

The Mediating Role of Attentional Control on the Relationship between Multilingualism and Writing Ability of Iranian EFL Learners

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Abstract

One of the most important cognitive factors which is reported to be advantageous among multilingual learners is the notion of attentional control (AC), as one of the core executive functions (EFs). The present study was thus motivated to investigate the moderating role of AC on the writing proficiency including three CAF measures (complexity, fluency, and accuracy) of Iranian upper-intermediate trilingual learners in comparison to bilinguals. To this end, a total of 70 EFL learners from different language institutes in Shahindezh, including both males (N=31) and females (N=39) were conveniently selected to participate in this study. All the intended participants, aged 18-22, were categorized into two groups of Turkish-Persian and Kurdish-Persian bilinguals (N=36) and Turkish-Kurdish-Persian trilingual EFL learners (N=34) based on their responses to a tailor-made linguistic background information questionnaire. An adapted version of the First Certificate in English (FCE) test was also administered to assure homogeneity across the sample. Further data were collected through attentional control scale (ACS), developed by Derryberry & Reed (2002), and a topic writing task which was selected from TOEFL writing inventories. Results of an independent samples t-test indicated that trilingual learners, compared to their bilingual counterparts, have a higher level of attentional control ability. Furthermore, the results of three separate sets of ANCOVA revealed that: First, trilingual learners outperformed bilinguals in all CAF measures of writing proficiency and, second, trilingual learners' higher attentional control ability does not moderate their superior performance in CAF measures. In other words, the superior performance of trilingual learners in complexity, accuracy and fluency measures of writing proficiency, in this context, is not attributable to their attentional control ability. The results are discussed in relation to the significant role that EFL learners' cognitive characteristics, possibly other than AC, and linguistic background may play in language learning in general, and writing proficiency in particular.

Keywords: Attentional control, bilingualism, CAF measures, multilingualism, writing proficiency

Introduction

In the past three decades, significant economic and political changes have occurred all across the globe. Consequently, cross-cultural contact is at the highest level in human history, as physical and geographical boundaries are shrinking day-by-day (Kumaravadivelu, 2008; Spolsky, 2009; Wright, 2004; Zakaria, 2011). These changes have also affected language education policies and practices, as multilingualism has become a common phenomenon in today's world. Multilingualism has become an omnipresent phenomenon in our modern society of large-scale migration, international markets and finance, backpacking youngsters, and a scientific community in need of a lingua franca to disseminate its achievements among its members (Jessner, 2006). Hence, people may need to raise their knowledge level and add a world language to their linguistic repertoire to effectively communicate with the other people throughout the world. This phenomenon may play a vital role in people's lives, help them have better contacts with different people all over the world, and satisfy their diverse needs. In today's world, monolingualism may be the exception and multilingualism the norm (Auer & Li, 2007). As a result, and with respect to the importance of multilingualism as a universal phenomenon and with the increasing number of the multilinguals all over the world, the need for paying much attention to this phenomenon is felt more.

Regarding multilingual learner's cognitive characteristics in English as a foreign language (EFL) tasks and contexts, executive functions (EFs; collectively referred to as executive function and cognitive control), have been the subject of a number of research studies (see Bialystok, Craik, Klein, & Viswanathan, 2004, for reviews). Executive functions refer to a family of top-down mental processes that enable us to adapt our actions to the ever-changing environment and to shape them in relation to our current goals (Burgess & Simons, 2005; Espy, 2004; Miller & Cohen, 2001). There is a general agreement that there are three core executive functions: inhibition [inhibitory control, including self-control (behavioral inhibition) and interference control (attentional control and cognitive inhibition)], working memory (WM), and cognitive flexibility (Lehto, Juujärvi, Kooistra & Pulkkinen, 2003; Miyake, Friedman, Emerson, Witzki, Howerter, & Wager, 2000).

Regarding the relationship between EFs and learning additional languages, attentional control (AC), is one of the most important domains and is defined as "an individual's capacity to choose what they pay attention to and what they ignore" (Astle & Scerif, 2009). This ability enables us to selectively attend, focusing on what we choose and suppressing attention to other stimuli. There is equivocation in the literature on the advantages of AC as one of the core EFs on language processing of bi/multilinguals. AC is reported to be advantageous among bi- and multilinguals in comparison to monolinguals (e.g., Costa, Hernández, & Sebastián-Gallés, 2008). However, there are some studies in EFL literature that found no advantage for bi/multilingual learners (e.g., Hilchey & Klein, 2011; Morton & Harper, 2007). This equivocation in the literature on the possible effects of learners' linguistic background on their future achievements, accordingly, warrants further research.

Due to the discussed matters and the importance of multilingualism in today's world, the affective, cognitive, social and other special characteristics of multilingual learners have been the subject of a great deal of research in recent decades. Cognitive aspects of bi/multilingualism have

been investigated from different perspectives, and the influence of some cognitive factors on learners' linguistic performance is well documented in the literature. Of relevance to the purposes of the present study are cognitive factors such as cognitive control abilities or executive functions, creative thinking, metalinguistic awareness, memory, and thinking abilities which are believed to be one of the main reasons of superior learning outcomes among bi- and multilingual learners (e.g. Bialystok 2001).

