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An Empirical Examination of the Association between Individual Differences Variables and Writing Performance of Iranian EFL Learners

Seyyed Mohammad Reza Amirian*
Assistant Professor
Hakim Sabzevari University
sm.amirian@hsu.ac.ir

Omid Mallahi
PhD Student
Hakim Sabzevari University
mallahiomid68@gmail.com

Gholam Reza Zareian
Assistant Professor
Hakim Sabzevari University
zareian22@gmail.com

Seyyed Mohammad Reza Adel
Assistant Professor
Hakim Sabzevari University
adelzero@yahoo.co.uk

Abstract

The present study was designed to initially test a model of the role of a set of cognitive (namely, aptitude and working memory) and motivational (namely, language learning goals, self-efficacy beliefs and self-regulation strategy use) individual differences variables in writing performance of a group of Iranian undergraduate EFL learners and, subsequently, to identify the possible differences in the writing quality and composing behavior of learners with different individual characteristics. A convenient sample of 125 BA level students of English Language Teaching and Literature from three state universities in Iran took part in the study. As for the data collection procedure, these participants, in various time intervals, wrote an argumentative essay, responded to the composing process scale, completed the aptitude and working memory measures and filled in the questionnaires exploring their motivational propensities, self-efficacy beliefs and self-regulatory strategy use in writing. The collected data were analyzed by using Path Analysis and Multivariate Analysis of Variance (MANOVA). Due to some problems like small sample size and idiosyncratic nature of the data, the model did not give satisfactory fit indexes. However, it was found that cognitive variables were more strongly correlated with the writing competence of the learners than the motivational ones. More specifically, the construct of foreign language aptitude had the highest potential to account for the writing competence

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* Corresponding author

of the learners and the learners having different levels of this construct were different from each other in terms of writing quality and composing processes employed while writing.

Keywords: cognitive individual differences, writing performance, path analysis

Human functioning in psychology has been studied by two contrasting approaches: experimental and differential. The experimental approach focuses on identifying structures and processes that are common to everyone, but the differential approach deals with the differences between the people and attempts to identify the major ways and attributes on which people differ (Skehan, 1991). In the same regard, 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 aptitude, working memory capacity and motivations among the learners.

Individual differences "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). In case of language learning, research has indicated that individual factors can determine not only the speed at which languages are being learnt but also the level of L2 attainment (Ehrman & Oxford, 1995; Ehrman, Leaver, & Oxford, 2003; Ellis, 2004; Gardner, 1985). Ellis (2008) has pointed to three large classes of variables that can be involved in determining individual differences in second language acquisition: learner differences, learner strategies and performance outcomes. More generally, in SLA research, individual difference variables are categorized as cognitive,

affective and personality-related factors (Ellis, 2012; Gardner, 1985) that are interrelated and dynamically interact with each other (Dörnyei, 2010). However, it should be acknowledged that since many variables are the outcome of complex interactions between cognition, affect and social influences, many scholars avoid classifying them into broad categories and are purposeful in selection of the variables of concern for their studies.

Individual differences, as one of the most important psychological aspect of SLA, have been extensively researched in L2 studies and are considered as the most consistent predictors of L2 learning success (Dörnyei & Skehan, 2003). This topic in SLA has been dealt with in a number of disciplines including cognitive psychology and applied linguistics (Aronin & Bawardi, 2012). They have investigated the attributes on which people vary and how these variations relate to language learning potentials of the learners. These variables are considered as "background learner variables that modify and personalize the overall trajectory of the language acquisition processes" (Dörnyei, 2009, p. 231). It is generally believed that most of the individual difference variables are related to some core issues in applied linguistics and can account for the important processes underlying SLA (Dörnyei, 2005, 2010). The combination of these variables is speculated to "answer why, how long, how hard, how well, how proactively, and in what way the learner engages in the learning process" (Dörnyei, 2009, p. 232).

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 better devise their instructional methods and might be able to plan the most suitable learning tasks and remedial strategies that best address their learners' individual needs (Ellis, 2012; Ferris, Liu, Sinha,& Senna, 2013; Rahimi, 2015). As for the implications of ID research for L2 skills, Kormos (2012) argues that despite the existence of research on the role and importance of individual differences in second language (L2) speaking (Dörnyei &

Kormos, 2000; Kormos & Trebits, 2012), reading skills (Grabe, 2009) and first language (L1) writing research (see e.g., Leki, Cumming, & Silva, 2010; Pajares, 2003), "little is known about how learner differences affect L2 writing processes, 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). In addition, investigating the role of individual difference variables in the writing performance of EFL learners is an under-researched area and, consequently, the present study intends to provide some insights about this issue by exploring the role of a set of cognitive and motivational individual differences variables in the writing performance of a group of Iranian undergraduate EFL learners.

