Iranian Journal of Applied Linguistics (*IJAL*)

Vol.19, No.1, March 2016, 99-140

An Investigation into the Individual Differences Correlates of Iranian Undergraduate EFL Learners' Writing Competence: A Mixed Methods Approach

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Abstract

The present study adopted a mixed-methods research design and explored the role of a set of cognitive (i.e., aptitude and working memory) and motivational (i.e., self-regulatory capacity and self-efficacy beliefs) individual difference variables in the writing quality and composing behavior of 78 Iranian undergraduate EFL learners. The necessary data were collected through a series of instruments and both quantitative (e.g., multiple regression and *t*-tests) and qualitative (e.g., narrative construction and qualitative comparative analysis) techniques were used to analyze the data. The results of these analyses indicated that the construct of foreign language aptitude had the highest level of correlation and contributory potential to account for the writing competence of the learners. The composing process of learners with different individual characteristics was also compared and it was found that learners with high self-regulation capacity orchestrated and managed their composing behavior in more effective ways compared to their less self-regulated counterparts. Moreover, the narratives and qualitative comparative analysis provided some insights about how various individual characteristics might affect the composing behavior of the individual learners. Finally, it was suggested that consideration of individual differences in writing can reveal more subtle information about the causes of strengths and weaknesses of different learners and may enable the teachers to design and implement more effective instructions targeting their learners' individual needs.

Key words: Individual differences; Writing competence; Composing process; Mixed-methods research.

Article Information:

Received: 10 January 2016 **Revised:** 1 February 2016 **Accepted:** 12 February 2016

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[DOI: 10.18869/acadpub.ijal.19.1.99]

1. Introduction

One of the fundamental questions in second language acquisition (SLA) research is what accounts for different levels of success and achievement of language competence among different learners. While a variety of factors such as "the amount and quality of naturalistic exposure, the duration and intensity of instruction, teachers' dedication, skills and abilities, the choice of teaching methodology, textbooks and supplementary materials, or the size, composition and dynamics of a particular group" (Pawlak, 2012, pp. xix-xx) can affect the learners' success or failure in learning another language, the most convincing explanation provided for this issue is the existence of various cognitive and affective individual differences such as different levels of aptitude, working memory capacity and motivations among the learners. Individual differences (IDs) "refer to dimensions of enduring personal characteristics that are assumed to apply to everybody and on which people differ by degrees … in other words, they concern stable and systematic deviations from a normal blueprint" (Dörnyei, 2005, p. 4).

Individual differences have been extensively researched in L2 studies and are considered as the most consistent predictors of L2 learning success (Dörnyei & Skehan, 2003). Researchers in disciplines such as cognitive psychology and applied linguistics have investigated the attributes on which people vary and how these variations relate to language learning potentials of the learners. These attributes are considered as "background learner variables that modify and personalize the overall trajectory of the language acquisition processes" (Dörnyei, 2009, p. 231). It is widely acknowledged that individual differences variables must be taken into account in both the theoretical accounts of SLA and in practical pedagogical decision-making (Dörnyei, 2005). Pedagogically, by being aware of the learners' individual characteristics and the important role they play in the learning process, teachers can more effectively design their instructional practices and may plan the most suitable learning tasks and remedial strategies that best address their learners' needs (Ferris, Liu, Sinha, & Senna, 2013; Rahimi, 2015).

As for the implications of IDs for research in L2 skills, Kormos (2012) argues that despite the existence of research on the role and importance of individual

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[DOI: 10.18869/acadpub.ijal.19.1.99]

differences in L2 speaking (Dörnyei & Kormos, 2000; Kormos & Trebits, 2012), reading skills (Grabe, 2009) and L1 writing research (see e.g., Leki, Cumming, & Silva, 2010), "little is known about how learner differences affect L2 writing processes and the quality of the written text produced, the way L2 learning skills are acquired, and the extent to which students can learn about the target language through writing" (p. 390). Furthermore, despite the conceptualization of second language writing as a wide-ranging discipline, incorporating multiple conceptual and methodological traditions (Nishino & Atkinson, 2015; Silva, 2013) and, as a result, the proliferation of research on L2 writing in domains such as writing instruction; written textual features; writer's voice, identity, and strategies; writing assessment and role of feedback (Teng & Zhang, 2016; Zhang, Yanb, & Liu, 2015), there are renewed calls for conducting research that studies individual students and contexts (Casanave, 2012; Lee, 2013), validating previous models and identifying other variables that explain L2 writing (Gustilo & Magno, 2015; Lu, 2010), and further examining of how cognitive and motivational variables can account for the individual learners' success or failure in acquiring writing expertise (e.g., Bruning & Horn, 2000; Graham, Berninger, & Fan, 2007; Lee, 2013). Accordingly, the present study attempts to investigate the individual differences correlates of a group of Iranian EFL learners' writing competence and to explore how learners with different cognitive and motivational individual differences profiles perform in different phases of writing and how these individual characteristics might affect their composing process.

2. Review of the Related Literature

2.1. Theoretical framework

Over the past decades, writing has been considered and analyzed as language production, a psychological process, a learning tool/activity (i.e., writing-to-learn), and a practice with different functions/genres related to discourse communities in various socio-cultural contexts (Klein & Boscolo, 2016). Hinkel (2013) states that in order to improve writing skill, students need to acquire a proper level of linguistic foundations, that is, master a range of grammatical and lexical skills, and

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become equipped with an adequate level of discourse knowledge. The research on L2 writing has also indicated that "composing is a non-linear, exploratory, and generative process whereby writers discover and reformulate their ideas as they attempt to approximate meaning" (Zamel, 1983, p. 165). The complexity of writing can best be captured and explained by the fact that writers must simultaneously perform a set of distinctive cognitive activities to accomplish the writing tasks: "they must simultaneously plan, translate, and review their text; they should consider a content problem of what to write, and a rhetorical problem of how to express their ideas in a way that suits both the topic and the audience" (De Smet, Brand-Gruwel, Leijten, & Kirschner, 2014, p. 352).

