University of Essex

TUNING EMOTIONAL FACE PERCEPTION WITH FACIAL NEUROMUSCULAR ELECTRICAL STIMULATION (NMES)

T.EFTHIMIOU@ESSEX.AC.UK

University of Essex

FACIAL FEEDBACK

Sel et al., (2015, 2016),
Hennenlotter et al., (2009)

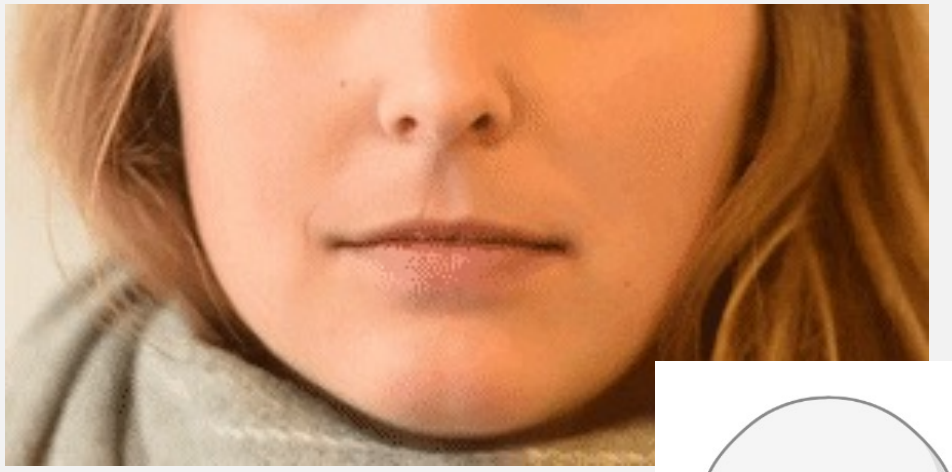
Davis et al., (2015),
Arias et al., (2018)

Wood et al., (2016),
Marmolejo-Ramos (2020)

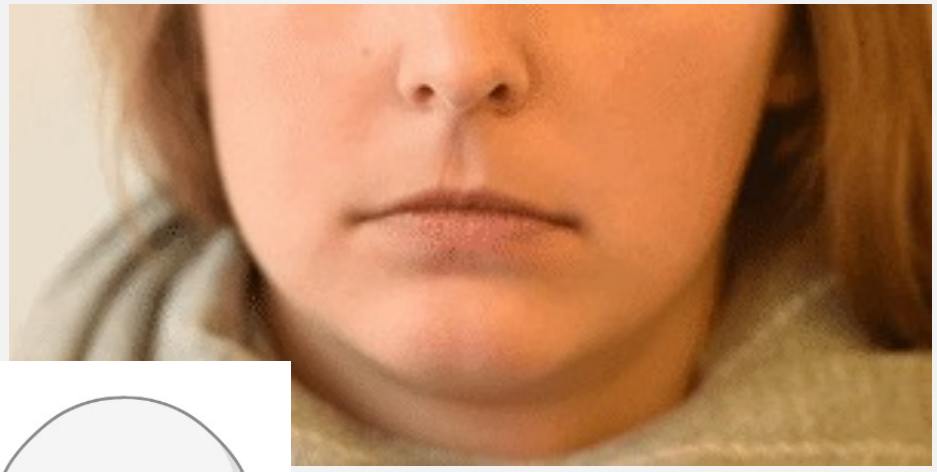
University of Essex

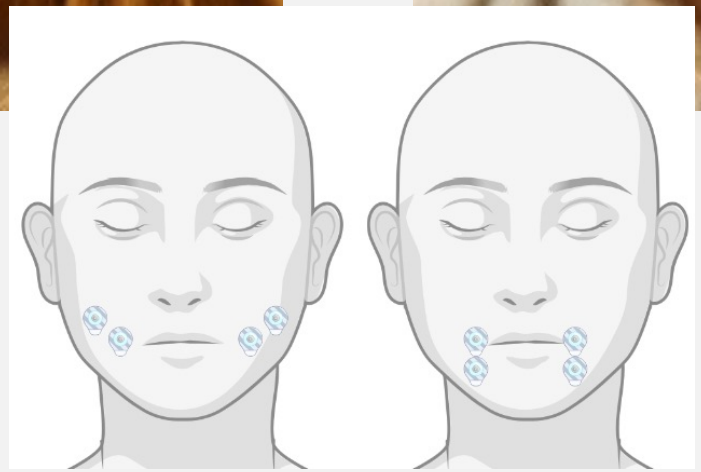
FACTION ACTION CODING SYSTEM (FACS)