Literature Review

Explanatory Variables of L2 Writing Competence

Schoonen, Snellings, Stevenson, and Van Gelderen (2009) maintain that the central issue in cognitively oriented research on writing is defining a "blueprint of the writer" (p. 77), that is, identifying what individual factors are involved in both L1 and L2 writing. Accordingly, a number of cross-sectional studies, which have used a variety of research methods, have been conducted to identify the predictors or explanatory variables of L2 learners' writing competence. In one of the earliest attempts, Sasaki and Hirose (1996) investigated the possible impact of second language (L2) proficiency, first language (Ll) writing ability, writing strategies in L1 and L2, meta-knowledge of L2 expository writing and past writing experience on Japanese university students' expository writing in English. Among the variables studied, L2 proficiency had the highest potential to account for the writing competence of the learners indicating that the individuals with higher levels of L2 proficiency paid more attention to the organization of their writing, wrote more fluently and exhibited greater confidence in writing for academic purposes. Schoonen, et al., (2003) also emphasized the important role of learners' linguistic knowledge resources while writing. Lee (2005) used SEM approach to investigate the role and

interrelationships among a set of inhibiting (writing apprehension and writer's block) and facilitating (free reading and self-initiated writings) factors and their participants' beliefs about and attitudes toward the instructional activities they experience in their writing. Findings of the study revealed that free voluntary reading was the only significant predictor of writing performance. In fact, it was found that the individuals who read more, feel less anxious about writing and face less blocking experience which in turn enable them to compose more effectively. Lu (2010) also examined the role of set of cognitive factors (namely, English (L2) language proficiency, Chinese (L1) writing ability, genre knowledge, use of writing strategies, and working memory capacity in L1 and L2) as the contributors of Chinese EFL learners' argumentative essay writing in English. The results of quantitative analyses indicated that L2 language proficiency is the most important predictor of L2 writing, followed by genre knowledge and L2 writing strategies.

Wong (2012) also argued for the importance of developing and enhancing learners' L2 proficiency and emphasized the need for effective writing strategy instructions in the ESL writing classrooms to reduce errors and improve learners' writing performance. Acknowledging the importance of topic knowledge, linguistic knowledge, writing approach, and writing experience on writing performance of ESL learners, Gustilo and Magno (2015) suggested that writing teachers must create an awareness of the importance of linguistic knowledge (e.g., grammar and vocabulary) in writing and provide practices that enhance their learners' knowledge in this aspect of writing; they must also encourage their learners to engage more in reading across the disciplines to expand their general knowledge of the world to have something to say while facing a new topic; they must provide opportunities for the students to write extensively inside and outside of the classroom; and finally, they must teach different writing approaches for the learners and make them familiar with different variables that inhibit or facilitate the efficacy of their L2 writing performance.

On the whole, this growing body of research has revealed that many factors like learners' world knowledge, writing strategies, first language (L1) writing ability, L2 proficiency, knowledge of L2 writing (i.e., sufficient meta-knowledge), instructional background, writing beliefs, attitudes and motivations, their level of aptitude and working memory, their literacy development, their history in teaching and learning writing and a variety of external (e.g., audience and materials used to draft the text) and internal processes might affect the quality of texts produced (see e.g., Chu, 2012; Cumming, 1989; Gustilo & Magno, 2015; Kormos, 2012; Lee, 2005; Lu, 2010; Matsuda, Ortmeier-Hooper & Matsuda, 2009; Sasaki, 2004, 2007, 2011; Sasaki & Hirose, 1996; Schoonen et al., 2003; Waitaha, 2012). However, the findings regarding the facilitative or inhibiting influence of various cognitive and affective factors on the learners' writing competence are rather mixed (see e.g., Kormos, 2012; Lee, 2002, 2005; Magno, 2008; Saadat & Fayaz Dastgerdi, 2014; Sasaki & Hirose, 1996). Previous studies have also found that the variances of investigated variables that explain L2 writing performance did not account for even half of the total variance of L2 writing performance (Lu, 2010). Few studies have also explored how reformulating these variables in an individual difference perspective can give us further insights about the writing potentials of different learners and how these individual factors might affect the writing quality and composing process of different groups of learners (Kormos, 2012).

The Role of Individual Difference Variables in (L2) Writing Process

The research on L2 writing has 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. In the same vein, learners' level of motivation 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" (Zimmerman & Reisemberg, 1997, as cited in Teng & Zhang, 2016, p. 123).

Kellogg's (1996) cognitive model has been used by some scholars to guide the discussion of the role of individual differences in writing. A point worth-mentioning is that this model has been originally proposed to account for the role of working memory in writing, but Kormos (2012) has used this model to elaborate upon the role of a set of cognitive and motivational variables in different phases of writing. In this model, there are three important interactive and recursive processes: formulation, execution and monitoring.

