

Original Article

Comparing the Effectiveness of Employing Convergent and Divergent Tasks to Improve Iranian EFL Learners' Writing Skill and Reading Comprehension Ability: Does Gender Matter?

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Abstract

Task-based language learning offers learners the rich input they need to study the target language and contributes to developing intrinsic motivation in the classroom (Ellis, 2020). Thus, the present study explored the effect of employing convergent and divergent activities to improve male and female learners' reading comprehension and writing abilities. To fulfill the purpose, a quasi-experimental study was designed and, through a homogeneity test, 32 female and 28 male students at the intermediate level were chosen. Then, they were randomly divided into four experimental groups. They underwent the teaching based on convergent and divergent activities principles. Accordingly, the results of ANCOVA indicated that male learners benefited from divergent activities, whereas convergent activities were significantly beneficial to female learners. More importantly, the result of MANOVA depicted that there was a statistical difference across gender. A follow-up Scheffe's post-hoc test was also conducted to locate the exact areas of differences. Results showed that female learners in convergent groups obtained the highest mean scores for writing and reading posttests. Finally, pedagogical implications suggested that EFL practitioners should address the gender differences in learning style preferences to design effective input-based and output-based tasks to encourage the learners to participate in an active learning environment.

Keywords: Convergent Tasks, Divergent Tasks, Gender Gap, Learning Style Preferences, Reading Comprehension Ability, Writing Skill

1. Introduction

Mastering the four abilities to listen, read, write, and speak is part of the language learning process. Perhaps the most common misconception about these four skills is that writing is the most difficult (Marije & Borges, 2020; Yu & Nan, 2020). This may be true since writing requires various skills, some of which are never fully developed by many pupils, even in their home language (Barone & Cargile, 2020).

Attempting to generate each sentence with its most apparent components is undoubtedly the secret to successful writing. Writing is thus a process of creating a text that serves as a communicative link between the writer and the reader, and learning to write is an essential aspect of language acquisition. As a result, as more people become aware of the importance of writing, English language teachers are focusing more on it (Crookes & Ziegler, 2021).

Undoubtedly, the capacity to write well is strongly linked to reading well. As Marije and Borge (2020) noted, "children benefit from exposure to what makes good writing."

Moreover, Woore and Porter (2020) argue that "Reading is a selective process that involves partial use of accessible minimal language clues selected from perceptual information based on the reader's expectations" (p.127). According to Feller (2020), proficient readers do not focus on sentences and words. Instead, they focus on gaining broad knowledge before comprehending specific components of the text. "Reading is an active skill since it continuously entails guessing, predicting, checking, and asking oneself questions" (p.8).

It's no surprise, then, that tremendous efforts and resources are being put forward to improve EFL learners' writing and reading abilities by developing more effective writing and reading courses. Many of these initiatives are taking shape in The Task-Based Language Teaching (TBLT) framework, which has received much attention in the last two or three decades (Ellis, 2017, 2020; Kim, 2020; Marije & Borges, 2020).

Tasks serve as the significant planning and instruction unit in TBLT, which stresses using actual language and asking students to engage in meaningful activities in the target language (Laguttseva, 2021). There are many distinct types of tasks in TBLT, and their application is mainly governed by conditional interaction factors (Ellis, 2020); one of these typologies is convergent/divergent tasks.

Convergent activities are concerned with recognizing common findings, reapplying approaches, and gathering data, and it is defined as ones that demand true justified knowledge, abstract conceptualization, and active exploration (Nezhad & Shokrpour, 2013). Such activities encourage the learners to cooperate in the sense that they allow for the negotiation of where a single aim is necessary; hence, collaborative work is required (Solares-Altamirano, 2020). These activities should elicit just one correct answer, allow collaborative work with brief replies that are not cognitively demanding, and so need no reference making (Andrä, 2020). Convergent tasks anticipate all participants to achieve the same objective as a regarded outcome; divergent tasks expect individuals to achieve various goals. The two task types activate different cognitive methods. As a result, when learners use different cognitive styles, the outcomes of the two task types can differ (Nezhad & Shokrpour, 2013).

In contrast, Divergent activities help the learner generate and analyze many more creative ideas, make unexpected connections that need new significant information, and offer multiple end alternatives with presumably multiple goals (Marashi & Dadari, 2012). Beccia (2020) stated these tasks provide autonomous efforts that individuals can complete differently depending on their cognitive styles and may lead to varied outcomes. Students can ask questions with more than one valid answer in divergent assignments. This situation has no perfect answer because the available responses depend on one's perspective or experience (Andrä, 2020; Kim, 2020; Laguttseva, 2021; Solares-Altamirano, 2020). Divergent learners may approach concrete problems from various angles, so a challenge that supports this learning style may result in better learning outcomes (East, 2020). East (2020) further claimed that diverse activities allow individuals to perform autonomous tasks that may result in various outputs based on their cognitive styles. According to Ellis (2017), learners must complete divergent activities to reach their objectives.

Considering the debatable effects of convergent and divergent tasks and the challenging concept of gender differences in L2 tasks performance, the present study attempts to open new horizons highlighting the effects of convergent and divergent tasks as an effective strategy for Iranian male and female learners to overcome with reading and writing difficulties. It also intends to shed light on gender differences in learning style preferences. Hence, the present study can be of great importance for teachers to notice the gender gap in learning style preferences and find out which task-based approach is more

effective for male and female learners. Moreover, understanding the effectiveness of type of task and gender gap can also help the material developers and syllabus designers to design more effective task-based activities to encourage the learners to participate in an active learning environment.

2. Literature Review

2.1 Integrating Reading into Writing Tasks

Reintegrated second language writing tasks eliciting writing performances that include additional abilities such as reading or listening. Reading-to-write, according to Feller (2020), is a concept in which writers return to resources and read them in multiple ways as they hunt for specific information and use reading strategies to fit task expectations for the writing. Woore and Porter (2020) also described the reading-to-write concept as follows: The literacy event in which readers/writers use text(s) that they read, or have read, as a basis for text(s) that they write referred to as reading for writing.

Reading for writing can also be interpreted as recognizing that writing is frequently the physical effect of reading/writing exchanges. In theory, there are three hypotheses or models for the reading-writing connection: (1) directional hypothesis, (2) non-directional hypothesis, and (3) bidirectional hypothesis (Barone & Cargile, 2020).

The reading-to-write approach is supported by the directed hypothesis, which states that reading improves writing. Reading and writing shares structural components' in this concept. This reading-to-write model presupposes that information is only transferred in one direction. Readers, for example, would be able to repeat patterns such as comparison after being familiar with them through their reading. The directed model, according to Crookes and Ziegler (2021), is the most important model in terms of teaching. According to the non-directional hypothesis, reading and writing are derived from a single underlying proficiency (Yu & Nan, 2020). Information can be transferred in either direction in this model: from reading to writing or from writing to reading. Marije and Borges (2020) argued that the cognitive process of producing meaning connects reading and writing in this approach. For the non-directional paradigm to work, he claims that explicit guidance is required.