AU12 - *Zygomatic Major*



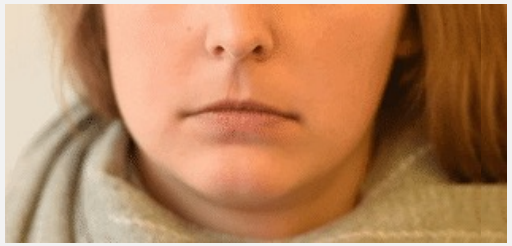
AU15 - *Depressor Anguli Oris*

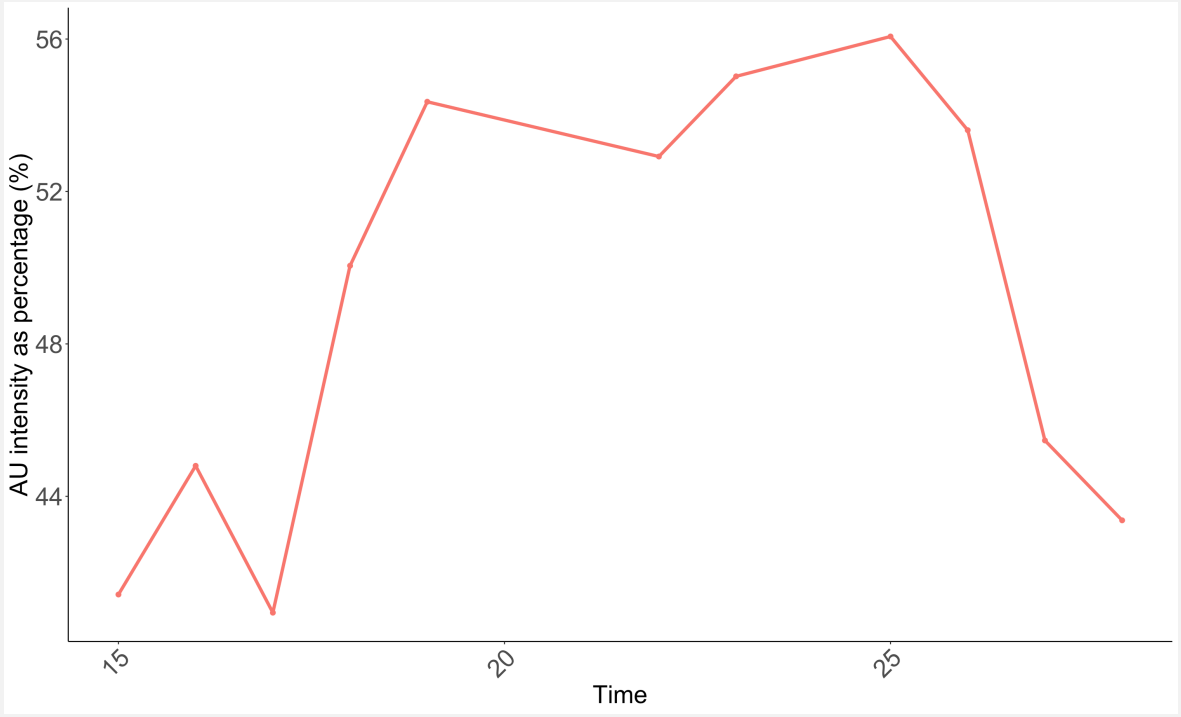


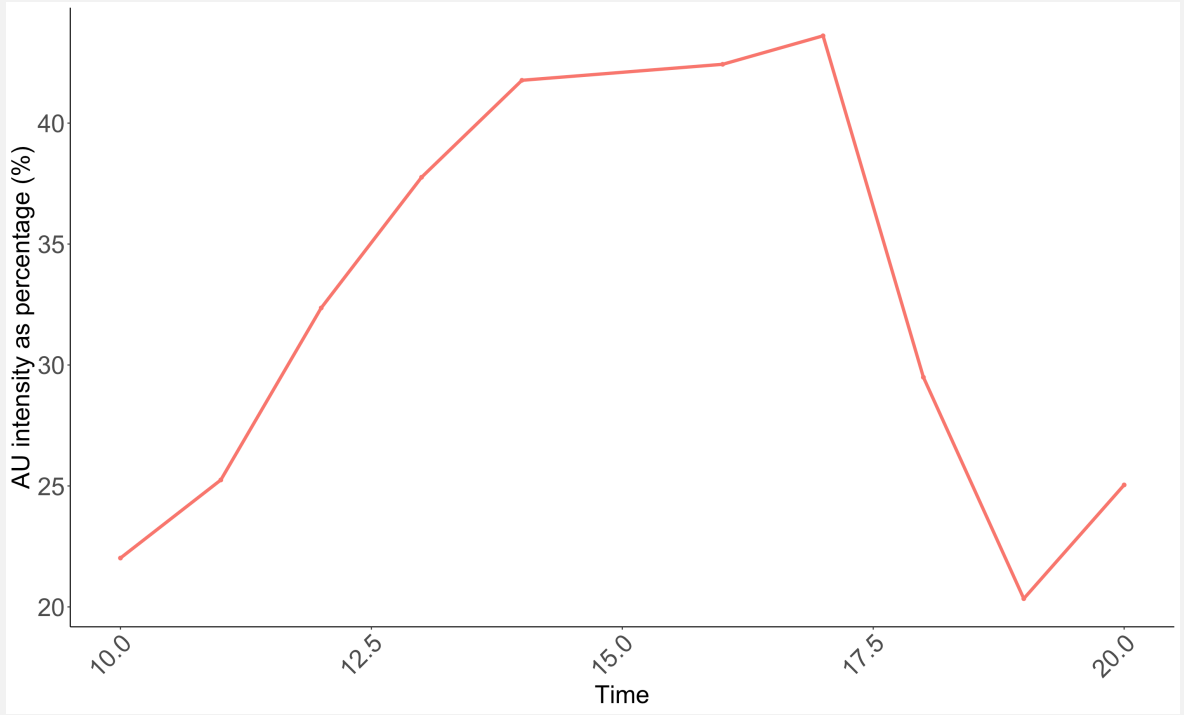


VIDEO ANALYSIS

University of Essex



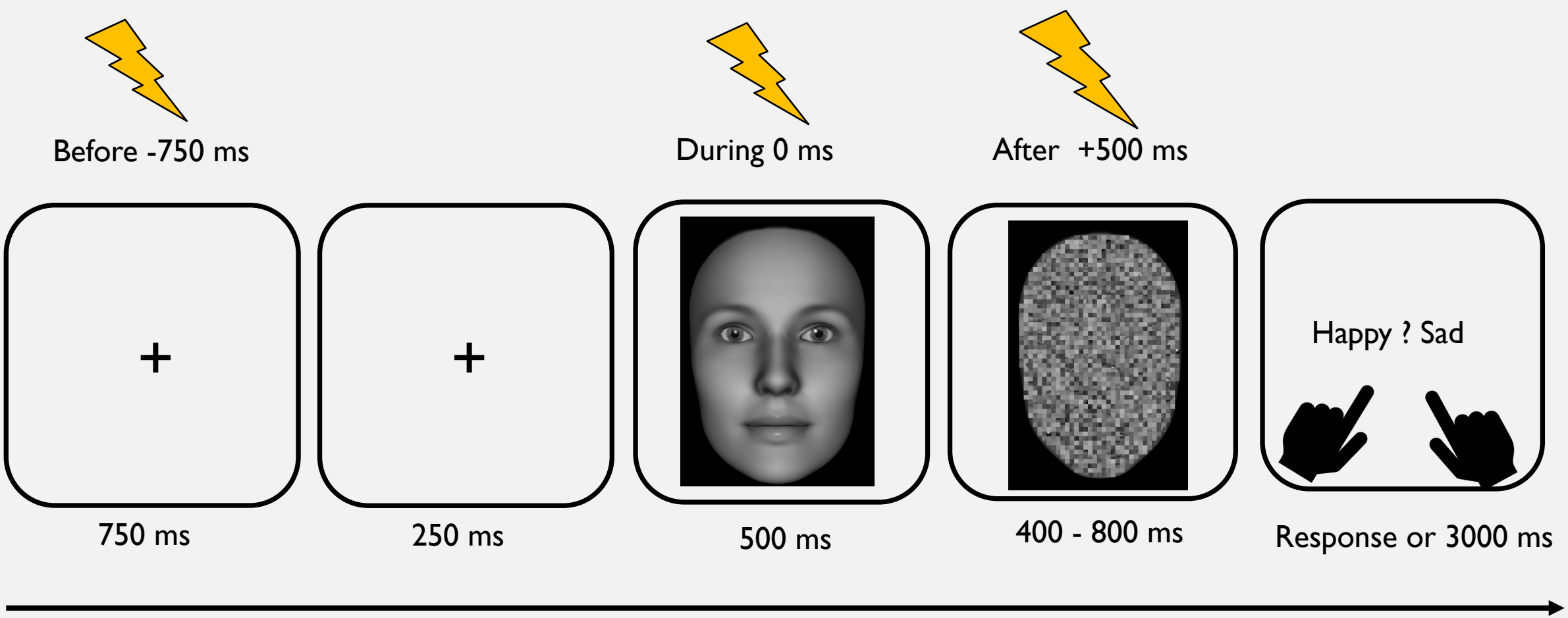




- Video analysis using the Python package Py-feat (Cheong et al., 2021)

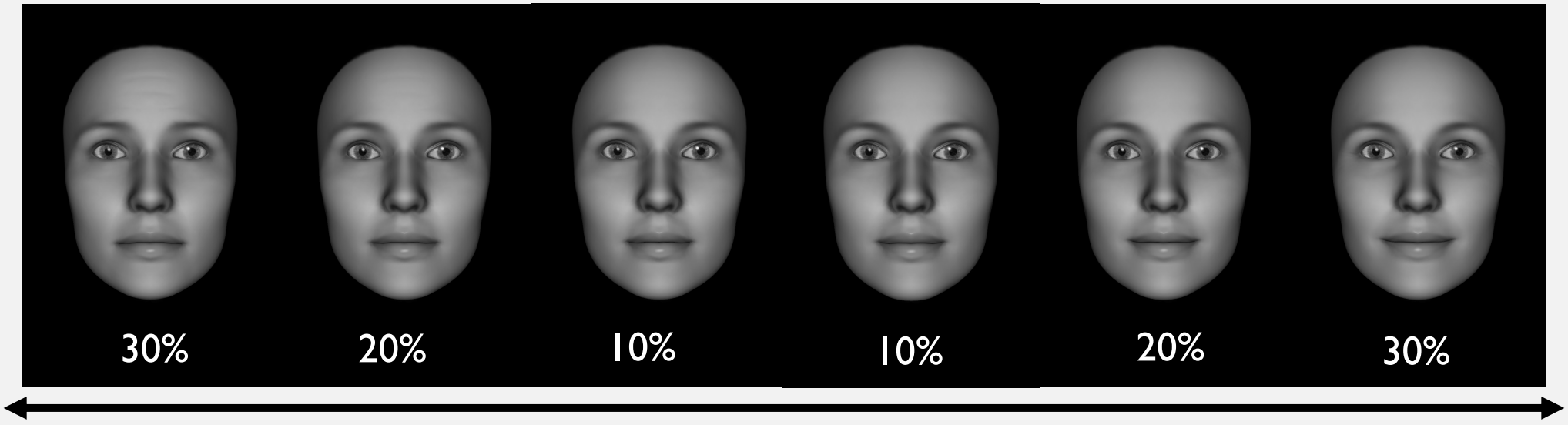
TASK

University of Essex



STIMULI

University of Essex



[1] Inner brow raiser
[4] Brow Lowerer
[7] Lids Tightener
[11] Nasolabial Deepener
[15] **Lip Corner Depressor**