The areas investigated in this regard include monolingual vs. bilingual performance differences in various cognitive tasks, such as conflict resolution (e.g. Bialystok, 2010; Marzecová, 2013; Pelham & Abrams, 2014), goal maintenance (e.g., Costa, Hernandez & Sebastian-Galles, 2008; Hilchey & Klein, 2011), and task-set switching (e.g., Costa, Hernández & Sebastián-Gallés, 2008; Garbin, Sanjuan, Forn, Bustamante & Rodríguez-Pujadas, 2010).

However, in spite of extensive studies that have been carried out during the past years, there still exists abundant conflicting claims regarding the role of EFs, as one of the most important cognitive variables, in the process of language learning and there yet remains a great deal of confusion in the area concerning the role of learning additional languages in the aforementioned relationship. Yet, despite the considerable growth of the field of L2 writing, little is known about multilingual's writing; To date, only a small number of studies have examined multilingual's writing (e.g., Buell, 2004; Canagarajah, 2004, 2006, 2007, 2011). Moreover, based on Naghdipour (2016), almost all Iranian learners of English have difficulty in writing skill. Hence, it is hoped that the findings of the current study can present new insights about bilingual and multilingual learner's writing proficiency.

With reference to the discussed matters, the current study was an investigation of the relationship between Iranian EFL learner's linguistic background (bilingual vs. trilingual) and their writing proficiency in terms of CAF measures (complexity, accuracy and fluency). In addition, the mediating role of attentional control on the aforementioned relationship was investigated. In other words, the present study has been put forward to (1) examine the possible relationship between linguistic background and writing proficiency of Iranian EFL learners, (2) examine the possible relationship between linguistic background and attentional control of Iranian EFL learners, and (3) determine the possible role of attentional control on the relationship between linguistic background and writing proficiency. Furthermore, research interest in cognitive aspects of multilingualism and multilingual proficiency, a rarely touched upon field more specifically in the context of Iran, has increased in recent years.

Iran, as a multicultural and multilingual society, is home to a number of language communities speaking Persian, Turkish, Kurdish, and Arabic languages among others. Many children learn and speak their first language at home and study all of their courses in Persian throughout their education. In other words, people have to learn Persian language as a second and national language of the country and use it as a lingua franca for official and communication purposes. Hence, inquiries providing useful information about the nature of multilingualism in Iran and highlighting its diverse impacts on additional language learning, and also presenting beneficial insights for those Iranian authorities involved in English as a foreign language (EFL) learning, seems warranted in the multilingual EFL context of Iran.

Literature Review

Cognitive aspects of bi/multilingualism

During the first half of the twentieth century researchers were mainly concerned by any negative associations between bilingualism and general intelligence (g) and children's scholastic achievement (Hakutu, 1986). Systematic studies of the relationship between bilingualism and intelligence began around 1920 and research during this period was largely carried out with minority, immigrant populations, raising questions regarding the generalizability of findings and negative biases against such populations. Much of the justification for bilingual education (BE) programs hinged on the resolution of these early intelligence issues (Bialystok, 2001). Many researchers (e.g. Hakuta, 1986) have discussed how methodological and design flaws resulted in the majority of the early negative results favoring the monolingual experience.

Cognitive Flexibility

One area of cognitive skill that continued to display an advantage was "cognitive flexibility". Ben Zeev (1977a) decided to test the concept of cognitive flexibility. Vocabulary was not used as a criterion variable for bilingualism, rather, it was tested using a translation test. His findings revealed a bilingual advantage in understandings of syntactic structures as well as a more in-depth knowledge of syntax. Zeev (1977b) noted that by having to develop an awareness of structural similarities and differences between two languages, bilinguals may progress their analytic strategies at a faster rate than monolinguals, and transfer these skills to other domains and cognitive tasks.

With a wealth of studies now available, researchers have begun to identify the areas of cognition which can be positively or negatively affected by the bilingual experience. For example, some have identified that bilinguals may be delayed on many forms of verbal tasks compared with monolinguals (e.g. Kaushanskaya & Marian, 2007; Rosselli, 2000; Portocarrero, 2007; Gollan & Acenas, 2004). On the other hand, bilinguals tend to display a cognitive advantage when faced with tasks requiring a high degree of cognitive control or conflict resolution (e.g. Costa et al., 2008)

These control advantages are believed to be a result of the bilinguals' strengthened executive function (EF) skills, developed as a result of having to manage two active languages within the brain (Costa, Hernandez & Sebastian-Galles, 2008).

To conclude with, although bilinguals show advantages in general aspects of cognition, most advantages relate to, or may be mediated by, executive function(s) or cognitive control skills. In fact, regarding bi/multilingual learner's cognitive characteristics and advantages, executive functions have been one of the most researched areas (see Bialystok, Craik, Klein & Viswanathan, 2004, for reviews).