It is also maintained that the main writing processes (i.e., planning, composing and revising) are often highly recursive and the writing processes of a particular writer performing on a particular task are unique (Torrance, Thomas, & Robinson, 2000). In fact, when individual learners are asked to write, there might be some developmental and individual differences in their performance which are analyzed in terms of identifying the underlying factors or mechanisms that account for such differences (Guan, Ye, Wagner, & Meng, 2013). In the same regard, different individuals who benefit from various levels of cognitive abilities are expected to perform differently on the writing tasks and "execute and orchestrate these processes with varying degrees of efficiency" (Kormos, 2012, p. 390). Besides being a highly complex cognitive activity, writing is also a time-consuming activity whose accomplishment requires a high level of determination and attention. Accordingly, learners' working memory span and their motivation level can significantly affect their decision to engage in and do various types of writing activities, the extent of effort and attention they will expend while performing on different phases of writing process and the way they benefit from the learning potentials of the writing tasks (Kormos, 2012). Students themselves also consider L2 writing as a "challenging communicative act, which not only requires their cognitive and metacognitive engagement but also demands their motivational control to sustain their effort in learning to write" (Teng & Zhang, 2016, p. 123).

Kellogg's (1996) cognitive model is selected in the present study to guide the discussion of the role of cognitive and motivational individual differences in

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composing processes. In this model, there are three important interactive and recursive processes: *formulation, execution* and *monitoring*. In the formulation phase, writers plan the content they want to write and translate ideas into words. They retrieve ideas from their long term memory and any further information provided in the task rubric or prompt and manage to organize them in a coherent way. While translating the ideas into linguistic forms, writers must pay attention to lexical, syntactic and discoursal aspects of the texts. The second stage, i.e., execution, refers to the actual process and action of composing a handwritten or typed text. More specifically, they must retrieve appropriate lexical items, structure the sentences and clauses in an accurate way and link the sentences in a coherent manner to express the ideas in an effective manner. Finally, the monitoring stage refers to the refinement of the text and doing the required revisions to ensure the efficacy of the text in expressing the writer's intended ideas (for further elaborations on this model see Kellogg, Whiteford, Turner, Cahill, & Mertens, 2013; Kormos, 2012).

Based on the extracted and presented model in Figure 1, cognitive and motivational individual differences can play a role every stage of the writing process and can influence how the writers orchestrate these processes to plan the ideas, organize them in a coherent manner and translate them into linguistic form to create a unified, refined and high-quality written product.

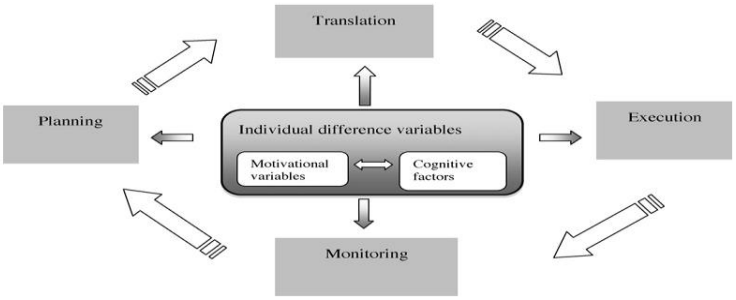

Figure1

Kellogg's (1996) Model of the role of individual differences in writing processes (extracted from Kormos, 2012, p. 392)

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Kormos (2012), after elaborating upon this model, presents and discusses some cognitive (namely, aptitude and working memory) and motivational variables (namely, self-efficacy beliefs and self-regulation capacity) that can play a role in L2 writing process. The present study uses this theoretical model for exploring the individual differences correlates of Iranian EFL learners' writing competence.

2.2. Role of cognitive and motivational individual differences in L2 writing

2.2.1. Aptitude and L2 writing

In educational psychology, aptitude is a highly complex cognitive construct. In fact, it is conceptualized that we do not have a single construct and a unitary factor named as '(foreign) language aptitude', instead we have a composite of measures and a set of "basic [and cognitively-oriented] abilities that are essential to facilitate foreign language learning" (Carroll & Sapon, 1959, p. 14). The central claim within aptitude research is that there is a special talent for learning foreign languages which varies considerably among the learners (Dörnyei & Skehan, 2003) and can determine the capacity and quality for learning (Dörnyei, 2009). The role of foreign language aptitude in SLA has been extensively researched (for reviews see Dörnyei, 2005; Dörnyei & Skehan, 2003; Ehrman & Oxford, 1995; Grigorenko, Sternberg & Ehrman, 2000) and it has been suggested that language aptitude, like other cognitive abilities, can be used in different phases and processes of language learning (hence, the conceptualization of aptitude as a dynamic and complex construct) and learners might benefit from the potentials of these abilities in different ways while performing on various learning tasks and in various learning conditions (Robinson, 2005; Skehan, 2002).

As for the relationship between writing and aptitude in SLA field, most of the studies have examined the link between aptitude components (*phonetic coding ability*, *grammatical sensitivity*, *rote learning ability and inductive language learning ability*) and the linguistic features of the text like accuracy, fluency and structural complexity and very few studies have explored the role of aptitude components in L2 writing processes. In one of these studies, Kormos and Sáfár (2008) found a rather facilitative effect of language aptitude on L2 writing. More specifically, they found a strong link between the component of the language

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aptitude test that measures metalinguistic awareness and teacher ratings of L2 writing tasks that formed part of a proficiency test.

In another study, Kormos and Trebits (2012) examined the relationships between the components of aptitude and fluency, accuracy, syntactic complexity and lexical variety of performance in two types of written narrative tasks and subsequently explored how the performance of learners varied in tasks of various cognitive complexity level. The results of the study indicated that inductive ability and grammatical sensitivity, as the components of aptitude, were more strongly correlated with the accuracy and complexity of the written productions. In fact, students with a higher level of grammatical sensitivity, who were hypothesized to devote more attention to clausal complexity, produced longer clauses in a written descriptive task compared to the performance of learners with lower grammatical sensitivity scores. However, no relationship was found between aptitude and the linguistic measures of performance in the written narrative tasks for which the learners were required to generate their own content and, hence, use their existing resources.

Lack of studies on the role of aptitude in L2 writing processes urged Kormos (2012) to put forward some hypothetical assumptions in this regard. She asserted that language aptitude can affect the linguistic processing and use of linguistic resources in the L2 writing process. Therefore, high aptitude learners might perform better in the translation and monitoring phases of writing. Moreover, higher levels of grammatical sensitivity and deductive ability were believed to assist the learners in the efficient grammatical encoding practice and writing more accurate and complex texts. Phonological sensitivity can help the learners with the correct spelling of graphemes while writing. Finally, it has been hypothesized that learners with good rote learning ability might have a satisfactory level of lexical knowledge which enables them to write texts with higher levels of lexical variety and complexity.