Reading and writing are both interactive and interdependent, according to the third hypothesis, bidirectional. According to Woore and Porter (2020), there are multiple

processes and relationships between reading and writing in this model, which is the most complex and comprehensive model. These processes and relationships may change as learners' language ability develops. As a result, any change in reading will affect writing and vice versa.

Thus, it is of the utmost importance for teachers to have clear-cut criteria for designing effective reading and writing tasks. The most important criterion is that the teachers should decide whether they want the learners to reflect upon a single solution or diverse correct answers.

2.2. Convergent Tasks Versus Divergent Tasks

A task is a work plan that demands learners to process language pragmatically to attain an end that can be evaluated in terms of content rather than language (Ellis, 2017). Ellis (2020) further stated that one technique to categorize tasks is to divide them into divergent and convergent. Ellis (2020) defined the divergent as the activities that require the use of cognitive processes in which different cognitive methods are required to do this activity, and the learners have separate goals to achieve in diverse tasks. He defined convergent tasks as the students' activities to achieve different inputs to arrive at one correct solution. Moreover, Ellis (2020) compared the two approaches claiming that convergent activities yield more intelligible input than divergent activities. However, the latter generates more output and also produce more words and more complex utterances than convergent activities. Kersten (2021) also describes his findings noting that convergent problem-solving activities generated significant interactional and discourse differences than divergent debating tasks.

Marashi and Shizari (2015) investigated how convergent and divergent activities influenced the writing and motivation of EFL students. The findings revealed that learners in the convergent group improved their writing significantly more than those in the divergent group, but there was no significant difference in enhancing learners' motivation between the two treatments.

Nurdiana (2017) investigated whether convergent and divergent activities provide different levels of complexity, accuracy, and fluency in speaking, as well as which task might maximize learners' autonomy. The results demonstrated no significant difference in complexity between convergent and divergent activities regarding student speaking

performance. Furthermore, on a posttest of students' speaking accuracy, the convergent group outperformed the divergent group. In terms of fluency, the data demonstrated that students' speaking fluency did not differ significantly across convergent and divergent activities. Divergent tasks have also been shown to be more effective in increasing learners' autonomy.

In another study, Tabrizi, Goldouz, and Bader (2020) examined the impact of convergent and divergent activities on the speaking ability of Iranian intermediate EFL students. The results showed that both techniques had differing degrees of impact on speaking performance and that convergent and divergent activities had different effects on the speaking performance of Iranian intermediate EFL students. The results showed that learners could improve their speaking skills by doing convergent and divergent activities.

However, Azimi, Behjat, and Kargar (2016) examined the effect of convergent and divergent activities on learners' reading comprehension ability. They found that divergent activities were more effective than convergent ones in improving learners' reading comprehension.

One of the most critical factors that could affect the learners' performance regardless of the tasks' types is the task conditions such as learners' gender. In other words, the preferences in selecting learning styles vary across male and female learners (Tseng & Gao, 2021).

2.3. Gender Gap in Learning Style Preferences

SLA study is frequently thought to incorporate comparable elements like age, race, ethnicity, and character, but few studies mention gender considerations. Several studies have looked into the impact of such characteristics on the SLA system. For instance, Bernhard and Bernhard (2021) explored the role of gender in learning languages through the synthesis of studies that addressed some ideas and possible gender-related differences in foreign language acquisition. The summary elucidates several associated student performance differences. According to certain studies, females did better on L2 evaluations than their male counterparts in secondary and primary school (Calafato, 2021). Gender has also been shown in various studies to impact how children learn a language significantly. Males outperformed females in using a specific linguistic pattern. For example, females,

on the other hand, use more learning strategies to do better and acquire talents faster (Tseng & Gao, 2021).

More importantly, Hou and Hou (2017) investigated the relationship between gender differences in learning a second language from an aspect of multiple intelligence and ambiguity tolerance. The findings of their study are depicted in Figure 1.

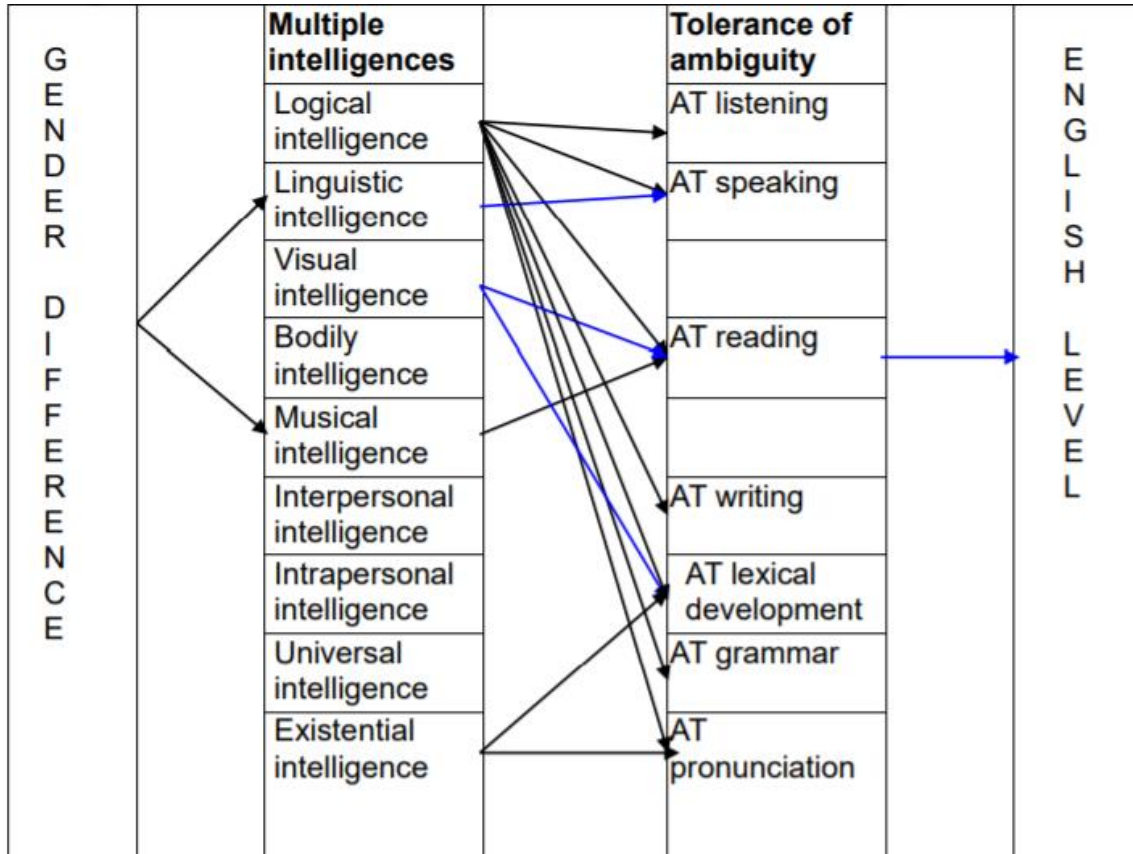


Figure 1. *The Relation of Gender Difference, MI, TA and English Level (Hou & Hou, 2017)*

