Psychophysiological characteristics of verbal rumination

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Welcome

This book, when finished, will contain my dissertation research.

Acknowledgments

Acknowledgemnents are not yet available.

Abstract

Blah blah blah

Part I

Theoretical framework

Chapter 1

Overt and imagined actions

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1.1 Motor imagery

Considerable experimental evidence has accumulated to suggest that movement execution and MI share substantial overlap of active brain regions (for review, see Guillot et al., 2012). Such apparent functional equivalence supports the hypothesis that MI draws on the similar neural networks that are used in actual perception and motor control (Jeannerod, 1994; Grezes and Decety, 2001; Holmes and Collins, 2001)…

1.1.1 Simulation theories

...

1.1.2 Emulation theories

...

1.1.3 Action representation and internal models

Voir Jeannerod (2004), Wolpert el al. (1995), Wolpert & Gharamani (2000)…

1.2 Speech imagery

...

1.2.1 MVTV Cohen (1986)

...

1.2.2 Predictive models

...

Chapter 2

Rumination as simulated speech

As suggested by **?**, rumination and other forms of spontaneous thoughts can be considered in a common conceptual space (see Figure 1). This space is built upon two dimensions: *deliberate constraints* and *automatic constraints*. These dimensions represent two general mechanisms that allow to constrain the contents of these related mental states and the transitions between them. The first contrain correspond to a deliberate processus and is implemented through **cognitive control** (**?**). The second constrain is referring to more automatic constrains like sensory afferences. In this framework, rumination is characterized by the highest level of automatic constraints and spread all along the *deliberate constraints* dimension.

...

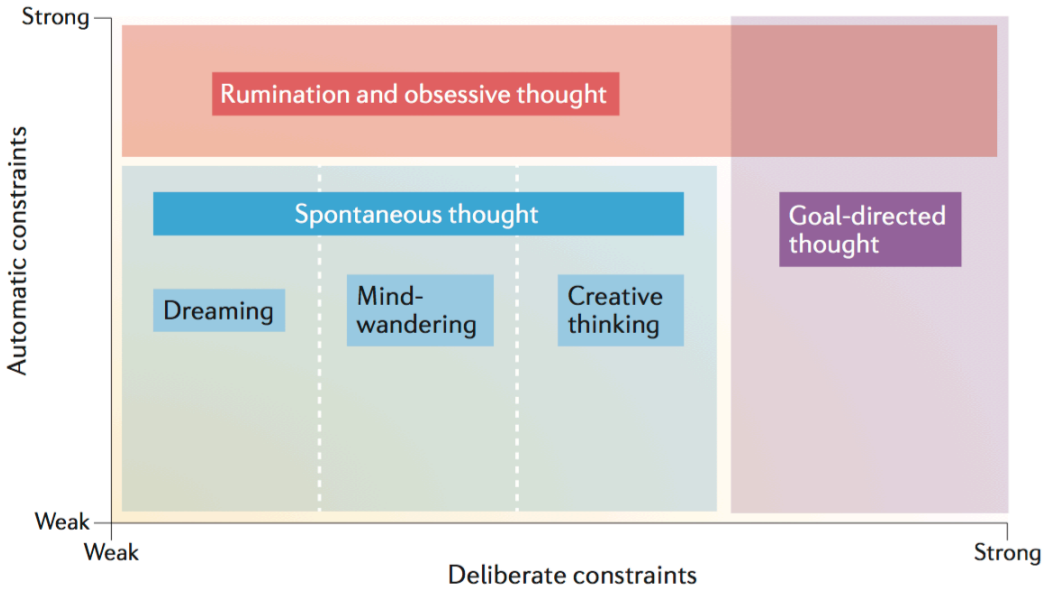

Figure 2.1: Conceptual space of different types of thought (Christoff et al., 2016)

Chapter 3

Electromyographic correlates of speech production

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3.1 Speech production mechanisms

...

3.2 Speech production muscles

...

3.3 Muscular physiology

...

3.4 EMG signal

3.4.1 EMG signal measures

Muscular activity can be studied at different levels. At the cellular level, using electrophysiological measures like micro-electrods implanted in the cell, that allow direct measures of **action potential**. At the segmental level, biomechanis study

