
**The Effect of Education and Gender on Language Proficiency: A Study
of Multilingual Hungarian Young Adults' Verbal Fluency**

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Abstract

Recent developments in the field of multilingual processing have led to a renewed interest in exploring the effect of verbal fluency tasks from a new perspective (shishkin & Ecke, 2018). This Hungarian case study intends to investigate the effect of verbal fluency tasks on multilingual participants' language proficiency with special attention to gender differences and educational background. Six participants were recruited to take part in the study: three males and three females. Respondents' first language (L1) was Hungarian while their two foreign languages include English (L2/ L3) and German (L2/ L3). Data for this study were collected by using verbal fluency tasks, namely phonological and semantic fluency tests. Data management and analysis were performed using SPSS 22. The results suggest that students outperformed their graduate peers. The majority of the participants obtained better scores in English in terms of semantic fluency meanwhile most of the subjects achieved greater results in German as for the phonemic category. Female participants outperformed males both in the majority of phonemic and semantic tasks.

Keywords

Multilingual processing, verbal fluency, verbal fluency tasks

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Introduction

Verbal fluency is a major area of interest in the field of neuropsychology. Studies have been mainly focused on the relationship between verbal fluency and the cognitive status so far (Troyer & Moscovitch, 2006). Research based on verbal fluency tests - especially phonological and semantic fluency- has been studied by many researchers in order to investigate the effect of verbal fluency tasks before or after the decline of the mental status and cognitive processes (Shao, Janse, Visser, & Meyer, 2014). These tests are mostly implemented either to find out probably more diagnosis on mental health disease like dementia, or Alzheimer disease or to examine the relationship between verbal fluency tests and the decline of mental status in patients (Weakley, & Schmitter-Edgecombe, 2014; Mueller, Koscik, LaRue, Clark, Hermann, Johnson, & Sager, 2015). Demographic characteristics of the subjects can also play an integrative role in the semantic and phonological fluency. According to the PISA report (2003) socio-economic status (SES) is interconnected with the motivation and language proficiency (Kormos & Kiddle, 2013). Moreover, verbal fluency tests are applied to assess creativity and strategical thinking based on gender differences (Scheuringer, Wittig, & Pletzer, 2017; Rena Li, 2014; Hyde & Marcia, 1988). Relevant and fresh case studies have been appeared in the scene to provide new insight into the effect of verbal fluency tasks on gender, maturity or language dominance (Nshwi & Failasofah, 2019; Alkrisheh & de Bot, 2018). Recently, one study has been written about the multilingual context of Indonesia where the researcher investigated three different languages with the help of verbal fluency tasks (Aziez et al., 2020).

Based on the latest statistical data, learning foreign languages and speaking more than one language can still be counted as a peculiarity in Hungary. However, far too little attention has been paid to the effect of language fluency task amongst university students (Olkonnen, 2017). The sample consists of undergraduate and graduate students who were asked to take part in the research. This case study seeks to examine the language proficiency in three different languages based on verbal fluency tasks in the case of six Hungarian young adults. In reviewing the literature, definitions of first language, mother tongue and second/additional language are given in order to provide the theoretical framework of the current study. Moreover, gender differences and the effect of educational background will be scrutinized based on the literature. Dialect is out of consideration in the current paper.

Whilst some research has been carried out on the difference of mono- vs. bilinguals, there have been few empirical investigations into the role of verbal fluency tasks on third language acquisition and on gender differences (Huang et al., 2020). Moreover, a considerable amount of literature has been published on the effect of verbal fluency tasks. So far, however, there has been little discussion about the role of educational background in verbal fluency tasks. There is also a further issue that should be touched upon. Gender differences are a highly controversial topic so this research study investigates the role of sex in different fluency tasks. The aim of the current study is to concentrate on multilingual processing using verbal fluency test amongst graduate and undergraduate university students. This research seeks to examine the role of multilingual proficiency, gender and education on verbal fluency.