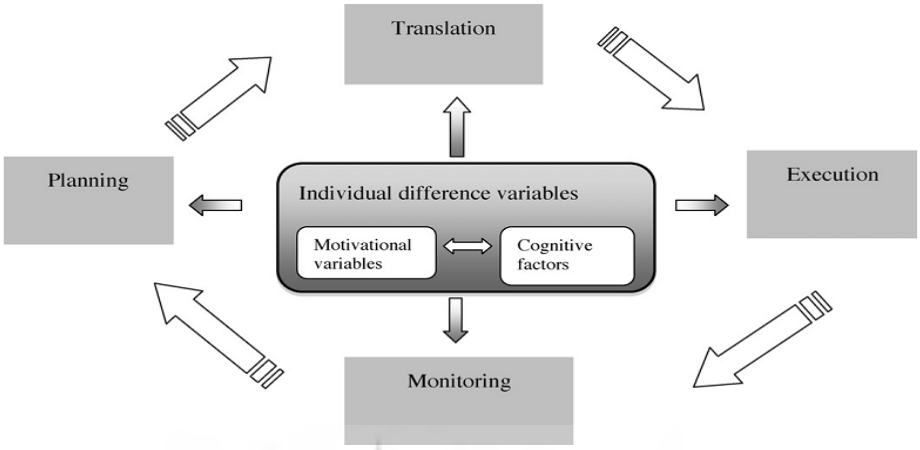

Figure1. Kellogg's (1996) Model of the role of individual differences in writing processes (extracted from Kormos, 2012, p. 392)

Based on the extracted and presented model in Figure 1, cognitive and motivational individual differences can play a role and influence every stages of the writing process and can influence how the writers orchestrate these processes to plan the ideas, organize them in a coherent manner, translate them into linguistic form to create a unified, refined and high-quality written product (Kormos, 2012). In fact, this model specifies the dynamics of planning ideas, translating them into sentences, and reviewing ideas or sentences on the central executive, phonological loop, and visuo-spatial sketchpad (as the components of working memory) based on the available evidence (Kellogg, Turner, Whiteford, &Mertens, 2016). It, thus, integrates Baddeley's (1986) model of working memory with the seminal Hayes and Flower's (1980) model of written composition. Kormos (2012), after elaborating upon this model, presents and discusses some cognitive (namely, aptitude and working memory) and motivational variables (namely, learning goals, self-efficacy beliefs and self-regulation capacity) that can play a role in L2 writing process and presents some hypotheses about how these individual characteristics might impact the writing quality and composing behavior of different individuals. She also calls or further studies in various educational settings and sociocultural contexts to test these hypotheses. Accordingly, the present study uses this

theoretical model for exploring the individual differences correlates of Iranian EFL learners' writing competence and seeing the possible differences in the composing process and writing quality of learners with different individual characteristics.

Statement of the Problem and Research Questions

Despite the conceptualization of second language writing as a wide-ranging discipline, incorporating multiple conceptual and methodological traditions (see e.g., Klein & Boscolo, 2016; 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 how cognitive and motivational variables can account for the individual learners' success or failure in acquiring writing expertise (e.g., Graham, Berninger, & Fan, 2007; Lee, 2013). Accordingly, the present study was conducted to initially test a model of the role of individual differences variables in writing and, subsequently, to see whether there are any significant differences among the learners with different cognitive and motivational individual characteristics in their composing behavior and the quality of texts produced or not. More specifically, the present study intends to provide answer for the following research questions:

1. Does the proposed model of the role of individual difference variables in writing give satisfactory fit indexes based on the data collected from a group of Iranian undergraduate EFL learners?
2. Are there any significant differences in the quality of texts produced and the text production processes employed by learners with different individual characteristics?

Method

Participants and Setting

A convenient sample of 125 Iranian undergraduate (junior and senior) EFL learners studying Teaching English as a Foreign Language (TEFL) and English Language and Literature in three state universities in Iran participated in the study. The average age of the participants was 21 and they were from both genders and from a variety of ethnic and educational backgrounds. It is worth-mentioning that the data were collected from nearly 200 students, but since some students did not consistently take part in the data collection sessions and did not answer all the instruments, they were not included in the final analyses. The language proficiency level of these students, as measured by Oxford Placement Test (OPT), was from intermediate to advance: 46 intermediate, 55 upper-intermediate and 24 advanced proficiency level students. All the selected participants had passed advanced writing and essay writing courses in their universities and were quite familiar with the principles and conventions of essay writing in English.

Instruments

Measure of writing performance. 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. It is also maintained that argumentative tasks would lead to more knowledge-transforming and problem solving behavior on the part of learners, which in turn might provide us with more informative protocols about the learners' cognitive processes. In addition,

a rather general and familiar topic was selected for this essay to enhance the learners' degree of involvement with the task.

The participants were also informed that the written essays would 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 provided a detailed analysis of the designated features of the written texts, was used to analyze and score the students' performance on the writing task. This score also served as a criterion for comparing the quality of texts produced by learners with different individual characteristic.

The composing process measure. In order to capture the possible differences in the composing behavior of learners with different individual differences profiles, the students were required to respond to the items of a text production processes scale developed by Gustillo and Magno (2015). This scale had 24 items targeting the students' performance in different phases of writing like idea generation which measured students' strategies and sources of ideas; idea encoding which refers to students' ease or difficulty in translating their ideas into English words and structures; idea transcription refers to whether or not students transcribed their ideas after they had formed them in complete sentences, and idea/text revision which asked as to whether or not students evaluate/revise their ideas and texts. Each item was rated using a four-point scale with the following responses: Not at All (1), Very Little (2), Somewhat (3), and To a Great Extent (4).