According to Hou and Hou (2017) findings, females exhibited higher linguistic and musical intelligence, which was linked to being more tolerant of reading ambiguity and having a higher English level in the end. As a result of the relationship among gender differences, Multiple Intelligences (MI), and Second Language Tolerance of Ambiguity (SLTA), it is supported that females have always been regarded as better language learners, which could explain why females have always been regarded as better language learners.

None of the previous studies probed into the relationship between convergent/divergent tasks and learners' gender. Thus, given the effectiveness of

divergent/convergent activities in the EFL context, as well as the challenging extra-linguistic factor of gender differences within the field of second language acquisition, the current study attempted to compare the effect of convergent and divergent activities on the reading and writing abilities of Iranian EFL male and female students. As a result, the following questions were addressed in this study:

1. Is there any significant difference between the effect of convergent and divergent activities on EFL learners' writing skill?
2. Is there any significant difference between the effect of convergent and divergent activities on EFL learners' reading comprehension ability?
3. Do the effect of convergent and divergent activities on Iranian EFL learners' writing skill differ in terms of gender?
4. Do the effect of convergent and divergent activities on Iranian EFL learners' reading comprehension ability differ in terms of gender?

3. Methodology

3.1. Design and Context of the Study

The present study's design is quasi-experimental since the participants were selected non-randomly. As the participants of this study were the students of the classes that the researcher already taught, the sampling of this study was convenient non-random sampling. Besides, there were four experimental groups in this study that were compared to each other, so the design of this research is comparison group design. The treatments were based on two types of tasks: convergent and divergent. There were four experimental groups in this study: 1. Female convergent group, 2. Female divergent group, 3. Male convergent group, and 4. Male divergent group. The independent variable of this study were gender and two different types of tasks. The dependent variables were writing skill and reading comprehension ability.

3.2. Participants

This study involved 60 Iranian intermediate learners from a private school in Tehran, Iran, comprising 32 teenage female learners and 28 teenage male learners aged between 16 and 19. These participants were chosen from a larger group of 90 students based on their performance on a sample Preliminary English Test (PET), which was piloted on 30

participants with similar characteristics. After that, the 60 individuals were randomly assigned to four experimental groups:

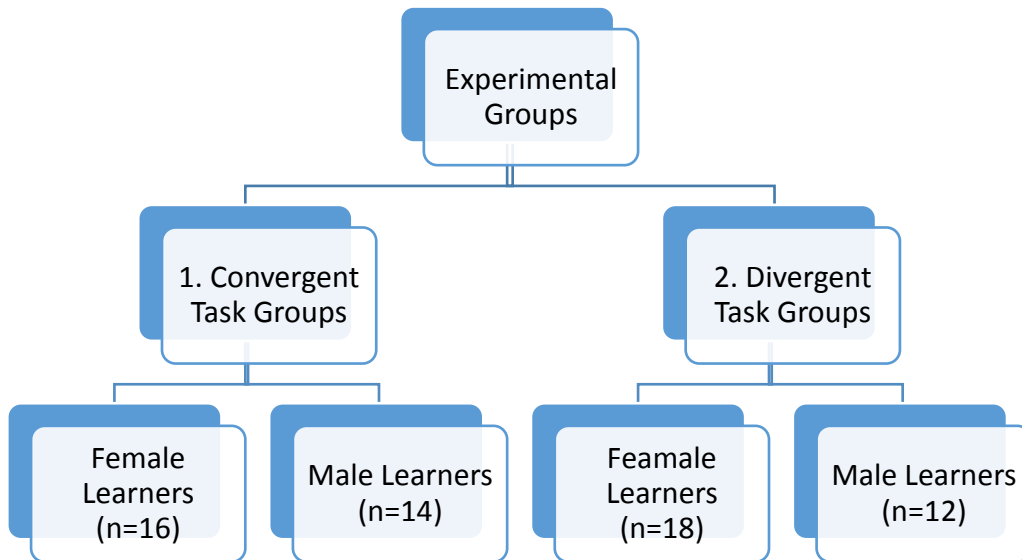


Figure 2. Design of the Study

Furthermore, two instructors served as raters for the PET's writing portion in this study. The inter-rater reliability of the two raters was 0.86, which was considered significant.

Table 1
Demographic Background of the Participants of the Study

Initial Number of the Participants	90
Final Number of the Participants	60 (32 Females & 28 Males)
Age	16-19
Major	High School
Language School	Goldis Language institute
Academic Years	2020-2021
Convergent Task Groups	16 female & 14 Male
Divergent Task Groups	18 Female & 12 Male

3.3. Instruments

3.3.1. Preliminary English Test (PET)

First, the researchers used a sample PET that had been previously piloted to choose a homogeneous sample of individuals depending on their prior level of skill. Reading and writing (paper 1), listening (paper 2), and speaking (paper 3) are the four sections of PET (paper 3).

Because the focus of this study was on the learners' writing skill and reading comprehension ability, all three portions of the PET were administered, except the speaking piece. Furthermore, the exam originally comprised 75 items, but five of them were eliminated after the piloting. The piloting among the 30 students had a reliability of 0.81, while the actual administration for selecting the 60 participants was 0.87.

3.3.2. Posttests

This study used the reading and writing papers from another sample piloted PET as posttests.

3.3.3. Course-Books

Pathways Reading and Writing, and Critical Thinking (Blass & Vargo, 2012), which blends fascinating National Geographic stories, images, video, and infographics to bring the world into the classroom, was the major coursebook for the participants. Learners are engaged by authentic, relevant content and precisely planned lessons. This coursebook was utilized for the divergent groups since the activities that generate questions can yield correct answers and ideas.

Northstar (Boyd & Numrich, 2013) is a comprehensive integrated skill training program. It combines critical thinking and academic skills with language development, and it engages pupils with real-world subjects. It is intended to prepare pupils for the rigors of college and university studies. This coursebook was used for the convergent groups, since the activities provided the learners with different inputs to lead them to the one correct answer.

