

Is Field Dependence/Independence a Source of Test Bias in Iranian EFL Majors' Cloze Test Performance?

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Recent language testing research investigates factors other than language proficiency that may be responsible for systematic variance in language test performance. One such factor is the test takers' cognitive styles. The present study was carried out with the aim of finding the probable effects of Iranian EFL learners' cognitive styles on their performance on cloze tests. For purposes of the present study, it was hypothesized that field (in)dependence would introduce systematic variance into Iranian EFL learners' cloze test performance. 30 female students all majoring in English Translation at Shiraz Islamic Azad University took the Group Embedded Figures Test (GEFT), a reduced version of TOEFL test, and a cloze test. The results of the present study provided evidence that the field-dependent (FD, hereafter) subjects performed the same as their field independent (FI, hereafter) counterparts on the cloze test. It was, therefore, concluded that test takers' cognitive styles may not be viewed as a source of systematic variance in performance on cloze tests and hence, may not be a source of test bias.

Key Words: cloze test, cognitive styles, field dependence, field independence, systematic variance, test bias

1. Introduction

The primary concern in test development and use is to make sure that not only are test scores reliable but also the interpretation and uses we make of test scores are valid (Bachman, 1990). When validating a test, we identify the factors that produce reliable variance in test scores. Thus, we can say that "reliability is concerned with determining how much of the variance in test scores is reliable variance, while validity is concerned with determining what abilities contribute to this reliable variance" (Bachman, 1990, p. 239).

In the process of validation, specific test uses and specific groups of test takers are addressed. But within these groups there might be subgroups that are different from each other in ways other than the language ability being measured. These differences might affect the test takers' performance and hence, the validity of the inferences we make of the test scores. Thus, even if the test scores may appear to be a valid indication of the ability of

those particular groups, these systematic differences in their test performance that are the result of differences in individual characteristics might lead to what is called test bias (Bachman, 1990).

The identification of bias is too complex because differential performance per se cannot be sufficient evidence for test bias. That is, if different groups perform differently on a given test, this may be an indication of actual inter-group differences in that specific ability. Or it may indicate deficiencies in the instructional program of some groups of test takers (Popham as cited in Bachman, 1990).

One of the potential sources of test bias in language tests is differences in cognitive characteristics of test takers. One of these cognitive characteristics is field dependence/independence. Brown (2000) defines field independence as the ability to perceive a particular relevant item in a field of distracting items. Field dependence, on the other hand, is “the tendency to be ‘dependent’ on the total field so that the parts embedded within the field are not easily perceived, although that total field is perceived more clearly as a unified whole” (Brown, 2000, p. 115).

Field independence addresses the degree to which an individual focuses on some aspect of experience and separates it from its background (The word “field” or “ground” is used for this kind of background; the term “figure” is sometimes used to indicate what receives focus and is thus pulled into the foreground.). Some researchers extend the concept to refer to the ability to conduct abstract cognitive operations on the material that receives focus (e.g., Witkin, Moore, Goodenough, & Cox, 1977). Morgan (1997) maintains when the field is not clearly organized, individuals who tend to be FI are relatively likely to impose their own structure on the material, whereas FD persons often accept it as it is. According to Ehrman (1997), an FI learner is adept at focusing a spotlight on data and at distinguishing and focusing deeply on some specific aspect of the material being learned. Such a learner can look at the forest and pick out exactly the kind of tree in which she or he is interested. A FI learner is likely to be relatively skilled at chunking information and working further with it.

The term “field dependence” is used in two ways in the literature: absence of the kind of discrimination referred to as field independent and awareness of the entire field. Since field dependence is always measured by tests of field independence, it can be safely defined only as absence of field independence. However, because learners need to be aware of background activity and to bring information into focus and reorganize it, there is a positive aspect to what is traditionally called “field dependence” which can enhance functioning in complex social situations. Complex social situations are, in turn, often involved in real language use; therefore, this kind of ‘field dependence’ is likely to play a constructive role (Ehrman & Leaver, 2003).

