests to see whether the influence of FDI cognitive style will be in the same manner as in the IELTS or not.
- 2) The correlations between different listening tasks and FDI cognitive style were reported by the present study but the number of questions in each task was limited, therefore this study can be extended to further explore the association of FDI cognitive style and different listening tasks with adequate number of questions for each task. There are also some other listening tasks that were not included in this study like true/false, short answer questions or classification. So another area for research could be analyzing the performance of field-dependent/independent individuals on various listening tasks that are used in different international English tests.

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**Appendix**

Table 4.1. Basic Descriptive Statistics for the IELTS and the GEFT

Tests	No. of items	Mean	SD	Kurtosis	Mean p-value	Mean $r_{pbi}$	$\alpha$
IELTS	40	23.43	6.726	-.1.065	0.58	0.29	.846
GEFT(18 items)	18	9.65	4.709	-1.142	0.53	0.44	0.787

Table 4.2. Frequencies of Field-Dependent and Filed-Independent Participants

	field-dependent	filed-independent
Frequencies	122	78
Percent	61%	39%

Table 4.3. Basic Statistics of Field-dependent and Field-Independent Groups' IELTS Scores and Listening Tasks Scores

	Group	N	Mean	Std. Deviation	Std. Error Mean
IELTS	Field Dependent	121	21.09	5.746	.522
	Field Independent	79	27.03	6.561	.738
Note Completion	Field Dependent	121	6.83	2.169	.197
	Field Independent	79	8.86	2.551	.287
Form Completion	Field Dependent	121	3.07	1.230	.112
	Field Independent	79	4.01	1.019	.115

Multiple Choice	Field Dependent	121	5.02	1.678	.153
	Field Independent	79	5.80	1.911	.215
Sentence Completion	Field Dependent	121	3.63	2.184	.199
	Field Independent	79	5.29	2.089	.235
Matching	Field Dependent	121	2.36	1.087	.099
	Field Independent	79	2.91	1.076	.121

Table 4.4 Independent Samples T-Test

		Levene's Test or Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
IELTS	Equal variances assumed	1.344	.248	-6.748	198	.000	-5.934	.879	-7.669	-4.200
	Equal variances not assumed			-6.562	151.052	.000	-5.934	.904	-7.721	-4.148
Note	Completion	2.675	.104	-6.019	198	.000	-2.026	.337	-2.690	-1.362

	Equal variances not assumed			-5.819	147.660	.000	-2.026	.348	-2.714	-1.338
Form Completion	Equal variances assumed	6.626	.011	-5.684	198	.000	-.947	.167	-1.275	-.618
	Equal variances not assumed			-5.911	186.977	.000	-.947	.160	-1.262	-.631
Multiple Choice	Equal variances assumed	2.663	.104	-3.044	198	.003	-.781	.257	-1.287	-.275
	Equal variances not assumed			-2.963	151.396	.004	-.781	.264	-1.302	-.260
Sentence Completion	Equal variances assumed	.317	.574	-5.355	198	.000	-1.663	.311	-2.275	-1.051
	Equal variances not assumed			-5.406	172.087	.000	-1.663	.308	-2.270	-1.056
Matching	Equal variances assumed	.798	.373	-3.550	198	.000	-.556	.157	-.865	-.247
	Equal variances not assumed			-3.558	167.995	.000	-.556	.156	-.865	-.247

Table 4.5. Correlations between field-dependent/independent groups and the IELTS and listening tasks

	Field- independent	Field- dependent
IELTS	.364**	.284**
Note Completion	.330**	.130
Form Completion	.252*	.168
Multiple Choice	.170	.273**
Sentence Completion	.428**	.190*
Matching	.176	.277**

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

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