Literature Review

We need to define language from a sociolinguistic approach. Sociolinguistics considers language as a behaviour which has regional and social situations. Language is not only used for communication but it also has the power to form one's identity (van Coetsem, 1992). Language can be characterized by different factors such as language use, function, and status. Vernacular variety of the language is the one which is spoken by common speech and by a particular region in the country. The opposite side of vernacular language is considered to be the taught and written variety of the language. Vernacular languages are usually underestimated ones comparing to the standard variety of the languages. The standardization process involves grammar, pronunciation, vocabulary and orthography. The role of the standard variety can be quite diversified: it is applied to the education, administration, and to the media (Stavans & Hoffmann, 2015). This can be briefly illustrated by the Hungarian language. The standard variety of Hungarian is the language what we use at the office, on media platforms or in the educational context. The vernacular version of Hungarian involves a lot of expressions (like slang words) or different grammatical forms of the language that is not obliged to use officially.

The definition of mother tongue and first language (L1) need to be clarified as literature offers contradictory findings about one's mother tongue that can be identical with someone's 'native', 'home' or primary language. According to Stavans and Hoffman (2015), "the notion mother tongue refers to the first language acquired, possibly the one that one knows best and quite likely the language that defines the group identity" (p. 41). The Collins Online Dictionary defines first language differently as mother tongue: "Someone's first language is the language that they learned first and speak best; used especially when someone speaks more than one language."¹ Hungarian language is the ultimate mother tongue of the participants as the state language of the country is exclusively Hungarian besides the 13 minority languages (Kenesei, 2010). The question of minority languages is neglected in this case study.

A vivid interest has aroused in multilingualism research over the past decade. Multilingualism is a natural trend to human speakers and it is an integral part of the human language faculty. Linguists working in the field of bi- and multilingualism are more popular in our modern society due to globalization, mobility and fast communication (Hammarberg, 2018). Research on third language acquisition (TLA) is very limited and it is still in its infancy, although this particular field has got more attention over the last decade. The intense activity of the emerging field started approximately 20 years ago therefore multilingualism has received much attention only in the past two decades. Nowadays being monolingual means the exception and commanding two or more languages is not counted as peculiarity like in the former century (Herdina & Jessner, 2002). Many people can acquire a third or fourth language and multilingualism or third language acquisition is a natural phenomenon in many parts of the world. However, TLA is more common in multilingual

¹ <https://www.collinsdictionary.com/dictionary/english/first-language>

settings like in Africa or Asia; people can acquire second/third or additional languages in monolingual settings (Cenoz, 2013). With the increased interest in third language acquisition, several authors (De Angelis, 2007; Hammarberg, 2010) felt the need to investigate whether there are differences between multilingualism and TLA and to what extent (Hammarberg, 2014)

A second language (L2) refers to any language at an individual's disposal other than his/her mother tongue. One can acquire more languages after the second language; it can be named additional languages. Grosjean (2001) points out that bilinguals are those who use two or more languages in their every-day life so the focus is on the regular use and not on fluency. Jessner (2008) talks about inconsistency in terminology because focusing on more than two languages can be problematic from a traditional monolingual perspective.

Multilingualism research concentrates on more than two languages which may occur a terminological confusion with regard to the traditional monolingual norms. As already mentioned, the study of SLA applies to the learning of second language/ languages according to some researchers (Cook & Singleton, 2014). SLA scholars believe that the development and processing of an L2 includes the same mechanisms which one needs in order to acquire a third language. As distinct from this, a growing number of researchers believe that SLA is different from TLA in many aspects (see Cenoz, Hufeisen, & Jessner, 2001, 2003). For Cenoz (2013), TLA refers to "the acquisition of a language that is different from the first and second and is acquired after them." (p.71). TLA is often used as a synonym for multilingualism but third languages acquisition means the acquisition of an L3.

Multilingualism covers a broader field than language acquisition as it refers to the proficiency in 2 or more languages. Multilingualism research with particular reference to language learning and speech development are usually in short supply but some significant developments have been made recently (De Angelis, 2007). Learners of two or more languages should cope with the challenges of building strategies and skills in order to achieve the language learning tasks. Multilingual speakers can reflect on their own learning process and they are more successful in explaining the usefulness of prior linguistic knowledge. Moreover, Cenoz (2013) examined the difference between mono-and multilingual learners and the diversity of learning can be a noticeable feature. Learning a second language can have various routes in case of even a second language. The L2 status plays an important role in the language learning process. Another distinction between 2nd and 3rd language acquisition refers to the contextual and linguistic elements that are called third language competence and performance.

