Using Information-Gap Tasks to Improve Reading: An Analysis of Cognitive Styles[1]

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Received: 2018/05/31 | Revised: 2018/09/03 | Accepted: 2018/11/06

Abstract

This study was an attempt to investigate the effect of information-gap tasks on field-dependent (FD) and field-independent (FI) EFL learners' reading comprehension. For this purpose, 61 learners out of a total number of 120 existing intermediate learners studying at a language school in Tehran were chosen through their performance on a piloted sample Cambridge Preliminary English Test (PET) and subsequently on the Group Embedded Figure Test (GEFT). Overall, there were 33 FD and 28 FI learners undergoing the information-gap task treatment. Furthermore, an independent samples *t*-test was run on the mean scores of the two groups on the reading section of the sample PET, thereby proving that they were homogeneous at the outset in terms of their reading. Another sample PET reading section was administered as the posttest of the study after each group was exposed to 15 treatment sessions. At the end of the instruction, another independent samples *t*-test was run on the mean scores of

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the two experimental groups in the posttest with the results indicating that there was no significant difference between the two groups' reading skill.

Keywords: Language learning, Reading, Information-gap tasks, Field-dependence, Field-independence.

1. Introduction

One of the fundamental functions among most human populations is the skill of reading. People who know how to read have the necessary (albeit not always the sufficient) means to educate themselves in almost any area of life. To this end, they can discover new issues from books, newspapers, and of course the internet. Hence, "proficiency in reading is a key target of schooling and major prerequisite for learning, both within and beyond the context of education" (Boulware-Gooden, Carreker, Thornhill, & Joshi, 2007, p. 70).

In real life, people can get involved in different kinds of reading depending on their needs ranging all the way from reading to acquire information to reading merely for pleasure. In doing so, one may be seeking a global impression of the text only, reading for inference, focusing on direct references, analyzing every detail, scanning for specific content only, or a variety of other causes whether in the first or second language (Harmer, 2007). With this extended array of needs and goals in reading, it is thus no wonder that this skill has been and continues to be the focus of hugely extensive research in the ELT literature globally (e.g., Alderson, 2005; Baker & Boonkit, 2004; Brantmeier, 2003; Grabe, 2009; van den Broek & Espin, 2012; Woolley, 2010; Yusuf, 2011) and also in the context of Iran (e.g., Ahangari & Mohseni, 2016; Bahardoost & Ahmadi, 2018; Faghih & Nemati, 2014; Marashi & Rahmati, 2017; Saeidi & Yusefi, 2008; Yousefian, 2015).

Among the many different procedures used in reading classes, information gap tasks are designed to encourage learners to obtain the information that they do not possess (Richards, 2006). An information gap exists when one person/party holds the information that the other party does not and both parties thence share their information or, put more directly, these gaps occur "when learners are missing a piece of the necessary information" (Larsen-Freeman, 2000, p. 148). Information-gap tasks have gained a noticeable extent of attention among ELT researchers (e.g., Fallahi, Aziz Malayeri, & Bayat, 2015; Fatemipour & Nourmohammadi, 2014; Ismaili & Bajrami, 2016; Lam Son, 2009; Marashi & Amirabadi, 2017; Pica, Kang, & Sauro, 2006; Soleimani, Zare, & Abbasi, 2014)

Alongside the teaching method employed in the ELT classroom, the role of the students' personalities is also decisive in acquiring the language successfully (Weisstein & Jacobson, 2009). One such personality variable is the individuals' cognitive style which was introduced in the 1970s by Witkin "to describe the concept that individuals consistently show stylistic preferences for the ways in which they organize stimuli and construct meaning for themselves out

of their experiences" (Rumetshofer & Wob, 2003, p. 18). There are different kinds of cognitive styles; among them, the field dependency (FD) and field independency (FI) continuum has received much attention (Triantafillou, Pomportsis, & Demetriadis, 2003). In the learning process, FD refers to the learning style of those who tend to look at the whole of a learning task which contains many items while FI encourages the ability to identify or focus on particular items and not being distracted by other items in the background or context (Witkin & Goodenough, 1981). The ELT literature is of course full of studies on the different aspects of FD/FI in the process of language learning (e.g., Behnam & Fathi, 2009; Chamorro-Premuzic, Furnham, & Lewis, 2007; Chapelle, 1995; Kahtz & Kling, 1999; Marashi & Kordbacheh, 2014; Salmani-Nodoushan, 2007; Tinajero & Paramo, 1998; Zhang, 2004).

