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Original Research

An investigation into Iranian English learners' use of cognitive strategies and writing performance across different language backgrounds and proficiency levels

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Abstract

Background: The significance of strategy use in writing is well established. However, particular strategy types which different learners can use in different contexts provides invaluable insights for the stakeholders. The current study examined the frequency of cognitive strategy use in writing as well as the quality of writing produced by language learners at different levels of proficiency (high or low) and from different language backgrounds (Turkish-Persian or Persian).

Methods: For this study, 176 Iranian learners of English were divided into bilingual (n=91) and monolingual (n=85) categories and participants were placed at high (n=95) or low (n=81) proficiency levels based on their scores on the Test of English as a Foreign Language (TOEFL) administered for placement purposes. The research data was collected through writing cognitive strategy questionnaire and argumentative writing samples.

Results: The results of ANOVA and Mann-Whitney tests revealed that (1) language background and proficiency level could jointly affect the frequency of cognitive strategy use, (2) could each influence the quality of the written products on its own, and (3) the strongest relationship between cognitive strategy use and writing quality existed among the bilingual participants with high language proficiency.

Conclusion: Knowing a second language may increase learners' use of writing cognitive strategies, thereby enhancing the quality of their writing. These findings could prove useful for English as a Foreign Language (EFL) teachers and content developers.

Introduction

The significance of writing in second language learning is underscored by both learners and teachers[1] wherein successful learning of writing gives an advantage to language learners,[2] and difficulty in gaining command over writing often disadvantages less proficient students in their language learning endeavors.[3]Writing is generally considered to be of great importance to academic success: it is the most commonly used assessment measure for student evaluation, and students' weak writing ability can thus seriously jeopardize their academic success.[3] Therefore, most students studying a second language, regardless of their proficiency level, see writing as a difficult task that must be mastered in order to pass their exams.[4]

Factors most frequently cited in the literature as influencing writing skill include the following: first language (L1) writing competence,[5,6] metacognitive knowledge about the writing task along with the writer's proficiency level and personal characteristics,[7] and writing strategies and the type of strategies employed.[8,9] Writing strategies are particularly relevant, as there are many researchers who equate learning second language (L2) writing with the acquisition of successful writing strategies.[10-12]

The term "strategy" generally refers to a process that learners intentionally choose to use, which is likely to lead to learning enhancement.[13-16] Oxford[16,17] argued that strategies have the potential to be a powerful learning instrument which can lead to enhanced proficiency and self-confidence, and strategies facilitate the process of internalization, storage, retrieval, and use of the new language. When language learning strategies (LLS) are considered in the writing skill, learning L2 writing can be viewed both as the acquisition of macro strategies, such as planning, and micro strategies, such as automatic searches

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for words.[18]

Oxford[16] and O'Malley and Chamot[15] developed a comprehensive model broadly dividing such strategies into direct (providing for direct involvement of learners with the target language, e.g. memory and cognitive strategies) and indirect (supporting and managing language learning without directly involving the target language, e.g., metacognitive and affective strategies). Modifying this earlier model, O'Malley and Chamot[15] introduced three major categories: cognitive, metacognitive, and socio-affective strategies.

Cognitive strategies are personal strategies that enable students to process and transform information. O'Malley and Chamot[15] emphasized the role of these strategies in the input of information, working on new information in different ways through practicing, organizing, inferencing, synthesizing, deducing, etc., to ensure comprehension. Following criticism for dissociating memory from cognition in her original classification, Oxford[19] subsequently included memory strategies within the cognitive ones to "aid the learner in putting together, consolidating, elaborating, and transforming knowledge of the language and culture." Acknowledging the contributions from these earlier models, Di Carlo [20] classified cognitive strategies as "those actions that learners adopt in a conscious (or potentially conscious), relatively controlled and intentional manner, to optimize assimilation, internalization, construction, consolidation and transference of knowledge and language skills."

