Candidates are highly recommended to write a proposal that fits into one of the following research lines and are recommended to contact the relevant supervisors when developing proposals. Other projects may be developed but the potential supervisors at the partner universities MUST be contacted prior to application.

- The phonology-morphology-syntax interface in typical and atypical language development
- Eye-movements in developmental peripheral dyslexias
- Temporal basis and evolution of prosody in child speech
- The relationship between executive functions and language in children/young adults with developmental disorders (dyslexia, specific language disorder, autism spectrum disorder)
- Language deficits after awake surgery in LGG
- The role of the graphemic buffer in developmental dysgraphias

The phonology-morphology-syntax interface in typical and atypical language development

Recent research suggests that phonological properties of the ambient language are learned rather early and have a crucial impact on the development of morphological and syntactic properties of the language. For instance, phonotactic and positional effects have been observed in children’s ability to detect inflectional endings and to produce inflected word forms, and metrical properties of a language seem to be related to the acquisition patterns for function words like determiners. Doctoral projects within this research program should track the perception, processing, and production of morphological information and its interactions with both phonology and syntax in children with different kinds of developmental disorders. Interesting populations to look at would include especially children with atypical language acquisition who suffer from a perceptual deficit (hearing impaired children) and children with atypical language development who do not suffer from a known perceptual deficit (children with specific language impairment or with a risk for specific language impairment).

Supervising Partners:
Macquarie University Sydney (Prof. Katherine Demuth)
University of Potsdam (Prof. Dr. Barbara Höhle)

Eye-movements in developmental peripheral dyslexias

In the last few decades, research on developmental dyslexias has primarily focused on deficits in phonological processing, considering phoneme awareness and phonological short-term memory as the main cause of reading difficulties (e.g., Snowling, 2000, Vellutino et al. 2004, for a review). However, there are children with reading impairments whose phonological processing is completely normal (e.g., Friedmann & Rahamim, 2007; Friedmann, Kerbel, Shivmer, 2010; Kohnen et al., 2012). Some of the behavioural features of these children are thought to arise from deficits in peripheral components of the reading system: visual-orthographic processing. For example, it has been observed that children with so called Developmental Attentional Dyslexia move letters between words (e.g.,
reading part dark as "dart park"). Moreover children with so called Developmental Letter Position Dyslexia move letters within words (e.g., reading slime as "smile").

The main aim of the present project is to conduct a detailed investigation with English- and German-reading children who show deficits in visual-orthographic processing (e.g., Attentional Dyslexia and Letter Position Dyslexia) in order to understand how the associated reading errors arise. In addition to off-line reading tasks (measuring accuracy and speed), on-line processing will be investigated by monitoring eye movement, as this method provides a unique window into how impaired visual-orthographic processing unfolds during reading.

Supervising partners:
Saskia Kohnen (Macquarie University);
Nicole Stadie (Potsdam University)

Temporal basis and evolution of prosody in child speech

Timing and temporal coordination in speech are assumed to be the phonetic bases for linguistic prosody (syllables and feet), but timing in reference to syllable and foot structure remain largely terra incognita in the phonetics literature. Using methods for registering the timing of speech events, we study the relation between prosodic phonological organization (in terms of syllables and feet) and phonetic, measurable indices of that organization. We then track the evolution of this relation in children’s developing speech. The sequencing and specifically the timing of speech events is central to speech but also to reading. In children characterized as ‘impaired’ readers, there is a close link between coordination and reading ability (Carello et al. 2002). Prosodic units such as syllables are furthermore implicated in the error patterns of patients with apraxia of speech and other impairments (Ziegler 2008, Wolff 2002). A key aim of the project is to develop tools with which normal language development as well as impairment or developmental delay in child populations can be detected and rigorously evaluated.