3.4. Data Collection Procedure

At the outset of the investigation, the piloted PET test was given to 90 elementary EFL students, from whom 60 study participants whose scores were one standard deviation

above and below the mean were selected and randomly assigned to four experimental groups. All four experimental groups were given treatment in 12 sessions held twice a week, with 60 minutes dedicated to reading and writing training in each session.

In all classes, the instructional materials and time allotted for the treatment and the teacher (one of the researchers) were the same, but the teaching methods were different.

3.4.1. Convergent Task Groups

Pre-task: Each unit begins with speaking activities that draw students' attention to the topic. Focus questions presented in each unit encouraged learners to connect with the reading passage personally. In this way, students could make inferences about and predict the content of each unit. Then, the teacher asked each student to answer the short self-assessment questions as a pre-reading activity. This activity could help students check what they know and allow the teacher to target instruction.

While-task: Learners were required to concentrate on two opposing thought-provoking readings chosen from a variety of authentic genres to imitate students' intellectuality and critical thinking skills at this stage. After predicting the topic, the students had to double-check their guesses and complete a range of tasks to ensure comprehension. The following activity required students to take what they had learned and organize, integrate, and synthesize it in a meaningful way.

Post-task: Post-task phase required the learners to focus on their writing skill. First off, they should use the newly-learned vocabularies and useful grammar structures creatively and in their final writing activity to be prepared for their last writing activity. Afterward, in the final writing activity, they should organize their ideas based on piratical structural patterns, and they had to write about the topics presented in each unit. After they finished their writing, they had to revise their writing to establish unity and coherence throughout their writing paper. Finally, the students were required to edit their papers based on the final draft checklist provided in the end of each unit.

3.4.2 Divergent Task Groups

Pre-task: The first task consisted of four main parts: 1. Building vocabulary (in which the learners should fill in the blanks using words highlighted in the reading text). 2. Using vocabulary (in which the students were asked to discuss pre-reading questions with

their partners while focusing on unfamiliar words presented in the questions (i.e., what contributions has the internet made to society?). 3. Brainstorming (i.e., students should brainstorm about a topic-related sentence and discuss them with their partners. 4. Predicting (the learners were asked to skim the paragraphs and share their ideas on what they think the reading passage is mainly about).

While-task: After the students read the reading passage, they engaged in the writing tasks. In the first task, six different topics were provided, and they had to choose one of the topics and write a paragraph. In the second task, a topic related to the reading passage was provided for them (i.e. what is one way that people have collaborated on the internet?), and then, they had to write a topic sentence to introduce the topic, complete the writing outline with supporting details, and write a conclusion.

Post-task: In this stage, the students could also develop their critical thinking skills by reading between the lines. For instance, they had to make inferences and logical guesses about what the writer of the reading passage did not say directly.

3.5. Data Analysis Procedure

The data were analyzed in two stages using SPSS statistical software: descriptive and inferential. In the descriptive analysis stage, the data for the PET main administration was analyzed. In the inferential analysis stage, ANCOVA was first used to compare the mean scores for pre-and post-tests across all four groups. Next, the assumption underlying MANOVA were checked. After the assumptions were met, a two-way MANOVA was conducted to compare the multivariate sample means. Finally, the Scheffe post-hoc test (because the numbers of group members were not equal) was used to compare the differences between pairs of groups.

4. Results

4.1. PET Administration

The researchers administered the piloted PET to 90 students to select 60 of them for the study. The reliability of the participants' test scores was 0.76, and the interrater reliability of the two raters who participated in the scoring of the writing papers was established ($r = 0.892$, $p = 0.000 < 0.01$). Table 1 details the results for writing raters.

Table 2

Correlations between Raters in Writing Scores

		WritingRater1	WritingRater2
WritingRater1	Pearson Correlation	1	.892**
	Sig. (2-tailed)		.000
	N	60	60
WritingRater2	Pearson Correlation	.892**	1
	Sig. (2-tailed)	.000	
	N	90	90

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

Further, the mean and standard deviation for PET were calculated at 38.40 and 9.12, respectively.

Table 3

Descriptive Statistics for PET

	N	Minimum	Maximum	Mean	Std. Deviation
VAR00001	90	20.00	50.00	38.4000	9.12805
Valid N (listwise)	90				

Since there were two independent variables and two dependent variables involved in this study, the researcher had to run ANCOVA to compare the pretests and post-test mean scores across the groups.

Hence, the descriptive statics and ANCOVA tests for male and female participants' reading and writing pretests and posttests scores are shown in the following tables. Table 4 represents the descriptive statics for male participants' reading posttests across the groups.

Table 4

Male Participants' Reading Posttests Scores across the Groups

Groups	Mean	Std. Deviation	N
MaleConvegent	22.1429	6.13762	14
MaleDivergent	25.5833	5.03548	12
Total	23.7308	5.81417	26

Table 4 indicates that male learners in the divergent group achieved a higher mean ($M = 25.58$) than those in the convergent group ($M = 22.14$). Further, an ANCOVA test was run to compare the effectiveness of two different interventions designed to improve male participants' reading ability posttest. Reading posttest was used as the covariate in this analysis. The outcomes are depicted in Table 5.

Table 5
Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	280.338 ^a	2	140.169	5.708	.010	.332
Intercept	177.276	1	177.276	7.219	.013	.239
Groups	21.118	1	21.118	.860	.363	.036
ReadingPretest	203.854	1	203.854	8.302	.008	.265
Error	564.777	23	24.556			
Total	15487.000	26				
Corrected Total	845.115	25				

a. R Squared = .332 (Adjusted R Squared = .274)

There was a significant difference between male participants' posttests in both groups after controlling for pretest scores, $F_{(1, 23)} = 8.302$, $p < .0005$; *partial* $\eta^2 = .265$. Moreover, the descriptive statistics for male participants' writing post-tests are presented in Table 6.

Table 6
Male Participants' Writing Posttests Scores across the Groups

Groups	Mean	Std. Deviation	N
Male Convergent	21.0000	5.62959	14
Male Divergent	24.6667	5.71017	12
Total	22.6923	5.85675	26

Based on Table 6, male participants in the divergent group ($M = 24.66$) achieved significantly higher mean scores than those in the convergent group ($M = 21.00$). Furthermore, an ANCOVA test was run to compare the effectiveness of two different interventions designed to improve male participants' writing ability posttest. Writing posttest was used as the covariate in this analysis. The outcomes are depicted in Table 7.

