Research Networking Programmes

Short Visit Grant ☒ or Exchange Visit Grant ☐

(please tick the relevant box)

Scientific Report

The scientific report (WORD or PDF file – maximum of eight A4 pages) should be submitted online within one month of the event. It will be published on the ESF website.

***Proposal Title**:* Phonological processing in dyslexia

Application Reference N°: 6545

1) Purpose of the visit

The aim of this visit was to discuss some theoretical and methodological issues regarding my PhD thesis in the Interdisciplinary Scientific Doctoral study Language and Cognitive Neuroscience. The topic of the thesis is description of phonological deficit in dyslexia in Croatian as orthographically transparent language. Although there is broad evidence that reading impairment is linked to phonological deficits and many studies connect early phonological skills and reading development, the nature of phonological deficit is still relatively unexplored, especially in languages other than English. One of the main area of interest of researchers at Institute of Cognitive Neuroscience and Psychology at Hungarian Academy of Sciences in Budapest is phonological processing (in bilingual speakers, infants and specific populations like children with language or reading disorders), thus I found their advices and expertise very useful for my research.

One of the models within phonological theory of dyslexia suggests that there are two possible aspects of phonological deficit: deficit in phonological representations and deficit in phonological skills (Ramus and Szenkovits, 2008). Phonological representations and skills are hard to be perfectly dissociated but their dissociation is crucial for testing the theory. Although the idea of two factors within phonological system is relatively new in the field of dyslexia (Ramus et al, 2013), dichotomy between phonological representations and manipulation with those representations (phonological skills) has been proved to be important indicator of development of phonological system in bilinguals and second language learners. Researchers at Institute of Cognitive Neuroscience and Psychology in Budapest are exploring second language learning using

stress deafness paradigm developed by Dupoux (2008, 2010) which taps individual ability to discriminate phonological representations and ability to code and recall them. Although primarily developed to study bilinguals, paradigm allows testing the model of F. Ramus within phonological theory of dyslexia. I already discussed some methodological issues regarding my PhD study with professor Honbolygo in previous communication and my research moved from using ERP passive listening paradigm toward using stress deafness task in order to test the chosen theoretical framework. We conducted research where we tried to adapt stress deafness task for Croatian.

The purpose of this visit was very narrowly connected to my PhD study. Before first meeting I prepared plan of the visit and questions I intended to tap during my study stay:

1. Since I planned and conducted research under prof. Honbolygo's supervision, I intended to discuss the results obtained from that previous research.
2. Discuss adaptation of stress deafness task for special population that is my target group of participants and discuss some questions regarding the future analysis of results.
3. Discuss methodological issues regarding participants, procedure and materials that will be used in the research.
4. Expand and fortify theoretical underpinnings of my research.

2) Description of the work carried out during the visit

Host professor, F. Honbolygo ensured working place (desk and computer) at the Institute during my stay. First day we agreed about the dynamic and goals of my visit: every day in the morning I had meeting with host professor where we discussed some of my prepared questions. Professor would recommend a selection of materials for me to study. In the afternoon I was working on the topic that we agreed in the morning and preparing discussion for the following day. Additionally, in the afternoon I had opportunity to discuss some problems with other members of the institute (prof. Valeria Csepe, Denesh Toth, Andrea Kobor). These meetings were very beneficial for me since all researchers deal with my area of interest.

In the first part of the visit I analyzed data collected using the stress deafness task (SRT) in Croatian sample. One part of these data was published as poster presentation at VI. Dubrovnik Conference on Cognitive Science (Dubrovnik, 22-24 May 2014). We discussed some questions that I had while adapting the paradigm for Croatian, and go through more detailed analyses of the data. We also discussed recording of the stimuli and acoustical analysis.

In the second part we were discussing questions regarding my PhD study. The goal of the study is to address the development of phonological system in children with dyslexia in the framework of the model which presumes dichotomy between phonological representations and the ability to manipulate with those representations (phonological skills) and to show the influence of metaphonological (phonological awareness) and cognitive functions to this skill. The aim of this part of the visit was to single out cognitive functions which will be measured based on previous research of dyslexia. We discussed cognitive functions that could influence SRT and the most suitable neuropsychological tests or experiments to examine them.

At the end of the visit we discused possibility of future collaboration between University of Zagreb and Institute of Cognitive Neuroscience and Psychology at Hungarian Academy of Sciences in Budapest. Since these two institutions have long history of cooperation and there are some mutual projects, there are some possibilities for future exchange of knowledge and research.

Additionally to the planned work connected to my research, I had the opportunity to get insight into the research conducted at the Institute in general and the ongoing projects. Since the Institute has two very well equipped EEG labs it was very interesting and useful to participate during the experiments, discuss some problems in data collection and results of the experiments. During my stay I also got the insight into the tests and tasks used for assessment of dyslexia what I found very useful since these tests are yet to be prepared for Croatian population. Among others, I was informed about 3DM test (Dyslexia Differential Diagnosis Maastricht, Blomert and Vaessen, 2009) adapted for Hungarian by the researchers of the host institute (D. Toth and V. Csepe).

3) Description of the main results obtained

During this short visit stay all the planned objectives were met. The outcomes of the stay can be summarized as follows:

1. Expanded knowledge in the domain of cognitive functions underlying reading and phonological processing.
2. Expanded knowledge about detailed analyses of the data obtained by SRT experiments and correlation of those results with cognitive functions and phonological skills.
3. Clear guidelines regarding methodology of the future study: participants, procedure, experiments and data analysis.

Discussions, studying materials and interaction with the host professor and with the other members of the Institute were notably helpful to round up my previous ideas and clearly plan future research. One of the most important questions for my research was selection of cognitive functions that will be measured and correlated to SRT. Suggested readings and discussions directed my research toward executive functions. I was familiarized with different models of executive functions and the importance of strict distinction between different components. Based upon readings we concluded that the most suitable model is Integrative model by Miyake (Miyake et al., 2000) and we planned tasks and experiments which will examine functions they extracted as the basic executive functions. This model proposes three main components of cognitive functions: inhibition, working memory and cognitive flexibility. I had the opportunity to see experiments designed to investigate these functions used for previous research at this institute. Beside executive functions mentioned above, importance of the measure of verbal fluency was discussed. I studied the research of verbal fluency in dyslexia and the possible analyses of this measure (e.g. Takacs, 2013). It was very important to discuss sample and data analyses because of the specific circumstances of this study: since in Croatia there are no standardized tests for dyslexia, we were considering the alternatives for two-group design. We also discussed the possibility of post-hoc cluster analyses to obtain more objective groups.

In the last two days of this study visit I revised my research proposal on the basis of the new information and knowledge gained during the visit and got the feedback from prof. Honbolygo.

4) Future collaboration with host institution (if applicable)

Since the PhD program Language and Cognitive Neuroscience at University of Zagreb requires two supervisors from different scientific fields of research, we discussed the possibility that host professor F. Honbolygo becomes one of my supervisors. We agreed about the future steps in my research, made provisionary schedule for adapting tasks to Croatian and programming experiments, and set deadlines. We agreed about my future visit to the host institution in August 2015 when we will analyse collected data and discuss conclusions of the conducted study.

While there have not been any concrete agreements on producing a collaborative scientific article, such option is very likely once the data will be obtained.

5) **Projected publications / articles resulting or to result from the grant *(ESF must be acknowledged in publications resulting from the grantee's work in relation with the grant)***

6) Other comments (if any)