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2.2.2. Working memory and L2 writing

Empirical evidence in cognitive psychology suggests that working memory (WM) is "one of the greatest accomplishments of human mind and a significant source of individual variation in performing cognitive tasks" (Biedron, 2012, p. 78). An all-encompassing conceptualization of WM defines it as "those mechanisms or processes that are involved in the control, regulation, and active maintenance of task-relevant information in the service of complex cognition" (Miyake & Shah, 1999, p. 450). Since working memory coordinates attentional resources and is responsible for the initial appraisal, processing and temporary storage of the received information, it can be considered as an influential factor affecting performance on a variety of cognitive operations and abilities like language learning, comprehension, cognitive control, writing and reasoning (Engle, Kane, & Tuholski, 1999).

The important role of WM in SLA is self-evident (Kormos & Sáfár, 2008; Wen & Skehan, 2011). However, similar to the aptitude construct, few studies have investigated the role of working memory in L2 writing. Kormos and Sáfár (2008) showed that scores in the writing components of a proficiency test were not correlated with the scores of a backward digit span test as a measure of the complex working memory capacity. A rather similar finding was found in Adams and Guillot's (2008) study which somewhat downplayed the importance of working memory in composing the texts. Lu (2010) also found that working memory capacity has a slight impact as explanatory variable for L2 writing performance in the timed essay writing task.

However, Swanson and Berninger (1996) found a significant relationship between working memory and writing skill and attributed this finding to the intelligent and effective use of writing strategies, the trade-off between low- and high-order writing processes and efficient allocation of working memory resources to writing tasks. Based on the assumption that "individual differences in language-related cognitive tasks are due to the total level of activation in a general working memory system" (p. 379), Swanson and Berninger supported the claim that individual differences in writing are related to individual differences in working memory capacity and operations skill specific to the type of processing and tasks

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being performed. Similarly, Hoskyn and Swanson (2003), in a cross-sectional study, found that WM moderated structural complexity in writing when other cognitive functions (namely, handwriting speed, spelling, word knowledge, and reading comprehension) were controlled for. Kellogg, Turner, Whiteford, and Mertens (2016) also confirmed the important role of (verbal) working memory in planning and grammatical encoding of lexical items in syntactic structures.

2.2.3. Self-efficacy beliefs and L2 writing

Learners' interest and their self-efficacy beliefs also determine the degree of their attention, efforts, persistence and time devoted to any learning activities (Bandura, 1986). Accordingly, since "writing is laborious, time-consuming and in many contexts often a voluntary activity, interest and self-efficacy beliefs might determine whether L2 learners engage in writing at all and, when given the choice, what kind of writing tasks they decide to perform" (Kormos, 2012, p. 399).

Writing self-efficacy research starting from mid-1980s has illuminated relationships between writing self-efficacy and a number of other variables related to writing such as writing quality and standards, level of writing apprehension and also differences in self-efficacy of different individuals (see e.g., Bruning, Dempsey, Kauffman, McKim, & Zumbrunn, 2013). This body of research has shown that self-efficacy is a reliable predictor of students' writing performance and mediates between what they believe they can write and what they actually write (e.g., Klassen, 2002; Meier, McCarthy & Schmeck, 1984; Pajares, 2003; Parjares & Johnson, 1996; Sanders-Reio, Alexander, Reio, & Newman, 2014).

Research also has shown that writing self-efficacy is related to students' achievement goal orientations, perceived value of writing, and their use of strategies throughout the composition process and it mediates the effect of gender and pre-performance on writing performance (see e.g., Pajares, 2003; Zumbrunn, 2010). Furthermore, research evidence has indicated that students with high writing self-efficacy write better and are less apprehensive about writing than those with low writing self-efficacy (Bruning, et al., 2013; Pajares, 2003). This finding is due to the fact that students with higher writing efficacy beliefs "enjoy and value

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writing, put more effort into writing tasks, persist longer with writing challenges, and write more inside and outside of the classroom" (Zumbrunn, 2010, pp. 26-27).

2.2.4. Self-regulation and L2 writing

Since composing process is generally self-planned and self-sustained, self-regulation is critical for writing success (Zimmerman & Reisemberg, 1997). Self-regulation of writing refers to self-initiated thoughts, feelings, and actions that writers use to improve their writing (Schunk & Zimmerman, 1994). The writing models of Flower and Hayes (1981) and Bereiter and Scardamalia (1987) emphasize the cognitive and self-regulatory aspects of composing and maintain that "skilled writing is a goal-directed activity and that writing processes such as planning, sentence generation, and revising must be orchestrated so that the writer can switch attention between these functions and a host of mechanical, substantive, and environmental concerns" (Graham & Harris, 2000, p. 3). Consequently, self-regulatory skills are required not only for generating productive ideas and writing strategies but also for managing the writers' affective states like controlling their anxieties and emotions that can accompany writing (Bruning, et al., 2013).

As for explicating the roles and potentials of self-regulation capacity in the writing process, the model of self-regulated learning behavior developed by Zimmerman (2000) can be used. This model consists of forethought, performance and self-reflection phases which can correspond to the planning, execution and monitoring stages of writing in the model of individual differences in writing proposed by Kellogg (1996). Graham and Harris (2000) also identified a number of self-regulation strategies that writers use during the composition process to monitor their performance with regard to environmental, behavioral, and personal processes: goal-setting, planning, record keeping, organizing, self-monitoring, self-evaluating, revising, self-verbalizing, rehearsing, environmental structuring, time planning, self-consequating, seeking social assistance and self-selecting models. Consequently, self-regulation can be involved in all stages of writing process from start to finish and the studies have reported substantial gains in writing achievement and motivation as a result of self-regulatory instruction (i.e., self-regulatory strategy development (SRSD)) in writing courses (Graham & Harris,

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2009; MacArthur & Philippakos, 2013; Magno, 2009; Santangelo, Harris & Graham, 2008; Zimmerman & Bandura, 1994).

As the investigation of literature revealed, few studies have explored the roles and effects of cognitive and motivational individual differences in L2 composing process and the quality of the texts produced by EFL learners. The present study, to the extent possible, intends to explore the links among these variables and see whether they are able to predict the writing competence of a group of undergraduate Iranian EFL learners or not. The composing behavior of learners with different individual differences profiles will be scrutinized and compared as well. More specifically, the present study attempts to answer the following research questions:

1. Is there any significant relationship between the cognitive and motivational individual differences variables (aptitude, working memory, self-efficacy beliefs and self-regulation) and the writing competence of Iranian EFL learners?
2. How well do the independent variables (i.e., self-regulation capacity, self-efficacy beliefs, aptitude and working memory) in the individual differences framework predict the writing competence of the learners and which one is the best predictor?
3. Are there any significant differences in the composing processes employed by learners with different individual characteristics?
4. How might these individual characteristics affect the composing behavior/process of learners with different individual differences profiles?