Table 7

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	292.402a	2	146.201	5.950	.008	.341
Intercept	73.074	1	73.074	2.974	.098	.114
Groups	6.552	1	6.552	.267	.611	.011
WritingPretest	205.531	1	205.531	8.365	.008	.267
Error	565.136	23	24.571			
Total	14246.000	26				
Corrected Total	857.538	25				

a. R Squared = .341 (Adjusted R Squared = .284)

There was a significant difference between male participants' writing posttests in both groups after controlling for pretest scores, $F_{(1, 23)} = 8.365$, $p < .0005$; *partial* $\eta^2 = .267$. Further, the descriptive statistics for female participants' reading post-tests are shown in Table 8.

Table 8

Female Participants' Reading Posttests Scores across the Groups

Groups	Mean	Std. Deviation	N
Female Convergent	28.1875	6.09063	16
Female Divergent	27.6667	6.11652	18
Total	27.9118	6.01698	34

As depicted in Table 8, female participants in the convergent group received a slightly higher mean score ($M = 28.18$) than those in the divergent group ($M = 27.66$).

After adjusting reading pretest scores, there was a significant difference between female participants' reading posttests in both groups. The outcomes are shown in Table 9.

Table 9
Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1180.140a	2	590.070	1.253E3	.000	.988
Intercept	.221	1	.221	.469	.498	.015
Groups	.470	1	.470	.998	.326	.031
ReadingPretest	1177.843	1	1177.843	2.502E3	.000	.988
Error	14.595	31	.471			
Total	27683.000	34				
Corrected Total	1194.735	33				

a. R Squared = .988 (Adjusted R Squared = .987)

There was a significant difference between the female learners' reading posttests scores in both convergent and divergent groups after controlling for pretest scores, $F_{(1, 31)} = 2.50$, $p < .0005$; *partial* $\eta^2 = .988$. Additionally, the descriptive statistics for female participants' writing posttests are presented in Table 10.

Table 10
Female Participants' Writing Posttests Scores across the Groups

Groups	Mean	Std. Deviation	N
Female Convergent	28.5625	6.38716	16
Female Divergent	26.8333	6.38242	18
Total	27.6471	6.34791	34

As depicted in Table 10, female participants in the convergent group received a significantly higher mean score ($M = 28.56$) than those in the divergent group ($M = 26.83$). Besides, the ANCOVA test was run to compare the effectiveness of two different interventions designed to improve female participants' writing ability posttest. Writing posttest was used as the covariate in this analysis. The outcomes are depicted in Table 11.

Table 11

Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1118.624a	2	559.312	82.119	.000	.841
Intercept	8.476	1	8.476	1.244	.273	.039
Groups	5.746	1	5.746	.844	.365	.026
Writing Pretest	1093.297	1	1093.297	160.519	.000	.838
Error	211.141	31	6.811			
Total	27318.000	34				
Corrected Total	1329.765	33				

a. R Squared = .841 (Adjusted R Squared = .831)

There was a significant difference between the female learners' writing posttests scores in both convergent and divergent groups after controlling for pretest scores, $F_{(1, 31)} = 160.519, p < .0005; partial \eta^2 = .838$.

4.2. The Assumptions Testing

Before running the multivariate analysis, the researcher checked the MANOVA assumptions, including 1. Multivariate normality, 2. Multivariate outliers, 3. Scatterplot matrix, and 4. Multicollinearity test.

Table 12

Tests of Normality

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Post Reading	.103	60	.186	.961	60	.054
Post Writing	.101	60	.200*	.961	60	.051

According to the Shapiro-Wilk test, the sig value for both reading and writing posttest across groups is greater than the p-value (*Reading*: .054 > .05, *Writing*: .051 > .05), meaning that the data is distributed normally. Moreover, sig value for KS test also

confirmed that the scores are distributed normally (*Reading*: .186 > .05, *Writing*: .200 > .05). Hence, the assumption of normality is met.

Table 13

Mahalanobis Distance Test

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	1.3764	1.6403	1.5000	.06016	60
Std. Predicted Value	-2.055	2.333	.000	1.000	60
Standard Error of Predicted Value	.066	.289	.104	.046	60
Adjusted Predicted Value	1.0904	1.6477	1.4914	.08033	60
Residual	-.60144	.62362	.00000	.50062	60
Std. Residual	-1.181	1.224	.000	.983	60
Stud. Residual	-1.225	1.479	.008	1.011	60
Deleted Residual	-.64769	.90962	.00857	.53119	60
Stud. Deleted Residual	-1.231	1.495	.008	1.012	60
Mahal. Distance	.000	13.318	1.967	3.421	60
Cook's Distance	.005	.334	.022	.045	60
Centered Leverage Value	.000	.305	.033	.058	60

As depicted in Table 13, the maximum value for Mahalanobis Distance is smaller than the critical value ($13.31 < 13.82$), which means that there are no multivariate outliers across the combination of dependent variables and independent variables. Since the Mahalanobis Distance maximum value is in the acceptable range, the researcher can check the linear relationship of each pair of the dependent variables across each level of the independent variables. The results are shown in Figure 2.

According to Figure 3, the analytical scatterplots matrix shapes start from the bottom left and move to the top right in each relationship between dependent and independent variables. That means that there is a linear relationship between each pair of dependent variables for all combinations of groups of the two independent variables.

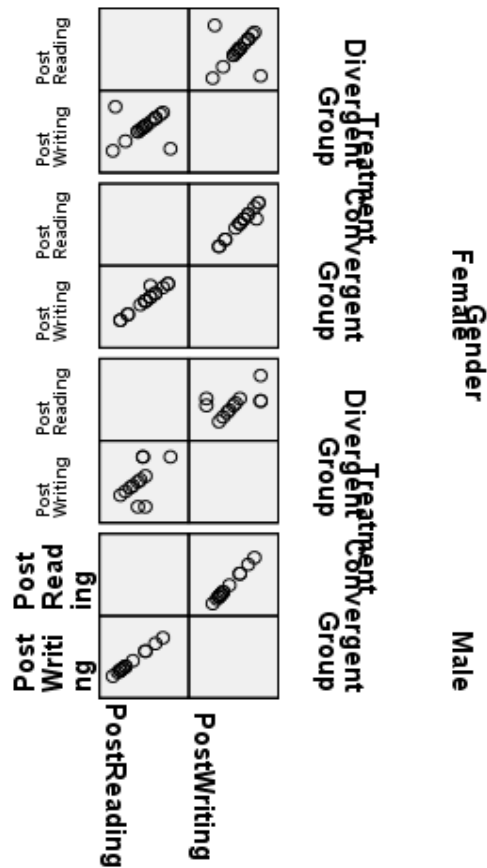


Figure 3. Scatterplots Matrix for Reading and Writing Posttests across the Groups

Table 14

Multicollinearity Test for Reading and Writing Posttests

		Post Reading	Post Writing
PostReading	Pearson Correlation	1	.695**
	Sig. (2-tailed)		.000
	N	60	60
PostWriting	Pearson Correlation	.695**	1
	Sig. (2-tailed)	.000	
	N	60	60

The correlation between the two dependent variables is .695, less than .90, which means that the two dependent variables are related, but they are not multicollinear. Thus, all the MANOVA assumptions are met.