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 contained 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 to make 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 Persian, and the test was then given to two TEFL scholars 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 test 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 the students 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 were 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). All the sentences were in an active and affirmative form within a range of 13-16 words. Half of the sentences were constructed as 'nonsense' sentences to make sure that the participants processed sentences for meaning as well as recalling the final word of each sentence. The test was in the PowerPoint format, but

due to large number of participants in the study we could not afford to administer it individually and we used video projection facility to administer the test to a group of learners in the classroom sessions. The sentences in the test were arranged in three sets of 3, 4, 5, and 6 sentences and each sentence appeared on screen for 8 seconds, when the computer transitioned to the next slide. After each set, a slide appeared to prompt the students to recall the final words of each set. In the original test, the participants had to read each sentence aloud, judge whether or not it made sense and say their judgment aloud while their answer was recorded and after each set must also recall the final words of each set and verbalize them. However, in the present study the researchers designed a sheet including some instructions and examples for how to perform on the test and a set of slots to enable the students to write their responses regarding the semantic plausibility of the sentences and the recalled words for each set of the sentences.

Motivation questionnaire. The instrument used to examine the learners' learning goals was adapted from Kormos and Dörnyei's (2004) motivation questionnaire and consisted of 38 five-point Likert-scale questions exploring learners' degree of (a) integrativeness, (b) incentive values, (c) attitudes toward learning the L2, (d) linguistic self-confidence, (e) language use anxiety, (f) task attitudes, and (g) willingness to communicate. The reliability index for this instrument was .66 Cronbach's Alpha.

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 were preceded by the phrase "I can …" to grade the strength of subjects' beliefs in their writing ability in the five factors of writing: content, design, unity, accuracy and punctuation. This questionnaire enjoyed form a good reliability index: .89 Cronbach's Alpha.

Self-regulation in writing scale. The self-regulation scale contextualized in writing was developed and validated by Kanlapan and Velasco (2009). This scale is based on Zimmerman's (2002) 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.

Data Collection Procedures and Analyses

In order to collect the necessary data, the participants, in various time intervals and in different classroom sessions, were required to respond to the tests and questionnaires of cognitive and motivational individual differences variables. 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. The whole data collection procedure took about one educational year and great care was taken to observe ethical standards in the treatment of selected samples.

The original aim of the study was testing the model of individual differences in writing proposed by Kellogg (1996) using Structural Equation Modelling (SEM) approach which brought together multiple regression, path analysis and factor analysis in hypothesizing the relationships between a set of constructs and measured variables based on a substantive theory (Kunnan, 1998). In fact, "linear structural equation modeling is a useful methodology for statistically specifying, estimating, and testing hypothesized relationships among a set of substantively meaningful variables" (Bentler, 1995, p. ix). Linear Structural Relationships (LISREL) statistical package, which enabled the researchers

to "specify the nature of the relationship between variables and then test for how well the data obtained fits the complex model that had been specified" (Skehan, 1991, p. 282), was used to estimate the model. A full SEM model allowed researchers to estimate both the links between the latent variables and their observed measures (the measurement portion of the model) and the direct effects among the variables (the structural portion of the model) (Winke, 2013).

However, due to problems such as small sample size, inadequacy of the instruments/measures in estimating the intended constructs or even the perfunctory responses of the individuals to the items of these instruments/measures, the model did not converge and no satisfactory fit indexes were obtained. Consequently, the researchers decided to use *Path Analysis* to examine the contribution of each independent variable to the dependent variable (i.e., writing competence). A path analysis closely resembled a SEM model; however, there were no latent variables in the path analysis compared to a full SEM model. Path analysis calculated path coefficients which showed "the direct effect of a variable taken as a cause of a variable taken as an effect" (Kerlinger & Pedhazur, 1973, p. 310).

Subsequently, the students' written text scores and their responses to the items of the composing measures were examined and compared to see the possible differences in the composing processes and quality of the texts produced by learners with different individual differences profiles. Initially, the students with different levels in each individual characteristics were categorized into different groups (i.e., High, Mid and Low groups for each variable) and then their performances were compared to see the possible differences in the general text production processes employed while writing and the quality of texts produced by using multivariate analysis of variance (MANOVAs). MANOVA was an extension of analysis of variance which was used here because we had two dependent variables (i.e., writing quality and composing process) that were conceptually and practically related to each other.

Results

In the present work, path analysis was used to analyze how much of the total variability in writing competence could be explained by the causal impact of a set of individual difference variables. Before doing this analysis, some preliminary considerations such as the interval level of data, normality of data and multicollinearity assumptions were ensured. In case of estimation of the measurement model, the covariance matrix must have been obtained as the main requirement since was the only input type that can be used for estimating LISREL models (Bentler, Bagozzi, Cudeck, & Iacobuccim 2001;Vieria, 2011). Covariance Matrix showed relationship between X and Y variables (that is, independent and dependent variables) and the covariance of each variable with its own.