The general hypothesis is that persons with a high degree of field independence would perform well on discrete-point tests in which the items

are unrelated to each other and to the overall context in which they occur. On the other hand, persons with low field independence might be expected to perform well on integrative tests such as the cloze test in which they are required to process the test in a global manner (Bachman, 1990). The purpose of this article is to examine this hypothesis and to investigate whether or not field dependence/independence can be a source of systematic difference in the performance of Iranian EFL learners and therefore, whether it would lead to test bias. As for this study, the null hypothesis would be that 'there is no difference between the performance of FI students as compared to that of the FD ones on the cloze tests'.

1.1 Literature review

The concepts and methods derived from work on cognitive style over the past two-and-a-half decades are being applied at an ever increasing rate to research on problems of education. Among the cognitive styles identified to date, the field dependence/independence dimension has been most extensively studied and has had the widest application to educational problems. While research on educational applications is still in its early stages, the evidence that research has already produced suggests that a cognitive style approach may be applied with profit to a variety of educational issues (Salmani-Nodoushan, 2006).

The first studies on field independence/dependence were conducted by Witkin (Ehrman & Leaver, 2003). This cognitive style has been among the most commonly used language learning style dimensions (e.g., Chapelle & Green, 1992; Ehrman, 1997; Jamieson, 1992). In one of the early studies that applied this concept to foreign language learning, Stansfield and Hansen (1983) found that FI learners were better at classroom learning, as tested by discrete item instruments. However, the construct has been little tested with communicative outcomes.

Field independence, in particular, has been found to correlate significantly and positively with L2 learning in school settings where the target language is taught formally. In their study of first grade English-speaking students in a French immersion program in Canada, Genesee and Hamayan (1980) found significant and positive correlations between FI and both general achievement in French and French listening comprehension skills.

In the USA, Hansen and Stanfield (1981) found that field independence played a major role in the acquisition of linguistic competence for American college students enrolled in a Spanish course. Studying a similar group of adult learners, the same researchers also found a positive but rather modest link between field independence and satisfactory scores on cloze tests.

Likewise, Hansen-Strain (1984) found a significant and positive relationship between field independence and scores on L2 tests which was particularly noticeable in the case of the cloze test and dependent, to a certain degree, on the learners' cultural background and sex. Finally, both Chapelle and Roberts (1986) and Carter (1988) found support for the correlation of field independence with L2 learning in the case of college students.

Given the interesting relationship between field independence and tutored L2 learning, Brown (1987) suggests that field independence may be an advantage in classroom L2 learning. Conversely, he implies, field dependence may be suitable in untutored naturalistic L2 acquisition environments in which language is being spoken around the subject. This may be because of the fact that naturalistic language acquisition involves natural communication in which FD people may be more successful by virtue of their empathy, social outreach, and perception of other people.

In the same vein, Dulay, Burt, and Krashen (1982) show that more analytical FI characteristics are related to the conscious learning of metalinguistic skills while field dependence seems to serve the development of communication skills through subconscious acquisition. Thus, it is no wonder that Abraham (1983) discovered a significant and positive relationship between Krashen's (1981) strategy of monitoring which is part of conscious tutored learning and field independence.

The study done by Alptekin and Atakan (1990) was designed to explore the relationship between L2 achievement and field dependence versus field independence and hemisphericity. The researchers reported that, as expected, the results of their study answered their first research question (i.e. whether there was any relationship between L2 achievement and the field dependence/independence dimension of cognitive style) affirmatively.

A preliminary report on the relationship of FD/I cognitive style to Spanish language achievement and proficiency has been provided by Carter (1988). A corollary question, according to Carter, concerns whether cognitive style and course orientation affect learners' perception of the process of learning a foreign language. Such perception may be logically assumed to influence choice of learning strategies, and thereby, perhaps the learners' degree of success. Carter found that FD individuals were more advantageous for language learning.

Brown (1987) postulated that FI learners may have the advantage in classroom foreign language learning because of the formal, or structure oriented, nature of the classroom task as opposed to a more natural or functional use of language for communication of meaning. The implication is that the supposed superiority of a FI cognitive style in classroom learning may be related to a distinction between the usual formal linguistic achievement orientation of classrooms and tests and functional language proficiency.

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Considering field dependence/independence a source of variance in language tests, Chapelle (1992) explored the relationship between this cognitive style and language test performance. She reported research investigating the relationship between field independence and language measures. The results of her study indicated differential relationships of field independence with cloze, dictation, and multiple choice language tests. The relative strengths of these relationships also differed for native speakers in regular English classes, native speakers in remedial English classes, and nonnative speakers.