Executive functions and bi- and multilingualism

Those studying cognitive control and attention continue to debate how to appropriately conceptualize and define the executive function (EF). In spite of recent efforts to clarify the precise nature of EF, the concept continues to evolve (e.g. Diamond, 2013; Baumeister & Vohs, 2004).

Monsell (1996, p. 93) described the nature of EF as one of the ‘unsolved mysteries of the mind’. When synthesizing the definitions available it is important to consider the opinions of leading researchers within the field itself.

Adele Diamond defined the executive functions as (2013, p. 136): “...a family of top-down mental processes needed when you have to concentrate or pay attention, when going on automatic or relying on instinct or intuition would be ill-advised, insufficient, or impossible”. In other words, the principle of EF combines a number of mechanisms or functions that allow an individual to control and modulate their behavior and cognitive processes. These regulating processes are therefore essential for human cognition (Miyake, Friedman, Emerson, Witzki, Howerter, and Wager, 2000). However, there is little agreement concerning how many functions make up this ‘family’ of mental processes or how best to group them into a coherent structure, identifiable within specific neural substrates of the brain.

EF has also been described as a multidimensional concept of behavior. Together the EFs combine to serve a number of higher order cortical functions such as, goal-directed behavior, attentional control, temporal organization and planning (Lehto, Juujärvi, Kooistra, & Pulkkinen, 2003). Behaviorally these processes enable us to control our impulses, to hold information temporarily in mind while performing another task, to think flexibly and to complete novel or complex day-to-day tasks (Huizinga & Smidts, 2011). Consequently, the EFs involve multiple neural networks within the brain, including the thalamus, prefrontal cortex (PFC), and basal ganglia (; Middleton & Strick, 2001, 2002; Pennington, 2002; Wilcutt, 2007).

Clinical research has found EF impairments played a central role in a number of developmental disorders including Attention Deficit Hyperactivity Disorder (ADHD) and Autism Spectrum Disorder ASD (Ozonoff, 1997). These deficits were also strongly correlated with impairments in the frontal lobes of the brain. Following these discoveries interest in the EF began to filter through to normative research and within the last 30 years, researchers have investigated the developmental trajectories of the EF across childhood.

Despite the availability of numerous definitions, modern research continues to struggle with conceptualizing and modelling the EF. One of the key differences in opinion within EF literature relates to how unified the individual EFs actually are. While some authors consider the EF as a single entity, conceptually equivalent to the general intelligence factor (e.g. Duncan, Emslie, Williams, Johnson, & Freer, 1996), others prefer to adopt a more fragmented view of the EF (e.g. Diamond, 2013; Miyake et al., 2000). In a fragmented or component-specific model, the EF is seen as a central system, made up of relatively independent sub-functions (e.g. Lehto et al., 2003; Miyake et al., 2000; Robbins, 1998).

Modeling the executive function

A number of models have been proposed to conceptualize the overarching structure of the EF. Fundamentally, these models differ in the number of functions they include. They also differ in the degree to which each function is separable and whether or not the EF should be viewed as a unitary construct. These debates are often mediated by the importance placed on the Working Memory (WM) mechanism or function. While some have suggested that WM is a function included as part of the overall EF system (Diamond, 2013), others have proposed that the EF is

the central mechanism to the overarching WM system (e.g. Baddeley, 1996). This debate tends to divide researchers and most often segregates them according to their areas of interest (i.e. EF or WM).

WM researchers tend to implement Baddeley and Hitch's (1974) working memory model as the theoretical basis for their research while EF researchers tend to work from the EF model proposed by Miyake and colleagues (2000). Beyond this debate of modelling the EF, researchers have also debated the specific functions or EF components that should be included within each model. This review will briefly discuss two prominent EF models with emphasis on those that provide a sound theoretical basis for this research.

The first model discussed is a classic model of the EF and is arguably one the most historically important models in cognitive psychology. The conceptualization of the specific EFs also originated from this prominent cognitive framework. The multicomponent model proposed by Baddeley and Hitch (1974, see also Baddeley, 1996, 2000), entitled the working memory (WM) model of cognition comprised of four main components: the phonological loop (dealing with speech-based, phonological information), the visuo-spatial sketchpad (concerning visual and spatial information), the episodic buffer (a limited capacity storage system which temporarily integrates information from the visuo-spatial sketchpad and phonological loop) and the central executive (CE; or the central control system, concerned with the control and regulation of cognitive processes, in other words, the EFs).

The phonological loop, visuo-spatial sketchpad and episodic buffer act as "slave systems" to the CE which controls the allocation of resources across systems, organizes multiple cognitive activities, and can revise the content of memory in light of new and relevant information or updating (Bull, Espy, & Wiebe, 2008). Assessments of the CE involve testing processing and storage skills concurrently using tasks such as listening span (Daneman & Carpenter, 1980), counting span (Case, Kurland, & Goldberg, 1982) or backward digit span. Assessments of the visuo-spatial sketchpad and phonological loop include short-term memory (STM) tasks, requiring minimal resources from the long-term memory (LTM) store and no additional cognitive demands are present. Examples of STM tasks are the digit recall, word recall, and visual-patterns task (Baddeley, 1996; Milner 1971; Pickering & Gathercole, 2001).