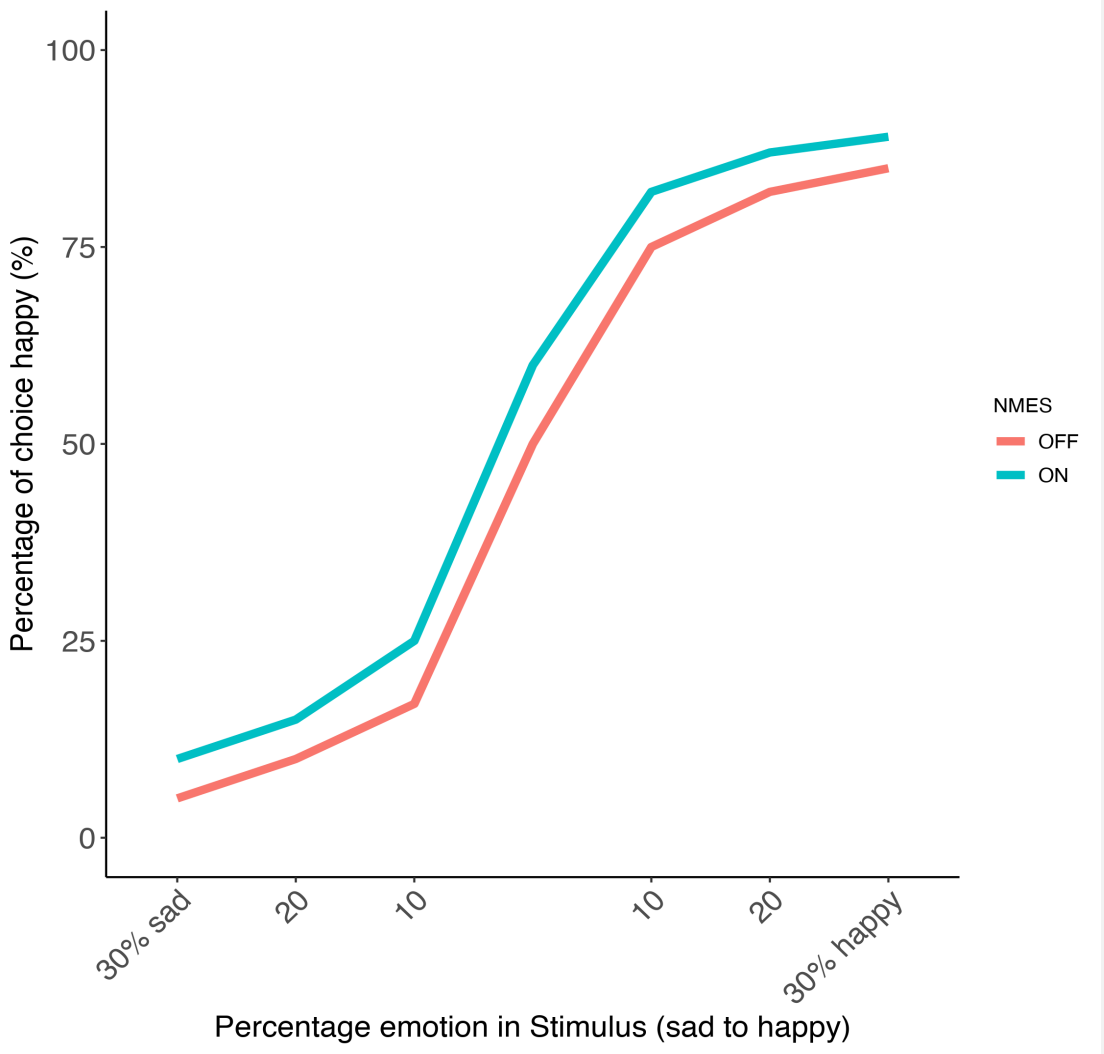
[6] Cheek Raiser
[7] Lids Tightener
[12] **Lip Corner Puller**

AIMS

University of Essex

Three studies

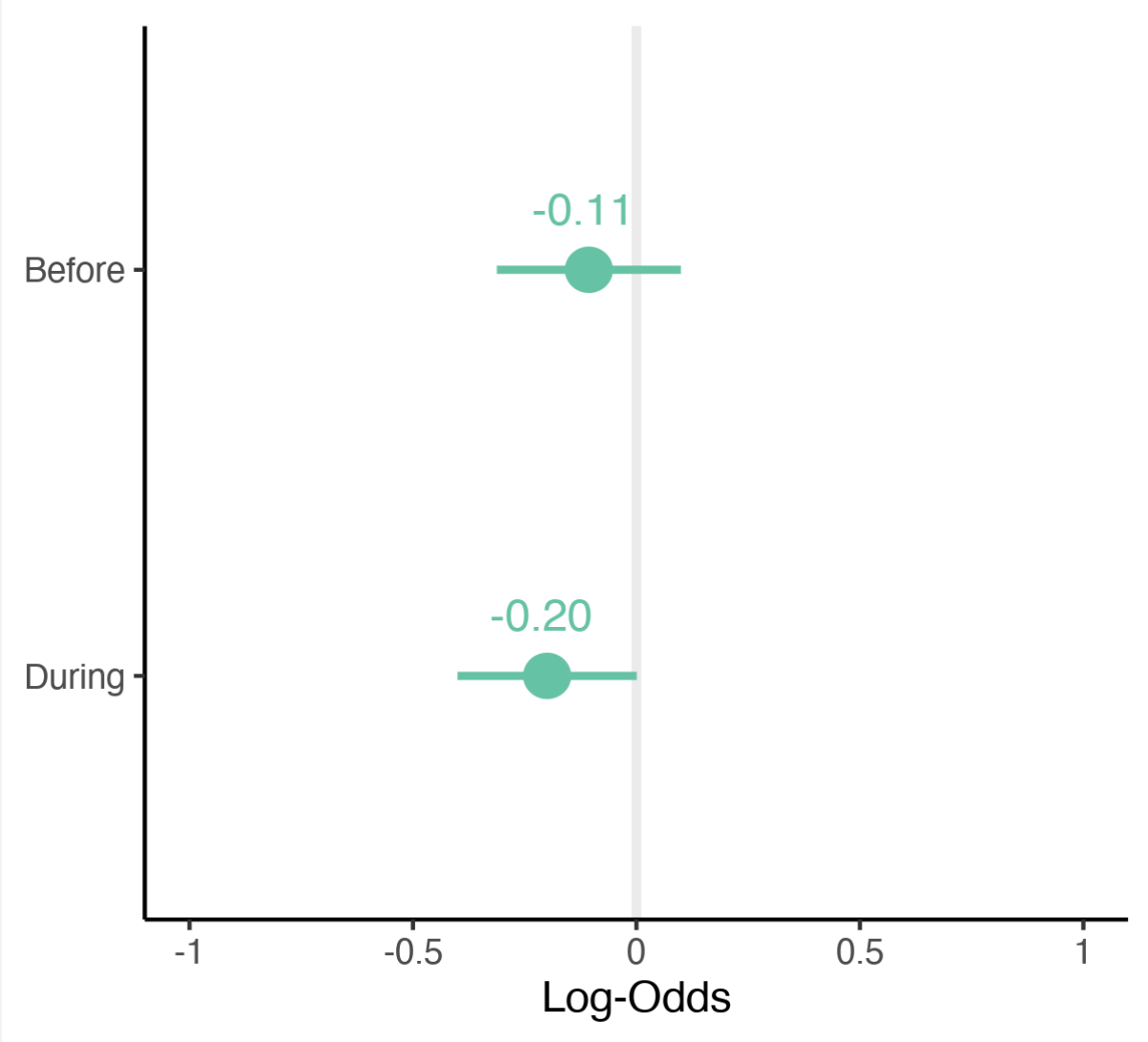
1. NMES applied to the DAO
2. NMES applied to the ZM
3. Within subject design consisting of two sessions in which NMES was applied to the DAO and ZM

