

EXTENDED ABSTRACT

A STUDY INTO THE ROLE OF WORKING MEMORY AS AN INDIVIDUAL DIFFERENCE IN ACQUIRING ORAL PROFICIENCY

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Abstract

Recent years have witnessed an increasing number of empirical second language acquisition (SLA) research into exploring the pivotal role of cognitive and affective variables as individual difference and their contributory nature in various aspects of L2 learning. Thus, the current study probed into the role of working memory as an individual difference (IDs) in acquiring oral proficiency. The multi-component model theory was used as the theoretical framework. This quasi-experimental mix-method study consisted of twenty (n=20) third-year undergraduates of the faculty of Social Sciences, University of Kelaniya. Data were collected through tests and semi-structured interviews, and data were analyzed quantitatively and qualitatively. The findings of this study revealed inconclusive and contradictory evidence in terms of quantitative and qualitative data findings. Quantitative data showed an insignificant correlation between working memory and speech production while qualitative data reported learning process and mastery in speech production impeded severely by affective variables more than cognitive variables. The results recommend more empirical studies in this area for corroboration.

Keywords: Working memory, individual difference, oral performance

1. Introduction

This study aims to address the influence of working memory (WM), and its impact on speech production in L2 speech production. WM is identified in the Second Language Acquisition (SLA) literature as one of the constituent factors which accounts for second language learners' differences in the rate of acquisition and levels of attainment. However, what is not studied extensively and proven empirically is why there is so much variation among learners in terms of achievement. Further, it is not clear whether the differences are due to the WM capacity of the individual learners, or it is a combination of other cognitive and affective factors.

A vast number of studies on single or multiple individual differences; specifically, on working memory were carried out in the early 1960s in the field of SLA and there was a paucity since then (Carroll, 1965). On the other hand, when considering its discourse in Sri Lanka, to the best of my knowledge, no single study on WM and SLA has been reported on the given phenomena related to second language pedagogy.

The remaining section of the introduction, therefore, will look at the literature related to working memory and speaking skills. Empirical evidence suggests the importance of WM in L2

speech production. The research conducted at the dawn of the 20th century confirmed that based on WM, it is possible to predict L2 oral development in computer-mediated communication (see Payne & Whitney, 2002; Payne & Ross, 2005) and in the traditional classroom (Mizera, 2006; O'Brien, Segalowitz, Collentine, & Freed, 2007). As indicated in the multi-component model theory, the phonological loop is used differently in various stages of L2 oral development: at the early level, it helps in the development of narrative skills and at a more advanced level, it contributes to the correct use of function words (O'Brien et al., 2007). This research finding coincides with Payne's and Whitney's (2002) study that WM plays a different role at different levels of fluency of L2 speakers. Fortkamp (1999) study examined the relationship between the limited capacity of a person's working memory and L2 speech production in a group of learners whose L1 is Portuguese and L2 is English. The research revealed that learners with larger WM capacity have higher speech rates. However, it was not very clear whether learners' lower performance was attributed only to their limited WM or due to other affective factors.

Teaching and mastering speaking as a skill in the ESL context are always challenging for both teachers and learners (Bygate, 1987, p.10). Similarly, Lado (1961) argued speaking is one of the important yet difficult skills to be mastered due to its spontaneous nature. Thus, the present study aims to investigate the impact of working memory as an individual difference in acquiring oral proficiency and further examines the reasons as to how and why there is a gap among learners in acquiring speech and attaining mastery beyond the threshold level.

To examine the complex interplay of individual differences in acquiring oral proficiency, the current study sets out to answer the following research questions:

1. To what extent do individual differences in working memory diverge among second language learners?
2. What roles do individual differences in working memory play in l2 learning and speech production?

2. Methodology

The present study employed a mix-method research design and the sample consisted of (n=20) undergraduates of the social sciences of the University of Kelaniya. Convenient sampling was used as the sampling method which is known as availability sampling; a specific type of non-probability sampling method that relies on data collection from a conveniently available population (Sedgwick, 2013). The reason why the present study incorporates a mixed-method research paradigm is to transcend the traditional dichotomy between quantitative (positivist) and qualitative (interpretivist) research approaches as highlighted (Johnson et al., 2007). Moreover, quantitative data was collected through "the adapted version of the Speaking Span Test (Daneman & Green, 1986)" and a narrative task (Robbinson, 1995) while the qualitative data was collected through an interview protocol. The SPSS package and a data-driven coding system were used to analyse quantitative and qualitative data respectively.

