

An Investigation of Attention Control Ability in Monolinguals, Bilinguals and Trilinguals

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Abstract

Cognitive characteristics of people are not in the same level, and facing with some situations and experiences may cause change to these features, although they may not be changed because of some factors. Here an attempt has been made to investigate one of these cognitive characteristics_ attention control ability, variations, if any, in the scope of native, second and foreign language. This study was a quantitative correlational study. A sample of 90 Iranian people (monolinguals, bilinguals, and trilinguals) was drawn from different universities and foreign language institutes. Quantitative data were collected through a valid questionnaire (attention control scale). The finding revealed that there is no significant difference between these three groups of people in terms of attention control ability.

Keywords: Attention control, Cognitive characteristics, Monolinguals, Bilinguals, Trilinguals

1. Introduction

Attention is a concept that psychologists find it difficult to define. Shiffrin (1988) provides a definition for attention and argues that “attention has been used to refer to all those aspects of human cognition to do with limited resources or capacity, and methods of dealing with such constraints” (p. 31). Poshler (1998) provides another definition for attention and postulated that attention refers to the processing or selection of some information at the presence of other information.

As mentioned, attention is not a single concept, and also it is rather than of one kind. Attention should be considered as a number of different varieties. The thing is that it is possible to constrain the amount of attention that a human can allocate to different stimuli (Mitchell, Myles, Marsden, 2013). At each time people allocate different amount of attention to different stimuli and tasks which may be restricted in some way. Regarding this issue there are two hypotheses: Robinson’s Cognitive Hypothesis (Robinson, 2007), and Skehan’s Trade-off Hypothesis (Skehan, 2009).

Based on Cognitive Hypothesis, human possess different “pools” of attentional resources, and the existence of competition within and interference between these pools may cause poorer performance. In Trade-off Hypothesis, unlike Cognitive Hypothesis, the assumption is that, there is a single limited capacity for attention, and under this hypothesis, increasing specific task makes a competition trend between fluency, accuracy and complexity. But under Cognitive Hypothesis it is not the case, and increasing specific tasks can focus attention in particular ways.

Broadbent (1954) focus on the division of attention using simultaneous, dichotic presentation that is known as the “split span” technique. The subject was presented with six digits; these digits were arranged into three successive pairs. One digit of each of these pairs was presented through a headphone to the right ear of the listener, and the other digit was heard simultaneously to the left ear. After all those six pairs of digit were presented to the subjects, they were asked to recall as many as digits they can. The interesting finding was that when all digits reported were analysed, the participants report the three items from one ear before the three items from the other ear. Based on this, Broadbent argued that “selection is ear by ear” and the second set of digits is waiting in the buffer store, and if the channel is switched they will be outputted, it shows the fact that people have not the ability to attend to both channel simultaneously, i.e. cannot attend two ears, at once. Cherry(1953) showed that, when participants were told beforehand which channel was to be responded to, the performance was better than when they were given instructions about which channel to report afterward.

In another study by Desimone and Duncan (1995) characteristics of visual attention was accounted, and the argument was that “the first basic phenomenon is limited capacity for processing information. At any given time only a small amount of the information available on the retina can be processed and used” (p. 193).

Trofimovich (2007) investigated the relationship between the noticing of feedback, the learning of English L2 morphsyntax and vocabulary, and four cognitive characteristics of the

target learner group including: phonological memory, Working memory, attention control, and analytical ability. In this study first learner were tested for their knowledge of target grammar and lexis and also for their general proficiency. Then they were asked to complete a computerized picture description task. In this kind of task some picture are presented and the participants need to answer a question by producing one sentence description, after that they heard a correct form of the sentence, and they should determine if the sentence they heard matched with the sentence they produced. For measuring participants' phonological memory and their analytical ability a series of psychological tests were used, to measure their attention control they were asked to produce two different symbol sequences at the same time. This type of task, participants' attention shifted between two sets of stimuli.

As the last step, a post test and a delayed post-test were applied to estimate their knowledge of target grammar and vocabulary. The result of this research showed that the scores of attention control implies that participants' attention control was not significantly related to their L2 learning, however there has been a significant correlation between their level of attention control and their analytical ability and also aspects of language development.