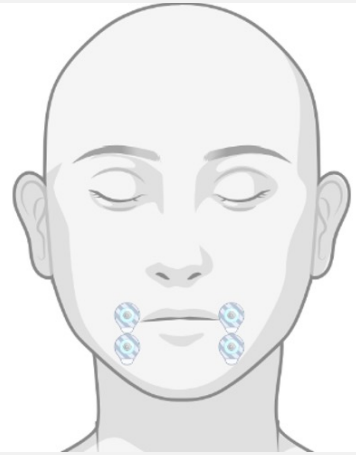


RESULTS

University of Essex

N = 18





Depressor Anguli Oris (DAO)

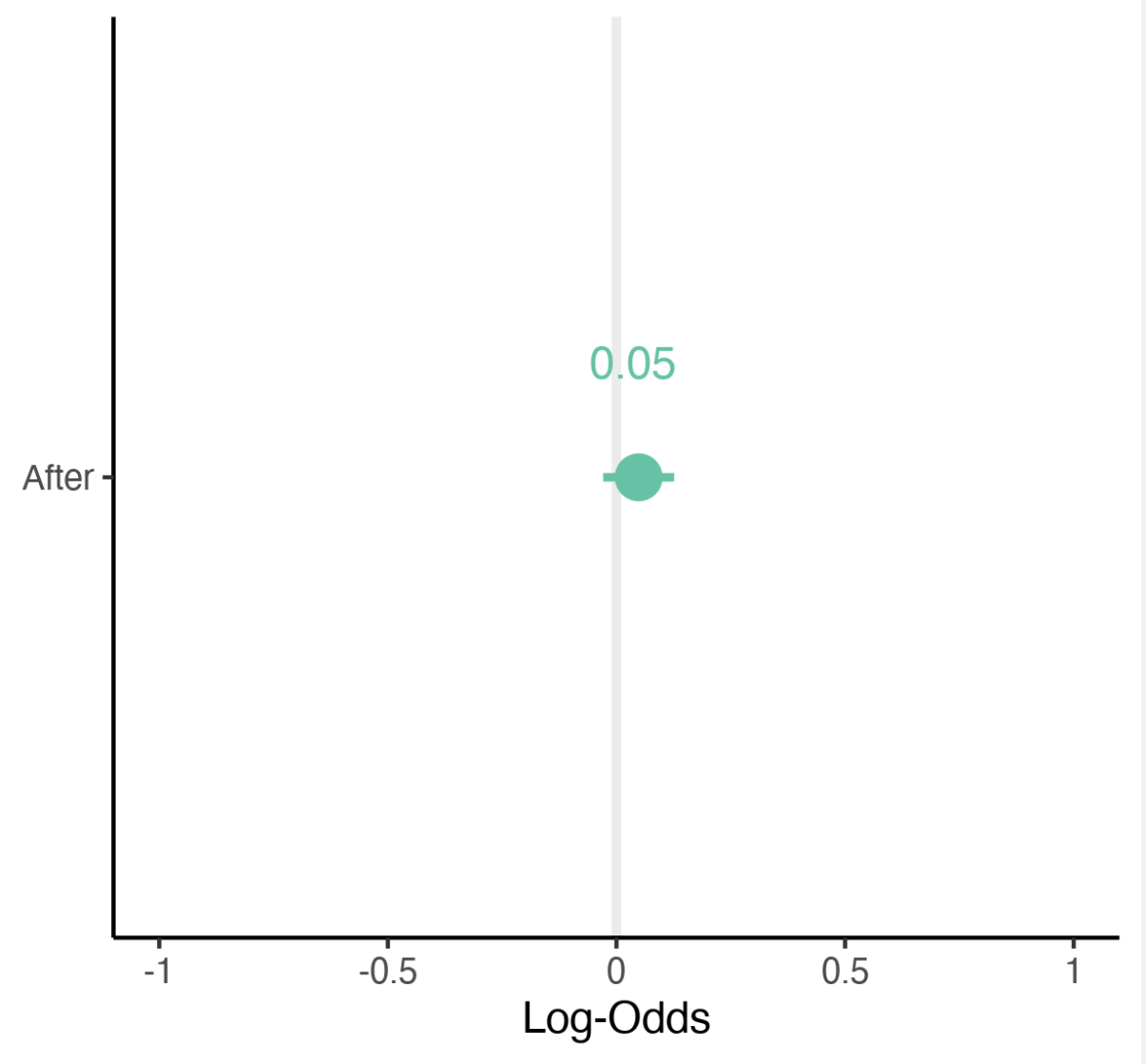
Increased odds of choosing sad

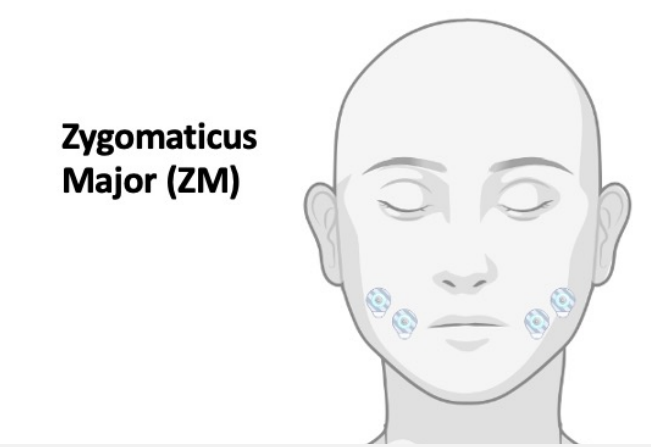
Increased odds of choosing happy

RESULTS

University of Essex

N = 24





Increased odds of choosing sad

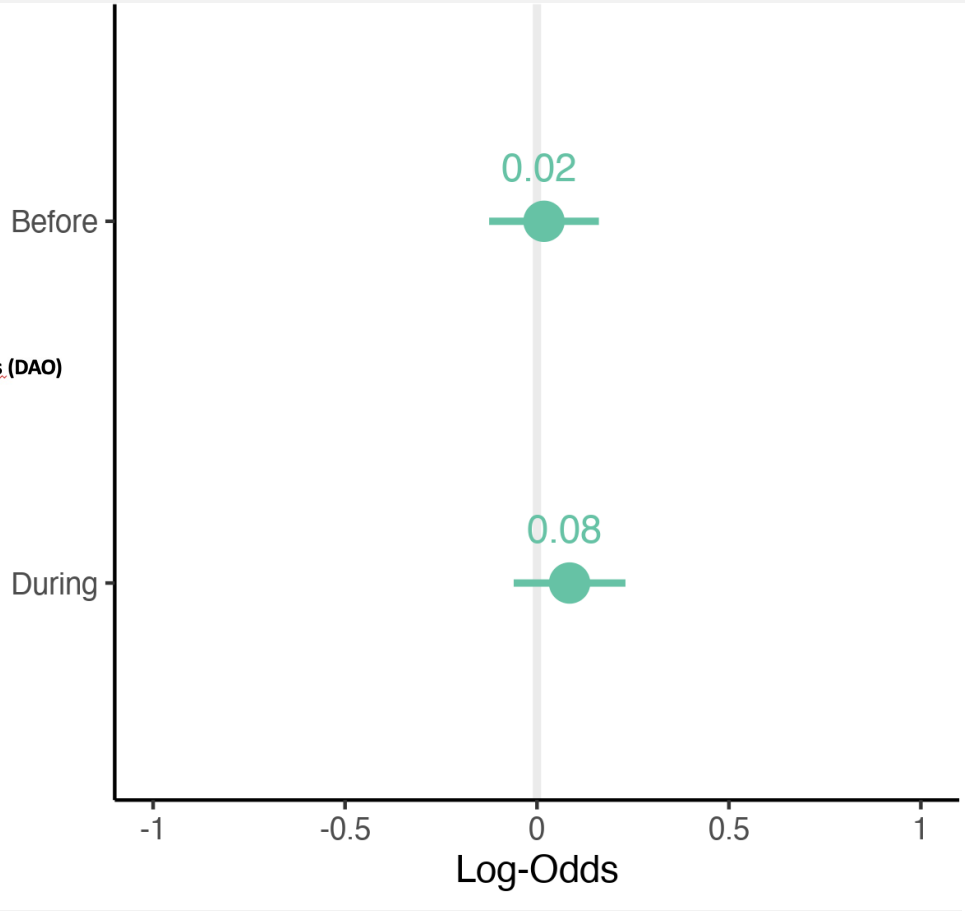
Increased odds of choosing happy

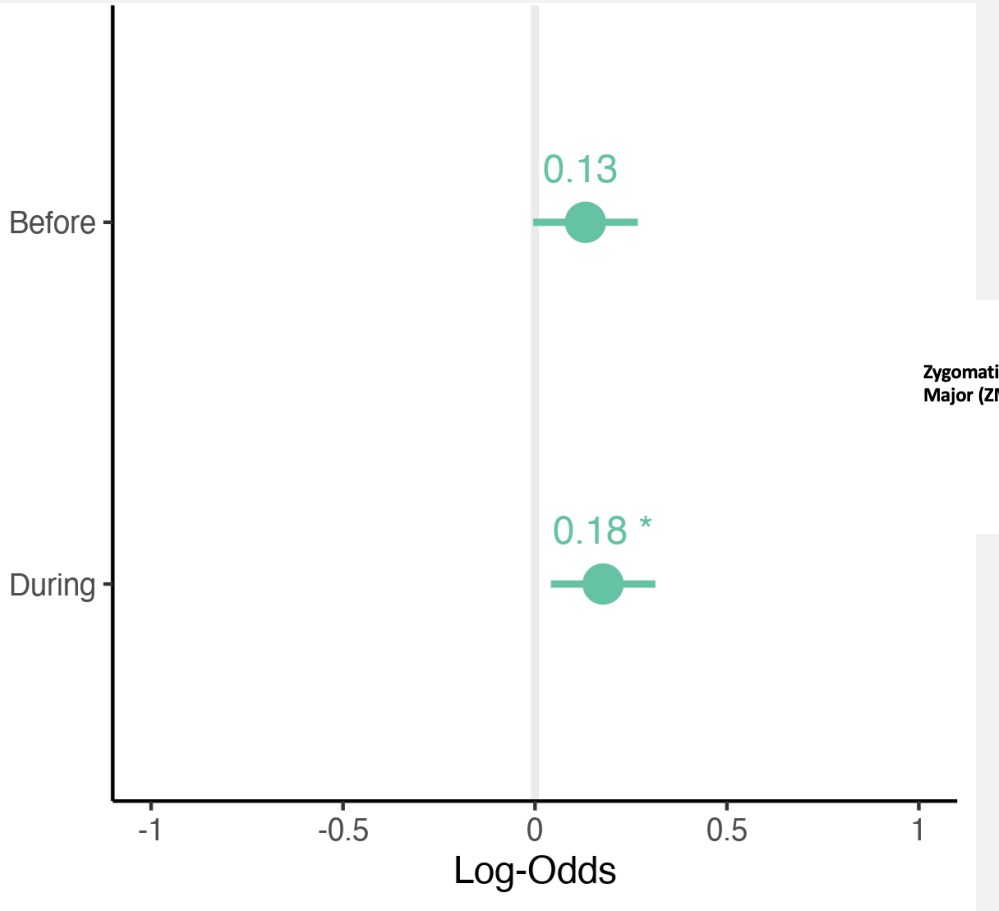
RESULTS

University of Essex

N = 22

Depressor Anguli Oris (DAO)





Zygomaticus Major (ZM)

Increased odds of choosing sad

Increased odds of choosing happy