4.3. Investigating the Null Hypotheses

Having established the prerequisite assumptions, the two-way MANOVA was run to test the null hypotheses and investigate the interaction effects between the independent and dependent variables. The results are shown in Table 15 and Table 16.

Table 15.

Multivariate Tests for Gender, Treatment and the Interaction Effects

	Effect	Value	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>Sig.</i>	Partial Eta Squared
Intercept	Pillai's Trace	.956	5.914E2a	2.000	55.000	.000	.956
	Wilks' Lambda	.044	5.914E2a	2.000	55.000	.000	.956
	Hotelling's Trace	21.505	5.914E2a	2.000	55.000	.000	.956
	Roy's Largest Root	21.505	5.914E2a	2.000	55.000	.000	.956
Gender	Pillai's Trace	.126	3.950a	2.000	55.000	.025	.126
	Wilks' Lambda	.874	3.950a	2.000	55.000	.025	.126
	Hotelling's Trace	.144	3.950a	2.000	55.000	.025	.126
	Roy's Largest Root	.144	3.950a	2.000	55.000	.025	.126
Treatment	Pillai's Trace	.016	.442a	2.000	55.000	.645	.016
	Wilks' Lambda	.984	.442a	2.000	55.000	.645	.016
	Hotelling's Trace	.016	.442a	2.000	55.000	.645	.016
	Roy's Largest Root	.016	.442a	2.000	55.000	.645	.016
Gender * Treatment	Pillai's Trace	.030	.843a	2.000	55.000	.436	.030
	Wilks' Lambda	.970	.843a	2.000	55.000	.436	.030
	Hotelling's Trace	.031	.843a	2.000	55.000	.436	.030
	Roy's Largest Root	.031	.843a	2.000	55.000	.436	.030

a. Exact statistic

b. Design: Intercept + Gender + Treatment + Gender * Treatment

According to Table 15, there was a statistically significant difference regarding the male and female learners' performances on reading and writing posttests' mean scores, $F_{(2, 55)} = 3.95$, $p < .0005$; *Wilk's A* = 0.874, *partial η*² = .126. However there was not any significant differences between the two types of interventions $F_{(2, 55)} = .442$, $p > .0005$;

Wilk's $\Lambda = .984$, $partial \eta^2 = .016$. Further, there was not any interaction effects between gender and the treatments, $F_{(2, 55)} = .843$, $p > .0005$; Wilk's $\Lambda = .984$, $partial \eta^2 = .030$. Moreover, the results for the tests of between-subjects effects are presented in Table 16.

Table 16

Tests of Between-Subjects Effects

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Partial Sig.	Partial Squared	Eta Squared
Corrected Model	PostReading	336.332a	3	112.111	3.201	.030	.146	
	PostWriting	374.932b	3	124.977	2.612	.060	.123	
Intercept	PostReading	39326.260	1	39326.260	1.123E3	.000	.953	
	PostWriting	39168.224	1	39168.224	818.547	.000	.936	
Gender	PostReading	242.155	1	242.155	6.915	.011	.110	
	PostWriting	302.624	1	302.624	6.324	.015	.101	
Treatment	PostReading	31.245	1	31.245	.892	.349	.016	
	PostWriting	14.100	1	14.100	.295	.589	.005	
Gender * Treatment	PostReading	57.518	1	57.518	1.642	.205	.028	
	PostWriting	51.627	1	51.627	1.079	.303	.019	
Error	PostReading	1961.068	56	35.019				
	PostWriting	2679.652	56	47.851				
Total	PostReading	43170.000	60					
	PostWriting	43875.000	60					
Corrected Total	PostReading	2297.400	59					
	PostWriting	3054.583	59					

a. R Squared = .146 (Adjusted R Squared = .101)

b. R Squared = .123 (Adjusted R Squared = .076)

There was statistically significant difference between the male and female learners' performance on reading comprehension posttests, $F_{(1, 56)} = 6.915$, $p < .0005$; $partial \eta^2 = .016$ as well as their performances on the writing ability posttests $F_{(1, 56)} = 6.324$, $p < .0005$; $partial \eta^2 = .005$. In contrast, there was not any significant difference between the effect of the two different treatments on learners' reading comprehension ability $F_{(1, 56)} = .892$, $p > .0005$; $partial \eta^2 = .016$ and learners' writing skill $F_{(1, 56)} = .295$, $p > .0005$; $partial \eta^2 = .005$. furthermore, the outcomes of Table 14, did not find any significant interaction effects between the gender and the treatments on learners' reading

comprehension posttests, $F_{(1, 56)} = 1.642, p > .0005; partial \eta^2 = .028$. Additionally, there was not any significant interaction effects between the gender and treatments on learners' writing skill posttests scores $F_{(1, 56)} = 1.079, p > .0005; partial \eta^2 = .019$.

Table 17

Multiple Comparisons for writing and Reading Posttests across the Groups

Dependent Variable	(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
WritingPosttets	MaleConvergent	MaleDivergent	-3.6667	2.39474	.509	-10.5693	3.2360
		FemaleConvergent	-7.5625*	2.22773	.014	-13.9837	-1.1413
		FemaleDivergent	-5.8333	2.16921	.076	-12.0859	.4192
	MaleDivergent	MaleConvergent	3.6667	2.39474	.509	-3.2360	10.5693
		FemaleConvergent	-3.8958	2.32463	.429	-10.5964	2.8047
		FemaleDivergent	-2.1667	2.26861	.822	-8.7057	4.3724
	FemaleConvergent	MaleConvergent	7.5625*	2.22773	.014	1.1413	13.9837
		MaleDivergent	3.8958	2.32463	.429	-2.8047	10.5964
		FemaleDivergent	1.7292	2.09155	.877	-4.2996	7.7579
	FemaleDivergent	MaleConvergent	5.8333	2.16921	.076	-.4192	12.0859
		MaleDivergent	2.1667	2.26861	.822	-4.3724	8.7057
		FemaleConvergent	-1.7292	2.09155	.877	-7.7579	4.2996
ReadingPosttest	MaleConvergent	MaleDivergent	-3.4405	2.32801	.540	-10.1508	3.2698
		FemaleConvergent	-6.0446	2.16565	.061	-12.2869	.1977
		FemaleDivergent	-5.5238	2.10876	.089	-11.6021	.5545
	MaleDivergent	MaleConvergent	3.4405	2.32801	.540	-3.2698	10.1508
		FemaleConvergent	-2.6042	2.25986	.723	-9.1180	3.9097
		FemaleDivergent	-2.0833	2.20539	.827	-8.4402	4.2735
	FemaleConvergent	MaleConvergent	6.0446	2.16565	.061	-.1977	12.2869
		MaleDivergent	2.6042	2.25986	.723	-3.9097	9.1180
		FemaleDivergent	.5208	2.03327	.996	-5.3399	6.3816
	FemaleDivergent	MaleConvergent	5.5238	2.10876	.089	-.5545	11.6021
		MaleDivergent	2.0833	2.20539	.827	-4.2735	8.4402
		FemaleConvergent	-.5208	2.03327	.996	-6.3816	5.3399