One would think that as the mode of seeking information is perhaps directly related to one's degree of FD/FI, i.e., how a person deals with information gaps is perhaps determined by whether s/he is FD or FI, there might have been studies in the ELT literature comparing the way FD and FI learners respond to information gap tasks. Ironically, despite the multitude of studies having been conducted on both information gap tasks and the FI/FD cognitive style separately (a number of which have been reported above) that demonstrate the significance of the two domains, no studies on the comparative effect of information-gap tasks on FD and FI learners have been reported in the literature –to the best knowledge of the researchers of this study of course. Accordingly, this study set out to look into the above issue and thus, to respond to the following research question:

Question: Is there any significant difference between the effect of information-gap tasks on field-dependent and field-independent EFL learners' reading?

2. Review of the Related Literature

2.1. Reading

Reading has been defined differently by different people at different times. From Goodman's (1973) psycholinguistic model of reading based on which reading was regarded as a guessing game in which readers reconstruct a message encoded by a writer and Coady's (1979) elaboration on the reader's background knowledge interacting with conceptual abilities and process strategies to Grabe and Stoller's (2002) argumentation that reading is coterminous with an initial decision-making and thus, forming an interpretation of what is read, perhaps the only certain element in a definition of reading is that there is a reader, a writer, and a text (Alderson, 1984).

Reading may be considered as a way of communication between readers and writers as reading is the process of realization, interpretation, and perception of written or printed material which creates an opportunity for the reader and the writer to interact with each other (Sheng, 2000). Accordingly, a complex interaction of automatic and strategic cognitive processes enables the

reader to create a mental representation of the written text (van den Broek & Espin, 2012).

Accordingly, reading is a dynamic process in which the reader constructs meaning from a written text by resorting to their experience and knowledge (Heilman, Blair, & Rupley, 1998). During this process, readers engage in reflection, judgment, analysis, synthesis, problem-solving, making choices, inferencing, etc. (Hedge, 2000).

Regardless of how dynamically readers get involved in the reading process, their prime goal is comprehension (Pressley, 2002). However, comprehension is not reliant only upon language processes such as basic reading skills, decoding, vocabulary, sensitivity to text structure, and inferencing (Cain & Oakhill, 2009); rather, it depends also on the characteristics of the reader such as his/her prior knowledge, working memory, and of course personality style (Yovanoff, Duesbery, Alonzo, & Tindal, 2005).

2.2. Field-Dependence/Field-Independence

As noted above, the cognitive style –notably, the FD/FI of learners–alongside the teaching method employed in the ELT classroom is essential in acquiring the language successfully. These FD/FI measures which "do not indicate the content of the information but simply how the brain perceives and processes the information" (Hansen, 1995, p. 2) are very much a continuum with most persons falling between these two extremes (Robinson, 2001). FD learners need a strong support system; otherwise, they will be overwhelmed by stress and difficulties, while FI learners do not have any organization and they learn to respond to explicit directions and requirements (Witkin, 1976).

FD individuals are more person-oriented and do better with interaction-based learning; whereas, FIs tend to be more analytical (Zhang & Sternberg, 2006). Put in more detail, FDs are socially dependent, gregarious, and eager to make a good impression as they tend to be more other-regulated rather than self-regulated (Waber, 1997). On the contrary, FIs have a greater aptitude for cognitive restructuring and are usually autonomous and impersonal while being self-reliant and lacking awareness for social stimulus values (Altun & Cakan, 2006). FIs are usually inner-directed, self-motivated, and individualistic and do not require extrinsic motivation and they rate low on interpersonal qualities (Rayner & Riding, 1997).

Different studies have identified a number of connections between FD/FI cognitive styles and language learning. To begin with, Chen (2002) found out that some FD learners need greater support from the instructor, while FI learners are able to follow the program independently. Zhang and Stenberg (2006) concluded that the better performance of FIs can be due to their level of intellectual functioning, while Altun and Cakan (2006) demonstrated that these are the cognitive styles that affect students' performance. Furthermore, Salmani-

Nodoushan (2007) found that FD students perform better than FI students when it comes to the social aspects of language.

