PUBLISHABLE SUMMARY

Summary description of the project objectives

Verb deficits are characteristic of Agrammatic Aphasia (AA) and Specific Language Impairment (SLI). It has been reported that verb processing difficulties vary with verb types. For example, the verbs 'to sleep', 'to build' and 'to offer' are intransitive, transitive and ditransitive and select respectively one, two and three arguments (i.e. a subject ; a subject and one object ; a subject and two objects). It is called the verb argument structure and it has been defined as a function of verb processing difficulties in both AA and SLI. However, it is not clear whether argument structure complexity increases lexical or morphosyntactic difficulties. So far, studies have mostly concerned indoeuropean and Romance languages, and Basque was left out of the discussion. The aim of this study is to assess verb argument structure complexity effects in Basque, French and Spanish. Basque verb properties and their contrasts with French and Spanish are relevant to determine whether verb argument structure complexity increases lexical or morphosyntactic processing difficulties, whether they affect both production and comprehension and whether errors are specific to verb processing. In addition, collecting data from different language families is useful to address the issue of the universality of language deficits.

Description of the work performed since the beginning of the project (Cf. also Annex)

From November to August 2013: I enriched my knowledge about verb deficits in Specific Language Impairment and Agrammatic aphasia, in relation to argument structure. I conceptualized a test, which is mainly inspired on the tasks I used in my PhD. However, stimuli are better controlled in terms of frequency, age of acquisition and imageability.

From August to January 2014, I selected the stimuli and supervised a Master student's research internship in Language and Speech therapy. She was involved in controlling the stimuli factors and I taught her how to take into account language specific properties in order to create a test in different languages. In addition, I contacted a Graphic designer to create the stimuli and I presented my project in several places: at Loraine Obler's lab in New York; Ana Ines Ansaldo's lab and weekly meetings at Phaedra Royle's lab in Montreal. I received feedback on the project. All approved the need of creating multilingual assessment for a multilingual society. The comprehension task I developed using the pro-drop parameter in Basque and Spanish and by adapting it to French with the use of clitics was judged original and relevant to assess verb morphosyntactic decoding. Moreover, the collection of Basque/French/Spanish data from bilinguals was considered of particular interest to define how the same underlying deficit manifests in structurally different languages in the same individual. In December, I went to Basque country and I presented the stimuli to linguists, speech therapist and a neurologist, in order to control the stimuli by experts from both sides of the Basque country (North and

South) before creating the materials. The stimuli were qualified as accurate and usable in all Basque country, and appropriate for both children and adults.

From January to April 2014, I developed the test and I decided, with the help of a programmer, to create an application, implementable on a tablet, which would be user friendly. The longer-term idea is that this tool would be useful for speech therapists and researchers. I submitted the project to the Ethical committee of University de Montreal to recruit and assess French speaking adults and children, with and without language impairments. I also taught a course, at Université de Montréal (Introduction to Psycholinguitics) to a group of 70 undergraduated students. (45 hours)

From April to July 2014, I recruited participants. I contacted several universities, associations and schools. In May and June**,** I assessed 10 adults, 10 children (age 5-10), 3 adults with agrammatic aphasia, 5 adults with other aphasia types (mixed, progressive, anomia, other) and 3 children with SLI. All were native French speakers. The assessment took place at the Speech Therapy School, but also in associations and schools. I got in touch with speech therapists and I developed a network in Montreal around this project. (The project still goes on, since more children with SLI are going to be assessed on the basis of the test, under the coordination of Phaedra Royle.)

From July to November 2014: I presented the test and the preliminary data in international conferences (International Workshop on Language Production; Science of Aphasia; Academy of Aphasia; Mental Lexicon). I started to co-write a paper with Phaedra Royle about argument structure and verb deficits in French SLI.

Description of the main results achieved so far

The comparison of French data collected from 2 children with SLI (age 6 and 7) and a group of ten children (age 5 to 10) showed that in SLI, verb errors are not lexical but morphosyntactic and increase with argument structure complexity. Children with SLI did not produce accurately any ditransitive sentence (i.e. a verb with a subject and two complements). In comprehension, while Typically Developing children were perfectly able to decode singular/plural verb inflection and clitics at age 5, both children with SLI performed at chance.

The main results are that children with SLI show difficulties in producing ditransitive structures (i.e. a sentence including a subject, a verb a direct object and an indirect object). However they produce all verb types in action naming. Therefore, argument structure complexity showed an effect at the morphosyntactic level. Moreover, verb inflection production errors (subject-verb agreement) were observed in both control and SLI groups but *comprehension errors were observed only in the SLI group.* We assume that verb inflection comprehension deficits might be a marker of French SLI and we argue that both arguments structure deficits and verb inflection deficits characterize SLI in French. On the other hand, agrammatic aphasia also manifests increasing errors with argument structure complexity. The latter appeared to interfere with verb retrieval: verbs with complex argument structure involved more errors in both action naming and sentence production, that is at both word and sentence levels. The

comprehension task was also performed at chance and suggests a central deficit of verb inflectional morphology. Noun morphosyntactic processing was problematic too. Prepositions and determiners were omitted in agrammatism and substituted in SLI. The preliminary conclusions are that verb argument structure complexity shows effects on verb processing in both SLI and agrammatism. Both production and comprehension are affected in both groups, and verb processing is not only affected but also noun morphosyntactic processing.

Expected final results and their potential impact and use (including the socio-economic impact and the wider societal implications of the project so far).

The expected results are to enrich the actual database on SLI and agrammatic manifestations by providing Basque data (an understudied language in the context of language disorders) cross-linguistic data, and data from bilinguals. The use of the test will be suggested to speech therapists in order to keep on getting and sharing data from a crosslinguistic perspective. A project is in progress to assess more children with SLI, in Montreal, on the basis of this test. It was presented to speech therapists who found the tool user friendly and well adapted for the assessment of children. The project specifically aims to get cross-linguistic data in order to participate in discussions about the nature of verb processing deficits, and to identify similar or distinct patterns of verb deficits across languages and across populations. Finally, this study aims to keep international connections and to strengthen an interdisciplinary network for the study of language pathologies. Contacts have already been undertaken in both sides of the Basque country (North and South), and between Europe and Canada. These contacts are expected to last beyond the duration of this project, in order to permit language assessment adapted to multilingual societies.