Recognizing the centrality of working memory in executing learning strategies, some scholars[21] adhere to the definition of writing strategies as "problem solving devices," in agreement with Flower and Hayes'[22] view of writing strategies as writers' tools in handling linguistic or rhetorical problems. Along these lines, Macaro[23] noted that certain functions of working memory (e.g., perceiving, holding, processing, and encoding) can be enhanced by collective use of strategies, which can then improve the quality of writing. Regarding the influential role that strategy use can play in L2 writing success, several scholars[24-26] have also pointed to the effect of strategy instruction and learners' strategic awareness and use with their written products. The general conclusion that the current literature has reaches is that the more frequently and efficiently writing strategies are used, the better written performance they will yield.

Given the significant role that the use of LLSs can play in the writing skill, a particular strand of research in the L2 writing literature has focused on the interaction between learners' proficiency level and strategy use. The majority of the research in this area suggests that learners at a higher proficiency (HP) level often use more strategies in a broader range compared with their lower proficiency (LP) counterparts.[9,5,6] There have been reports of lower proficiency students using more strategies than higher proficiency students,[27] but upon closer examination it was observed that HP students used strategies more efficiently than LP students, whose frequent use of the strategies seemed to have little effect. Regarding the type of strategies employed by students at both LP and HP levels, Charoento[8] found that HP students repeatedly used cognitive strategies, while in a study by Wu,[6] HP participants availed themselves to metacognitive and social strategies.

In addition, the number of languages an individual has mastered can also constitute a source of difference in the underlying processes of L1, L2, and third language (L3) writing. Bilingual individuals have generally been considered to be in a advantaged position to learn a new language than monolingual individuals, which is assumed to result from their previous experience of L2 acquisition along with a wider range of LLSs they can employ.[28] Bialystok[29] attributed this apparent advantage of bilingual individuals, compared with monolingual individuals, to the activation of two language systems in their brains when interacting with a new language system.

The advantage that bilingual individuals are assumed to possess in learning a novel language has been studied in several areas of language learning, including reading comprehension,[30-32] lexicon,[33,34] phonology,[35] grammar,[36] LLSs, social and compensation strategies.[37,38] However, comparatively little attention has been paid to possible differences in the acquisition of different aspects of writing by bilingual individuals and monolingual individuals. There is sparse research investigating bilingual and monolingual differences in learning to write in a new language; only two research studies[39,40] bore any resemblance to the current study. Ransdell and Levy[40] investigated the writing quality and fluency of monolingual and bilingual students across two experiments. The key quality contributing to bilingual preeminence in this study was their ability to identify irrelevant information, which can be of significant assistance to working memory over time. Modirkhamene[39] also compared the differences between monolingual and bilingual individuals in writing from a cross-linguistic transfer point of view. However, the current researchers have approached the issue from a different perspective, examining the cognitive benefits that bilingualism may yield to the process of L3 writing.

This study is an attempt to sustain a simultaneous focus on two interrelated research fields - SLA and bilingualism - which have seldom utilized the insights from each other.[28,41] In other words, we set out to explore how learning L3 writing might be influenced by the particularities of bilingualism. Moreover, in view of the inherent diversity of L3 research, the findings of existing studies may not be easily generalizable to the Iranian context due to a host of variables, including gender, proficiency level and especially the language background of the research participants in any particular research setting. This indicates the need for focused research on particular aspects of L3 learning, and the present study is

intended to be a step in that direction. This study aimed at investigating possible differences between monolingual and bilingual individuals at different proficiency levels with regard to employing writing cognitive strategies and writing performance, as these two areas have rarely been addressed in L3 research in Iran. Focusing on the aforementioned research purposes, the following research questions are addressed in this study:

1. Are there any differences between monolingual Persian and bilingual Turkish-Persian EFL learners in the use of writing cognitive strategies across two proficiency levels?
2. Are there any differences between monolingual Persian and bilingual Turkish-Persian EFL learners' writing performance across two proficiency levels?
3. What is the relationship between the participants' cognitive writing strategy use and their writing performance across two proficiency levels and language backgrounds?

Materials and Methods

Participants

A total of 230 English learners from the Iranian Language Institute (age range 18 to 25) voluntarily participated in the current study. The majority of participants (91%) were undergraduate students majoring in medical science, engineering, and humanities. Bilingual participants (n = 118), whose first and second languages were Turkish and Persian, respectively, were selected from branches in East Azerbaijan, Iran. Monolingual participants (n = 112) were students from branches in Esfahan, Iran, and learned Persian as their first and only language.