Other studies found relatively strong evidence of a relationship between FI and cloze test performance in groups of adult second language learners (e.g., Hansen-Strain, 1984; Hansen & Stanfield, 1981; Stanfield & Hansen, 1983). However, Yang (2006) found that learning style was not the effective factor in influencing student achievement and FI students did not differ significantly from FD ones in their achievements. He concluded that students with different learning styles and backgrounds learned equally well and did not differ much in their use of learning strategies.

The basic question in this study is whether success on a cloze test is solely a function of second language proficiency, or other nonlinguistic factors affect the ability to fill in the blanks appropriately. Theoretically, in a cloze test a person needs to employ a large number of interrelated skills that comprise a language system (e.g., lexical, grammatical, contextual) in order to be able to predict accurately which word fits into each empty space. This prediction is said to happen through a hypothesis testing strategy based on one's internalized language competence (Stansfield & Hansen, 1983).

If the L2 cloze test is considered to be a task that asks the test taker to infer or predict the appropriate words in order to fill the gaps through a hypothesis testing strategy, it could be related to the cognitive restructuring abilities fostered by an FI cognitive style. As a result, the test may make cognitive demands which allow the field independent person to fill in the blanks more easily or accurately regardless of second language proficiency. On the other hand, FD persons may be at a disadvantage when taking this type of test since they are not as likely to use the strategies helpful to the solution of L2 cloze problems. In this case, a cognitive style bias would be operating in cloze test performance; a bias that would lessen the validity of this instrument as a measure of second language proficiency (Stansfield & Hansen, 1983). This study intends to examine whether field dependence/independence is operating in Iranian EFL learners' cloze test performance.

1.2. Research questions

In many Iranian academic contexts, cloze tests are utilized as a measure of Iranian university students' proficiency level. To ensure the validity of this

instrument as a test of proficiency, we need to examine whether factors other than language proficiency are also involved in cloze test performance or not. To this aim, this study intends to investigate the relationship between field dependence/independence as a cognitive style of Iranian EFL learners and their performance on cloze tests. Therefore, it seeks to answer the following research questions:

1. Does FD students' performance on cloze tests differ from that of FI ones?
2. Which factor is more influential in cloze test performance, proficiency level or FD/I cognitive style?

2. Method

2.1. Participants

A convenient sample of 30 students was chosen to participate in the study. They were undergraduate female students who were studying English Translation at Shiraz Islamic Azad University. Their average age was 19 years old. Based on their scores on the proficiency test, they were grouped into low and intermediate proficiency levels.

2.2. Instruments

The students' degree of field dependence/independence was determined by the Group Embedded Figures Test (GEFT). The GEFT is a group administered test that requires the participant to outline a simple geometric shape within a complex design. The participant must locate or separate the relevant information from the contextual field and restructure it to design the correct shape. In theory, this task discriminates the extent to which the person perceives analytically and is able to identify the relevant information within the organized field.

The GEFT includes three sections of increasingly complex geometric figures with the first or practice section containing seven figures and the second and third sections each containing nine figures. For each figure, students are requested to locate and trace a simple form embedded within the complex figure. Students were requested to trace as many of the simple forms as they can within a time limit of two minutes for the practice section and five minutes each for the second and third sections. Students received a score of 1 for each correct tracing of the simple form; the total test score was the number of simple forms correctly traced in the second and third sections combined, ranging from 0 (field dependent) to 18 (field independent).

Oltman et al. (as cited in Bosacki, Innerd, & Towson, 1997) obtained a test-retest reliability for the GEFT of .82 for both males (N=80) and

females (N=97). Furthermore, the standardization of the GEFT had criterion validity coefficients of .82 (N=73) and .63 (N=63) for males and females, respectively (Bosacki et al., 1997).

Foreign language proficiency was assessed using a reduced test of TOEFL (Zarei, 2004) which has been validated against another TOEFL test. The reason to prepare and use this reduced test is the fact that classes in Iran are mostly one hour and a half long and a long test cannot be administered at this time. The proficiency test was a 60-item test. It consisted of 15 structure questions, 15 written expressions, and 30 reading comprehension questions.