As for the interconnectedness of the FD/FI cognitive styles and reading, there are studies with mixed results. For instance, while Khalili Sabet and Mohammadi (2013) concluded that FD learners of English perform better in reading comprehension than FI learners, Behnam and Fathi (2009) found the opposite results; they did, however, note that the intervening variable of gender may have impacted the finding of their study.

2.3. Information-Gap Tasks

Information-gap tasks were introduced by Long (1989) within the context of task-based language teaching whereby "the term gap actually refers to the fact that all people possess information unknown to others and that when a need arises to overcome the gap, communication takes place" (Thomas, Liao, & Szustak, 2005, p. 161). In such tasks, one person has certain information that must be shared with others in order to solve a problem. "An information-gap task is an activity in which students are missing information to complete a task and must communicate with their classmates to fill in the gaps" (Larsen-Freeman, 2001, p. 148).

Richards (2006) stated that information-gap is one of the important aspects in real communication thus suggesting that, "If students go beyond practice of language forms and use their linguistic and communicative recourses in order to obtain information to complete a task, more authentic communication is likely to occur in the classroom" (p. 18).

Information-gap tasks are effective in leading learners to improve their linguistic and negotiation skills, thereby enhancing the level of learning significantly (Pica, Kanagy, & Falodum, 1993). One of the advantages of information-gap tasks is that students can discuss the meaning because they need to make sure what they are saying is comprehensible to others to accomplish the task (Neu & Reeser, 1997). Information-gap activities emphasize vocabulary and grammatical structures and allow students to use linguistic forms in a communicative way, and thus bring the language to life for students. Accordingly, students have the chance to use the language to speak in the target language (Ur, 1996).

The popularity of information-gap tasks in ELT classroom "has been well established by their long-standing presence in the SLA research" (Pica et al., 2006, p. 329). They are indeed efficient as they prompt the students to ask each other questions and help make the language classroom experience more meaningful and authentic (Doughty & Williams, 1998, as cited in Marashi & Amirabadi, 2017).

3. Method

3.1. Participants

The participants of this study were 61 female intermediate EFL learners in a private language school in Tehran. These participants were chosen through two stages: first, their general English language proficiency and second, their score on a questionnaire identifying FI and FD individuals. Accordingly, a sample Cambridge Preliminary English Test (PET) already piloted on 30 intermediate learners was administered to 120 existing language learners who were at the intermediate level. The 90 learners whose scores fell within one standard deviation above and below the mean were selected for the second screening stage.

Subsequently, 61 participants (aged 16-20) were selected from those 90 students based on their performance on the Gift Embedded Figure Test (GEFT) such that there were 33 FD and 28 FI learners who were divided into two experimental groups (each group consisted of two classes thus in total, there were four classes: two classes of FD learners and two classes of FI learners). Moreover, the two researchers participated in rating the writing papers of the PET; their inter-rater reliability had been established a priori ($r = 0.87$, $p = 0.0001 < 0.01$).

3. 2. Instrumentations and Materials

Preliminary English Test (PET)

A sample PET was administered for the participant selection process as described above. The test covers all the four language skills of reading, writing, listening, and speaking. PET is part of a group of examinations developed by Cambridge ESOL called the Cambridge Main Suite. PET consists of the four language skills in three papers: reading and writing (paper 1), listening (paper 2), and speaking (paper 3). As this research was focused on the reading ability of the learners, the speaking section of the PET was not administered. Furthermore, the test originally contained 75 items, but 11 items which proved faulty in the item analysis following the piloting were discarded.

For the assessment of the writing section, the researchers used the PET general mark scheme which is used as a rubric for a summative score. According to the PET rating scale, the criteria include language range, variety, complexity message communication, grammatical structure, vocabulary, spelling, punctuation, content points, length, and target reader and the maximum overall score would be five.

Reading Posttest

The researchers administered the reading part of another sample PET to the two groups at the end of the instruction as the posttest. The test was piloted beforehand and seven items from the total 35 were discarded following item analysis.