Accordingly, the present study aimed to answer the following questions:

1. Is there any significant difference between monolinguals and bilinguals in their attention control ability?
2. Is there any significant difference between monolinguals and trilinguals in their attention control ability?
3. Is there any significant difference between bilinguals and trilinguals in their attention control ability?

2. Methods

2.1 Design

The design of this study is *expost facto*, and is a quantitative correlational study.

2.2 Participants

The sample in this study consisted of 90 Iranian participants, including; 30 monolinguals, 30 bilinguals, and 30 trilinguals (35male, 55female) their selection was based on availability technique from different university and language institutes of Kermanshah, Iran. the sample was predominantly adult population, Their age ranged between up to 15 and 40. The reason for selecting such a sample was what Piaget(1985) named ' formal operational stage" -the stage of cognitive development (formal operational stage) begins around 11 and is fully achieved by age 15 . The sample all had academic education in humanities and they were in second, third, or fourth semester of their M.A course. The detailed information about their major, age, and gender were obtained through the first page of the questionnaires. Monolingual and bilingual participants were selected from Azad University of Kermanshah, Payamenoor University of Kermanshah, and Razi University of Kermanshah. Trilinguals were selected from College Institute, Bamdadan Institute, and Zagros Institute. For all

monolingual sample Persian was their only language, for bilinguals Persian was their first language and Kurdish was their second language, and trilinguals were participants with the ability, in addition to Persian and Kurdish, to speak in English, this group of sample used Persian and Kurdish in their routine and they also were people with the ability, in English, to making communication with foreigners without any explicit errors. Among these three groups of people trilinguals for their proficiency of the English were screened and only those who were upper intermediate and advanced, based on the language institute hierarchy were selected. The purpose of having subjects from the same level of proficiency was to ensure that the results were not affected by differences in knowledge of the language. Monolinguals and bilinguals were screened according to their self report. Monolingual of the study were subjects who use only one language (Persian) in the home and society, and bilinguals were people who use both Persian and Kurdish in home and in social context.

2.3 Procedure

Answering the related question needs a valid instrument so an Attentional Control Scale (Derryberry and Reed, 2002) was implemented to measure the samples' attention control ability. After preparing the required questionnaire as the first step, selecting the participants based on the criteria of this research was carried out. Accessibility to monolingual participants was one of difficult stages of doing research. This group of participants needed to use only one language (Persian) in their life and there were not a lot of people who live in a bilingual community and use only one language. Eventually 90 participants showed their agreement to take part in this experiment, which consisted of three groups: 30 monolinguals, 30 bilinguals, and 30 trilinguals. Before the main phase of the study to be employed during the main research, a pilot study was carried out with 12 subjects. participants were informed of the aim of the study as well as their scores via sending Email to the examiner. At last, 90 participants showed their agreement to taking part in this study. They were all presented with the attention control test in the same university or institute they were engaged.

2.4 Data Analysis

Answering the research questions needs to compute first, the normality of the distribution of the data, and as the distribution of the data which was computed in Kolmogrov Smirnov was not confirmed so in comparing the mean of the working memory and attention control of monolingual, bilingual, and trilingual groups nonparametric Mann-Whitney test was used, which is the equal of the parametric independent sample t-test.

3. Results

The first research question was made to do a comparison between monolinguals and bilinguals regarding their attention control.

In order to answer the first research question, first the researcher computed descriptive statistics of participants' attention control scores which were presented in Table 1.

Table 1. Descriptive Statistics of Attentional Control Test

	N	Minimum	Maximum	Mean	Std. Deviation
Attention	88	32.00	66.00	53.1250	6.21236
Valid N (listwise)	88				
	88				

It can be seen in above Table, the mean score of attention control test of the participants was 53.12 and the standard deviation was 6.12. The minimum score was 32.00 and the maximum score was 66.00.

Table 2. showed the ranks of the scores of monolinguals and bilinguals regarding their attention control ability.

Table 2. Ranks of Monolinguals and Bilinguals Attention Control Scores

	language	N	Mean Rank	Sum of Ranks
Attention control	Monolingual	30	32.32969.50	
	Bilingual	30	28.68860.50	
	Total	60		

The results of this Table showed the mean rank of 30 monolinguals as 32.32, and the sum of ranks of their scores as 969.50. Bilinguals' mean rank was 28.68 and the sum of ranks of their scores reported 860.50.