In order to ensure that the study included participants at both higher and lower levels of proficiency, students who placed at the elementary and advanced levels according to the institute's criteria were selected to represent LP and HP, respectively. A sample Test of English as a Foreign Language (TOEFL) was also administered to aid with placement. Participants who were placed at the intermediate level based on their proficiency test scores (n = 35) were excluded from the study. Incomplete data were obtained from 19 participants which was not included in the analysis. Therefore, as shown in Table 1, a total of 176 students (69 males and 107 females) were included in the final analysis. Results were considered statistically significant at $P < 0.05$.

Table 1. The participants

Language background	Proficiency level	n
Bilingual	LP	42
	HP	49
	Total	91
Monolingual	LP	39
	HP	46
	Total	85
Total	LP	81
	HP	95
	Total	176

Instruments

The first instrument used in the data collection was a TOEFL sample test for the purpose of determining participants' proficiency level. The test consisted of 60 multiple-choice items: 30 reading comprehension items and 30 structure and written expression items. The listening section was excluded because it was impractical to administer and was outside the scope of the present study. The internal consistency of the test was found to be acceptable (Cronbach $\alpha = 0.77$). The difference in scores between LP and HP participants was statistically significant [$F(8, 32) = 0.005$, $P = 0.03$], indicating that these two levels were discrete.

The second instrument was a demographic and background information questionnaire developed by the researchers to collect participants' language background, gender, and their self-assessed proficiency level, which ranged from excellent to poor.

A writing cognitive strategy questionnaire was also administered, which consisted of 30 Likert-type items adapted from Petrić & Czárl,[42] Peñuelas,[43] and Teng & Zhang.[44] After the questionnaire was modified and drafted, it was piloted with a small group of randomly selected participants (n = 35), followed by revising, rewriting, and omitting of some items. The questionnaire was submitted to two experts in the field of Teaching English as a Foreign Language (TEFL) to check the items' clarity and relevance. The reliability of the 30 remaining items was examined using Cronbach's alpha, which was found to be at an acceptable level (0.87). To ensure participants, especially LP participants, understood the questionnaire, it was also translated to Persian.

The writing prompt was the last instrument utilized in the current study to assess written production from the participants. They were asked to write a 200-250 word argumentative essay on "the pros and cons of social networking applications in their educational system." Participants were told that their scores in the writing task would be part of their final scores in the writing course to motivate them to perform at the highest levels.

Procedure

Before the first data collection session, all participants were informed of the purpose of the study as well as the processes involved, and they were also assured of confidentiality of the data during and after data collection. First, participants were given the background information questionnaire. Then they were assigned to LP and HP levels using the TOEFL Sample Test. After that, random stratification of the participants was conducted and each group was assigned roughly the same numbers of LP and

HP across the two groups (monolingual and bilingual).

In the second data collection session, participants were given a writing prompt along with the instructions in both Persian and English. The time allocated for writing a 200-250 word essay was 30 to 40 minutes. After completing the writing task, participants were asked to complete a cognitive writing strategy questionnaire (about15 to 20 minutes). Students were asked to complete the writing task before the questionnaire to help avoid bias in the writing task through knowledge they could have gained from the writing strategy questionnaire.

Scoring the writing samples

A scoring framework was developed by the researchers which was based on the scoring models designed by Ghanbari et al,[45] Jacobs et al,[46] and Weir.[47] As shown in Table 2, each response was scored on a 100-point scale. Considering grammatical correctness, when there was more than one syntactic error, half a point was deducted and when there were no syntactic errors, one point was awarded. A colleague was called in to correct a sample of 10 randomly selected writing samples after being trained, and the inter-rater reliability coefficient ($\alpha = 0.77$) was considered acceptable.

Results

The first objective of the study was to determine if there were differences between monolingual Persian and bilingual Turkish-Persian EFL learners in terms of the use of writing cognitive strategies across two proficiency levels (higher and lower). In order to provide a tangible illustration of participants' performance, descriptive statistics, including the mean and standard deviation, are shown in Table 3.

In examining the relation between two independent variables (language background and proficiency level) and one dependent variable (cognitive strategy use), a two-way ANOVA was used for the analysis, the results of which are shown in Table 4.