Despite the CE component of the WM model (Baddeley's, 1996) having arguably the most influence on cognitive achievement (i.e. controlling each of the slave systems), for many years it remained the least studied of the four components (Baddeley, 1996). Understanding the mechanisms comprised within the CE is essential as EFs are included within this system. Baddeley (1996) proposed that three distinct functions are ascribed to the CE: inhibition, shifting and updating. Inhibition or inhibitory control (IC) refers to an ability to suppress or ignore prepotent or automatic responses as well as ignoring distracting stimuli from the environment. Shifting (or switching) is the ability to shift between mental sets or rules and has also been described as the ability to think flexibly (cognitive flexibility). Finally, updating is the ability to store information while updating, manipulating and alternating information in WM. These EFs enable individuals to focus their attention while dealing with interference and/or conflict present in complex cognitive tasks, e.g. speech production (Miller & Cohen, 2001, Ye & Zhou, 2009).

In spite of new experimental techniques, many still question the specification of EF. For example, should the EF be seen as a single, coordinated system serving a number of functions, or should it be defined as a cluster of largely autonomous control processes (Baddeley, 1996)?

The advantage of the model proposed by Miyake and colleagues model (2000) was that it brought together opposing views, describing the EF as a group of interrelated yet distinct components. They suggested that the EFs have both a unified and diverse nature and attempted to overcome issues of task impurity by employing a range of tasks to test each of the proposed EFs, using latent variable analysis to draw conclusions regarding conceptualization. Results indicated that a full three-factor model best fitted the data from the nine executive tasks and notably, EFs were not completely independent and shared some commonality between each other. The model, which identified a degree of commonality between EFs, was also a better fit for the data than the model assuming complete independence. As a result of these findings researchers now carefully consider the potential EF skills tapped by their behavioral tasks. Furthermore, it may be the case that another function or strategy beyond those tested contributed to performance on complex EF tasks.

Since publishing their paper, Miyake and colleagues' model of EF has received extensive support with samples of both adults and children (e.g. Anderson, 2002; Asato, Sweeney, & Luna, 2006; Bull, 2004; Fisk & Sharp, 2004; Garon, 2008; Huizinga, 2006; Huizinga & van der Molen, 2007; Rose, Feldman, & Jankowski, 2011).

As stated earlier, Miyake et al.'s EF model comprised of three executive sub-functions: inhibition (or inhibitory control; IC), shifting (switching or cognitive flexibility) and working memory (WM or updating). Among these functions, one function suggested as being dissociable from other EFs is inhibition or inhibitory control (IC); Miyake et al., 2000) and involves being able to deliberately inhibit dominant and autonomic (or prepotent) responses. These autonomic responses may originate from internal predispositions or may be environmental distractors. Therefore, IC enables individuals to focus their attention, behavior, thoughts and emotions while avoiding habitual or distracting responses (Diamond, 2013). Perceptually, IC requires ignoring certain stimuli and attending to alternative stimuli of choice. This ability to ignore and focus on task-relevant stimuli is also called interference suppression, selective/focused attention, attentional control or attentional inhibition (Theeuwes, 2010), and will be discussed in more details in the following section.

Attentional control (AC)

Tasks that measure attentional control commonly include distracting information that participants must ignore in order to respond successfully. Common tasks of AC include the Simon task, the Stroop task (Stroop, 1935), Flanker task (Eriksen & Eriksen, 1974; Mullane, 2009), antisaccade tasks (Luna, 2009; Munoz & Everling, 2004), delay of gratification tasks (Kochanska, 2001), and go/no go tasks (Cragg & Nation, 2008).

Typically, responses on congruent trials are faster and more accurate than responses on incongruent trials. The difference in reaction time or accuracy between congruent and incongruent trials provides an index of participants' attentional inhibition abilities, with smaller differences

between congruent and incongruent trials representing more efficient attentional control, or in other words, less cost of ignoring conflicting information.

Bilingual adults and children have been previously reported to show smaller differences between congruent and incongruent trials (i.e., more efficient attentional control) in flanker tasks (Costa, 2008; Toa, Marzecovà, Taft, Asanowicz, & Wodniecka, 2011), and antisaccade tasks (Bialystok & Viswanathan, 2009). Such bilingual advantages in attentional control are frequently explained as resulting from the need for bilinguals to keep their two language systems separate.

Green's (1998) inhibitory control (IC) model was based on the earlier work of Norman and Shallice (1988) who proposed an action model which regulated language through external sensitivity (exogenous) and internal direction (endogenous) as methods of control. For instance, Bunge (2002) differentiate between two types of IC: interference suppression and response inhibition. Recent evidence suggests that, as with active and reactive inhibition, children may show different developmental trajectories for each type. As bilingualism is not proposed to require the withholding of habitual responses in the manner required during response inhibition, no advantages have been found for such tasks, e.g. on the Day-Night task (Bunge, 2002; Colzato, 2008).