3. Method

3.1. Participants

A total of 78 B.A level (Junior and Senior) students of English Language and Literature and English Language Teaching in two State universities in Iran participated in the study. It is worth-mentioning that the data were collected from more than 100 students, but since some students did not consistently took part in the data collection sessions and did not answer all the instruments, they were not

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included in the final analyses. The average age of the participants was 21 and they were from both genders (9 males and 69 females) and from a variety of ethnic and educational backgrounds. The language proficiency level of these students, as measured by Oxford Placement Test (OPT), was from intermediate to advance: 26 intermediate, 35 upper-intermediate and 17 advanced proficiency level students. Moreover, due to the objectives of the study in terms of exploring the individual differences correlates of the leaners' writing competence based on their performance in an essay writing prompt, all the selected participants had passed essay writing courses and were quite familiar with the principles and conventions of essay writing in English.

3.2. Design

The present study has adopted a Mixed Methods Research (MMR) design which uses both qualitative and quantitative features in the design, data collection, and analysis to generate a multiple perspective on the phenomenon and corroborate the findings (Teddlie & Tashakkori, 2009). Tashakkori and Creswell (2007, p. 4) defined mixed methods as "research in which the investigator collects and analyzes data, integrates the findings, and draws inferences using both qualitative and quantitative approaches or methods in a single study or program of inquiry". In the present study, a 'sequential explanatory design,' which is known as a straightforward MMR design that is easy to implement and analyze but enriches the findings considerably (Dörnyei, 2007), is selected to expand our understanding of the contribution of different individual characteristics to the composing process and quality of texts produced by different individuals. In this design, the priority is given to the quantitative data collection and analysis which is then followed by the collection and analysis of qualitative data and then the two methods are integrated during the interpretation phase of the study. In other words, the qualitative results are used to assist in explaining and interpreting the findings of a primarily quantitative study (Creswell, 2009).

In line with the sequential explanatory design of the study, Sequential Mixed Methods Sampling strategy is adopted in which the quantitative and qualitative strands are used "to generate complementary databases that include information

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that has both depth and breadth regarding the phenomenon under study" (Teddlie & Yu, 2007, p. 85). In this MM sampling strategy, the methodology and results from the first strand (that is mostly quantitative) inform the methodology employed in the second strand (that is qualitative and generally a subsample derived from the quantitative sample) (Kemper, Stringfield, & Teddlie, 2003). The quantitative strand in the sequential mixed method sampling typically requires a probability sampling procedure, but due to the small number of participants who had passed essay writing courses as a requirement by our sampling frame, the researchers decided to collect data from all the available participants and consequently a convenient sampling technique was adopted for this strand. As for the qualitative strand, a purposive random sample was selected from the larger quantitative sample in order to further explore the issue of concern and "add credibility to the evaluation by generating QUAL, process-oriented results to complement the large-scale QUAN-oriented research that also took place" (Teddlie & Yu, 2007, p. 90).

3.3. Instruments

Measure of writing competence: The participants of the study were required to write a three-paragraph essay (including a general introduction paragraph, one detailed body paragraph and a general conclusion paragraph) on a general argumentative topic selected from IELTS writing module Task 2. The argumentative topic was selected because it is believed that such topics could be expected to demand "more complex processing" (Grabe & Kaplan, 1996, p. 121) than other types of writing (e.g., narratives), and thus we expected to see more differences in how individuals with different cognitive and motivational profiles perform in the composing process. The participants were informed that the written essays will be analytically scored and they must pay balanced attention to different features of their texts: content and organization, support and development, cohesion and coherence, structure, vocabulary and mechanics. In fact, an essay scoring rubric developed by Paulus (1999), which provides a detailed analysis of the designated features of the written texts, was used to analyze and score the students' performance on the writing task.

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The composing process measures: In order to come up with a comprehensive nature of the differences in the composing behavior of learners with different individual differences profiles and to corroborate the findings, two rather related measures were used. At first, the students responded to the items of the internal cognitive process questionnaire developed by Weir, O'Sullivan, Yan and Bax (2007). The original questionnaire had 38 Likert-scale items which were modified in the present study to account for the general cognitive processes applied by the individuals while writing in English. After the modification, 30 statements were chosen that targeted students' actions in different stages of writing like goal setting, topic and genre modifying, generating, organizing, translating and reviewing ideas.

Moreover, to keep the track of the students' actions in the composing process, they were required to keep a process log which asked them some questions to reflect upon and describe their actions in the planning, execution and monitoring stages of writing. Logs are well-established tools used in educational studies for generating useful data about the learners' learning process (Helms-Park, Radia, & Stapleton, 2007) and accessing the cognitive processes used by the students while writing (Stapelton, 2010). The questions used in the process log were in the form of an open-ended survey and the items were extracted and adapted from Wong (2000) and Lei (2008) questions designed for analyzing their students' actions during the writing process and also based on the researchers' own studies on the composing process.

Foreign language learning aptitude test: The test used to assess EFL learners' aptitude in learning a second language was THE COLLEGES OF OXFORD UNIVERSITY CLASSICS LANGUAGE APTITUDE TEST (Specimen of Written Test at Interview Issued 2010). The purpose of the test was to measure the extent to which EFL learners were ready to go through learning a second language. The test contains three parts measuring the students' ability in paired associates, verbal intelligence and grammatical sensitivity. In order to ensure the students' understanding of the test and making the test more valid for use by Iranian EFL learners, a number of practical steps were implemented. At first, most of the instructions, which seemed to be complicated for the learners, were translated into

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Persian, and the test was then given to two TEFL scholars (a university instructor and a Ph.D. student) to compare the translated instructions with the original ones. After receiving the comments of these scholars, some translations were modified and the test was pilot-tested to a group of 20 students to see whether the instructions and layout were clear and if they encounter any problems while responding to the test or not. Most of the students found the instructions clear but commented that the text is very lengthy and they cannot attend to all the questions at the designated time. Consequently, the researchers decided to remove one set of items in the Paired associate section for which the students, based on a sample data, were required to translate from English to an artificial language and vice versa. They were also required not to spend much time on the items which sound complex and challenging for them. After these comparisons and adjustments and doing some changes to the layout of the test, the test was administered to the main participants of the study in various classroom sessions.

