Contents

1 Design Ideas (Protokoll *[2016-07-25 Mo]*) :

1.1 Basic Ideas

- Mu and simulation are related
- A pronounced ERD in mu signals 'simulative' aspects of one of at least three processes:
  - action observation
  - action preparation
  - action execution
- Simulation 'entrenches' these processes, presumably making it more difficult to ...
  - inhibit them,
  - switch (attention) to other actions / stimuli or prepare for them
- We want to manipulate the 'simulation characteristics' of the stimuli to investigate these assumptions
- In Response Priming speak, this means: the more 'simulative' the task / prime stimulus
  - the larger the congruency effect and

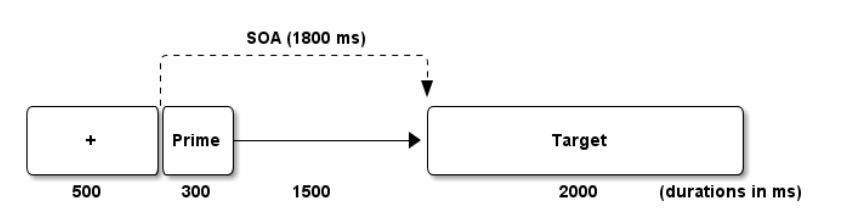
  - the more pronounced the mu component

- It is likely that ERD in Alpha (even in central regions) will be influenced by spatial attention

1.2 Design

- Response Priming Paradigm: Prime -> <blank> -> Target (valid or invalid)

1.2.1 Trial Structure



- with an ITI of 2500 ms, the duration of each trial amounts to **6800 ms** (with the default SOA of 1800 ms)
  - A shorter SOA (900 ms) yields a total trial duration of **5900 ms**

1.2.2 Factors

- Manipulated factors (within subject)

  Expression Two target emotions of different valence (e.g. *Happy* vs. *Angry*) [*80 Trials / Expression*]

  Validity congruence of Prime and Target Stimulus or Prime and Response (*valid* vs. *invalid*) [75% of trials valid]

- those yield the four 'basic' conditions present in each Response Priming experiment

- we will additionally manipulate:

  Stimulus Type *Faces* vs. *Inverted Faces* vs. *Letters*

  SOA Difference in time between Prime and Target Stimulus Onset (*long* (1800 ms) vs. *short* (900 ms))

- Fully crossed, such a **2^3x3** factorial design would yield 24 conditions and a total runtime of about **102 minutes**
- We will thus opt for an **incomplete** (or reduced) **factorial design**, manipulating the SOA only in the StimType-Faces Conditions:
  - this reduces the number of conditions to 16 and the length of the experiment to about **70 minutes**
  - this design will **not** be balanced and thus cannot be described as a 2^{3-1}x3 fractional factorial design
  - all main effects will be confounded by interaction effects involving SOA

1.2.3 Table of Conditions

	Happy				**Angry**				**Sum**
	valid		**invalid**		**valid**		**invalid**		
	long	**short**	**long**	**short**	**long**	**short**	**long**	**short**	
Faces	60	60	20	20	60	60	20	20	320
Inv. Faces	60	-	20	-	60	-	20	-	160
Letters	60	-	20	-	60	-	20	-	160
Sum	180	60	60	20	180	60	60	20	640

- total: 70 minutes (54 min SOA_{long}, 16 min SOA_{short})
- blockwise:
  - Faces: 34 minutes
  - Inverted Faces: 18 minutes
  - Letters: 18 Minutes
- total length without Inverted Faces: 52 minutes
- total length without inverted Faces, with full factorial design: 68 minutes

1.3 Expected Simple Effects

1.3.1 behavioral: congruency effect (RT & accuracy)

We expect interactions between Validity and StimType as well as Validity and SOA with regard to the congruency effect (RT(invalid) - RT(valid)). The expected contrasts are as follows:

- Faces > Inverted Faces > Letters (in SOA_{long})
- SOA_{short} > SOA_{long} (in $StimType_{faces}$)

1.3.2 neuronal (ERD in mu band)

- Faces > Inverted Faces > Letters
- SOA_{short} > SOA_{long}

1.4 Reasoning

1.4.1 SOA manipulation

A shorter SOA presumably ...

- increases **cognitive load**
- causes the processes of (prime) stimulus encoding, preparation of (valid) response and attentional shift towards target stimulus to collapse/overlap/conflict

1.5 Additional Exploratory Lines of Questioning

- Interactions between SOA and Expression
- Interindividual Differences in mu ERD (& rebound)?
- Chronometry of mu ERD (and its relation to expression/valence)

1.6 Open Questions

- What does the SOA manipulation achieve?
- different mus:
- ☐ Choice of Target Signal:
  - perceptual difference to Prime?
  - identical signal in each StimType condition?
- Perceptual equivalence of stimuli (esp. $StimType_{Faces}$ and $StimType_{Letters}$)