3. Results and Discussions

The following section will present the results in the following sequence:

- working memory
- narrative task and
- interview data

3.1 Working Memory

Results of the working memory test (for more details of the Speaking Span Test, test items, and how the test is conducted, see Speaking Span Test by Daneman & Green, 1986) The individual test

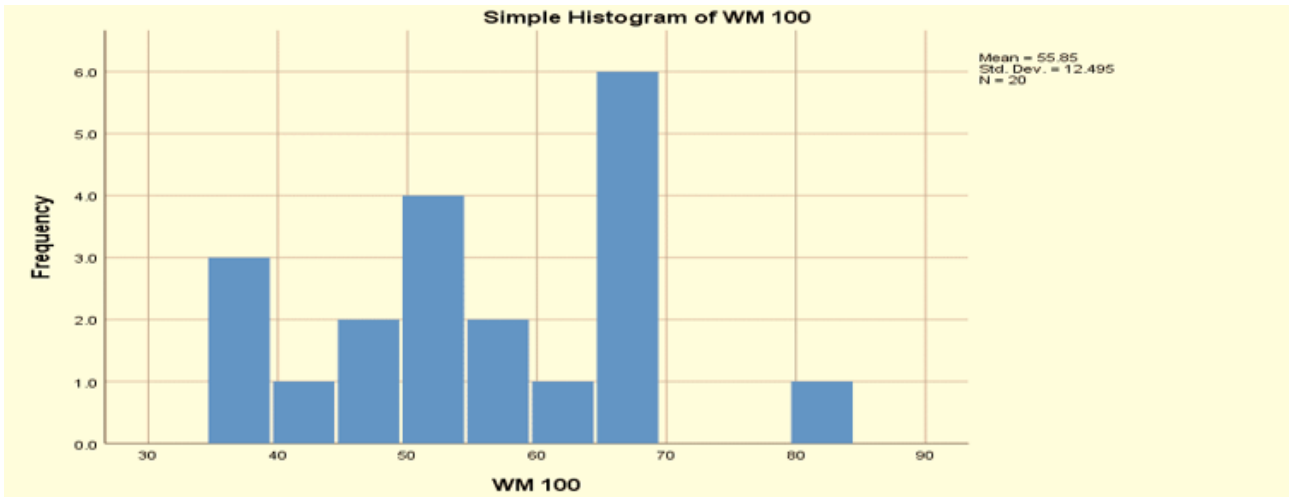


Figure 1. Histogram of the test results of WM

Table 1. Results of the WM test

Participant ID	WM (out of 100 %)
1	38
2	41
3	51
4	48
5	37
6	46
7	38
8	59
9	68
10	68
11	68
12	68
13	65
14	50
15	52
16	65
17	63
18	52
19	58
20	82

result of working memory shows a normal distribution of the test scores where the discrimination index (45) i.e., the difference from the lowest to the highest obtained in the test provides evidence of variability among individuals.

The above histogram indicates the mean score ($M= 55.85$) and standard deviation ($SD= 12.495$) of the speaking span test suggests that the overall performance of the candidates is just above average.

Table 2. Mean score and standard deviation of planned and spontaneous tasks

Tasks (100%)	N	Range	Minimum	Maximum	Mean	Std. Deviation
Planned (F/A/C)	20	39	28	67	42.90	16.435
Spontaneous (F/A/C)	20	54	22	76	40.10	14.574

3.2 Narrative task

The results of the picture-cued narrative task adapted from Robinson (1995) are presented in the following section. This narrative task is one of the most popular ways to elicit oral language performance through a picture-cued stimulus that requires a description from the learner. Here, the task is carried out based on two different speaking situations: planned and spontaneous (for more details of the narrative task, picture types, and how the task is conducted, see Robinson, 1995).

Descriptive statistics of the planned and spontaneous tasks result as shown in the table above suggest that the candidates performed better in the planned task than the spontaneous task as expected but the difference is insignificant.