In corresponding to language proficiency, several studies have dealt with the issues on gender differences with regard to verbal fluency tasks (Hyde & Marcia, 1988; Scheuringer, Wittig, & Pletzer, 2017). Sex differences in verbal fluency performance are a much debated topic. A female advantage has been more often observed in case of phonemic fluency (Weiss et al., 2006). Despite this, very few studies showed that women tend to outperform men in semantic fluency tasks (Capitani et al. 1999, 2005) while Mathuranath et al. (2003) conducted a study to examine the effects of age, education and gender on verbal fluency. A full discussion of the issue is beyond the scope of the current research.

Methodology

Research design, site, and participants

The study employs quantitative method in order to answer the research questions. This study was conducted in the form of filling in a verbal fluency test, with data being gathered via verbal fluency tests (VFT) including Semantic Fluency (SF) task and Phonemic Fluency (PF) task. The verbal fluency test is a short test which measures verbal and cognitive functioning (e.g., Lezak et al., 2012). The VFT typically involves two tasks: category fluency (or it is called semantic fluency - Benton, 1968) and letter fluency (Newcombe, 1969 - phonemic fluency). In the standard versions of the tasks, participants are given 60 seconds (1 min.) to make up as many words as possible within a semantic category (category fluency) or starting with a given letter (letter fluency). Semantic category labels as category fluency and letter fluency are called phonological category, as well. The terminology will be used according to this naming. The participant's score is the number of correct words related to each task. The test was constructed on an online surface using the application of quizlet.com. The questions were designed to focus on one semantic category (jobs) and on one phonological category (words starting with letter S) (Shao, Janse, Visser, & Meyer, 2014).

A small sample was chosen because of the expected challenge of recruiting voluntary participants due to the tight time frame as this study was part of a PhD course at University of Pannonia (2018, May). Six university students (N=6) were involved in this study from the University of Pannonia. Gender differences can be detected in the project as three women and three men took part in the study. They are young adults between the age of 19 and 26. They started to acquire second and third languages at primary school. All the students were participants from the University of Pannonia, Veszprém although fictional names were used in this study. It is important to mention that three of them accomplished their teacher training MA studies: one of the three studied only German at the university whereas the other two participants finished their studies as English-German teacher. It is a vital factor that the three students are studying in the teacher training programme of English and or German. One of them was first year student while the other two participants were second year students. As far as the languages are concerned, the mother tongue of the participants is Hungarian and they acquire English and German languages as foreign languages (L2/L3).

Data collection and analysis

Participants were given two tasks from the verbal fluency test. (VFT) They needed to fill in the online format of the tests and they had got 1 minute for accomplishing each task. Participants were asked to overtly generate as many Hungarian words as possible in one minute according to the given examples. First, letter fluency was assessed in the case of one trial: participants were asked to create words starting with letter 'S'. After that, category fluency was measured with the help of one trial: individuals were asked to name jobs in Hungarian language. When the minute passes, the participants move directly to next

category. Subjects had to accomplish the subparts of the same test in English and German, as well. Data management and analysis were performed using *SPSS* (2013). The quantitative data from the test was analysed by using *SPSS 22* program and the findings were presented in tables.

Ethical considerations

The present study was implemented with the help of the participants who studied at the University of Pannonia, Veszprém. They were informed about the process of investigation and it was highlighted that participation was voluntary. Subjects had the right to withdraw from the research but 6 out of the 6 participants could successfully fulfil the tasks. The case study was self-funded. Information and data on participants have been kept confidentially.

Findings

Abbreviations will be used to describe the variables which are important at the stage of the data analysis. Hung(S) is phonemic category in Hungarian, Eng(S) stands for phonemic category in English and Ger(S) illustrates phonemic category in German. The same labels were used in the case of the semantic category i.e. Hung (Jobs) stands for the semantic category in the Hungarian language, Eng(Jobs) is semantic category in English meanwhile Ger(Jobs) describes the semantic category in the German language.