Positive covariance indicates positive linear association between the variables and negative covariance shows negative association. If there is no relationship between the variables, the covariance becomes equal to zero. The following table presents the covariance matrix derived for the variables of the study. As it is depicted, cognitive variables, especially the construct of foreign language aptitude, have a positive linear association with the writing competence as the dependent variable and motivational variables indicate a negative association.

Table 1
Covariance Matrix

	Writing	W-Memory	Aptitude	Regulation	Efficacy	Goals
Writing	35.98					
W-Memory	1.61	4.99				
Aptitude	24.84	-0.08	191.22			
S-Regulation	-0.18	0.09	-0.54	0.09		
S-Efficacy	-0.45	-0.13	-0.27	-0.02	0.17	
L-Goals	-0.04	-0.02	0.35	0.01	-0.02	0.09

After deriving the Covariance Matrix, the basic model was estimated. Based on the information obtained in the estimated model (presented in Figure 2), the data points and parameters in the path model were the same,

that is, the chi-square, degree of freedom, probability and root mean squared error of approximation (RMSEA) were equal to zero. Consequently, adequacy of the model could not be tested (Ullman, 2006).In SEM literature, a nonsignificant chi-square and a CFI above .95 suggest model acceptance, and an RMSEA value below .05 indicates a good fit of the model to the data (Hu & Bentler, 1999).These requirements are not satisfied in the present analysis and thus the adequacy of model could not be tested.

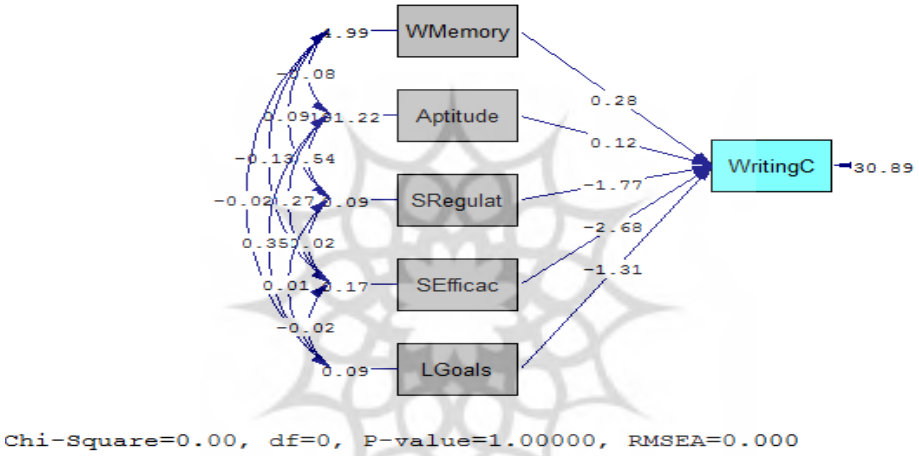

Figure 2. A path diagram of estimated model of the role of individual differences in writing

Afterwards, the standardized solution was estimated. From the standardized measurement model, correlation coefficients between the variables could be observed. Based on the results presented in Figure 3, only the cognitive variables had a positive correlation with the writing competence of the learners. This finding could be interpreted in such a way that writing was more a cognitively-oriented activity than an affectively-motivated one and cognitive factors were more responsible for accounting for the writing competence of the learners than the motivational propensities.

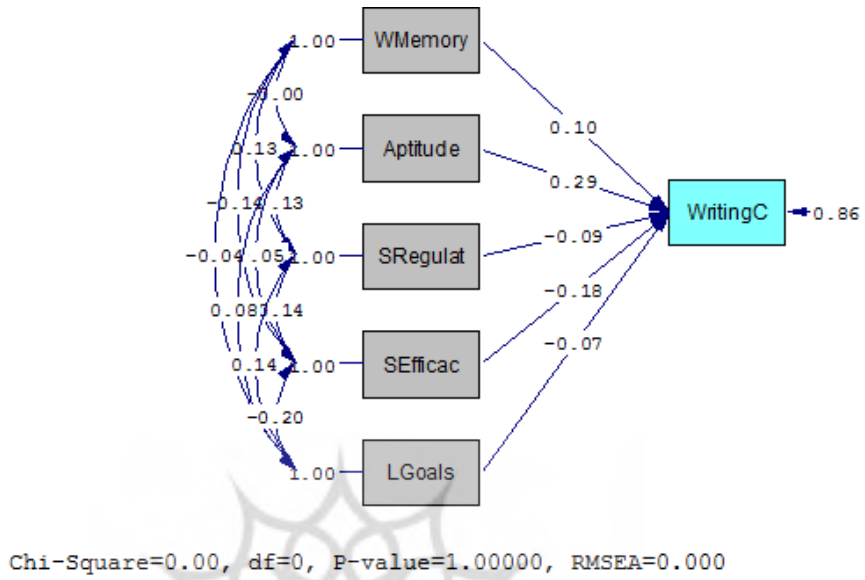

Figure 3. A path diagram of standardized solution model

Moreover, in order to assess the relative contribution of each indpendnet varaible to the group's writing performnce, *t*-values were obtained. According to the information presented in Figure 4, only the construct of foreing languge aptitude significantly contributed to the writing of the learners ($t=2.89 > t_{critical}=1.96$), which corroborated the results of standardized measurement model. The red numbers in the figure indicated that the relevant indexes had not been able to effectively measure their corresponding variables.