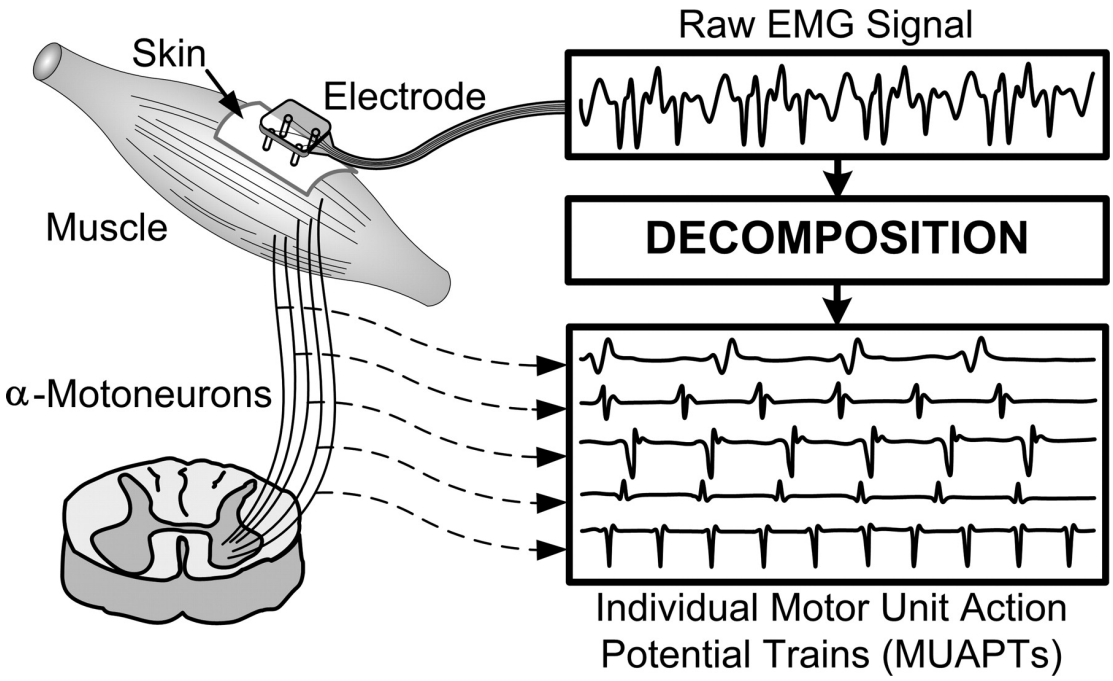

Figure 3.1: Motor unit action potential schema.

muscular activity using surface sensors, positionned on the skin…intermediate levels…

3.4.2 Motor Unit Action Potential

Motor unit action potential (MUAP) is the electric field resulting from the sum f the electric fiels emitted y each fiber of the motor unit. This train of action potentials will generate a *train* of MUAP, call **motor unit action potential trains** (MUAPT). The electric potential generated by this field is highly dependant of parameters such as the number of fibers, their length, speed of conduction and position of the neuromuscular junction.

…

EMG signal then result in a mixture of recruited motor units.

3.4.3 Surface EMG

…*crosstalk* phenomenon (**?**). In reason of the important… of facial muscles, the EMG activity of one recorded muscle generally does not represent the activity of a single muscle but rather a mixture of…**?**…

3.4.4 Basic signal processing

…the EMG signal is a stochastic signal… In order to illustrate what EMG signal looks like, we simulated EMG signal based on a standard algorithm (**?**, pp.70-71), implemented in R by **?**.

```
> source("code/EMGfuns.R")
> emg <- EMG_sim(n = 2048, sampFreq = 1000, lF = 10, hF = 100)$sim
> ts.plot(emg, xlab = "Time (ms)", ylab = "simEMG", col = "steelblue")
```