Since the sample size for each group was not equal, Scheffe's Post-Hoc test was run to compare the learners' performances across the different groups. Firstly, the male and female learners' performances on writing ability were compared to each other. Male learners in the convergent group received the lowest mean difference of -5.68, and Male learners in the divergent group achieved the mean difference of -0.798. On the other hand, female learners in the convergent group obtained the highest mean difference of 4.39, and female learners in the divergent group received the mean difference of 2.090. Secondly, the male and female learners' performances were compared to their reading comprehension ability. Male learners in the convergent group achieved the lowest mean difference of -5.00, and male learners in the divergent group obtained the mean difference of -0.41. In contrast, female learners in the convergent group received the highest mean difference of 3.056, while female learners in the divergent group obtained a mean difference of 2.36.

5. Discussion

The first research question is concerned with the effectiveness of convergent/divergent tasks on learners' writing skill. Based on the reported results, male students in divergent group ($M = 24.66$, $SD = 5.7$) received significantly higher scores than the male students in the convergent group ($M = 21$, $SD = 5.02$). In contrast, female students in convergent group ($M = 28.56$, $SD = 6.38$) achieved better results than female students in divergent group ($M = 26.83$, $SD = 6.38$).

The second research question addressed the effectiveness of convergent/divergent tasks on learners' reading comprehension ability. Based on the outcomes of this study, male students in the divergent group ($M = 25.58$, $SD = 5.03$) obtained significantly higher scores than the male students in the convergent group ($M = 22.14$, $SD = 6.13$). On the other hand, female students in convergent group ($M = 28.18$, $SD = 6.09$) received slightly higher scores than female students in divergent group ($M = 27.66$, $SD = 5.7$).

The third research question is concerned with the effectiveness of convergent/divergent tasks on male and female learners' writing skill. Based on the reported outcomes, male students in the divergent group ($MD = -0.79$) outperformed the male students in the convergent group ($MD = -5.68$) in terms of writing skill. Furthermore, female students in convergent ($MD = 4.39$) group outperformed the female students in divergent group ($MD = 2.09$). Thus, in terms of writing skill, female students in the

convergent group obtained the highest mean difference of 4.39, outperforming all other three groups of this study.

The fourth research question addressed the effectiveness of convergent/divergent tasks on male and female learners' reading comprehension ability. As mentioned in the result section, male students in the divergent group ($MD = -0.41$) outperformed the male students in the convergent group ($MD = -5.00$) in terms of writing skill. Further, female students in convergent ($MD = 3.05$) group outperformed the female students in divergent group ($MD = 2.36$). Hence, in terms of reading comprehension ability, female students in the convergent group obtained the highest mean difference of 3.05, outperforming all other three groups of this study.

The study's findings demonstrated that male learners benefited from divergent activities, whereas convergent activities were significantly beneficial to female learners regarding writing skill and reading comprehension ability.

Based on the findings of this study, male learners who used divergent thinking strategies achieved better results in their writing and reading section of the PET posttest than the male learners who used convergent thinking strategies. Such divergent-based activities presented the male learners with a more encouraging setting for language usage. During performing these tasks, the male students encountered a substantial number of opportunities to engage; this interaction, in turn, aided their language learning by presenting them with the difficulty of comprehending and making themselves understood. This means that using bottom-up strategies for male students could become more proficient readers and writers. In other words, male learners were more advantageous than female learners when generating different ideas and solutions. Open-ended activities such as discussions, predicting tasks, writing an essay, making inferences, and logical guesses used in this study could develop male learners' motivation and metacognitive awareness when working individually. Such student-centered activities could enhance male students' intellectuality and critical thinking abilities.

Although the female learners in the divergent group enhanced their L2 achievements significantly, female learners in the convergent group obtained the highest mean difference and mean score in terms of reading ability and writing skill. Female learners who used convergent thinking achieved the highest mean scores on reading comprehension and writing posttests, outperforming the other three groups of the study. Since the convergent

activities are mainly designed based on top-down learning strategies, they can provide different inputs that could help the learners achieve the correct answer. Meaning that for developing their writing and reading abilities, they prefer the technique that was structured so that it advised the students exactly as to how they should proceed with the work was one highly likely element that resulted in the convergent group achieving higher writing and reading scores. The classroom activities in this study were structured to correspond to the required information exchange among the learners; hence, the convergent activities require learners to focus on one solution to a problem. Such a strategy can improve learners' performances in different problematic areas of writing and reading tests. The researcher observed that learners who used convergent thinking strategies gained the best results in the reading multiple choice questions and in the matching comprehension questions of the PET posttest.

Moreover, the taught-provoking activities presented in the procedure section in this study also helped the learners read the reading passage presented in the PET posttest and quickly decide which statement is correct and which one is incorrect. The strategy of focusing on the single best answer as the main principle of convergent thinking also helped the participants read the presented text in the PET posttest and choose the correct vocabulary to fill in the gaps. Furthermore, as the convergent groups' post-task phase mentioned, the learners acquired writing skills based on fixed structural and practical writing principles. Such structural principles helped the learners to obtain high scores in the writing section of the PET posttest.

The outcome of this study is in harmony with the findings of Tabrizi et al. (2020) and Nurdiana (2017) who found that learners can develop their 12 abilities through both convergent and divergent activities. In other words, the findings of this study confirmed that both convergent and divergent activities could be beneficial for the learners. Moreover, the outcome of this study confirmed the findings of Marashi and Shizari (2015). They found that learners in the convergent group improved their writing substantially more than those in the divergent group. The findings of this study are also in harmony with the findings of Hou and Hou (2017), who found out females were superior to males in terms of linguistic intelligence, tolerate of ambiguity of reading, and English level. However, the outcome of this study contradicts those of Azimi et al. (2016) who found that divergent activities are significantly more effective than convergent ones.