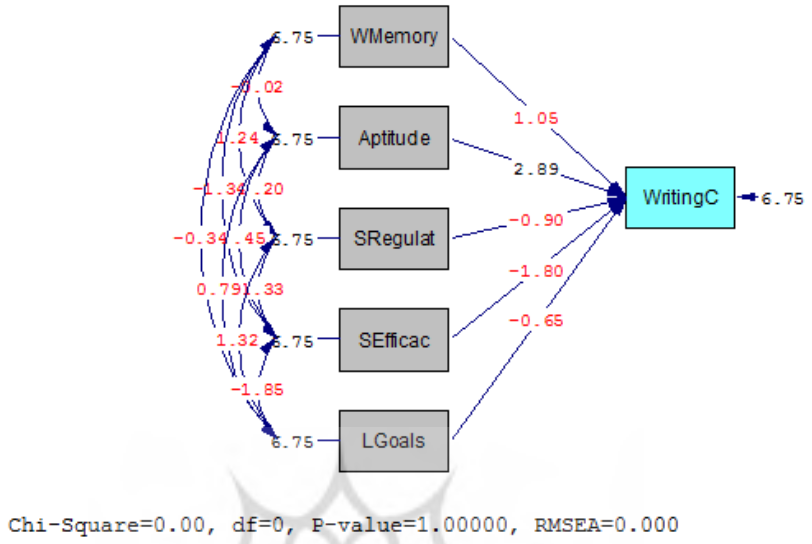

Figure 4. A path diagram of *t*-values

Since the construct of foreign language aptitude was the only variable that showed a significant contribution to the writing performance of the learners, only the learners who were different from each other in this construct were compared in terms of writing quality and text production processes employed. The total score used to measure this construct was 100 and, based on the scores obtained, the participants of the study were categorized into three groups: High Aptitude group for those who scored 70 and above, Mid Aptitude group for those scoring between 50 and 69, and Low Aptitude group for the students who had a score of below 50. A multivariate analysis of variance (MANOVA) was run to see any possible differences in the quality of texts produced and the composing process of learners with different levels of aptitude.

Table 2 presents the descriptive statistics for this analysis. As for the quality of texts produced, the high aptitude group has the highest mean score (*N = 15, M = 39.73, SD = 5.22)*, next comes the mid aptitude group (*N = 57, M = 36.52, SD = 6.32)* and the lowest mean score refers to the low aptitude group (*N = 53, M = 34.43, SD = 5.18).* However, in the text production processes employed, the mid aptitude group has the highest

mean score (*N = 57, M = 68.64, SD = 7.36)* and the high aptitude group had the lowest mean score in the composing process (*N = 15, M = 67.73, SD = 8.65*).

Table 2

Descriptive Statistics for Three Different Aptitude Groups' Writing Quality and Text Production Processes

	Aptitude Group	Mean	Std. Deviation	N
Writing Competence	High	39.73	5.22	15
	Mid	36.52	6.32	57
	Low	34.43	5.18	53
	Total	36.02	6.19	125
Composing Process	High	67.73	8.65	15
	Mid	68.64	7.36	57
	Low	68.16	7.21	53
	Total	68.33	7.41	125

In order to see whether there were statistically significant differences among different aptitude groups on the linear combination of the dependent variables (i.e., writing competence and composing process), the multivariate tests of significance were inspected (see Table 3).

Table 3

Multivariate (MANOVA) Tests for Different Aptitude Groups

Effect		Value	*F*	Hypothesis *df*	Error *df*	*Sig.*	Partial Eta Squared
Intercept	Pillai's Trace	.985	5.053	2.000	121.000	.000	.988
	Wilks' Lambda	.012	5.053	2.000	121.000	.000	.988
	Hotelling's Trace	75.892	5.053	2.000	121.000	.000	.988
	Roy's Largest Root	75.892	5.053	2.000	121.000	.000	.988

Effect		Value	*F*	Hypothesis *df*	Error *df*	*Sig.*	Partial Eta Squared
Aptitude group	Pillai's Trace	.077	2.434	4.000	244.000	.048	.038
	Wilks' Lambda	.923	2.459[a]	4.000	242.000	.046	.039
	Hotelling's Trace	.083	2.484	4.000	240.000	.044	.040
	Roy's Largest Root	.081	4.942[b]	2.000	122.000	.009	.075

a. Exact statistic

b. The statistic is an upper bound on F that yields a lower bound on the significance level.

c. Design: Intercept + Aptitude group

The results indicated that there was a statistically significant difference between the High, Mid and Low aptitude groups on the combined dependent variables, *F (2, 121) =2.45, p=.046<.05; Wilks' Lambda=.92; Partial Eta Squared=.03*. Moreover, Tests of Between-Subjects Effects were examined to see whether there were any significant differences among the groups for each dependent variable separately. According to the statistics presented in Table 4, the learners with different aptitude scores were significantly different from each other in terms of their writing quality (*F(2, 122)=4.92, p=.009<0.05, partial Eta Squared=.07*).