As shown in Table 4, no significant difference [$F(1, 172) = 0.47$, $P = 0.493$, $\eta_p^2 = 0.003$] was found between bilingual ($M = 3.29$, $SD = 0.49$, $n = 91$) and monolingual ($M = 3.24$, $SD = 0.48$, $n = 85$) individuals in their use of cognitive strategies. Similarly, there was no meaningful difference [$F(1, 172) = 0.65$, $P = 0.422$, $\eta_p^2 = 0.004$] between LP ($M = 3.23$, $SD = 0.50$, $n = 81$) and HP participants ($M = 3.29$, $SD = 0.47$, $n = 95$) in their use of cognitive strategies. However, with regard to interaction between language background and proficiency level, a significant effect on cognitive strategy use was seen [F

Table 2. Writing scoring framework

Main category	Subcategories
Content (0-24)	a) Thesis statement (6) b) Related ideas (6) c) Development (6) d) Discussing all aspects of the topic (6)
Organization (0-20)	a) Effectiveness of introduction (5) b) Effectiveness of conclusion (5) c) Separate paragraphs (5) d) Appropriate length (5)
Discourse (0-20)	a) Topic sentence (4) b) Paragraph unity and coherence (8) c) Cohesion: i) Reference (4) ii) Conjunction (4)
Syntax (0-12)	a) Clause structure and parallel structure (1) b) Word order (1) c) Tense and voice (1) d) Subject-verb agreement (1) e) Verb form (1) f) Singular/plural nouns (count non-count) (1) g) Modifying (1) h) Part of speech (1) i) Prepositions (1) j) Articles (1) k) Pronouns (1) l) Possessive form (1)
Vocabulary (0-12)	a) Effective word choice (4) b) Appropriate register (4) c) Collocation (4)
Mechanics (0-12)	a) Spelling (3) b) Punctuation (3) c) Neatness and appearance (3)

Table 3. Descriptive Statistics for Cognitive Strategy Use

Language background	Level	Mean	Standard deviation	n
Bilingual	LP	3.2	0.53	42
	HP	3.4	0.41	49
	Total	3.3	0.49	91
Monolingual	LP	3.3	0.47	39
	HP	3.2	0.49	46
	Total	3.2	0.48	85
Total	LP	3.2	0.50	81
	HP	3.2	0.47	95
	Total	3.2	0.49	176

Table 4. Result of ANOVA for cognitive strategies use

Source	df	Mean square	F	Sig.	Partial Eta²
Language background	1	0.11	0.47	0.493	0.003
Proficiency level	1	0.15	0.65	0.422	0.004
Language background ×Proficiency level	1	2.16	9.45	0.002	0.052
Error	172	0.23			
Total	176				

(1, 172) = 9.45, $P = 0.002$, $\eta_p^2 = 0.05$]. To put it simply, the effect of language background conditions on cognitive strategy use was different for HP and LP participants. The HP bilingual individuals had the best performance compared to their counterparts.

The second purpose of the study was to discern if differences existed among monolingual Persian and bilingual Turkish-Persian EFL learners' writing performance across two proficiency levels. Descriptive statistics for the participants' writing performance are shown in Table 5 to provide context for the discussion of the results of the inferential statistical tests.

A two-way factorial ANOVA was deemed to be the most appropriate statistical test, as with the second research question; however, having examined the underlying assumptions of conducting ANOVA, the normality assumptions were found to have been violated. Therefore, non-parametric Mann-Whitney U tests were employed to test the data.

The results of the first Mann-Whitney test revealed a significant difference between monolingual ($Mdn = 61.25$) and bilingual participants ($Mdn = 67.25$), [$U = 2746$, $Z = -3.33$, $P = 0.001$, $r = 0.25$]. The second Mann-Whitney test, which examined the differences between the HP and LP groups in terms of writing performance, showed that HP participants ($Mdn = 67$) significantly outperformed their counterparts ($Mdn = 62$) in terms of written production level [$U = 3110$, $Z = -2.25$, $P = 0.024$, $r = 0.17$]. Regarding the third research question which addressed the relationship between the cognitive strategy use and writing performance across different proficiency levels and language background conditions, Pearson product moment correlation tests were conducted and the results are shown in Table 6.