University of Essex

DISCUSSION

- Our initial pilots suggest stronger facial feedback effects when stimulation is delivered 'during' visual stimulus onset.
  - Both for DAO and ZM muscles
- However, we could not replicate our findings for the DAO which may be due to expressions of sadness containing more muscles/AUs than for happiness
- Based on our pilot studies, we aim to recruit 50 participants

THANKS TO

University of Essex

Dr Sebastian Korb

Dr Marc Mehu

Dr Arthur Elsenaar

Dr Reinhold Scherer

Dr Alex Sel

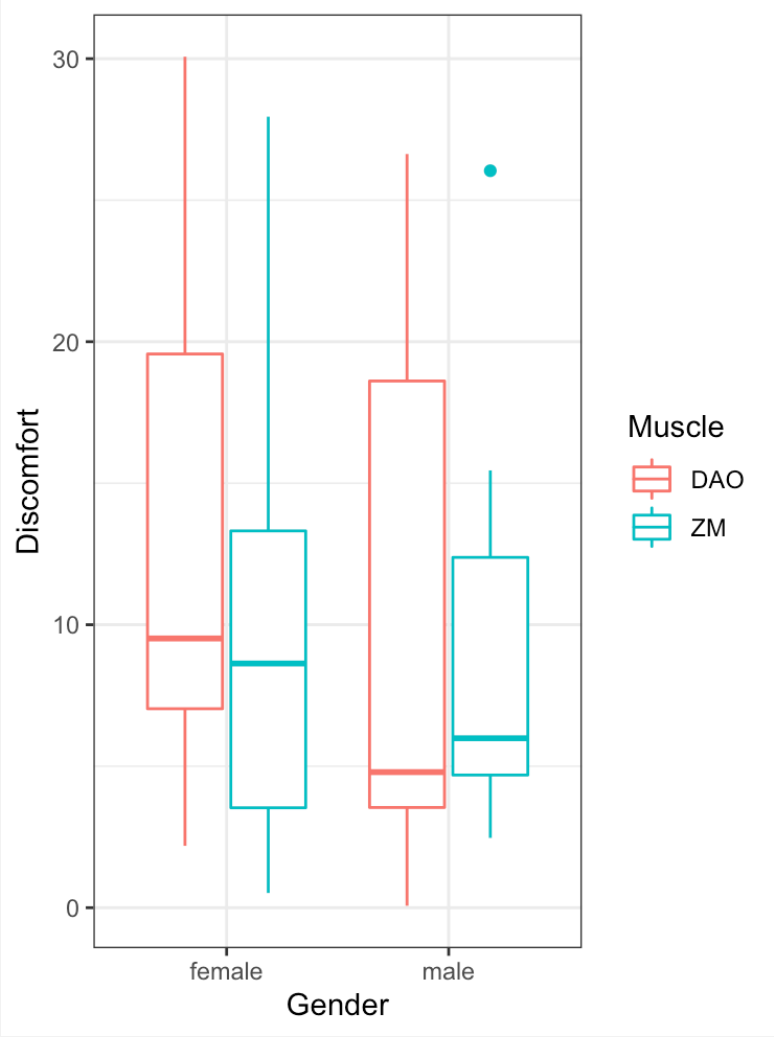
Dr Joshua Baker

FWF Der Wissenschaftsfonds.