In summary, as a result of bilinguals suppressing and inhibiting the unintended language during speech production, certain aspects of IC may be advantaged through the bilingual experience, and one of the well-researched areas in this domain is attentional control ability (e.g. Bialystok, 2001; Costa et al., 2008; Paradis, 1984). The next section is an attempt to provide a brief history of related research in this regard.

Attentional control and language skills

two points should be noted about the role of AC in language skills: First, the exact role of attentional control in language learning has not yet been fully unpacked and there are few studies in the literature in this regard. Second, most of the previous research examined the role of AC in receptive language skills (listening and reading) and to the researchers best knowledge there are few studies about AC and productive skills, with no study about the role of AC on writing performance.

However, research suggests that individual differences in attentional control are related to reading comprehension in typical children, and that attentional control problems distinguish children with and without reading problems.

For example, de Jong and Das-Smaal (1995) found that attentional control correlated significantly with reading comprehension.

Also, Savage, Cornish, Manly, and Hollis (2006) found that a "central executive" composite that was weighted heavily on response inhibition accounted for significant variance in reading comprehension (5%) after age, IQ, and attention group were accounted for.

Also, van der Schoot, Licht, Horsley, and Sergeant (2000) found that dyslexics age 9–12 were generally worse at response inhibition than controls, and that dyslexic "guessers," who read fast but inaccurately, were affected more so than "spellers," who read slowly and with more accuracy.

Flory et al. (2006) used the Stop - Signal task to assess both response inhibition and inattention in 116 school - aged children (49 with ADHD, 67 non - referred controls) claiming that poor sustained attention contributes to deficits in reading comprehension that do not result from poor decoding. Poor reading comprehension may be the result of an inability to focus attention on the text, which leads to difficulties with the processing and maintenance of information in WM (Flory, 2006; Silva-Pereyra, 2010).

Finally, attentional control is also investigated in terms of dichotic listening test, which is a psychological test commonly used to investigate selective attention within the auditory system and is a subtopic of cognitive psychology and neuroscience. Specifically, it is "used as a behavioral test for hemispheric lateralization of speech sound perception. During a standard dichotic listening test, a participant is presented with two different auditory stimuli simultaneously (usually speech). The different stimuli are directed into different ears over headphones. Participants are asked to pay attention to one or both of the stimuli. Later, they are asked about the content of either the message they were asked to attend to or the message that they were not told to listen to.

Research findings indicate that bilinguals outperform monolinguals in dichotic listening tests due to their superior AC level (e.g. Egeth and Yantis 1997; Shulman et al. 1999, 2002; Corbetta et al. 2000; Hopfinger et al. 2000; Giesbrecht et al. 2003).

Despite the considerable growth of the field of L2 writing, little is known about multilinguals' writing; To date, only a small number of studies have examined multilinguals' writing (e.g., Buell, 2004; Canagarajah, 2004, 2006, 2007, 2011). Therefore, with the aim of alleviating the drawbacks of the previous studies and compensating for the lack of studies in this vein, the current study attempted to investigate the role of attentional control in bi- and multilingual writing performance.

Method

The present study sought to determine the mediating effect of attentional control on the relationship between linguistic background and writing proficiency of Iranian upper-intermediate EFL learners

Design of the study

Within a descriptive design, the current study aimed at comparing bilingual vs. trilingual EFL learners' attentional control and at determining its role on their writing proficiency in terms of CAF measures. The first group consisted of bilingual learners who were learning English as their third language, and the second group comprised trilingual learners who were learning English as their fourth language. Employing quantitative method, therefore, the data needed for approaching the above-mentioned objectives were collected through administering three types of questionnaires, i.e. linguistic background questionnaire, an adapted version of First Certificate in English (FCE) test and attentional control scale (ACS). Finally, the participants were asked to write an essay about a carefully chosen realistic topic from TOEFL writing topics. The Statistical Package for Social Sciences (SPSS, version 18) and ANCOVA series were employed to analyze the collected data

Participants

Data for the current research were collected from a total of 70 EFL learners from four different language institutes in Shahindezh, Iran. The participants were upper-intermediate EFL learners within the age range of 18 to 22, selected on the basis of convenience sampling. In the process of screening and homogenizing the participants, prior to conducting any statistical analysis, and to make sure that all of the participants were upper-intermediate level learners, an adapted version of FCE test was used and as a result, Due to the purposes of the current study and as a result of implementing the background information questionnaire, the participants were selected and assigned into two groups of bilingual and trilingual learners. The first group, the bilingual group, consisted of Turkish-Persian and Kurdish-Persian bilinguals and comprised 36 EFL learners (16 males and 20 females). The second group, the trilingual group, involved Turkish-Kurdish-Persian trilinguals and comprised 34 learners (15 males and 19 females).