Working memory test: A computerized Persian version of reading span test (RST) developed by Shahnazari (2011) was used to measure the participants' working memory capacity. The use of Persian reading span test was due to the fact that prior research on this construct has indicated that working memory is language independent and measuring WM in the L1 helps to avoid conflating WM and L2 proficiency (Miyake & Friedman, 1998). In this test, the students are required to read sets of sentences (a total of 64 items: 10 practice session sentences and 54 test sentences) on a computer screen and report on the semantic acceptability of each sentence (processing assessment), and then recall the final word of each sentence when prompted (storage assessment). The test was in PowerPoint format and was administered to the group of learners in classroom sessions.

Self-efficacy beliefs in writing scale: The self-efficacy scale developed by Yavuz-Erkan (2004) was used to assess the students' self-efficacy beliefs in writing. It contains 28 four-point Likert-scale statements which are preceded by the phrase "I can …" to grade the strength of subjects' beliefs in their writing ability in the five

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factors of writing: content, design, unity, accuracy and punctuation. This questionnaire enjoys form a good reliability index: .89 Cronbach's Alpha.

Self-regulation in writing scale: The self-regulation scale contextualized in writing is developed and validated by Kanlapan and Velasco (2009). This scale is based on Zimmerman's (2000) three-stage model of self-regulation (including forethought, performance and reflection phases) targeting students' processes and strategies on the following eight dimensions: (1) setting specific proximal goals for oneself, (2) adopting powerful strategies for attaining the goals, (3) monitoring one's performance selectively for signs of progress, (4) restructuring one's physical and social context to make it compatible with one's goals, (5) managing one's time use efficiently, (6) self-evaluating one's method, (7) attributing causation to results, and (8) adapting future methods. The computed reliability index for this questionnaire was .92 Cronbach's Alpha which is quite satisfactory for the present study.

3.4. Procedures

3.4.1. Quantitative data analysis

As for the quantitative phase of the study, the participants, in various time intervals, were required to respond to the tests and questionnaires of cognitive and motivational individual differences variables as correlates of their writing competence. They also wrote the argumentative essay and completed the cognitive processes questionnaire in writing. These measured variables yielded numeric data that could be analyzed statistically in order to provide insight into breadth of the individuals' capabilities and experiences in L2 writing. In fact, the students' responses were entered into SPSS 16 statistical package and a set of descriptive statistics, correlations and multiple regression analyses were run to check the relationship among the variables and identify the potential predictors of the learners' writing competence.

Afterwards, the students were categorized into various groups (i.e., High vs. Low) based on their profiles in different individual differences variables and then their responses to the cognitive process questionnaire in writing were compared, by running a number of independent samples *t*-tests, to see if there are any significant

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differences in the composing process of learners with different individual characteristics or not.

3.4.2. Qualitative data analysis

In line with the principles of sequential explanatory MMR design, a qualitative set of data, through an introspection method, i.e., keeping a process log, were also derived from the participants in order to add more depth to the quantitative data and identify how learners with different individual characteristics perform in different phases of writing and how these characteristics might affect the composing behavior and quality of texts produced by different individuals. For this purpose, a number of students, who have fully completed their process logs, were randomly selected from the larger quantitative strand and their written texts and responses to the items of the process logs were examined and compared.

The process log was completed by the individuals immediately after writing the first draft of their essays targeting the processes and actions in the whole process of writing and revising until the submission of the essay. While a variety of techniques and instruments such as think-aloud protocols, interviews, stimulated recall protocols and direct observation are used for studying and uncovering the composing processes of L2 writers during immediate-response-to-prompt studies, the logs are relatively non-intrusive (Dörnyei, 2007; Stapelton, 2010). Consequently, the qualitative data in the present study were extracted from the students' written texts (that is, by doing a text analysis) and their responses to the process log questions.

As for analyzing the qualitative data, two main methods were used to analyze and compare the data across the individuals: Narrative construction approach and qualitative comparative analysis. At first, by using various data sources (the participants' scores in the cognitive and motivational individual differences measures, their responses to the process log questions and the analyses of their written texts), the researchers composed a narrative (averaging around 150 words) for each individual regarding the most salient aspects of their composing process and how the individual characteristics affected their composing behavior and thus

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the quality of texts produced. The use of narratives as an interpretive data analysis tool is well established in social science and educational qualitative research especially for analyzing and comparing the responses of individual cases to various types of interventions (see, e.g., Cresswell, 2007; Ferris, et. al., 2013; Gerring, 2007).

Afterwards, a qualitative comparative analysis (QCA) technique was adopted to compare the narratives constructed for the individuals in order to find general patterns in the data and reach a meaningful interpretation of the patterns displayed by the cases under examination (Schneider & Wagemann, 2007). This technique "allows one to analyze more than just a handful of cases, which is seldom done in case-oriented studies. This is a key asset, as it opens up the possibility to produce generalizations" (Rihoux, 2006, p. 682). This technique combines case orientation and interest in complexity of the qualitative approach with interest in generalization of quantitative research. In fact, the general aim of this analytical technique was to support the researchers in reaching a meaningful interpretation of the patterns displayed by the cases under examination.

4. Results

4.1. Quantitative results

The first research question was intended to examine the relationships between the dependent variable (i.e., writing competence) and the independent variables (i.e., language learning aptitude, working memory capacity, self-regulation and self-efficacy beliefs) of the study. For this purpose, at first the descriptive statistics for each variable were derived (see Table 1).

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Table 1
Mean, standard deviation, and correlations

Variables	**Mean**	**SD**	**(1)**	**(2)**	**(3)**	**(4)**	**(5)**
Aptitude (1)	49.26	12.20	1	-.05	-.14	.14	.24*
WM (2)	42.15	4.16	-.05	1	-.24*	.05	.04
Self-efficacy (3)	36.19	5.42	-.14	-.24*	1	-.20	-.21
Self-regulation (4)	47.04	4.73	.14	.05	-.20	1	-.05
Writing competence (5)	36.03	6.03	.24*	.04	-.21	-.05	1

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

The highest mean score was related to the construct of language learning aptitude (*M=49.26, SD=12.20*). The table also indicates that there has been a positive low correlation between this construct and the writing competence of the learners (*r=.24, p<.05*). It is worth-mentioning that, except for the construct of aptitude, no other variables showed a significant positive correlation with the writing competence of the learners and working memory only had a very low correlation with this construct. Another surprising point is the negative correlation of self-efficacy with all other variables of the study, which can be attributed either to the participants' actual low self-efficacy in writing or the inadequacy of the instrument used, as a self-report data, for estimating this construct.