Table 1 illustrates the results of the verbal fluency test. Inserting this chart is needed in order to exemplify individual differences compared to the total data. Hungarian is the mother tongue for all the participants so focusing on foreign language proficiency represents interesting data. It is highly important to mention that participants' educational background and career are known factors. Three participants are teachers but only two of them use the foreign languages on a daily basis. The first participant is working at a primary school and her major is German. She acquired the English language (L3) not as part of her university studies but she accomplished a language certificate in English (B2). Her results indicate that her scores are significantly higher in German (25; 12) than in English (4;5). Participant 2 is nowadays working as an assistant at a customer service and she does not use English and German languages that frequently. She accomplished her studies as English-German teacher but her results are unanticipated as she could not produce as many words as expected based on her language proficiency (e.g.: German: 7; 9 and English: 5; 14.) Comparing the two results (A. G. and A. Sch.) shows that the order of language acquisition and the years of language learning are not always straightly proportional with the proficiency. Participant 1 and 2 achieved quite similar results in English although only one of them accomplished her studies as an English teacher.

The scores of the third participant (Lóránt) serve as a positive outcome because he obtained quite similar scores related to his English and German in letter and semantic fluency. (E: 10, 11; G: 10, 11) He works as a teacher and he also frequently uses foreign languages in his everyday life. The other three participants were students at the University of Pannonia: one of them is a female while the other two participants are male subjects. They

gained higher results both in semantic fluency and letter fluency with regard to Hungarian. Students had got a more extensive vocabulary because they encountered more words and phrases during their studies. Analysing the test scores and the status of L2 could give an unanticipated finding: the performance does not always in line with the order of the language acquisition. The most striking result to emerge from the data is the leading role of the German language as the majority of the students produced more words in German than in English in the semantic category.

Table 1. *The results of verbal fluency test: Students and graduate participants*

Name	Hung(S)	Eng(S)	Germ(S)	Hung (Jobs)	Eng (Jobs)	Germ(Jobs)
1.Andrea G.	14	4	25	15	5	12
2.Adrea Sch.	21	5	7	19	14	9
3. Erika	17	15	25	23	20	14
4. Lóránt	12	10	11	9	10	11
5. Gábor	17	8	4	16	7	3
6. Bence	15	11	10	14	6	4

Simple statistical analysis was used to investigate the relationship between level of education and phonemic fluency. Students achieved greater results in English and in Hungarian than graduates which eventuated from the more frequent encounters of the foreign languages at the university. Table 2 indicated that students merely outperformed graduate participants namely in English (M=11, 33) and in Hungarian (M=16, 33) phonemic tasks. Despite of this, graduates achieved greater results in German (M=14, 33) phonemic fluency task.

Table 2. *Phonemic fluency and educational background*

education		Hung(S)	Eng (S)	Germ(S)
graduate	Mean	15,67	6,33	14,33
	N	3	3	3
	Std. Deviation	4,726	3,215	9,452
student	Mean	16,33	11,33	13,00
	N	3	3	3
	Std. Deviation	1,155	3,512	10,817

The role of educational level was also examined by analysing the semantic category with the help of descriptive statistics. As can be seen from the table, students achieved greater results in two categories namely in Hungarian jobs (M=14, 33) and in English jobs (M=11, 00) than their graduate peers. However, graduates outperformed undergraduates only in the German language (M=10, 67).

Table 3. *Semantic fluency and educational background*

education		Hung(Jobs)	Eng(Jobs)	Germ(Jobs)
graduate	Mean	14,33	9,67	10,67
	N	3	3	3
	Std. Deviation	5,033	4,509	1,528
student	Mean	17,67	11,00	7,00
	N	3	3	3
	Std. Deviation	4,726	7,810	6,083

Table 4 indicates that the results of letter fluency are very similar to the highest scores by the participants were for Hungarian, which is their native language. The descriptive statistics of the phonemic fluency shows that a normal distribution can be seen due to the standard deviations. The standard deviation of Hungarian is the lowest one as opposed to the other values like in the case of English and German.