Computing the difference between monolingual and bilingual groups regarding their attention control ability nonparametric Mann-Whitney Test was conducted.

Table 3. Mann-Whitney Test of Attention Control Scores of Monolingual and Bilinguals

	Attention control
Mann-Whitney U	332.500
Wilcoxon W	738.500
Z	-1.178
Asymp. Sig. (2-tailed)	.239

Based on the above Table, the results of Mann-Whitney test shows that $z = -1.178$ and $\text{sig} = 0.239$. Because the $\text{sig} (0.239) > 0.05$, the results reveal that there is no statistically significant difference between working memory of monolingual and bilingual groups. So the first hypothesis, that is, there is no significant difference between monolinguals and bilinguals in their working memory capacity was confirmed.

RQ2: Is there any significant difference between monolinguals and trilinguals in their attention control ability?

In order to find an answer to this question the following Tables presented. Table 4.11 shows the ranks of the scores of attention control of the monolinguals and trilinguals:

Table 4. Ranks of Monolinguals and Trilinguals Attention Control Score

	language	N	Mean Rank	Sum of Ranks
Attention control	Monolingual	30	31.87	956.00
	trilingual	28	26.96	755.00
	Total	58		

The results of this Table showed that monolinguals' mean rank of attention control scores was 31.87, and the sum of ranks of this group was 956.00. trilinguals' mean rank of attention control score was 26.96 with the sum of ranks that was reported 755.00.

To compare the attention control of monolinguals and trilinguals by Mann-Whitney Test was run.

Table 5. Mann-Whitney Test of Attention Control Scores of Monolinguals and Trilinguals

	Attention control
Mann-Whitney U	349.000
Wilcoxon W	755.000
Z	-1.107
Asymp. Sig. (2-tailed)	.268

According to this table $U=349.00$, $Z=-1.107$, $\text{sig}(.268) > 0.05$ indicated that is no significant difference between monolinguals and trilinguals' attention control. So the fifth hypothesis was accepted.

The third research question was as Q3: Is there any significant difference between bilinguals and trilinguals in their attention control ability? In Table 6 the ranks of attention control of bilinguals and trilinguals are provided.

Table 6. Ranks of Monolinguals and Trilinguals Attention Control Scores

	language	N	Mean Rank	Sum of Ranks
Attention control	bilingual	30	30.00	900.00
	trilingual	28	28.96	811.00
	Total	58		

The above Table shows that the mean rank of bilinguals' attention control score was 30.00, the mean rank of trilinguals' attention control was 28.96. The sums of ranks of attention control test scores were 900.00 and 811.00 respectively for bilinguals and trilinguals. Comparison of the two groups of bilingual and trilinguals' attention scores was done using Mann-Whitney Test.

Table 7. Mann-Whitney Test of Attention Control Scores of Bilinguals and Trilinguals

	Attention control
Mann-Whitney U	405.000
Wilcoxon W	811.000
Z	-.234
Asymp. Sig. (2-tailed)	.815
a. Grouping Variable: language	

The results of the Table 7 revealed that $\text{sig}(.815) > 0.05$, so there is no significant difference between bilinguals and trilinguals regarding their scores of the attention control ability.

4. Discussion

The aim of this was to do a comparison between monolinguals, bilinguals and trilinguals in their attention control ability. The sample of this study was adult population. To the best of my knowledge there is no study investigating cognitive differences of adults, but the results of the current study supports Mirdehghan, Nejati, and Ganjian (2013) that their results showed no significant difference between L1 and L2 in terms of selective attention accuracy. However, it is not in line with the finding of Bialystok and Martin (2004) who found that bilingual children in doing the tasks that demand the inhibition of attention, have a one year performance advantage over their monolingual peers. it worth to note that attention is not a single concept rather it can be divided into its subtitles. so although based on the results of this study both monolinguals and bilinguals and even trilinguals all are in the nearby same level of attention control, but there may be some variations in their, for example, attention shifting and/or attention focusing.

5. Conclusion

Based on the results of this study it can be concluded that knowing more languages may not affect attention control ability of individuals. There were almost no differences in the way that participants recalled the digits of the Digit Span Test, so the conclusion was that there was no significant difference between monolinguals, bilinguals, and trilinguals in their attention control ability.

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