Instruments

This section centers on instruments that were utilized in this study. Instruments include

- the **background information questionnaire** including 13 questions to elicit information regarding participant's age, gender, their parents' educational attainment and profession, the language(s) spoken by the participants, their age at the time of acquiring each language, the specific ways of acquiring the languages, their abilities in using the languages known to them, their English language experience, their self-rating of their L1, L2, and L3, and finally any formal instruction provided in their L1.
- **FCE test**, to measure the participants' general proficiency in English language and thus, assure the homogeneity of the sample. FCE is an intermediate/upper intermediate test developed by Cambridge University
- **Attentional control scale (ACS)** developed by Derryberry & Reed (2002), to determine the participants' attentional control level,
- a **topic writing task** which was selected from TOEFL writing inventories

Procedures

To begin with, the background information questionnaire was administered to 80 respondents from five different classes of four different language institutes at Shahindezh. Prior to this, permission was granted by the course instructors at these institutes, because regular class hours were used. This questionnaire was previously piloted by Modirkhamene (2011); accordingly its reliability was assured. The specified time for this part was 10 minutes.

Next, since the participants of the current study were from different language institutes and in order to assure homogeneity of the sample, an adapted (shortened) version of First Certificate of English (FCE). Hence, FCE test was implemented primarily in order to make sure that all the participants were at the predetermined level.

Furthermore, and after a short break, participants were asked to write an essay in English. Within a maximum period of 30 minutes, they were asked to write their essays within 120-180 word's limit. The topic of the writing task was selected from TOEFL writing inventories.

Finally, the Attentional control questionnaire was administered. ACS is a 20-item self-report questionnaire that assesses control of attention across two domains; focusing, the ability to maintain attention on a given task, and shifting, the ability to reallocate attention to a new task or to engage attention on multiple tasks.

In order to score the participant's writing tasks in terms of CAF measures, the Profile of Larsen-Freeman (2006), based on T-units, was used. The concept of T-unit has been defined as "one main clause with all subordinate clauses attached to it" (Hunt, 1965, p. 20). Accordingly, in order to estimate the writing accuracy, the proportion of the error-free T-units to the total T-units was calculated. For finding out the writing fluency, the average number of words per T-unit was taken into account, and, finally, in order to score the writing complexity, the total number of clauses divided by the total number of T-units was calculated.

It is noteworthy to mention that the above-mentioned procedures all took place in one session for each class and the total time specified to those tasks was 80 minutes. Each class was supervised by the researcher and the course instructor. Finally, after doing all the screening, only the data and written samples of 70 participants were included in the final list of collected samples.

Data Analysis

In order to analyze the elicited data about the relationship between participant's linguistic background (bilingual vs. trilingual) and attentional control ability, *t*-test analysis was used. Additionally, three separate sets of one-way between groups analysis of covariance (ANCOVA) was run in order to examine the relationship between linguistic background and each dimension of CAF measures of writing (complexity, accuracy and fluency). The mediating role of AC on the aforementioned relationship was also investigated through ANCOVA analysis. The Statistical Package for Social Sciences (SPSS, version 18) was employed to analyze the collected data.

Results and Discussion

The current study, with the aim of attending to the issues of such kind, attempted to investigate the effect of this relationship on their writing proficiency in terms of CAF measures (i.e. complexity, accuracy and fluency). Specifically, the overarching research questions which led this research study were as follows:

RQ₁: Is there a significant difference between bilingual and trilingual upper- intermediate EFL learners in terms of writing complexity when controlling the role of their attentional control?

RQ₂: Is there a significant difference between bilingual and trilingual upper-intermediate EFL learners in terms of writing accuracy when controlling the role of their attentional control?

RQ₃: Is there a significant difference between bilingual and trilingual upper-intermediate EFL learners in terms of writing fluency when controlling the role of their attentional control?

With respect to the above-mentioned explanations and in order to answer the first research question, a one-way between groups ANCOVA was conducted.

in order to ascertain the role of attentional control on their superior performance, ANCOVA analysis was run and the following results were obtained.

Table 1

Tests of Between-Subjects Effects: Complexity

Source	Type II Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	1.221a	3	.407	15.317	.000	.410
Intercept	1.118	1	1.118	42.077	.000	.389
Groups	.051	1	.051	1.917	.171	.028
Attentional control	.003	1	.003	.098	.755	.001
Groups * Attentional control	.021	1	.021	.785	.379	.012
Error	1.754	66	.027			
Total	198.566	70				
Corrected Total	2.976	69				

a. R Squared = .410 (Adjusted R Squared = .384)

As is shown in Table 1 a one-way between-groups analysis of covariance was conducted to explore the role of attentional control in the performance of the two groups in terms of complexity. The independent variable was the linguistic background of learners (bilingual vs. trilingual), and the dependent variable consisted of scores on the complexity aspect of writing proficiency. Participants' scores on the ACS (Attentional Control Scale) were used as the covariate in this analysis. Preliminary checks were conducted to ensure that there was no violation of the main assumptions of ANCOVA which were illustrated in the previous section. As is clear from the obtained results, the performance of the two groups was significantly different [$F = (.78)$, $p < .05$, partial eta squared = .012]. This means that bilinguals and trilingual' performance in complexity is significantly different. However, the mediating role of attentional control as a covariate is not significant.