The third instrument was a multiple choice cloze test (Tavakoli-Araqi, 1998). The deletion pattern was every 7th word for a total of 30 blanks. The first and the last sentences of the passage had remained intact. The reliability and the validity indices of this cloze test have been reported to be .81 and .76, respectively (Tavakoli-Araqi, 1998).

2.3. Data collection and analysis procedures

First, the proficiency test was administered and the students were classified as intermediate and low level ones based on their scores in the TOEFL test. Next, the cloze test was administered to all of the participants. They were, then, asked to answer the questions of GEFT in order for the researcher to determine their cognitive styles. The researcher administered the GEFT following directions in the Embedded Figures Test manual, allowing a completion time of 20 minutes.

The students were divided into two groups on the basis of their FD/I orientation. Students who obtained a GEFT score of less than 9 were classified as FD, and students who obtained a GEFT score of equal to or greater than 9 were classified as FI. The researcher used a Multiple Regression Analysis to determine the relationship between the students' scores on the cloze test and their proficiency scores and their field dependent/independent cognitive style.

3 Results

Multiple regression was the main statistical analysis used in this study. It is a statistical procedure in which scores on one or more variables (i.e. independent variables) are used to predict scores on another variable (i.e. dependent variable). The cloze test scores were the dependent variable in this study and proficiency test scores and FI/D scores were taken as independent variables. For this study, the criterion used was the maximum proportion of variance explained (R²), which provides an important measure of effect size (Cohen as cited in Bailey, Onwuegbuzie, & Daley, 2000). That is, R², which lies from 0 to 100%, measures the extent to which the independent variables

involved in the model predict the dependent variable. Table 1 presents the means and standard deviations of the scores on the three tests.

Table 1. Descriptive Statistics: Mean and Standard Deviation of the Three Tests

Tests	Mean	SD
Cloze	7.20	5.39
Proficiency	25.93	7.57
FD/I	7.20	5.39

Cloze test scores are out of 30, proficiency test out of 60 and FD/I out of 18.

Table 2 presents the correlations among all the variables, namely, dependent (cloze test scores) and independent variables (proficiency and FD/I).

Table 2. Correlations among All of the Variables

		cloze	proficiency	style
Pearson Correlation	cloze	1.000	.861	-.299
	proficiency	.861	1.000	-.220
	style	-.299	-.220	1.000
Sig. (1-tailed)	cloze	.	.000	.054
	proficiency	.000	.	.121
	style	.054	.121	.
N	cloze	30	30	30
	proficiency	30	30	30
	style	30	30	30

The correlation coefficient between the cloze test and the proficiency test is .861 and the p-value is 0.000. Thus, it can be concluded that the correlation coefficient is significant and positive, that is, there is a high correlation between the two tests. But, the correlation coefficient between the cloze test and the cognitive style (FD/I) is -.299 and the p-value is .054 and it is not significant; therefore, there is a very low correlation between these two tests. This suggests that cloze test performance is influenced by English proficiency rather than by FD/I cognitive style.

Since the correlation between GEFT and the cloze test (-.299) is less than that between cloze test and proficiency test (.861), it seems that a cognitive style bias may not be operational in cloze solutions. That is, the evidence indicates that FI individuals do not indeed fill in the blanks on a cloze test more easily than do FD persons. Based on these data, it appears that FD/I cognitive style does not fully explain Iranian EFL learners' cloze test performance.

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The multiple regression model included the following variables: proficiency level and FD/I cognitive style. These variables combined to explain 75% of the total variation (Table 3) because R square is .75 and it shows that 75% of the variance in the students' cloze test scores is explained by the combination of the two independent variables; that is, 75% of the variance of the cloze test scores is the result of the combined effect of both proficiency and cognitive style (FD/I).

Table 3. Coefficient of Multiple Determination

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.868(a)	.754	.736	3.07903

Predictors: style, proficiency

By looking at the ANOVA table (Table 4), one can make sure that the independent variables (proficiency and cognitive style) have been able to significantly predict the variance in the dependent variable (cloze test scores) because the correlation is significant (.000).

Table 4. ANOVA

Regression	Mean square	F	sig.
	391.948	41.343	.000

Table 5 presents the information related to every individual independent variable and specifies whether and to what extent each independent variable has been able to predict the variance in the dependent variable. We can use this table to answer our research questions; that is, to find out whether the performance of FI students on the cloze test differed from that of the FD ones and which factor is more influential in this respect.