Table 4. *Phonemic fluency*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Eng (S)	6	11	4	15	8,83	4,070
Hung(S)	6	9	12	21	16,00	3,098
Germ(S)	6	21	4	25	13,67	9,114

Table 5 provides the descriptive statistics for the semantic category. It is unsurprisingly true that participants produced the most Hungarian words related to jobs because the average scores of Hungarian jobs was the highest (M=16). What is not an astonishing fact is that English language (M=10, 33) outperformed the German one (M=8,83). The reason behind this is that the leading role of English can motivate people to acquire the language. As far as the standard deviation of the mean is concerned, there is normal distribution related to the semantic category.

Table 5. *Semantic category*

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Eng(Jobs)	6	15	5	20	10,33	5,750
Hung(Jobs)	6	14	9	23	16,00	4,733
Germ(Jobs)	6	11	3	14	8,83	4,446

Table 6 indicates the total number of words that all the 6 participants could perform in the different categories (phonemic and semantic) and in the different languages (Hungarian, English, and German). The findings suggest that participants obtain the greatest result in Hung (S) and in Hung (Jobs) and same amount of words (Sum= 96) were produced in both categories. With respect to foreign languages, the majority of the students achieved higher scores in German phonemic fluency task (Sum=82) than in English. By contrast, English language (Sum=62) outperformed German in semantic category.

Table 6. *Word production by categories*

	N	Sum	Mean	Std. Deviation
Eng (S)	6	53	8,83	4,070
Hung(S)	6	96	16,00	3,098
Germ(S)	6	82	13,67	9,114
Hung(Jobs)	6	96	16,00	4,733
Eng(Jobs)	6	62	10,33	5,750
Germ(Jobs)	6	53	8,83	4,446

Viewing the correlations between words starting with S in all the three languages, no significant difference can be explored since none of the correlation coefficients were significant at 5% level. Negative correlations could be viewed between Hungarian and English ($p=-,174$) and between German and English ($p=-,283$). The reason can be the factor that participants produced words in three different languages and the sample size was too small (Table 7).

Table 7. *Correlation: Phonological fluency*

		Eng (S)	Germ(S)
Eng (S)	Pearson Correlation		,203
	Sig. (2-tailed)		,700
	N		6
Hung(S)	Pearson Correlation	-,174	-,283
	Sig. (2-tailed)	,741	,586
	N	6	6

Table 8 presents the summary statistics about the correlations of the semantic category in all the three languages. No significant differences can be detected from the view of three languages (English, German and Hungarian). According to the Pearson correlation coefficient, positive correlation can be detected between English and German jobs. One unanticipated finding was that a very positive correlation could be seen between the results of Hungarian and English jobs.

Table 8. *Correlation: Semantic fluency*

		Hung(Jobs)	Germ(Jobs)
Eng(Jobs)	Pearson Correlation	,698	,574
	Sig. (2-tailed)	,123	,234
Hung(Jobs)	Pearson Correlation		,266
	Sig. (2-tailed)		,610

The table below illustrates the correlation between the three languages in the case of the semantic and phonemic categories. *Paired samples T-test* was used to explore whether there is a significant difference between the 2 categories or not. Table 8 shows that a strong and positive correlation can be detected in Hungarian and German letter and semantic fluency. The correlation between Ger(S) and Ger(Jobs) is interesting because English has gained a more prominent role as world language. German categories have got a significant difference due to the results.

Table 9. *Paired samples T-test: Languages*

		N	Correlation	Sig.
Pair 1	Hung(S) & Hung(Jobs)	6	,736	,095
Pair 2	Eng (S) & Eng(Jobs)	6	,550	,258
Pair 3	Germ(S) & Germ(Jobs)	6	,798	,057

The chart (Table 10) below presents the relationship between gender and phonemic fluency. Female participants tend to achieve greater results in German (M=19, 00) and Hungarian (M=17,33) phonemic fluency test. Despite of this, male participants outperformed females in the English version (M=9, 67) of the phonemic fluency test.