Group Embedded Figure Test (GEFT)

The Group Embedded Figures Test (GEFT) as a paper-based test taking 12 minutes was used by the researchers to identify the participants' FD/FI cognitive styles. The GEFT instrument was developed by Witkin, Oltman, Raskin, and Karp (1971) and contains three sections with 25 complex figures from which participants are asked to identify eight simple forms (labeled A to H). Section one of the GEFT includes seven complex figures (practice items timed at two minutes) and two sections of nine-item tests timed at five minutes per set including nine complex figures each. The respondents are asked to find the simple forms (A to H) in the complex figures and to trace them in pencil directly over the lines of the complex figures. The simple forms are present in the complex figures in the same size, the same proportions, and they all face the same direction as when they appear alone.

The total number of questions or –better put– figures are 18 since the seven beginning figures are for the purpose of practice and familiarization of students with the test. The maximum possible raw score would be 18: the score is obtained by adding the correct number of responses on the second and third parts of the test. There is no penalty for wrong answers.

A high score (13-18) means that the candidate could separate the simple figure from the complex figure and has tendencies considered to indicate FI. The converse is true for those who have low scores (0-6) on the test and they are considered to be FD. Candidates with mid-level scores (7-12) are considered to have mixed tendencies. The test developers reported a Spearman-Brown reliability coefficient of 0.8-0.9 for their instrument. The GEFT is a standardized validated psychological test; the norms and full details of numerous studies which report on the GEFT's validity and reliability can be found in the GEFT manual (Witkin et al., 1971).

Course Book

The main textbook used in this research study for both FD and FI experimental groups was *American File 3* for the intermediate level written by Latham-Koenig and Oxenden (2014). There are seven units in this book focusing on all four skills and also components of language. During this study, units 1-4 were taught according to the course objectives.

Procedure

The first step of this study was selecting the 61 participants for the two experimental groups described above. Once the two groups were in place, an independent samples *t*-test was run on the mean scores of the two groups in the reading section of the sample PET administered for homogenization. The results showed that the two FI and FD experimental groups (which comprised four classes as described earlier) bore no significant difference in terms of their reading at the outset.

The treatment which lasted 15 sessions (with 30 minutes of each session being allocated to reading using information-gap tasks) and spanned five weeks began. Both groups underwent the same instruction by the same teacher (one of the two researchers who was a graduate student of TEFL with over five years of experience in teaching English) using the same materials.

The treatment each session circled around all of the participants in the two groups using information-gap tasks as a part of their pre-reading activity. Typical types of these activities included: finding and giving information, completing a picture, finding differences or similarities, and predicting a partner's response all of which were based on the texts and exercises of the course materials.

The students in each experimental group were paired such that one possessed some information that the other lacked; therefore, the pair had to exchange ideas and information in order to come to a conclusion. Accordingly, the students were divided into A-B pairs. The teacher would copy two sets of pictures. One set for the A students contained a picture of a group of people. The other set for the B students contained a similar picture, but it contained a number of slight differences from picture A.

The students sat back to back and asked questions to try to find out how many differences there were between the two pictures. Or learner A had a biography of a famous singer with all the place names missing, while learner B had the same text with all the dates missing. Together they had to complete the text by asking each other questions. At the end of the treatment, both groups took the reading posttest described earlier.

4. Results

4.1. Participant Selection

As described earlier, the piloted PET was administered for participant selection. Table 1 below shows the descriptive statistics of this administration with the mean being 44.29 and the standard deviation 5.17.

Table 1.
Descriptive Statistics of the PET Administration

	N	Minimum	Maximum	Mean	Std. Deviation
PET Administration	120	32	55	44.28	5.12
Valid N (listwise)	120				

Dividing the Participants into Two Groups

As the students in the language school came from intact groups and random sampling was not feasible, the researchers had to make sure that the learners in each of the two experimental groups bore no significant difference in terms of the dependent variable of this study (reading skill) prior to the treatment. To this end, they checked whether the mean scores of the two groups on the read-

ing section of the PET administered earlier bore any significant difference or not. First, however, the descriptive statistics of the scores obtained by these 61 learners on the PET reading section are presented (Table 2). As shown, the mean and standard deviation of the FD group were 10.52 and 2.08, respectively, while those of the FI group were 10.93 and 2.12, respectively.