The second research question aimed to explore the unique contribution and predictive capability of each independent variable to account for the writing competence of the learners. For this purpose, a standardized multiple regression procedure was run (see Table 2). Preliminary analyses were conducted to ensure no violation of the assumptions of normality, linearity, multicollinearity and homoscedasticity. Based on the results of regression analysis, the only variable that

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indicated a significant result and had a better predicting power compared to the rest of the variables was the construct of aptitude (*B=.115, Beta=.233, t=2.062, p>.05*). This finding again confirmed the important role of aptitude in writing.

Table 2
Coefficients of multiple regressions

Model	Unstandardized Coefficients		Standardized Coefficients			Correlations		
	B	**Std. Error**	**Beta**	***t***	***Sig***	**Zero Order**	**Partial**	**Part**
(Constant)	46.112	12.457		3.702	000			
WM	.015	.166	.010	.091	.928	.041	.011	.010
Aptitude	.115	.056	.233	2.062	.043	.243	.235	.228
S-regulation	-.169	.145	.132	-1.64	.248	-.055	-.135	-.129
S-efficacy	-.233	.130	.210	1.787	.078	-.217	.205	-.197

a. Dependent Variable: Writing

In order to see how much of the variance in the dependent variable (writing competence) is explained by the model which includes a set of cognitive and motivational individual differences variables, the R Square (multiplied by 100) in the model summary table is obtained. According to Table 3, only 11% of the variance in total reported writing competence is explained by the independent variables.

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Table 3
Model summary of the standard multiple regression

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.331 [a]	.110	.061	5.84693

a. Predictors: (Constant), self-efficacy, Aptitude, self-regulation, WM

As for the third research question, at first the students with different individual characteristics (that is, the individuals with high and low performance for each variable) were identified and then a set of independent samples *t*-tests were run to see whether there are any significant differences in the cognitive processes employed in writing by various groups of individuals or not (see Table 4). As the results in the following table indicate, there were some mean differences between different groups in their composing processes, but only the learners with different self-regulatory strategy use (high self-regulation: *M=2.79* vs. low-self-regulation: *M=2.72*) were significantly different from each other in the cognitive processes employed for writing (*t (53.72) =-.742, p=.031*).

Table 4
Descriptive statistics and results of independent samples t-tests for different group of individuals' performance in the composing process

Variables	Groups	N	M	SD	*Sig.*	*t*	*df*
WM	High	24	2.83	.33	.642	1.267	76
	Low	54	2.73	.34			
Aptitude	High	42	2.75	.38	.073	-.376	76
	Low	36	2.78	.29			
Self-regulation	High	32	2.79	.39	.031*	-.742	53.72
	Low	46	2.72	.29			
Self-efficacy	High	25	2.70	.33	.878	-1.168	76
	Low	53	2.79	.34			

*p< .05

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4.2.Qualitative results

In order to supplement the quantitative analyses and identify more subtle differences in the composing behavior and quality of texts produced by different individuals, a number of participants, who had fully completed their process logs and essays, were randomly selected from the participants in the quantitative strand and their responses to the process log questions plus their written texts were analyzed to see how they had performed in different phases of writing. It is worth-mentioning that, due to space limitation, only the most salient aspects of five participants' performance are presented (see Table 5).

Table 5

Individual students' cognitive and motivational individual differences profiles

Participant	**Cognitive individual differences**		**Motivational individual differences**		**Writing score**
	Aptitude score	**WM score**	**Self-efficacy mean**	**Self-regulation mean**	
(1)Zeynab	53	42	32.00	40.88	54
(2)Maryam	42	43	39.50	49.62	36
(3)Setareh	22	40	30.00	50.00	28
(4)Marzieh	67	42	36.00	43.38	48
(5)Fatemeh	38	33	38.00	44.12	30

As was previously stated, in order to report the data about the performance of each individual, a narrative was constructed for each student and then the qualitative comparative analysis technique was adopted to come up with general observations about the selected participants.

Participant 1 is an advanced proficiency level student of English Language and Literature. Her response and performance on the individual differences variables indicate that she has a rather high cognitive profile (Aptitude: 53, Working

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memory: 42, Self-efficacy mean: 32, Self-regulation mean: 40.88, Writing competence: 54). The possible contribution of her high aptitude and working memory score is evident in her essay as well. The text she has written is highly unified and rich in content. She has used a variety of sentence structures and lexical expressions accurately and appropriately. The composing process has been managed effectively by this participant. As for her performance in the planning stage of writing, she has maintained that before starting to write she has engaged in a pre-writing activity:

Before I began to write, I thought about the subject, read some example form the web, asked my roommates' opinions and wrote some notes. I had a pre-writing before writing on the paper.

Regarding her actual writing process and the conversion of her thoughts to language, she has asserted that she has started with a draft of her work and as she has moved forward, she has added the ideas collected in the prewriting stage. She has also been able to manage her problems during the writing in a good way and she has not been worried about her time since she has felt free. As for the evaluation of her writing, she has commented that she has read the entire essay to revise it completely and she has mostly edited the phrases and sentences.

Participant 2 is an upper-intermediate proficiency level student of the same major and her individual differences profile is as follows: Aptitude: 42, Working memory: 43, Self-efficacy mean: 39.50, , Self-regulation mean: 49.62, Writing competence: 42. The text written by this student is rather well-organized and it enjoys a good level of support which can possibly be attributed to her high self-regulation capacity in writing. However, the sentence structures are not precise enough and they contain some grammatical mistakes. The analysis of her written text and her responses to the process log questions indicate that she has had an effective planning:

At first, I thought about the topic and took some notes of the important ideas. Then, I prioritize the ideas and raised some questions based on which I engaged in writing my draft.

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This effective planning has enabled her to create a well-organized text, but since she has not done any revisions, her text contains some inaccurate sentences and imprecise vocabularies.

Participants 3 is an intermediate proficiency level student of English Language Teaching and, except for the aptitude construct for which she has received a very low score, she has a moderate performance on the individual difference variables: Aptitude: 22, Working memory: 40, Self-efficacy mean: 30, Self-regulation mean: 50, Writing competence: 28. The analysis of her text indicates that she has written laboriously and with difficulty. She has adopted a conversational/informal style and the text is neither well-organized nor well-supported. There are also some grammatical and mechanical errors in her text. The examination of her process log indicates that, based on her assertion, she has had a planning (i.e., by doing brainstorming) and she has tried to control different aspects of her writing, which is confirmed by her high self-regulation mean score, but as she admits, she has encountered many problems during writing which have made her very anxious during writing:

I faced many problems in writing. Problems such as lack of ideas and inadequate explanation about the topic…. I really fear to forget the ideas that were in my mind. I was afraid to make mistakes in grammar and forget the vocabularies. So I tried to write carefully and step-by-step and choose easy words. These are clear for the reader.