As shown in Table 6, the correlations found among the variables of the study were all positive. With respect to level of proficiency, a stronger correlation between strategy use and writing performance was found at the HP level regardless of the language background conditions for both bilingual ($r = 0.41$, $P \leq 0.05$) and monolingual ($r = 0.62$, $P \leq 0.05$). With regard to language background, the strongest relationship was found for bilingual participants but only at the HP level ($r = 0.62$, $P \leq 0.05$). Interestingly, the weakest relationship was also found for bilinguals participants, at the LP level ($r = 0.29$, $P \leq 0.05$).

Table 5. Descriptive statistics for writing performance

Language background	Level	Mean	Standard deviation	n
Bilingual	LP	67.8	10.15	42
	HP	69.7	10.67	49
	Total	68.8	10.40	91
Monolingual	LP	60.8	14.70	39
	HP	65.0	14.14	46
	Total	62.8	14.50	85
Total	LP	64.2	13.10	81
	HP	67.4	12.64	95
	Total	65.8	12.93	176

Table 6. Correlation between use of cognitive strategies and written performance

Proficiency Level	Monolingual			Bilingual		
	n	Pearson's R	Sig.	n	Pearson's R	Sig.
Low	42	0.37	0.007	39	0.29	0.021
High	49	0.41	0.001	46	0.62	0.001

Discussion

As the results show, the frequency of cognitive strategy use by the participants at two different levels of proficiency and with two different linguistic backgrounds was not significantly different when these factors were considered in isolation. However, proficiency level and language background were found to interact significantly to affect the frequency of cognitive strategy use. Taken together, bilingual individuals were found to use more cognitive strategies only when they were at a higher level of English language proficiency, whereas their monolingual counterparts showed a completely opposite performance, with monolingual HP individuals using fewer cognitive strategies than monolingual LP individuals.

Concerning the written production, bilingual individuals seemed to be in a more privileged position. The higher the frequency of cognitive strategies used, the better the quality of texts produced by bilingual HP individuals. Bilingual individuals outperforming their monolingual counterparts, in general, was found to be theoretically consistent with the dynamic model of multilingualism,[48] which assumes that existing linguistic systems in bi/multilinguals are interwoven, which affects development of proficiency in different aspects of language. De Angelis and Jessner[48] noted that in studying the development of writing skill in bi/multi-lingual individuals over time, the dynamic nature of multilingualism, and the resulting interaction between different linguistic systems, must be taken into account.

The results are consistent with those of Afsharrad and Sadeghi Benis,[30] who reported no significant differences between monolingual and bilingual use of reading cognitive strategies. Baker and Boonkit[49] found no major discrepancy in the frequency of using cognitive reading/writing strategies between more successful and less successful learners, which is congruent with our findings. Thus it can be said that language learners' strategy use may be skill-bound, that is they might use the same strategy type (e.g., cognitive) with a different pattern from one skill to another. However, there have also been studies with contradictory findings. A case in point is Maghsudi and

Talebi,[50] who reported bilingual individuals used more cognitive reading strategies than monolingual individuals, with HP learners using significantly more cognitive reading strategies than LP learners. This discrepancy might be attributed to the learners' proficiency level or the particular skill examined in their study. Their participants were at a lower level of proficiency than ours, implying that their bilingual participants might not have yet reached the required proficiency level (threshold) in the target language to benefit from the advantages of bilingualism. Our findings also do not concur with those of Kato,[26] who reported more frequent and more efficient use of writing strategies among HP learners in comparison with their less proficient peers. Interaction effects, as were evident in our study, were congruent with Cumming's[18] threshold hypothesis. Lower mean scores belonged to LP bilingual individuals of while higher means belonged to HP learners, the inference being that for linguality to affect learners' use of cognitive strategies, their proficiency level plays a major role. This implies that to benefit from potential advantages of bilingualism a threshold level of proficiency needs to have been reached.

As for writing quality, there were interesting findings in our study. Bi-literacy is known to help with the acquisition process of written skills of a third language.[51-53] However, the bilingual individuals in our study had not been educated at school to read or write in their first language and thus were, in a way, illiterate in their first language, yet they were still better at writing than monolingual individuals. This suggests that something about bilingualism itself facilitates the acquisition of a new language, even if it is not accompanied by biliteracy.