Interview data and the analysis of the data are summarized as follows. The above data presents what the participants have suggested at the interview phase of the study. The interview data suggest that it is not only cognitive factors but also socio-linguistic and affective factors that affect candidates in their L2 speech production.

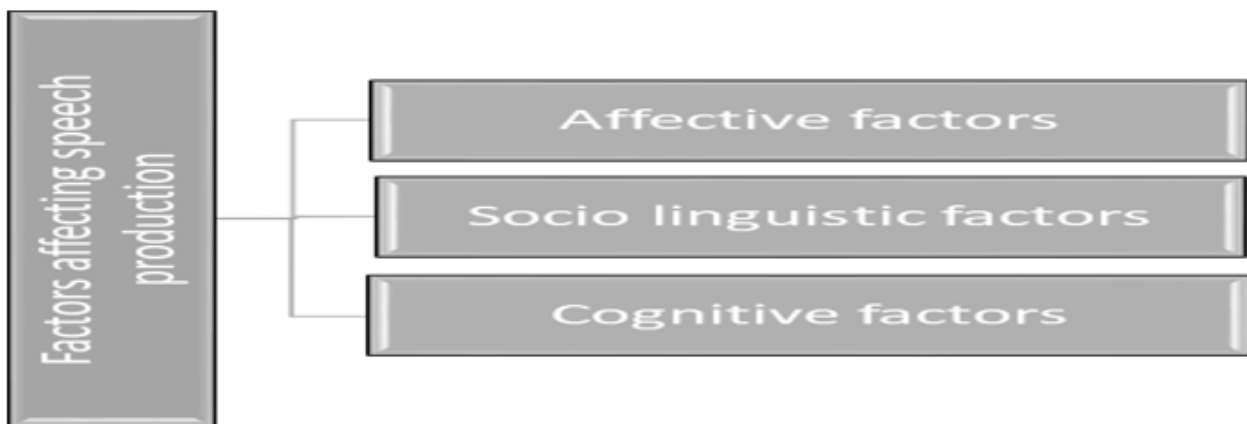


Figure 2. Summary of the interview data

4. Conclusion

The following table summarizes the findings of the study. To answer whether the individual difference in working memory has any influence on performance in the planned and spontaneous tasks, descriptive statistics were performed, and the results are presented in the discussion section. To observe a clear connection between these two independent variables (WM and Narrative task), a histogram was used to find the mean score and standard deviation of WM, and the mean score and standard deviation of planned and spontaneous tasks were calculated and compared. The mean score of WM is greater than the mean score of the planned and spontaneous tasks ($55.85 > 42.90$) and ($55.85 > 40.10$) provides no clear evidence of the influence of WM while performing the narrative tasks. The study anticipated a greater difference in the variability of the mean scores between spontaneous and planned tasks because participants had extra two minutes to prepare for the planned task. However,

Table 3. Findings of the study

Research question	The finding
To what extent does the individual difference in working memory diverge among second language learners?	A wide array of divergence of working memory was observed among different individuals. Statistically, an insignificant correlation was evident between working memory and speech production.
What roles do individual differences in working memory play in L2 learning and speech production?	The performance score of the participants in planned and spontaneous tasks has no bearing on their performance of the WM test scores. This was evident through the comparison of the mean scores of these tests and tasks. Participants performed better in planned tasks compared to spontaneous tasks as expected. However, an insignificant difference was observed. Thematic analysis yielded the following four superordinate themes: Status of L2 speaking in the ESL classroom. Factors affecting the speech performance of the learners. Learning strategies. Students' perceptions in improving speaking skills in the ESL classroom.

the difference is merely 2.8 which is statistically insignificant. This suggests that the given extra time had no impact on the performance in this study.

Through the analysis of the interview data, it is quite clear that affective and sociolinguistic factors do play a major role that obstructs the language learning process of the learners, while cognitive variables do impact their learning process. However, the rate of acquisition is sluggish because the positive factors are outweighed by the negative factors. The findings of this study coincide with Mizera's (2006) findings where complexities involved in L2 speech performance; may involve factors other than cognitive individual differences. He claims that personal and affective factors may also play a role in L2 speech performance. The findings of this study corroborate the arguments presented by Mizera (2006) that factors such as anxiety, nervousness, shyness, and lack of self-confidence have a greater influence on second language learners' speech production other than cognitive individual differences alone.

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