This participant has a rather high self-regulatory mean score (i.e., 50), but it seems that she has not effectively applied these strategies during the writing process and she has not been able to come up with a good solution to resolve her problems.

The next participant is an advanced proficiency level student of English Language Teaching and her individual difference profile puts her among the participants who enjoy from a high level of cognitive and motivational profile whose effect is evident in her written text: Aptitude: 67, Working memory: 42, Self-efficacy mean: 36, Self-regulation mean: 43.38, Writing competence: 48. She has written a text which is supported by a set of convincing evidence and the ideas are well-connected. The structures and vocabularies used are accurate and

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appropriate as well. Her responses to the process log questionnaire indicate that this refined text is the result of recursive process she has engaged in and adopted for writing her essay:

First of all I outlined what I meant to write. Then I did a kind of free writing. Sometimes I wrote the assignment again for new ideas especially I rewrote my sentences in order to revise them and come up with better sentences. Then I read the whole draft one more time, revised it and wrote it on the actual paper.

The final participant is an intermediate proficiency level student of English Language Teaching. Her individual difference profile indicates that her cognitive characteristics lag behind her motivational characteristics that are high: Aptitude: 38, Working memory: 33, Self-efficacy mean: 38, Self-regulation mean: 44.12, Writing competence: 26. In her written text, the grouping and connection between the ideas that are necessary for creating a coherent text are not well-handled and some of the lexical expressions are not precise enough. There are also many grammatical errors from mistakes in spelling to run-on sentences, which have made her whole text ineffective. The structural deficiencies in her text can be attributed to her low aptitude score and more importantly her inadequate L2 grammatical knowledge and proficiency. Inefficient organization and inadequate level of supporting details may have also been caused by her low working memory capacity, which did not allow her to give due attention and manage all aspects of her writing; her own perfunctory and unmotivated manner in writing can also be the reason for the abundance of problems in her written text.

The most important feature that distinguishes her composing behavior from the previous learners is her use of mother tongue, i.e., Persian, and translation while writing her text:

At first I write everything that comes into my mind about the topic in Persian on a piece of paper or in my notebook. They are mostly in the form of key words and key points or main sentences. Then I translate them on the main paper and use dictionary to check spelling and meanings of some words.

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Turing to their L1 and using translation as a writing strategy is very common among the leaners whose competence in writing is not well-developed and do not have an effective repertoire of other writing strategies. Moreover, her responses to the process log questions indicated that she does not fully engage in the process of writing and does not do any revisions and only writes whatever comes into her mind without any concerns for the proper organization of ideas or monitoring the structure of sentences.

As was previously mentioned, qualitative comparison technique was used to support the researchers in reaching a meaningful interpretation of the patterns displayed by the cases under examination. The analyses and comparison of the constructed narratives revealed the following patterns with regard to the possible roles and effects of cognitive and motivational individual difference variables in the composing process and quality of texts produced by the learners:

> The students' high cognitive and motivational profiles enabled them to engage more effectively in the recursive and non-linear process of writing (i.e., planning, execution and monitoring) and write more effective texts.
>
> Cognitive resources seemed to be more important than the motivational ones in enabling the learners to become fully engaged in the writing process.
>
> The individuals with higher working memory capacity were able to manage different aspects of writing more effectively.
>
> The individuals with higher aptitude, who were believed to have a higher mastery of L2 grammatical knowledge, wrote more structurally refined texts.
>
> Learners' L2 grammatical knowledge, in particular, and their L2 proficiency, in general, can also account for some proportion of variance in students' writing competence and they can facilitate the automatic use of necessary resources for writing.
>
> The students who were equipped with efficient writing strategies could more easily resolve their problems while writing.
>
> The students who dedicated a time for planning their content and revising their text produced texts of higher quality.

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Learners' affective states like their writing motivation, attitudes and apprehension can also affect their writing performance.

5. Discussion

5.1. Quantitative discussion

The quantitative strand of the study indicated that, among the studied variables, the construct of foreign language aptitude has the highest potential to account for the writing competence of the learners. This finding is in line with the findings of Kormos and Sáfár (2008) and Kormos and Trebits (2012) who found a rather facilitative effect of language aptitude on L2 writing. This finding can be attributed to the important role of linguistic resources such as grammar in writing since it is believed that inductive ability and grammatical sensitivity, as the components of aptitude, are strongly correlated with the accuracy and complexity of the written productions and, thus, can assist the learners in the efficient grammatical encoding practice and writing more accurate and complex texts (Kormos & Trebits, 2012). A good level of phonological sensitivity and rote learning ability can also help learners write a better text in terms of lexical variety and richness of content (Kormos, 2012).

In fact, since aptitude is a dynamic and complex construct and contains important learner variables such as learning strategies, self-regulatory capacity, motivational orientation and certain personality traits (Dörnyei, 2005; Kormos, 2012), this unique predictive power to account for the writing competence of the learners can be rather justified. In addition, since composing is a non-linear, exploratory, and generative process (Zamel, 1983), these traits can enable the learners to perform with a good degree of efficiency in different phases of writing and to have a better control over different aspects of writing like content and organization, development of ideas and creation of more unified and accurate texts.

The composing behaviors of learners with different individual characteristics were also compared and it was found that only the participants with different levels of self-regulatory strategy use had a statistically significant different engagement in the composing process. This finding confirms the importance of active regulation

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of cognition, metacognition, behavior, and motivation in writing in enabling the learners to sustain their efforts in the writing process and to use efficient strategies to successfully accomplish the writing tasks at hand (Bruning, et al., 2013; MacArthur & Philippakos, 2013; Magno, 2009; Teng & Zhang, 2016; Zimmerman & Reisemberg, 1997). Therefore, since self-regulation is considered as an aptitude which is improvable and can be influenced by experience and instruction (Winne, 1996), creating learning environments in which these strategies are taught and practiced can help us train more successful writers.