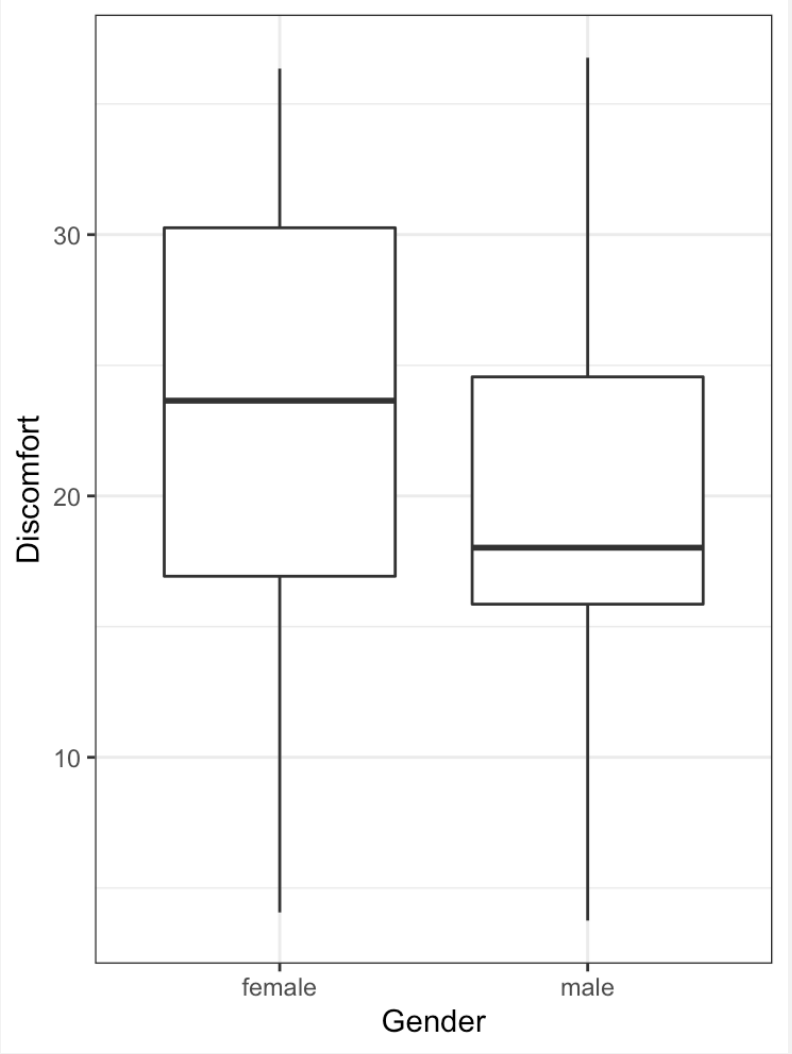
University of Essex

DISCOMFORT RATINGS

Pilot of ZM and DAO stimulation



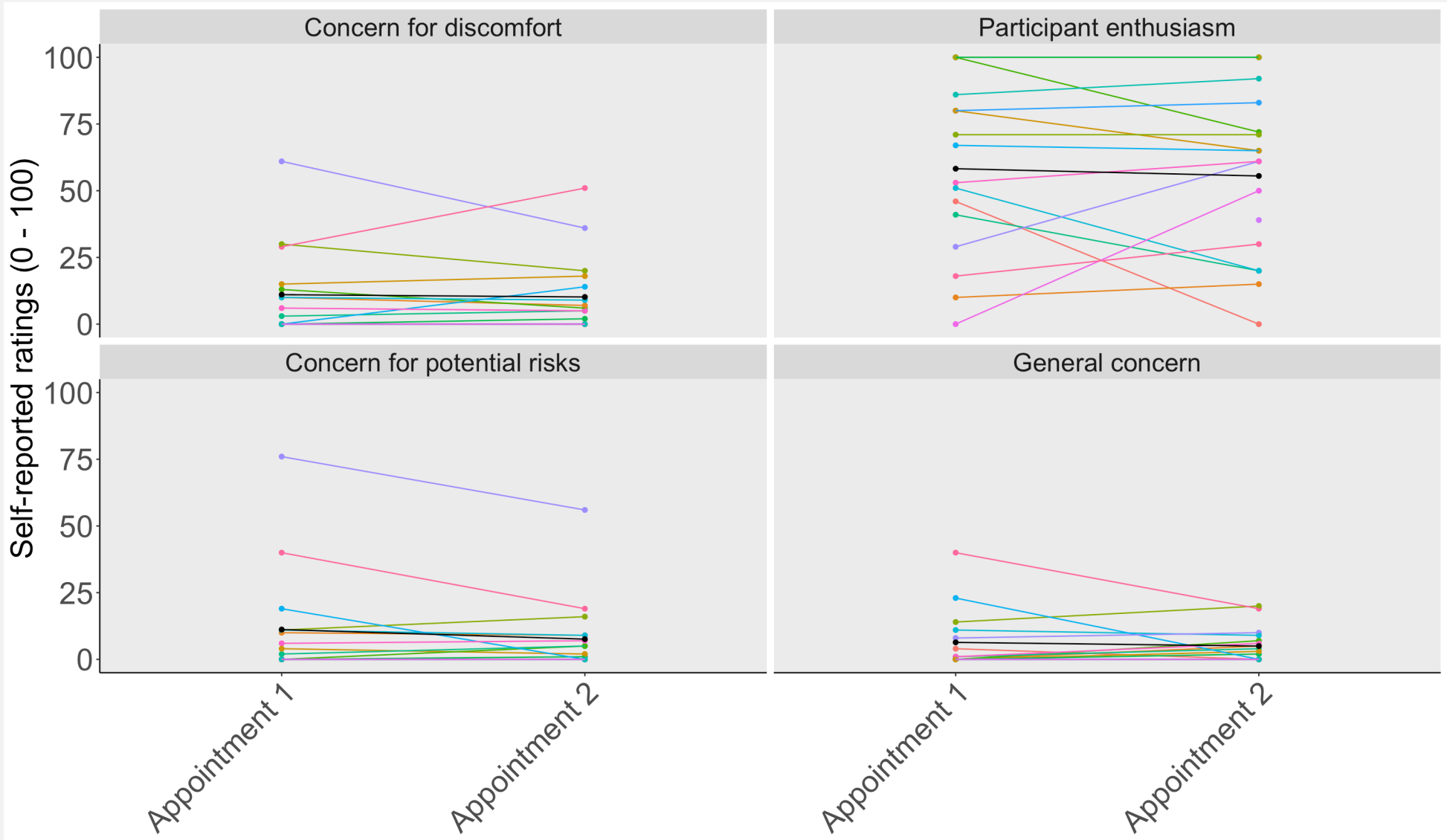
Pilot of DAO stimulation