Table 10. *Gender and semantic fluency*

Gender		Eng (S)	Hung(S)	Germ(S)
male	Mean	9,67	14,67	8,33
	N	3	3	3
	Std. Deviation	1,528	2,517	3,786
female	Mean	8,00	17,33	19,00
	N	3	3	3
	Std. Deviation	6,083	3,512	10,392

What is surprising is that females outperformed males in case of semantic fluency tests. The mean values of the semantic part showed that women reached higher results than men in the English and German semantic fluency tests. However, we need to take into account that the small sample size could influence the outcome of the test results.

Table 11. *Gender and semantic fluency*

Gender		Hung(Jobs)	Eng(Jobs)	Germ(Jobs)
male	Mean	13,00	7,67	6,00
	N	3	3	3
	Std. Deviation	3,606	2,082	4,359
female	Mean	19,00	13,00	11,67
	N	3	3	3
	Std. Deviation	4,000	7,550	2,517

Discussion

The involvement of three different languages (Hungarian, English and German) was a more demanding task and little evidence has been found to use as a reference. However, limited options were available to analyse the relationships between languages or categories but a great variety of data analysis and interpretation could be implemented. The most striking observation to emerge from the data comparison was that the tests were accomplished in the Hungarian language (L1) with the highest means in the phonemic and semantic categories. This finding contradicts with the study of Aziez et al. (2020) who found lower level of fluency in the participants' L1 than in L2 or L3.

The results showed that students accomplished verbal fluency tasks better than the graduate students. One possible interpretation could be that students obtained a higher intensity of language input and their vocabulary repertoire was more colourful and wider. All of the students reported that their language proficiency was becoming better due to the everyday habits and language use in the foreign language classroom. Respondents' foreign language proficiency supports the dynamic systems theory of Herdina and Jessner (2002) as language systems are dynamic and fluent systems.

As far as the two foreign languages are concerned, most of the students obtained greater results related to the English language in the semantic category meanwhile the majority of the students performed better in the German language in the phonemic category. The German language has got more words and phrases starting with S since we could think about the words with "Sch", as well. The reason could be straightforward behind the superior role of English in case of jobs as the name of professions are international and it can be related more to the English language (e.g., businessman, policeman, doctor).

The most surprising aspect of the data was that language order does not always in line with the proficiency. The discovery agreed to Jessner's (2006) view who supports the idea of the emergent qualitative changes in case of three languages "Apart from all the individual and social factors affecting second language acquisition, the process of learning and the product of having learnt a second language can potentially exert influence on the acquisition of an L3 and this involves a quality change in language learning and processing" (p.14).

Taken together, the results showed that a positive correlation was found in the semantic or phonemic categories related to Hungarian, English and German. However, the

data suggests that significant difference cannot be seen either in phonemic or in semantic categories. Insignificant differences can be detected within the phonemic or semantic categories based on the three languages. This result contradicts with Nshwi and Failasofah's study (2019) in which significant difference can be found in both categories (semantic and phonemic). Female participants gained higher scores in the semantic and in the phonemic categories than males. Females' superiority has played an integrative role in the work of former researchers (Maccoby & Jacklin 1974; Maccoby, 1966). Finally, the conclusion gives a brief summary and critique of the findings.

Conclusion

The study was carried out at the University of Pannonia and six participants were asked to take part in the research in 2018. Individuals were given the verbal fluency test in three languages and they filled in the test using an online platform. The aim of the research was to examine the effect of verbal fluency task on proficiency, gender and education amongst university students. The findings showed that undergraduate students accomplished verbal fluency tasks better than the graduate students. Additionally, a strong positive correlation was found in the semantic or phonemic categories related to English, Hungarian and German. With regard to gender differences, females obtained higher scores in the semantic and in the phonemic categories than males at least in two languages.

This present article serves as a base for future studies as it is considered as a pioneer work in the Hungarian context. It was not possible to investigate the significant difference between languages or categories because the sample size was too small. Our findings cannot be generalized due to the low number of the subjects so a larger study is planned to carry out. As for future implications, more participants should be involved and six more individuals are planned to take part in the future research. More detailed background (socio-economic status) of the participants can promote a more insightful research study.

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