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Project

Self-monitoring of language in production

Elin Runnqvist[(1)], Chotiga Pattamadilok[(1)], Kristof Strijkers[(1)],

Pascal Belin[(2)], F.-Xavier Alario[(3)], Mireille Bonnard[(4)]

(1) LPL, (2) INT, (3) LPC, (4) INS

Abstract

La Banque centrale a organisé un mode d'intervention permettant de comploter… de compléter le dispositif » (François Hollande, 2012).

Just like the president of France, once in a while speakers commit "slips of the tongue". When considering the anatomical and cognitive complexity of language production, involving the use and orchestration of several organs, body parts, mental representations and levels of processing, a pressing question is how is it possible that errors do not occur more often?

Through our recent research we examined the possibility that speech errors may be avoided similarly to how motor actions are controlled (e.g., Pickering & Garrod, 2013). Motor control is thought to involve internal modeling of upcoming actions, predicting their sensory consequences before they occur (i.e., efference copying, e.g., Wolpert et al., 1995) and suppressing their expected sensory response (i.e., reafference cancellation), leading to a larger activity in the relevant sensorial brain areas whenever there is a mismatch between what is expected and what actually occurs. Using low-frequency rTMS (Runnqvist et al., 2016), we found evidence for a causal implication in language production monitoring of the right cerebellum, a neural structure crucial for internal modeling (e.g., Blakemore et al., 2001). In another study (Runnqvist et al., in prep.), we observed that correctly produced words in conditions of high monitoring load resulted in more negative EEG amplitudes around 100 ms after the onset of the vocal response, a finding that can be related to the N100 component indicating auditory reafference cancellation as a consequence of internal modeling (e.g., Heinks-Maldonado et al., 2005).

Other studies obtained evidence that speech errors may be detected in a similar way as we manage irrelevant but potentially conflicting information when driving a car (e.g., Nozari et al., 2010). Both types of activity would be achieved through conflict monitoring involving the anterior cingulate cortex (ACC) and the pre supplementary motor area (pre-SMA). For example, Riès et al. (2011) observed that speech errors, just as errors in other cognitive domains, elicited more pronounced error-related negativities (ERN), an electrophysiological component with a source localized to the ACC. In an fMRI study, Gauvin et al. (2016) showed that speech errors involved increased activation of both ACC and pre-SMA.

The goal of the fMRI experiment proposed here is to advance in this novel line of research examining the possibility of shared processes between language production monitoring, motor control and conflict monitoring by investigating different aspects of error monitoring (prevention and detection) and levels of processing more or less distant to speech motor processes (lexical and phonetic variables).

Publications

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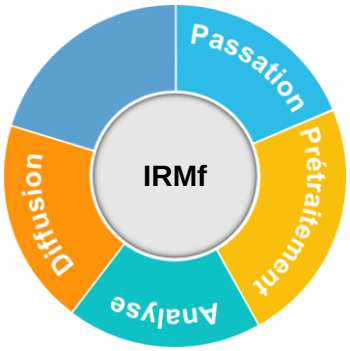
Mardi 27 Février 2018

Fiche-résumé contribution CREx



SLIP (en cours)

Self Monitoting of language in production
Investigateurs: Elin Runnqvist (LPL), Chotiga Pattamadilok (LPL), Kristof Strijkers (LPL), Pascal Belin (INT), F.-Xavier Alario (LPC) & Mireille Bonnard (INS).

Durée : depuis mai 2017

Contribution : Aide à la passation, au prétraitement et à l'analyse des données.

Objectif : *Etudier la contribution respective des processus impliqués dans le monitoring de la production du langage, le contrôle moteur et le monitoring des conflits en recherchant des aspects différents du monitoring des erreurs (prévention et détection) et des niveaux de traitement plus ou moins distants aux processus articulatoires (variables lexicales et phonétiques).*

Paradigme – Lecture à voix haute d'une paire de mots avec amorçage induisant en erreur

Passation – Passation effectuée auprès de 24 adultes de langue maternelle française (en cours)

Prétraitement – Prétraitement des données sur SPM12 (en cours)

Analyse – Analyse univariée sur le cerveau entier (en cours)

Diffusion –

Mardi 27 Février 2018