University of Essex

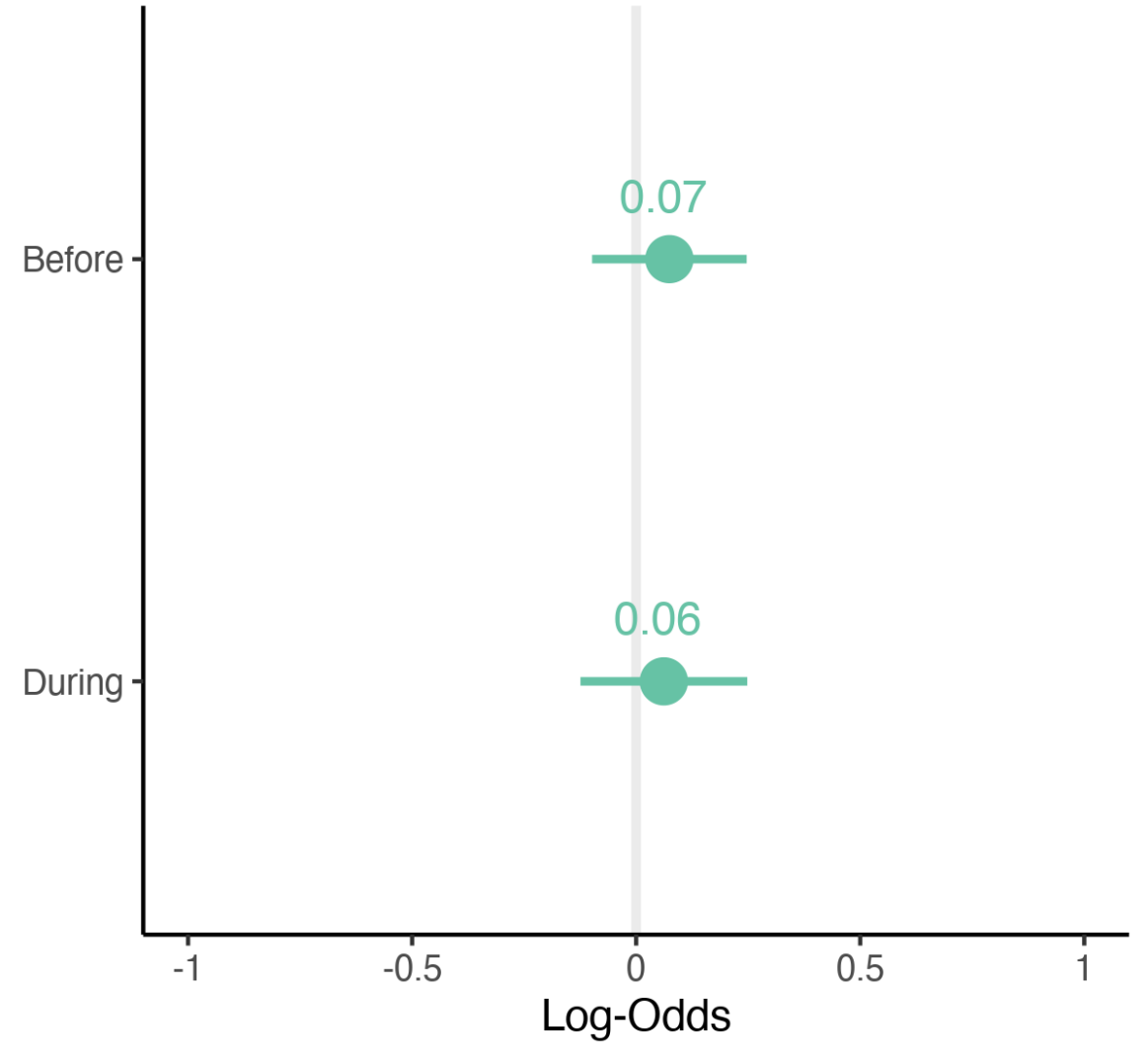
NMES

University of Essex



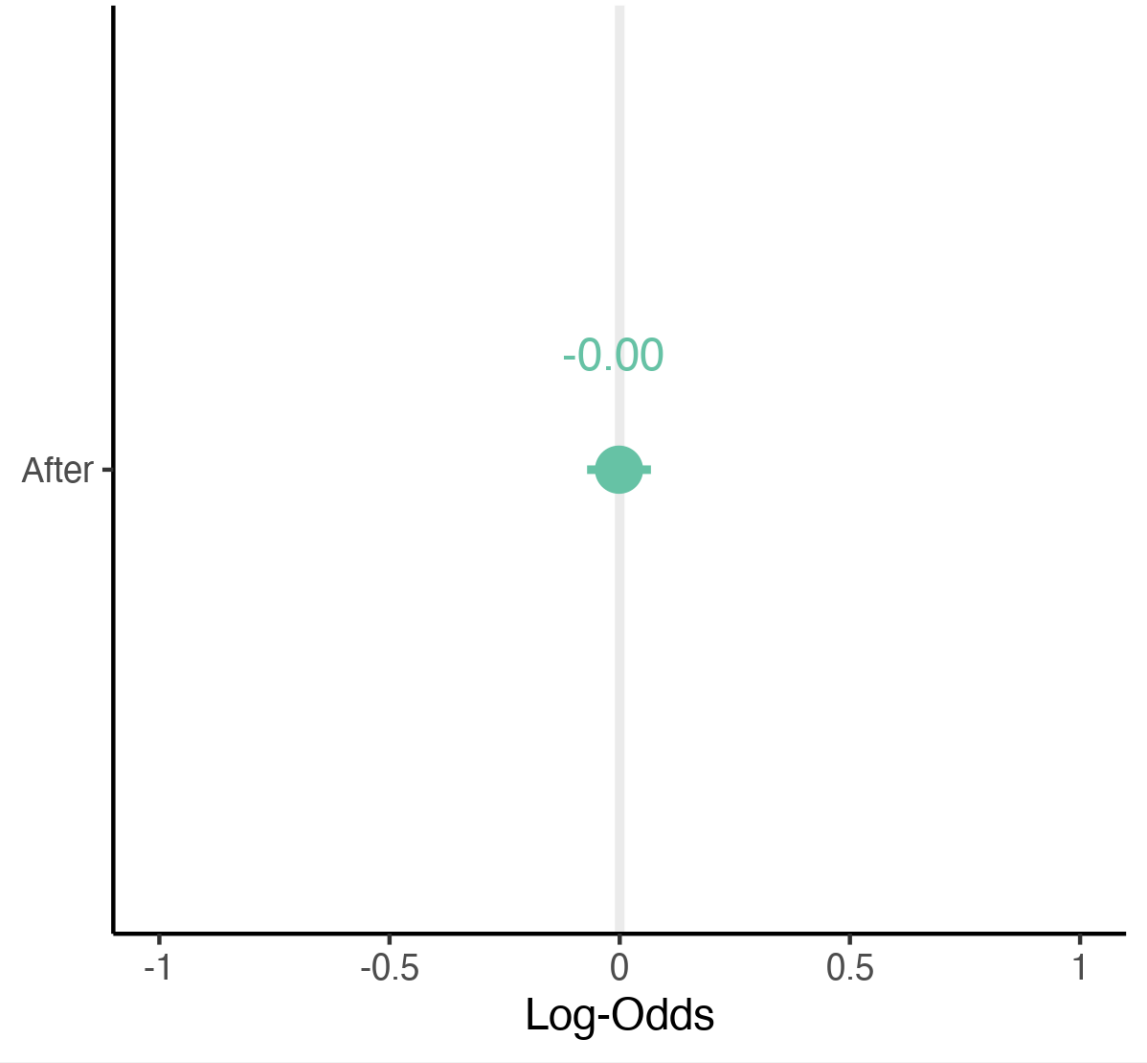
MODELS BY CORRECT RESPONSE

University of Essex



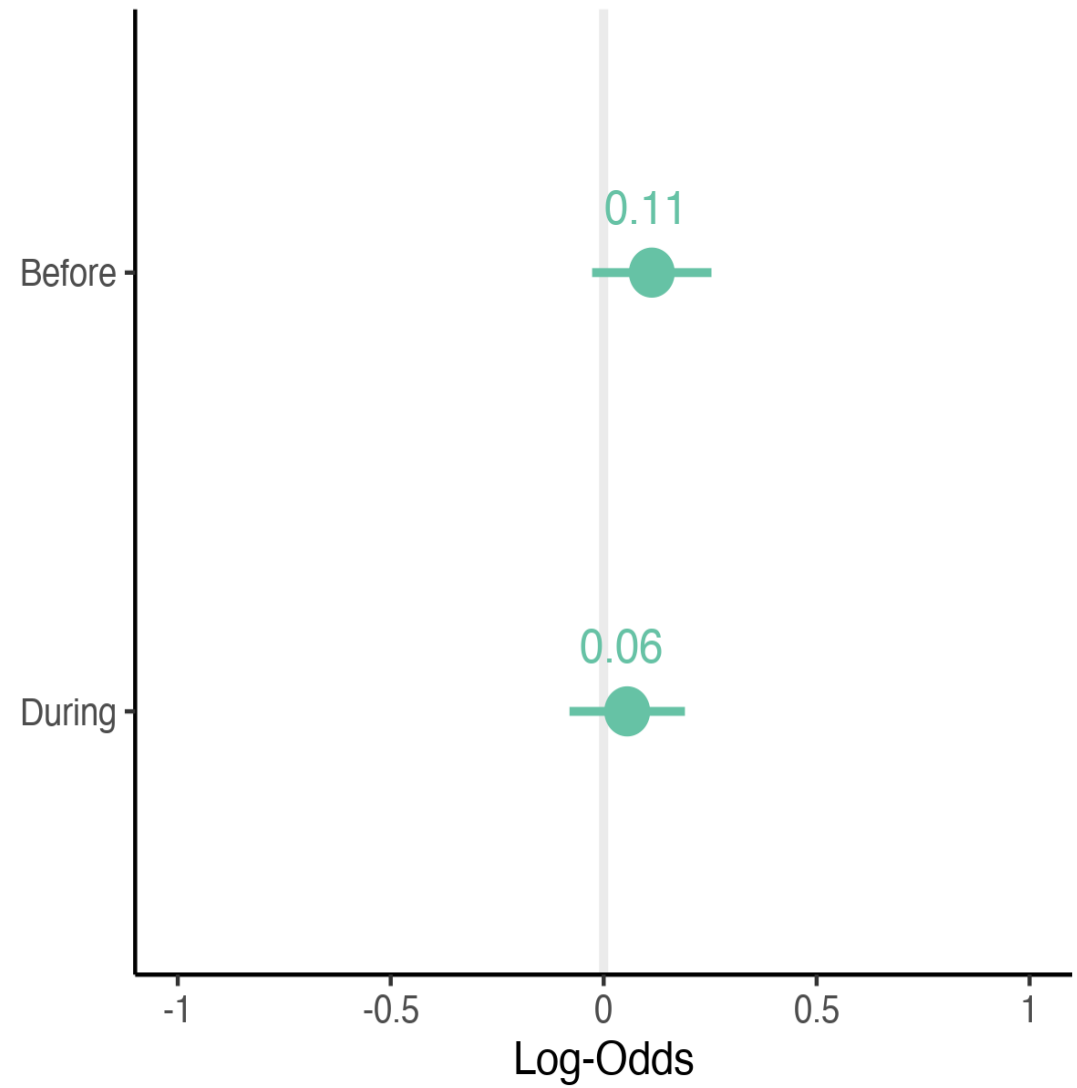