In other words, according to the findings of the present study, the better performance of trilingual learners in terms of complexity is not attributable to the covariate, i.e. their higher AC level.

The second research question dealt with the possible difference between bilingual and trilingual upper-intermediate EFL learners in terms of writing accuracy when controlling the effect of participants' attentional control.

Since it resembled the second one in nature, again the researcher used a one-way between groups ANCOVA to compare the performance of bilingual and trilingual groups in terms of writing accuracy while controlling the effect of attentional control as moderator.

to find out the moderating role of attentional control on their better performance in terms of accuracy, the researcher used ANCOVA analysis and the following results were achieved.

Table 2

Tests of Between-Subjects Effects: Accuracy

a. R Squared = .070 (Adjusted R Squared = .027)

Source	Type II Sum of Squares	df	Mean Square	F	Sig.	Partial Squared	Eta
Corrected Model	.032a	3	.011	1.647	.187	.070	
Intercept	.231	1	.231	35.490	.000	.350	
Groups	.014	1	.014	2.113	.151	.031	
Attentional control	.017	1	.017	2.592	.112	.038	
Groups * Attentional control	.015	1	.015	2.316	.133	.034	
Error	.429	66	.007				
Total	57.233	70					
Corrected Total	.461	69					

As is shown in Table 2 a one-way between-groups analysis of covariance was conducted to explore the role of attentional control in the performance of the two groups in terms of accuracy. Preliminary checks were conducted to ensure that there was no violation of the main assumptions of ANCOVA which were illustrated in the previous section. As is clear from the obtained results, the performance of the two groups was significantly different [F= (2.31), p= <.05, partial eta squared= .034]. This means that bilinguals and trilinguals' performance in accuracy is significantly different. However, the mediating role of attentional control as a covariate is not significant. In other

words, according to the findings of the present study, the better performance of trilingual learners in terms of accuracy is not attributable to the covariate, i.e. their higher AC level.

Research question3

Similar to previous research questions, ANCOVA analysis was run in order to determine the moderating effect of attentional control on the relationship between linguistic background and the fluency aspect of writing proficiency.

Table 4.9

Tests of Between-Subjects Effects: Fluency

Source	Type II Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	24.986a	3	8.329	2.969	.038	.119
Intercept	72.444	1	72.444	25.830	.000	.281
Groups	4.146	1	4.146	1.478	.228	.022
Attentional control	1.426	1	1.426	.508	.478	.008
Groups * Attentional control	5.886	1	5.886	2.099	.152	.031
Error	185.111	66	2.805			
Total	8238.527	70				
Corrected Total	210.096	69				

a. R Squared = .119 (Adjusted R Squared = .079)

As is shown in Table 3 a one-way between-groups analysis of covariance was conducted to explore the role of attentional control in the performance of the two groups in terms of fluency. The independent variable was the linguistic background of learners (bilingual vs. trilingual), and the dependent variable consisted of scores on the fluency aspect of writing proficiency. Participants' scores on the ACS (Attentional Control Scale) were used as the covariate in this analysis. Preliminary checks were conducted to ensure that there was no violation of the main assumptions of ANCOVA which were illustrated in the previous section. As is clear from the obtained results, the performance of the two groups was significantly different [$F= (2.09)$, $p= <.05$, partial eta squared= .031]. This means that bilinguals and trilingual' performance in fluency is significantly different. However, the mediating role of attentional control as a covariate is not significant. In other words, according to the findings of the present study, the better performance

of trilingual learners in terms of fluency is not attributable to the covariate, i.e. their higher AC level.

Discussion

Having presented the findings of the study in the above section, the researcher provides answers to the research questions, discusses the results, and compares and contrasts them with other available and relevant findings found in the literature in the following section. The findings of the current study provided positive evidence for the aforementioned claim.

The research questions of the present study were concerned about the relationship between linguistic background and writing proficiency in terms of CAF measures (i.e. complexity, accuracy and fluency). In addition, this study sought whether AC moderates such relationship. Before reporting the obtained results and comparing them with the related literature, it should be noted here that each of the research questions dealt with two major issues: first, whether there is a difference between bilingual and trilinguals in terms of CAF measures of writing. Second, whether the differences between the two groups are attributable to their AC level. To the best of our knowledge, this study was the first attempt to explore the latter question, i.e. the moderating role of AC on the writing proficiency of EFL learners. Hence, in this regard, the related research finding is reported based on our context of the current study.