All in all, based on the findings of this study, task conditions such as gender difference in learning styles were the determining factor in learners' performance, and the female learners in convergent and divergent groups achieved significantly higher mean difference and mean scores compared with those in convergent and divergent groups the male learners. This means that female learners adopted a more positive attitude towards using different task-based learning strategies and styles than male learners. Thus, when the female students employ different task-based learning strategies and styles, they become more motivated and have higher interest levels in learning the target and second language than the male learners. Hence, the outcomes of this study are in harmony with the previous studies that acknowledged the superiority of female learners in foreign language learning compared to their male counterparts. (Bernhard & Bernhard, 2021; Calafato, 2021; Hou & Hou, 2017; Tseng & Gao, 2021)

More importantly, the findings of this study suggested that female learners performed better on questions that required one correct answer, such as multiple-choice questions. Such results are not in line with the findings of Walstad and Robson (1997), who found that female students performed worse on multiple-choice questions. Moreover, based on the outcomes of this study, male learners performed well on open-ended questions. This finding is not in harmony with the study of Lumsden and Scott (1987), who claimed that female learners performed well on open format tests. Thus teachers need to apply reflective teaching in their classroom to discover which task type is suitable for male and female learners to improve their performance on multiple-choice and open-ended format tests.

6. Conclusion

Based on the outcome of this study, there was a significant difference between the males' and females' use of learning styles and strategies. Such a gender gap has always been debatable and challengeable within the EFL context. This means that female learners adopt learning styles and strategies more frequently and effectively than male learners. Such a gender gap in learning style preferences would be disadvantageous for male learners. Several scholars had pointed out that this gender gap could be established due to the fact that female learners are more motivated in L2 learning, have a more positive attitude towards learning second language and are more interested in target culture than the

male learners (Dörnyei & Clément, 2001; Ellis, 2020; Mori & Gobel, 2006). Ellis (2020) further claimed that besides females' positive attitude towards learning a second language, they are also benefit from more and better input, since they are superior in terms of listening comprehension.

Since there was a significant gender gap, the EFL teachers, material developers, and syllabus designers should focus more on female and male learners' learning style preferences. They should consider that the distinction between males and females in terms of learning a second language is of great importance and should not be neglected. According to this study, female learners who adopt convergent thinking strategies focusing on one single solution outperformed male learners who focused on generating different ideas and solutions. Thus, syllabus designers and curriculum developers should address the importance of gender distinction as an influential factor in establishing the quantity, quality, and nature of classroom interaction. Thus, considering the gender gap in learning style preferences could lead to designing more effective input-based and output-based tasks to encourage the learners to participate in an active learning environment.

Furthermore, the researchers summarized the findings of this study based on the task condition and gender gap in learning style preferences which are depicted in Figure 4.

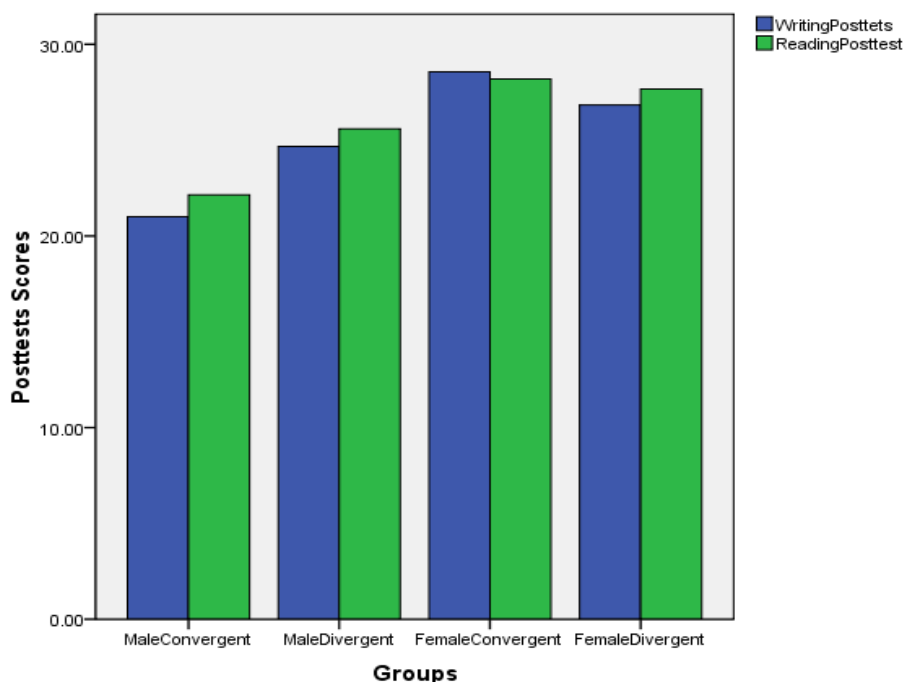


Figure 4. *The Relationship between Gender Differences in Learning Style Preferences and Posttests Scores across the Groups*

As illustrated in Figure 4, female learners in the convergent and divergent groups improved significantly in reading ability and writing skill. This means that female learners adopt a more positive attitude towards using different learning strategies and styles than their male counterparts. Moreover, female learners in the convergent group received the highest mean difference and the highest mean scores. This means that the female learners who used convergent thinking, input-based activities, and engaged in process-oriented learning adopted a more positive attitude towards learning the second language. They were also more motivated than female learners in the divergent group and male learners in both groups. Although male learners in the divergent group who were involved in product-oriented learning and output-based activities were improved slightly and outperformed the male learners in the convergent group, they didn't perform well on posttests compared with the female learners. In other words, the male learners in both groups were not motivated enough to learn the target language. Thus, the teachers should consider the task conditions such as gender differences in learning style preferences to design an effective task. In the present study, task condition was the determining factor in learners' performance. Moreover, teachers should investigate the effect of different types of tasks on male and female learners through their reflective teaching to determine which types of tasks can make female or male learners more motivated to adopt a positive attitude towards learning the target language.

This study is not flawless, and like any other study, suffers from several limitations. Firstly, the sole downside of a pretest-posttest control group design over a posttest-only design is that internal validity can be jeopardized due to the testing danger. This danger can arise when the pretest and treatment interact. If the intervention aims to improve academic performance, this hazard may not be as substantial. However, the researcher must assess whether the study's conclusions would be just as valid if no pretest had been given. If this is the case, the researcher can be confident in the design's internal validity while also having the benefit of tracking the subjects' growth or change over time.

Secondly, the researcher observed that female students adopted a more positive attitude towards the target culture and language learning. For instance, female learners showed a positive attitude when the teacher corrected their oral errors. In contrast, some male students adopted felt insecure when the teacher corrected their errors; thus, after being corrected, they preferred to participate less in classroom discussions. Female learners

preferred more group works. They received better results when they engaged in collaborative learning tasks. As a result, females participate and speak more in group work. However, most of the male students tend to work individually. They preferred reading and writing instead of speaking to solve the different tasks. Thus, less interaction occurred in the male groups. Hence, a further study is needed to be carried out about gender differences in learning style preferences to generalize the outcomes of this study.

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