Table 5. The Effects of Proficiency Level and FD/I Cognitive Style on Cloze Test Performance

Independent variables	Beta	tvalue	Sig.
Proficiency	.836	8.538	.000
FD/I style	-.115	-1.171	.252

Dependent variable: cloze test

By looking at the above table, one can understand that of the two independent variables, proficiency level and FD/I cognitive style, only proficiency level has had a significant effect on cloze test performance because its p-value is significant (.000). But, with respect to FD/I style, the p-value is not

significant (.252) indicating that FD/I style has not had any role in the variance observed in the cloze test scores. Looking at Beta values, one can find out the effect that one standard deviation unit change in the score for proficiency would result in .83 units of change in the cloze test scores. With respect to FD/I style, this unit of change would be -.115. Thus, one can say that proficiency level is a better predictor of cloze test scores in comparison to FD/I cognitive style. This result helps to approve the null hypothesis of the study; that is, the hypothesis that there is no difference between the performance of FI students as compared to that of the FD ones on the cloze tests.

Therefore, according to the results of this study, the answer to the first research question is negative; that is, there is no difference between the performance of the FD and the FI students. So, the null hypothesis is approved. The second question can also be answered. That is, of the two independent variables, proficiency level and FD/I cognitive style, proficiency level seems to be a more influential factor affecting Iranian EFL learners' cloze test performance.

4 Discussions and Conclusion

The low proportion of variance in cloze test performance explained by the selected learning style variables (FD/I) suggests that, at least for this sample of Iranian university students, learning style may not be a strong predictor of cloze test performance. Since the correlation between GEFT and the cloze test is less than that between cloze test and proficiency test, it seems that a cognitive style bias may not be operational in cloze solutions. That is, the evidence indicates that FI individuals do not fill in the blanks on a cloze test more easily than do FD persons. Based on these data, it appears that FD/I cognitive style does not fully explain Iranian EFL learners' cloze test performance.

As such, this finding is consistent with Yang's (2006) which showed that learning style is not an effective factor influencing student achievement and that FI students do not differ significantly from their FD counterparts in their achievements. He concluded that students with different learning styles and backgrounds learn equally well and do not differ much in their use of learning strategies.

However, this finding is in contrast to the results of some of the previous studies; for instance, the study conducted by Hansen and Stanfield (1981) in which they found a positive but rather modest link between field independence and satisfactory scores on cloze tests with a group of adult American learners.

It also contradicts the results of the study done by Hansen-Strain (1984) who found a significant positive relationship between field independence and scores on L2 tests which was particularly noticeable in the

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case of the cloze test and dependent to a certain degree on the learners' cultural background and sex.

Based on these findings, it can also be suggested that field independence may not be an advantage in classroom L2 learning in contrast to Brown's (1987) findings. We can also conclude that Carter's (1988) finding which showed that FD individuals were more advantageous for language learning might not be always true. In contrast to Chapelle (1992), it was found that field dependence/independence is not related to language testing and hence, is not a source of variance in language tests.

Field dependence/independence may not be responsible for variance in language test performance. It may not be the most influential variable responsible for introducing systematic error into language test scores. That is, the differential performance of FD/I students on cloze tests may have not been because of their FD/I cognitive style per se. Other factors may be involved in this process or it may be the effect of language proficiency. More studies in this area are needed to shed light on this issue and to show exactly whether or not FD/I cognitive style can be a source of systematic variance in second language cloze test performance and; therefore, a source of test bias.

5 Limitations and Suggestions for Further Research

Like most empirical research, the present study is not definitive but based on a certain sample of learners in a particular context in a particular language program learning a specific language. Future research is needed in which all of these factors are systematically varied in order to define more precisely than is possible here the factors affecting second language cloze test performance and leading to test bias. The data presented here do, however, suggest certain directions that research can take in examining the nature of systematic variance in cloze test performance which leads to test bias.

Finally, this study, like many other studies, has a number of limitations. The number of the participants was relatively small ($N = 30$) and all of them were female students. These factors will limit the generalizability of the results of this study to other contexts and populations. The other problem lies in the fact that this sample was a convenient sample and there was not any random selection. This will also limit the generalizability of the results of the study to other contexts. Further research is needed to mitigate these problems to the extent possible.

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