Supervising Partners:
University of Potsdam (Prof. Dr. Adamantios Gafos)
University of Groningen

The relationship between executive functions and language in children/young adults with developmental disorders (dyslexia, specific language disorder, autism spectrum disorder)

In recent research on developmental disorders, there is a great interest for executive functions. Executive functioning is an important construct that refers to aspects of the conscious control of thought and action (Zelazo & Müller, 2002). It involves processes needed for targeted, efficient and socially adapted behaviour such as inhibition, planning, self-regulation, flexibility, working memory and many more. An unambiguous definition however still lacks. Pennington and Ozonoff (2006) addressed the question what EF deficits mean for the understanding of underlying cognitive mechanism in developmental disorders. A common EF deficit seems to be the binding factor between these developmental disorders, explaining the
overlap in symptoms. More recently there has been a shift of perspective: developmental disorders are regarded as disorders of multiple underlying impairments, suggesting that the different symptoms may reflect impairments in separate functional systems (Bishop & Frazier Norbury, 2014). This point of view seems more plausible than 'single-factor' models, taking into account the wide variation in symptomatology. Instead of asking whether executive deficits can explain the entirety of symptoms, we need to consider which specific symptoms are linked with specific cognitive functions.

EF also influence language performance. (Phonological) working memory, in particular, is hypothesized to be a significant contributor to language processing, reading comprehension, and some types of language formulation (Baddeley, 1986). The aim of this research project is to investigate the relationship between different (online and offline) executive function measurements and a broad range of linguistic functions (comprising language production and comprehension skills, fluency, naming, phonological skills) and literacy (word, pseudoword and text reading, word spelling, précis writing, etc.) in clinical groups of children and young adults with developmental disorders which are known to have impaired language and/or literacy skills, such as individuals with dyslexia, SLI and autism spectrum disorders.

Supervisors:
University Groningen (home university): Dr. Wim Tops
Macquarie University Sydney: Prof. dr. Anne Castles

University of Groningen: Prof. dr. Barbara Höhle

---

**Language deficits after awake surgery in LGG**

Patients with low grade gliomas in the eloquent areas of the brain who have undergone awake surgery often complain about mild linguistic disorders, such as word finding problems. These word finding problems are not easy to detect with standard aphasia tests like the BNT. Also, it is not yet clear where these mild deficits stem from: the tumor, brain surgery or even chemo and / or radiation therapy. The latter is not excluded: patients with malignant tumors in other body parts (e.g. lung cancer, breast cancer) that have been removed and who have undergone chemo and / or radiation therapy may show up with cognitive disorders, among which language impairments (see e.g. Phillips & Bernhard, 2003). The current project will investigate the cause of the linguistic deficits in patients in whom the tumor in the eloquent areas has successfully been removed. In order to disentangle the consequences of the cause (brain tumor), the influence of brain surgery and adjuvant therapy (chemo, radiation and pharmaceutical treatment), several subject groups can be included, for example:

A test battery for detecting mild linguistic disorders will be developed and the patients will be assessed before surgery and 2 weeks, 3 months and 6 months after surgery.

Supervisors:
University Groningen: Prof dr. Roelien Bastiaanse, Dr. Djaina Satoer
University Trento: Prof. dr. Gabriele Miceli

---

**The role of the graphemic buffer in developmental dysgraphias**

http://phd-idealab.com/application/research.html - 3 - © 2014, Katalin Tamási, Universität Potsdam
Childhood spelling difficulties (developmental dysgraphias) affect about 15% of the population and can persist into adulthood (e.g., Landerl & Moll, 2010; Maughan, Messer, Collishaw, Pickles, Snowling, Yule & Rutter, 2009). Much research on developmental dysgraphia has focussed on children’s difficulty to acquire phoneme-to-grapheme mappings (non-lexical spelling), a sight word vocabulary (lexical spelling) and morphological rules (Bourassa & Treiman, 2001; Egan & Tainturier, 2011; Joshi et al., 2008; Kemp, 2009; Moats, 2009). Almost neglected is the influence of impairments to the orthographic working memory (the graphemic buffer) (but see, Yachini & Friedmann, 2010). This project will investigate how to best assess graphemic buffer impairments in developmental dysgraphias in a regular and irregular orthography (Italian and English). It will also result in a description of how impairments of the graphemic buffer interact with impairments of other aspects of spelling in children with childhood dysgraphia.

Supervising partners:
Dr Saskia Kohnen & Prof Lyndsey Nickels (Macquarie University)
Prof Gabriele Miceli (Trento University)

[with Prof Pierluigi Zoccolotti (Sapienza University Rome)]