5.2. Qualitative discussion

The initial and the most important implication which was driven by qualitatively comparing the constructed narratives for the individuals was that the students with higher levels of cognitive (aptitude and working memory) and motivation (self-regulation and self-efficacy beliefs) profiles could engage more in the writing process which is deemed to be non-linear and recursive. This engagement in turn enabled them to create a more refined text in terms of content, development and organization of ideas, sentences structure and lexical variety (e.g., the case for the participants number 1 and 4). In fact, in accordance with the ideas introduced in previous research on writing processes (e.g., Flower & Hayes, 1981; Plakans, 2008; Roca De Larios, Manchón, Murphy, & Martín, 2008), the constant involvement in planning the content, rehearsing different ways to convey the intended ideas and monitoring their actions enable students to write more effectively.

Moreover, most of the participants have highlighted their planning behavior in the writing process. The importance of extensive planning, which involves procedures such as setting goals, generating and organizing content, and diverse prewriting or rehearsal activities such as making notes about the topic, is supported by reports that good writers spend more time in planning than other writers (e.g., Humes, 1983; Sasaki, 2000; Stallard, 1974). De Milliano, van Gelderen and Sleegers (2012) and Khuder and Harwood (2015) also found that writers who plan more produce texts of higher quality.

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This comparative analysis also confirmed the important role of working memory in writing especially for the complex process of translating which makes huge demands on writers' cognitive processes since the number of things that must be dealt with simultaneously in this stage of writing is stupendous and the efficiency of writing is affected by expertise as certain processes become automated with expertise, that is, they no longer require cognitive processing (Kellogg, 2008). In the present study, it has also been identified that the students who write better have a higher level of working memory capacity which assists them in managing various aspects of their writing more effectively.

Learners' strategic behavior during the writing process can also help them manage this complex task effectively. In fact, the research on the role of strategies in writing has indicated that the effective use of writing strategies can enhance the quality of learners' performance and possibly can result in better writing competence (e.g., Cumming, 1989; Raimes, 1987; Roca de Larios, et al., 2008; Sasaki, 2007; Zamel, 1983). It has also been identified that learners who have problems in writing and mostly struggle with this skill lack the knowledge of writing strategies and, as a result, cannot perform effectively in planning, generating and organizing their ideas or proofreading and revising their written texts (e.g., Harris, Graham, Mason, & Friedlander, 2008). The performance of the participant 3 indicates that she has a rather high self-regulatory mean score, but her incapability in managing her actions and resolving the problems confirm the fact that she has not been effectively taught and, thus, has not applied these strategies effectively while composing her text because it is believed that the effective adoption of self-regulatory strategies can result in substantial gains in writing achievement and motivation (Graham & Harris, 2009; MacArthur & Philippakos, 2013; Magno, 2009; Santangelo, et al., 2008).

In addition, it was found that the students who have a higher aptitude score have been able to create a more accurate and structurally refined text. This finding also confirms the link between aptitude and grammar which enables the writers to engage in the efficient grammatical encoding practice and to write more accurate and complex texts (Kormos & Trebits, 2012). Aptitude, as a dynamic and complex

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construct, is also considered as an important predictor of foreign language learning in general and performance in a variety of language skills in particular (Gilabert & Muñoz, 2010). However, this effect is mediated by the learners' motivation and strategy use (Winke, 2013). The learners' low L2 proficiency level can also inhibit their automatic access to L2 lexical and syntactic resources, which in turn influences the overall quality of texts produced (Weigle, 2005).

Learners' affective states like their writing interests, attitudes and apprehension can also affect their writing performance (Wong, 2012). For example, the participant number 3, based on her low self-efficacy mean score and her comments in the process log, feels very anxious during the writing process and, as a result, cannot persist while facing writing challenges and thus is not able to come up with a refined text. Previous research has also indicated that self-efficacy beliefs can make an independent contribution to the prediction of writing competence (Bruning, et al., 2013; Pajares, 2003; Pajares & Johnson, 1996; Zumbrunn, 2010). These low self-efficacious individuals might turn to less effective strategies like translation form their L1 (e.g., the case for the final participant) which may disrupt their thinking processes and endanger the accuracy and fluency of the texts.

6. Conclusion

The present study used a mixed-method design to investigate the individual differences correlates of a group of Iranian EFL leaners and to examine how leaners with different individual characteristics perform in different phases of writing. The quantitative strand of the study indicated that the only factor that significantly contributed to the writing competence of Iranian EFL learners was the construct of aptitude, which confirm the hypotheses formed about the link between components of aptitude and the fluency, accuracy, syntactic complexity and lexical variety of performance in writing (Kormos & Trebits, 2012). The estimated model also indicated that the set of independent variables could only account for 11% of the variance in total reported writing competence. This limited potential can be attributed to the nature of writing which is a very complex and multifaceted construct that requires proficiency in several areas of skill and knowledge that make up writing only when taken together (Archibald & Jeffery,

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2000). Consequently, any attempts to build models of writing competence or even writing instruction must involve great care in determining which variables to gather data on, which instruments to use to do this, and how to reduce the resulting data into empirical forms suitable for analyses (Cumming & Riazi, 2000; Wardle & Roozen, 2012).

As for the differences in the composing behavior of learners with different individual characteristics, only the learners with different levels of self-regulatory strategy use significantly differ with each other in their manner of orchestrating mental resources while composing their texts. Despite the insights provided by previous studies in terms of the existence of developmental and individual differences in the writing performance of learners with different individual characteristics (Guan, et al., 2013), the statistical tests were not able to reveal these rather subtle differences in the composing process of learners with different levels of aptitude, working memory and self-efficacy beliefs, and consequently the process logs and written texts of the individual learners were qualitatively analyzed and compared. The qualitative analysis of the narratives constructed from various data sources provided some insights about how these individual characteristics might impact the composing behavior of the individual learners. The qualitative findings further corroborated the idea that the developing individual is "dynamic, adapting to new social contexts, constructing new knowledge, identities and ways of knowing" (Beach, 1999, as cited in Slomp, 2012, p. 83) that possibly affect the trajectory or processes he/she adopts while performing on different learning tasks.

On the whole, these profiles confirmed the idea that learners with different learning characteristics orchestrate their mental and affective resources in different ways to perform in different phases of writing and part of their difficulties or even capabilities in writing can be attributed to the efficiency with which they apply these resources while writing. Consequently, despite the difficulty of implementing individualized instruction in Iranian EFL classrooms, due to the large number of students and their heterogeneous level of competence in different aspects of writing, the EFL teachers must, to the extent possible, become familiar with these individual characteristics, they must use the materials and classroom resources in

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the most efficient ways to account for these differences and adopt effective techniques to enable the individual learners to achieve an acceptable level of writing competence.

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