Table 4

Tests of Between-Subjects Effects for Different Aptitude Groups

Source	Dependent Variable	Type III Sum of Squares	*df*	Mean Square	*F*	*Sig.*	Partial Eta Squared
Corrected Model	Writing quality	354.765[a]	2	177.383	4.920	.009	.075
	Composing Process	12.501[b]	2	6.250	.112	.894	.002

Source	Dependent Variable	Type III Sum of Squares	*df*	Mean Square	*F*	*Sig.*	Partial Eta Squared
Intercept	Writing quality	118871.360	1	118871.360	3.297	.000	.964
	Composing Process	405920.246	1	405920.246	7.285	.000	.984
Aptitude group	Writing quality	354.765	2	177.383	4.920	.009	.075
	Composing Process	12.501	2	6.250	.112	.894	.002
Error	Writing quality	4398.163	122	36.051			
	Composing Process	6797.387	122	55.716			
Total	Writing quality	166969.000	125				
	Composing Process	590536.000	125				

a. R Squared = .075 (Adjusted R Squared = .059)

b. R Squared = .002 (Adjusted R Squared = -.015)

Moreover, the inspection of mean differences in the Estimated Marginal table indicated that High aptitude group had a higher mean score (*M=39.73*) in their writing competence compared to the Mid (*M=36.52*) and Low (*M=34.43*) aptitude groups. Since we had an independent variable with three levels, it was necessary to conduct follow-up univariate analysis to identify where the significant differences lie.

Table 5

Estimated Marginal Means for Different Aptitude Groups

Dependent Variable	Aptitude group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Writing Quality	High	39.73	1.550	36.64	42.80
	Mid	36.52	.795	34.95	38.10
	Low	34.43	.825	32.80	36.06

Dependent Variable	Aptitude group	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Composing Process	High	67.73	1.927	63.91	71.54
	Mid	68.64	.989	66.69	70.60
	Low	68.17	1.025	66.14	70.20

For checking where the actual differences between the groups lie, Tukey post-hoc test was run (see Table 6). The multiple comparisons between the groups indicated that only the mean difference between the high aptitude and low aptitude groups (i.e., 5.29) was statistically significant at .009<0.05 level.

Table 6

The Results of Tukey Post-hoc Test for Multiple Comparisons of Quality of Texts Produced by High (1), Mid (2) and Low (3) Aptitude Groups

(I) Aptitude Group	(J) Aptitude Group	Mean Difference (IJ)	Std. Error	*Sig.*	95% Confidence Interval	
					Lower Bound	Upper Bound
(1)	2	3.20	1.74	.161	-.92	7.34
	3	5.29*	1.75	.009	1.13	9.46
(2)	1	-3.20	1.74	.161	-7.34	.92
	3	2.09	1.45	.165	-.62	4.81
(3)	1	-5.29*	1.75	.009	-9.46	-1.13
	2	-2.09	1.14	.165	-4.81	.62

*. The mean difference is significant at the 0.05 level.

Discussion

One of the main intentions in the present study was testing the model of individual differences in writing using structural equation modeling (SEM) which mainly attempts to explain a correlation or a covariance data matrix, derived from a set of observed or measured variables, that is hypothesized in a measurement model or a structural model (Kunnan, 1998). However, due to some inadequacies in the collected data and most importantly the small sample size, this model did not converge. Although

there was little consensus on the recommended sample size for SEM, many scholars have proposed a 'critical sample size' of 200 (Sivo, Fan, Witta & Willse, 2006) because smaller sample sizes might not ensure stable estimates or representativeness. Another explanation for this inadequacy referred to the nature of writing which was 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, 2000; Wardle & Roozen, 2012). 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). Possible inadequacies in any of these prerequisites might have led to the failure in the creation of a full SEM model in the present study.

This failure led the researchers to turn to a simpler analytic technique, i.e., Path Analysis, to test the theoretical relationships among independent measured variables and dependent measured variable and the direct and indirect effects of the independent variables on the dependent variable (Kunnan, 1998). Simply put, we were mainly interested in the interrelations between a set of cognitive and motivational variables and the learners' L2 writing performance. The results of path analysis showed that this model fell short of having very much explanatory power which means that cognitive and motivational variables did not explain very much of the variance in the outcome variables. In fact, the study faced a problem called by Cronbach (1975) as the 'interactive complexity' that is common to scientific investigations of multi-faceted human behavior. In other words, similar to what other scholars (e.g., Cumming & Riazi, 2000; Sasaki & Hirose, 1996) have found, the sheer number of variables investigated and the extent to which they interact with each other have defied identification of simple, straightforward causal relationships.