Table 2.
Descriptive Statistics of the Reading Scores of the Two Groups on the PET Administration

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error
FD Group Pre-Reading	33	7	14	10.52	2.078	.03	.40
FI Group Pre-Reading	28	7	14	10.93	2.124	-.59	.44
Valid N (listwise)	28						

Going back to Table 2, the skewness ratios of both groups (.03 /.40 = .08 and -.59 /.44 = -1.36) fell within the acceptable range of ±1.96; hence both distributions of scores were normal signifying that running the parametric independent samples *t*-rest was legitimized.

Table 3.
Independent Samples t-Test of the Mean Scores of Both Groups in Their Reading Prior to the Treatment

	Levene's Test for Equality of Variances		*t*-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	*t*	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	1.39	.71	.76	59	.44	.41	.53	-.66	1.49
Equal variances not assumed			.76	56.9	.44	.41	.54	-.69	1.49

As Table 3 above indicates, with the *F* value of 1.39 at the significance level of .71 being larger than .05, the variances between the two groups were not significantly different. Therefore, the results of the *t*-test with the assumption of homogeneity of the variances were reported here. The results (t =.76, p =.44 >.05) indicate that there was no significant difference between the mean scores of the two groups at the outset. This of course meant that since the groups were homogeneous in their reading before the treatment, any difference at the post-test level could be attributed to the effect of the treatment.

Posttest

The researchers administered the reading posttest among the two experimental groups once the treatment was completed. First, however, the test had to be piloted: the reliability of the test scores (estimated through the KR-21 procedure) gained by the participants in the pilot posttest was also .88. Table 4 below displays the descriptive statistics of this administration. As shown, the mean and standard deviation of the FD group were 10.79 and 2.19, respectively, while those of the FI group were 10.64 and 2.39, respectively.

Table 4.
Descriptive Statistics for the Posttest in Both Groups

	N	Mini-mum	Maxi-mum	Mean	Std. Devia-tion	Skewness	
	Statistic	Statistic	Statis-tic	Statis-tic	Statistic	Statistic	Std. Error
FD Group Post-Reading	33	7	14	10.79	2.19	-.16	.40
FI Group Post-Reading	28	6	15	10.64	2.39	-.01	.44
Valid N (listwise)	28						

Responding to the Research Question

To test the null hypothesis raised based on the research question of the study, i.e., there is no significant difference between the effect of information-gap tasks on FD and FI EFL learners' reading, the researchers intended to conduct an independent samples *t*-test. Prior to this, the normality of the distribution of these scores within each group had to be checked. Going back to Table 4, the skewness ratios of both groups fell within the acceptable range of ±1.96 (-.16 / .40 = -.41 and -.01 / .44 = -.03) thus signifying that the score distributions in both groups represented normality. Therefore, running a *t*-rest was legitimized.

As Table 5 below indicates, with the *F* value of .001 at the significance level of .97 being larger than .05, the variances between the two groups were not significantly different. Therefore, the results of the *t*-test with the assumption of homogeneity of the variances are reported here. The results (t = -.13, p = .89

>.05) indicate that there was no significant difference between the mean scores of the two groups in the posttest.

It can thus be concluded that the presupposed null hypothesis was not rejected meaning that information-gap tasks bear no significantly different impact on the FD and FI learners' reading.

Table 5.
Independent Samples t-Test on the Mean Scores of Both Experimental Groups

	Levene's Test for Equality of Variances		*t*-test for Equality of Means						
								95% Confidence Interval of the Difference	
	F	Sig.	*t*	Df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Lower	Upper
Equal variances assumed	.001	.97	-.13	59	.89	-.07	.58	-1.25	1.09
Equal variances not assumed			-.13	58.1	.89	-.07	.58	-1.25	1.09

Next, the researchers were interested to know how much of the obtained difference could be explained by the variation in the two levels of the independent variable. To determine the strength of the findings of the research, that is, to evaluate the stability of the research findings across samples, effect size was also estimated to be .52. According to Cohen (1988, p. 22), this is a moderate effect size. Therefore, the findings of the study could be moderately generalized.