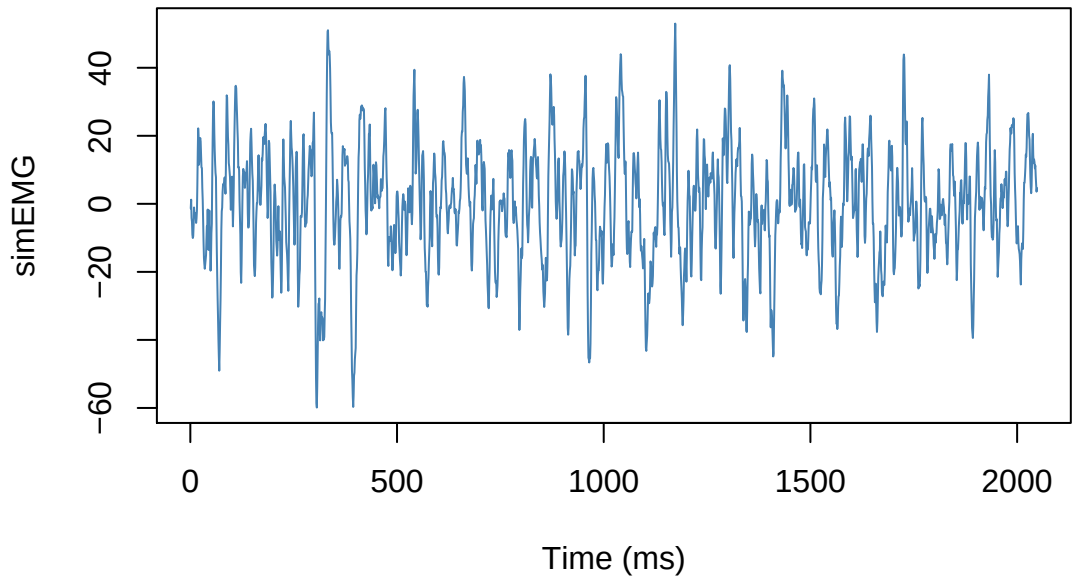

Figure 3.2: Simulated EMG signal.

…we rectify the EMG signal by taking its absolute value and substracting the mean in order to correct for any offset (bias) present in the raw data. It is interesting to note that the effects of rectification on the EMG signal is similar to the rectification of AM radio waves whose purpose is to enhance the low frequency components, wich encode the voice signals. Concerning EMG, the "voice" of the signal corresponds to the encoded force (**?**).

```
> emg <- abs(emg - mean(emg) )
> ts.plot(emg, xlab = "Time (ms)", ylab = "simEMG", col = "steelblue")
```

…

There are two main measures thant can be used to represent the magnitude of muscle activity. These two measures can be directly computed from the filtered EMG signal. The first one is the **average rectified value** (ARV):

$$ARV = \frac{1}{T}\sum_{t=1}^{T}|EMG(t_i)|$$

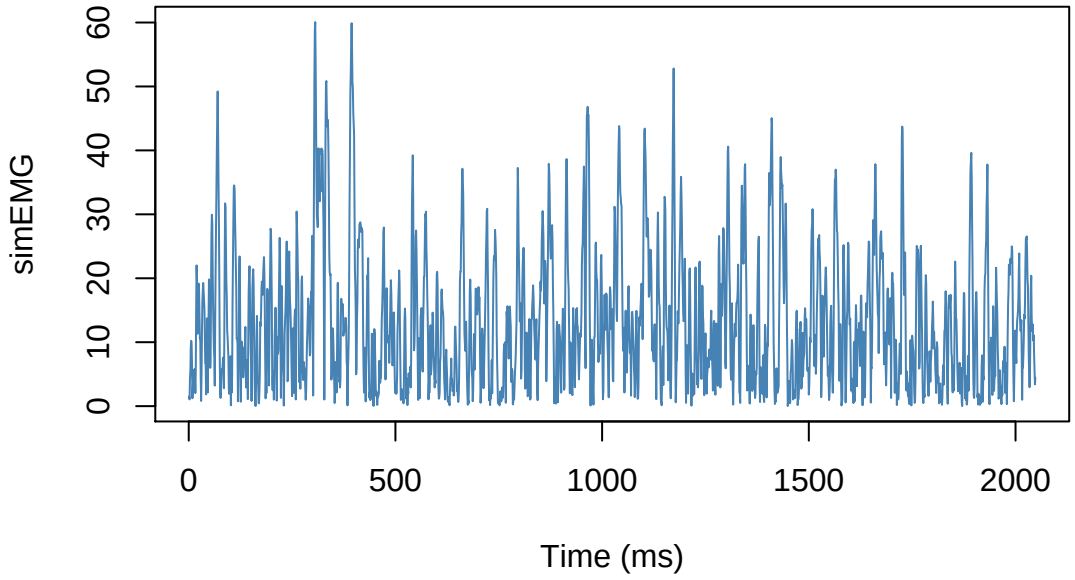

Figure 3.3: Rectified EMG signal.

which is computed over a specific interval $(0, T)$ and where $|EMG(_i)|$ is the absolute value of a datum of EMG in the data window. The unit of measurement is mV or μV, and the ARV calculation is generally similar to the numerical formula for integration (**?**).

The second one is the **root-mean-square** (RMS) amplitude:

$$RMS = \sqrt{\frac{1}{T}\sum_{t=1}^{T}|EMG^2(t_i)|}$$

where $|EMG^2(_i)|$ is the squared value of each EMG datum and has both physical and physiological meanings…

Part II

Experimental part

Blah blah blah… explain why two parts…

Chapter 4

Orofacial electromyographic correlates of induced verbal rumination

Biological Psychology paper...

Chapter 5

Dissociating facial electromyographic correlates of visual and verbal induced rumination

Second EMG study with Sonja...

Chapter 6

Zygoto experiment

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Chapter 7

Articulatory suppression effects on induced rumination

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Chapter 8

TMS study

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Part III

General discussion and conclusions

Chapter 9

General discussion

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Chapter 10

Conclusions

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