Moreover, the only factor that significantly contributed to the writing competence of Iranian EFL learners was aptitude which further confirm the link between components of aptitude and the fluency, accuracy,

syntactic complexity and lexical variety of performance in writing (Kormos & Trebits, 2012).This finding could be attributed to the important role of linguistic resources such as grammar in writing since it was believed that inductive ability and grammatical sensitivity, as the components of aptitude, were strongly correlated with the accuracy and complexity of the written productions and, thus, could 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 could also help learners write a better text in terms of lexical variety and richness of content (Kormos, 2012). In fact, since aptitude was 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 could be rather justified. In addition, since composing was a non-linear, exploratory, and generative process (Zamel, 1983), these traits could 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 preliminary analysis also indicated that working memory had a positive but low correlation with the writing competence of the learners. This finding further confirmed the role of working memory, as a cognitive resource, in the successful accomplishment of the complex tasks such as writing. In fact, since the efficiency of writing was affected by expertise as certain processes become automated, learners with different WM spans were expected to perform with varying degrees of efficiency in writing tasks (Kellogg, 2008; Kormos, 2012). Learners' limited WM capacity could hinder their access to higher level strategies and knowledge bases and resources necessary for writing (Weigle, 2005). Finally, despite the importance and contribution of affective and motivational resources such as the learners' interests, attitudes and self-efficacy beliefs in enabling the

learners to create an effective written texts (see e.g., Pajares, 2003; Wong, 2012), the estimated motivational constructs in the present study fell short of having any unique contributory potential to account for the writing ability of the learners.

Conclusions and Implications

Summary of the Findings

The original aim of the present study was testing a model of the role of individual difference variables in writing. However, due to small sample size and idiosyncratic nature of the data and more importantly the complex nature of writing, the model did not give satisfactory fit indexes and consequently the adequacy of model could not be tested. It is also believed that cognitive and motivational explanations, despite their usefulness in accounting for many aspects of writing expertise, do not provide the complete picture of what makes a good writer (Weigle, 2005) and the role of other factors such as the learners' social and cultural backgrounds, which might facilitate or inhibit their real exposure to or engagement in authentic writing practice, must be considered while trying to estimate or account for the writing competence of the learners.

The findings of the study also revealed that the construct of foreign language learning aptitude had the highest level of potential to account for the writing performance of the learners. This finding was mainly attributed to the important role of aptitude in grammatical and syntactic encoding which are important resources in writing and a high percentage of students' success in accomplishing a writing task depends on their adequate mastery of such resources for writing (Kormos, 2012). Learners with different levels of aptitude were also different from each other in terms of overall writing quality and cognitive resources used while writing.

Although the findings of present study fell short of presenting convincing evidence about the importance of individual differences in writing, teachers must consider the role and influence of their learners' individual characteristics in any pedagogical interventions. In fact, by being aware of the learners' individual characteristics and the important

role they played in the learning process, teachers could better devise their instructional methods and might be able to plan the most suitable learning tasks and remedial strategies that best address their learners' needs. Teachers must also try not to demotivate the learners by pushing them to adapt to their method of instruction, but they should "cater for [the learners'] individual needs during the moment-by-moment process of teaching (i.e., by emphasizing group dynamics and offering a range of activity types)" (Ellis, 1989, p. 260).

Limitations and Suggestions for Further Research

The most important problem the researchers faced while conducting the present study was the students' reluctance to participate in the data collection sessions and respond to and deliver the tests and questionnaires of the study, which affected both the quantity and quality of the collected data. In fact, the researchers collected data from nearly 200 students in the three educational settings, but only 125 participants had fully completed and delivered the assigned instruments. Moreover, the original aim of the study was testing the model of role of individual difference variables in writing through SEM procedure, which due to problems such as small sample size, inadequacy of the instruments used in capturing suitable data and thus the idiosyncratic nature of the data the model did not converge. Consequently, the study can be replicated with a larger number of motivated individuals and by adopting a more rigorous research methodology. In addition, the students' writing ability was assessed by their performance on a single essay which might not be representative enough of a learner's writing competence and multiple assignments must have been collected to provide a more valid assessment of the writing ability (e.g., Brown, 2004; Schoonen et al., 2003). However, due to time constraints and the large number of instruments for exploring other aspects of the learners' characteristics, it was not practical to include more writing tasks.

Due to importance of considering individual differences in instructional programs and designing accountable instructional programs

that fit the individuals' preferred learning approach and their needs and problems, further research must be conducted to see how learners with different individual characteristics perform on different learning tasks, how they respond to various types of interventions and how these individual characteristics might affect their performance. The present study explored the role of a limited number of cognitive and motivational variables in writing of Iranian EFL learners, future research endeavors must include and inspect the role of other variables, especially the social and cultural ones, to see whether they can make a difference or affect the learners' performance on various learning tasks or not. The nature of contributory potential of each variable must also be explored based on more powerful qualitative methods and by using more longitudinal studies that can trace the learners' development over a longer period of time.

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