5. Discussion

The results of the present study bear certain differences with those of previous studies. For instance, Fathi and Behnam (2009) found that FI learners had a better performance in reading compared to FD learners. Salmani-Nodushan (2007) concluded that FD students perform better than FI students while on the information-gap tasks side. Fallahi et al. (2015) found that these tasks had a significant effect on students' reading comprehension.

In the context of this study, the researchers think that there might be several reasons for the result. The first (also the main) reason is perhaps the fact that both FI and FD learners had several incorrect background information. This

incorrect information was fossilized in their minds and also they would transfer it to each other incorrectly which could be preventing them to understand the text well. Nunan (2002) also confirms the intervening role of background information that affects the reading comprehension of the learners. It can be concluded that the treatment itself had no significantly different effect between the two groups as the learners probably used the previous incorrect information they held in their minds rather than focusing on the new information which was being presented in the information gap tasks.

The second reason is perhaps the fact that FD learners asked many questions about the meaning of the words in the texts. Therefore, the FI learners sitting next to them would hear the meaning of the words explicitly, too and this juxtaposition of FI and FD learners may have superseded the impact of their cognitive style in the process of their learning.

Thirdly, the researchers observed that while FD learners had critical problems in the fill-in-the-blank tasks, FI learners had problems in multiple-choice tests and matching tasks. To the best knowledge of the researchers, there is no theoretical and/or empirical evidence for this observation. In other words, they did not come across any study in their literature review delineating that FD or FI learners have problems with certain task/test types. To this end, the researchers did not even know whether the aforesaid trend was a generality among FD/FI learners or simply particular to this study. Hence, at this stage and in the absence of theoretical and empirical evidence in favor of the compatibility of FD/FI learners and test/task types, the only point which could be concluded by the researchers in this regard is the fact that each group had a set of their own problems perhaps propelled by their cognitive style during the treatment and it was perhaps another factor at work for the treatment not having any significantly different impact on the two groups.

6. Conclusion

This research may heighten the sensitivity of teachers and researchers to find the possible solutions for those personality traits of learners which might influence their L2 proficiency and language skills such as reading comprehension. In many English classes, teachers and students perhaps do not have efficient communication because there is no real information exchange in class. In a traditional grammar-oriented class, teachers spend a lot of time asking students questions the students already know their answers. Hence, there is no exchange of information. In other words, there is no information-gap task. The teacher asks questions individually, then s/he evaluates the answers, and subsequently the cycle resumes with another student. This is not a realistic use of language. Without information gaps, classroom activities would be mechanical and artificial (Richards, Platt, & Platt, 1992). The appropriate use of language would be neglected without information gaps and proper communication.

Information-gap tasks go beyond the students' sitting passively in their seats and just listening to their teacher without any active participation in the

process of learning. Therefore, these tasks can increase the motivation among the learners since when students' sense of curiosity is activated to know what pieces of information their peers have, they would be motivated to communicate with each other and also reduce their anxiety because in this procedure, teachers could divide them into small groups. In addition, when students are engaged in an activity which they could do successfully with little interference from their teacher, their self-confidence would probably increase to a greater extent.

Alongside teachers, syllabus designers and textbook writers play a critical role in the learning process. In this regard, several tasks and also games could be designed for learners, such as puzzles, matching games, and crosswords in order to encourage them. This cannot be done unless teachers and syllabus designers cooperate in order for the learning process to become easier. They also have to pay attention to the personality and interests of the learners. Teacher guidebooks can be a good solution in using the books more easily.

Last but not least, in the process of conducting this study, certain suggestions for other studies in line with the one at stake came to the researchers' mind which are discussed here; to begin with, the same study could be conducted among male learners to see if the controlled variable of gender would change the results. Secondly, another variable which could be adjusted is age. In this study, the participants' age ranged between 16 and 20. The reaction of FD and FI learners in various age cohorts to information-gap tasks could be variant. Furthermore, the impact of information-gap tasks on the other skills of FD and FI learners such as listening and speaking could be investigated. Another point is that this study focused on FD/FI as personality variables of the study; other such researches could be conducted on different personality factors such as extroversion and introversion. Finally, another study could be conducted to compare the effect of information-gap and opinion-gap tasks on different language skills among FI and FD learners.

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