With respect to the above-mentioned explanations and regarding the remaining research question, the findings obtained through three separate sets of ANCOVA analysis demonstrated that: first, trilingual learners outperformed bilinguals in terms of complexity, accuracy and fluency. In other words, the obtained data revealed that multilingual learners are better writers in terms of CAF measures in comparison to bilinguals. It should be noted here that the plethora of studies that have explored issues in L2 writing contrasts with the dearth of research in multilingual writing. However, the findings of the present study are in line with Cenoz (2009), Herdina and Jessner (2002), Keshavarz and Ghamoushi (2014), and Dewaele (2010) who assumed that better performance of multilingual learners in writing proficiency is due to their higher metalinguistic awareness and improved cognitive skills. On the contrary, it contradicts with Raimes (1987), Arndt (1987), and Shen (2003) who found no advantage for bi- and trilingual learners over monolinguals in terms of writing proficiency.

Second, the superior performance of trilinguals in CAF measures of writing, according to the findings of the current study, cannot be attributed to their higher attentional control ability. In other words, as the related findings in previous section revealed, the superiority of multilinguals over bilinguals on CAF measures of writing proficiency is not moderated by their higher attentional control ability. It is thought that other linguistic or cognitive factors such as different learning styles, a different socio-cultural variables, memory effects, metalinguistic characteristics, etc. might be the possible cause of multilingual learners' better performance. Since the current study was the first attempt to address this question, further research in this regard is recommended to explore the role of cognitive variables, such as attentional control, in EFL learners' linguistic proficiency.

The findings revealed higher attentional control ability for trilingual learners in comparison to bilinguals. The performance of bilingual and trilingual groups in CAF measures of writing proficiency was also compared and the moderating role of AC on their performance was investigated. The obtained results indicated that attentional control does not moderate the higher performance of trilinguals in CAF measures.

The present study sought to investigate the relationship between Iranian upper-intermediate EFL learner's linguistic background (bilingual vs. trilingual) and their attentional control ability. The role of linguistic background on writing proficiency in terms of CAF measures (complexity, accuracy and fluency) was investigated as well. In addition, it was an attempt to scrutinize the moderating effect of attentional control on the relationship between linguistic background and writing proficiency.

Based on the obtained data, it was found that trilingual learners have superior attentional control ability than bilinguals. By comparing the performance of bilingual and trilingual groups in ACS (Attentional Control Scale), developed by Derryberry & Reed (2002), the findings of the current study revealed that trilingual learners have higher ability in managing their attention than bilinguals. This ability, according to Green (1998), is attributable to their experience in managing more languages in their mind. In other words, the everyday experience of choosing among their languages might be the cause of their superiority in managing their attentional resources and hence, their higher attentional control ability. The current study also revealed that attentional control does not moderate the superior performance of trilinguals in CAF measures of writing proficiency. In other words, the obtained results revealed that trilingual learners outperformed bilinguals in terms of complexity, accuracy and fluency measures of writing proficiency. But this better performance, according to the findings of the present study, is not because of their superior attentional control ability.

Implications

The findings related to the present study may provide some implications for EFL teachers, researchers, test-constructors, curriculum developers, syllabus designers, and material developers. EFL instructors, in general, and EFL teachers involved in multilingual settings, in particular, may improve their teaching process through attending to the findings of this study. They may modify their teaching procedures and methodologies to suit the particular needs and characteristics of the multilingual students.

Generally speaking, the findings may positively contribute to the realm of effective EFL instruction. As the results of the first research question revealed, multilingual learners enjoy higher attentional control ability in comparison to bilinguals. Since the role of attention and attentional resources are well-established in the realm of language learning, EFL teachers and curriculum developers should consider their multilingual learner's superior attentional capacities and adjust their teaching styles and materials according to their special characteristics.

Test-constructors, through attending to the findings of this study, can modify their testing system by preparing or selecting suitable writing tests. Moreover, they can design tests which accord with the linguistic background of the students and their special cognitive characteristics, to consequently help them enrich their background knowledge.

Limitations

Similar to the other studies, the current study suffered from some unintentional limitations. Attending to these limitations may provide some applicable insights for conducting further studies. The current study raises some caveats and limitations as follows: Of the prominent limitations is the small number of initial sample ($N=80$) which later decreased to 70 participants due to homogenizing them in terms of age, linguistic background, language typology, and EFL proficiency.

Including EFL learners involved in language institutes was another limitation of the current study which may make it difficult to attribute the findings to other larger contexts such as universities or secondary schools. Specifically stated, the very characteristics of learners (e.g. age, educational level, English language experience, English language proficiency, etc.) studying English at language institutes may differ from those involved in higher education.

The present academic research revealed that attentional control does not moderate the superior performance of multilinguals in CAF measures of writing. Otherwise stated, the current study revealed that trilingual learners have higher performance in CAF measures of writing, but this superior performance is not attributable to their greater attentional control ability.

This study contributes to a better understanding of bilingual and multilingual learners in EFL context of Iran. The results of this academic investigation might be a useful frame of reference through which educational authorities, school principals, and policy makers can put an effort to gain more in-depth knowledge about the nature of multilingualism in Iran and therefore, enhance the quality of EFL education in this regard.

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