Another possibility to account for the apparent better performance of bilingual over monolingual individuals in writing could involve the way each group learnt their first written language. Since writing is usually learned in formal settings and bilingual individuals in this study began learning this language formally, they were more likely to have developed an awareness around writing rules than monolingual individuals, who acquired Persian in naturalistic settings and may have applied their knowledge of spoken Persian while writing Persian. As Hernández[54] notes, when writing in a novel language writers often transfer their way of dealing with writing tasks to the new language, and bilingual individuals might be particularly privileged due to learning a language consciously in a formal setting.

Superior performance of bilingual individuals in written skills has been reported by several authors in an Iranian context. For example, Modirkhamene[31] found a significant difference between bilingual and monolingual individuals in writing. She attributed it to the bilingual individuals' prior experiences in learning two language systems, which, she asserted, facilitated the process of L3 learning.

Comparison of LP and HP levels also reveals that the higher writing scores of HP learners might not be explicable by their frequency of writing strategy use, since HP and LP participants did not seem different in terms of frequency of using any category of strategies. This is in contrast with the findings of Maghsudi and Talebi,[50] who found a significant difference between higher level and lower level learners in reading comprehension and use of cognitive and metacognitive strategies. They attributed better reading ability of their participants to their better use of strategies. In the present study, however, the two groups were different in the type of strategies they employed. Hence, the better performance of HP participants may be related to what writing strategies they employed in the process of writing.

Regarding correlations between the frequency of cognitive strategy use and writing performance, our results were somewhat similar to those of Saadat and Dastgerdi.[55] Using a questionnaire similar to ours, they found a significant correlation between writing strategy use and writing score. This correlation also existed in our data; however, there were other variables which influenced the strength of the correlation, with the strongest correlation belonging to HP bilingual individuals.

Conclusion

The results of this study add to the body of work supporting the benefits of bilingualism. Bilingualism was found to be a factor in developing learners' cognitive strategy use as well as enhancing their writing performance in L3. As a result, it could prove useful if the potential of bilingualism is recognized and tapped into by teachers and materials developers. Given the multilingual nature of our country, these findings could prove particularly fruitful in regions where Turkish is spoken as the first language (e.g., Azerbaijan provinces) where Persian and English are generally acquired as the second and third languages, respectively. Thus, if bilingual learners are trained and encouraged to employ writing cognitive strategies, and specific syllabi are designed to allow and facilitate learners' use of the strategies in question, with teachers recognizing the usefulness of the bilingualism of certain learners and the potential they bring to language classes, academic success in writing in this category of learners can be applied to other groups and settings. Additionally, as the strongest correlation between frequency of cognitive strategy use and written production was observed in HP bilingual students, it might be a good idea to give special attention to raising lower level students' awareness to cognitive strategy use in an attempt to improve the quality of their writing.

The present research encountered some limitations, which could be addressed in future research. First and foremost, in focusing on writing skill, participants' written production was examined along with the effects of the cognitive strategies used, essentially at macro discourse level. Future studies might focus on the influence of cognitive strategy use at the sentence or phrase levels,

a bigger picture could be revealed about the interaction between cognitive strategies and the written products of ESL learners. Second, this research was primarily concerned with strategy use during the writing process, so if prewriting and post writing stages are also included in future research designs, a more thorough understanding of the interconnection between strategy use and writing might be illuminated.

Another limitation had to do with the fact that the participants in our study comprised Persian monolingual and Persian/Turkish bilingual individuals; however, bilingual individuals of different linguistic backgrounds might benefit from bilingualism differently in the process of learning a particular novel language. If this line of research is taken up in future, it might be found that different linguistic backgrounds can affect learning a new language differently in terms of the cognitive strategies used by the learners.

Ethical approval

All participants were assured that the information collected through the questionnaires and writing prompts would be kept confidential and used for research purposes only.

Competing interests

The authors declare that there is no conflict of interest.

Authors' contributions

All authors met the criteria of authorship based on the recommendations of the international committee of medical journal editors.

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