MODEL BY CORRECT RESPONSE

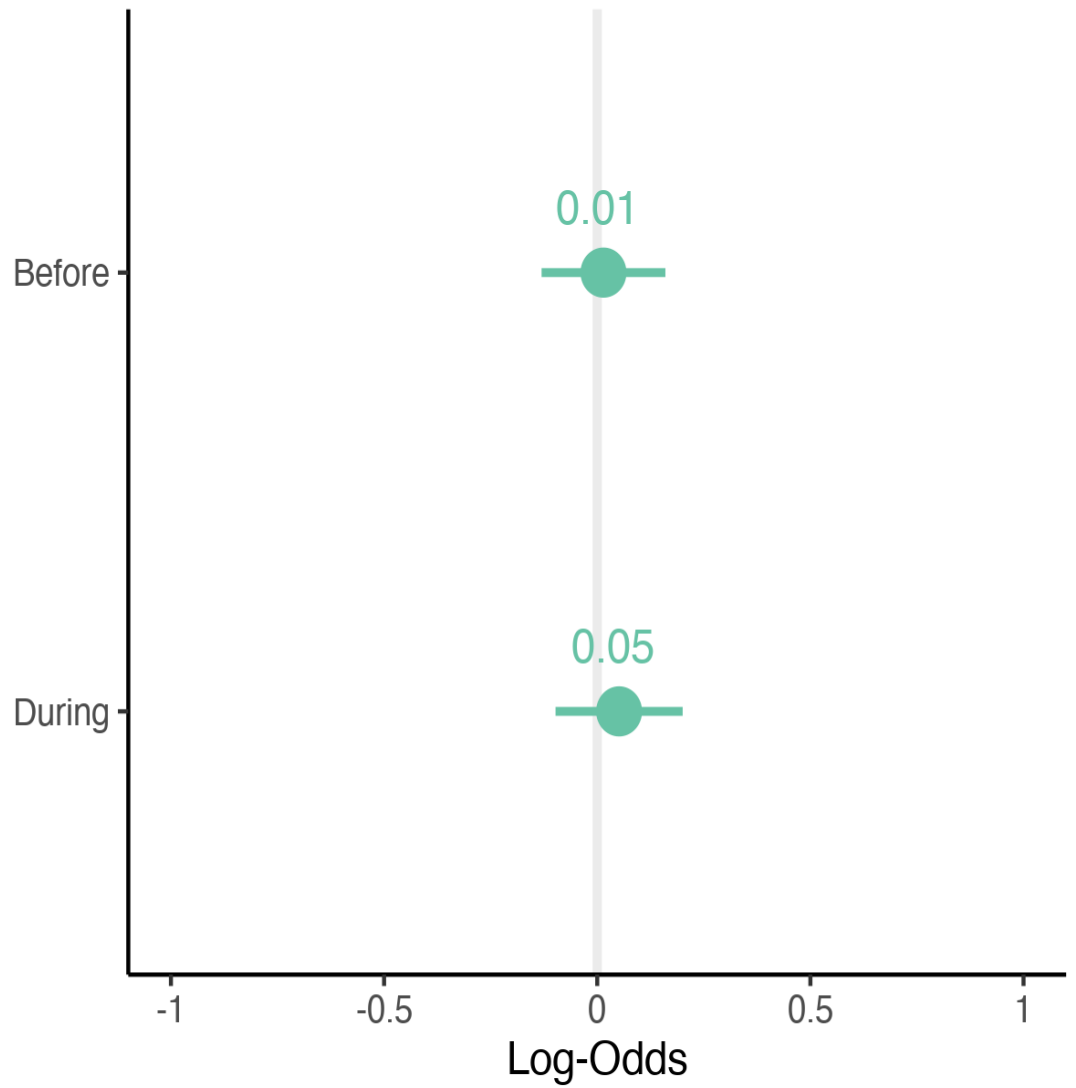
University of Essex



MODEL CORRECT RESPONSE

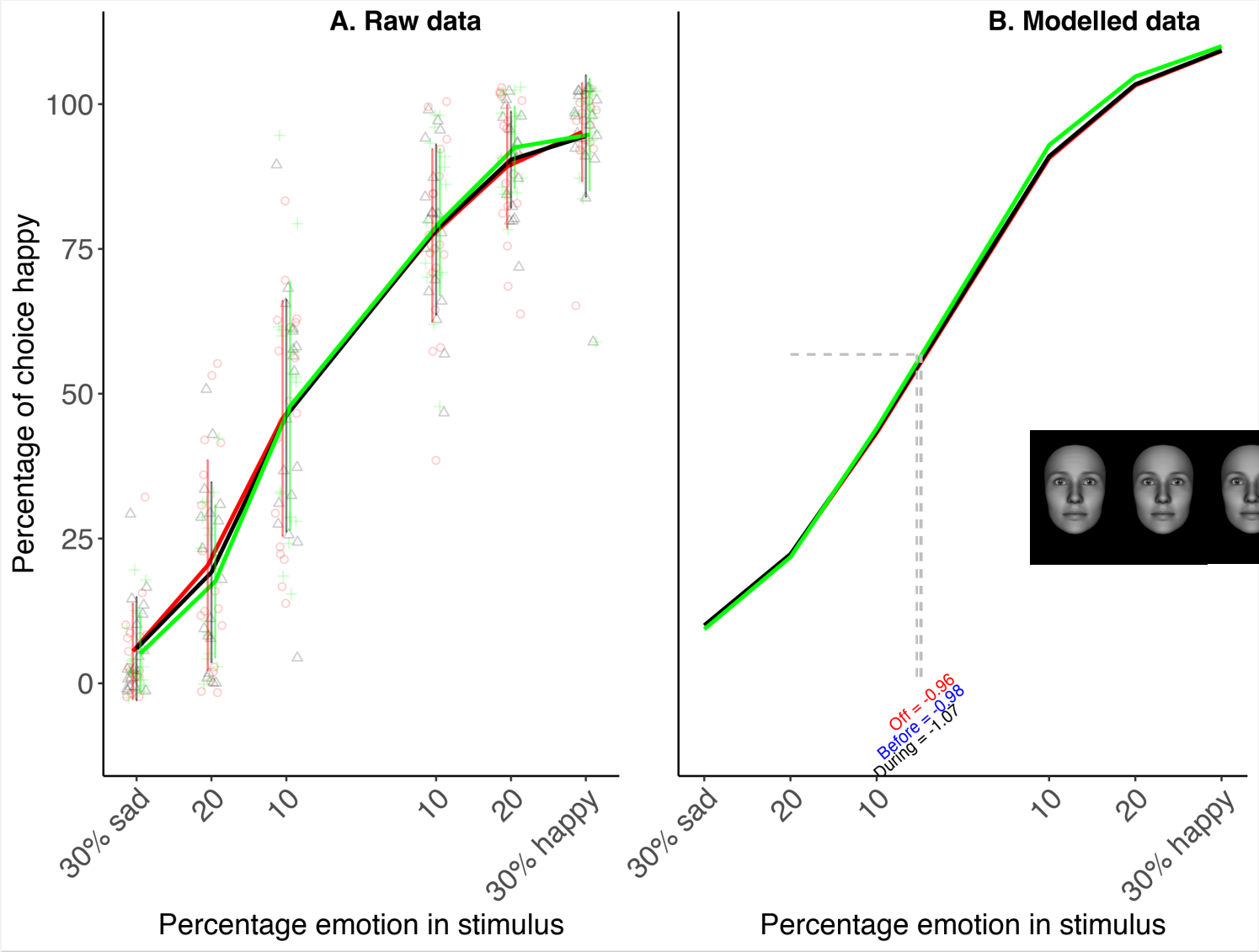
University of Essex

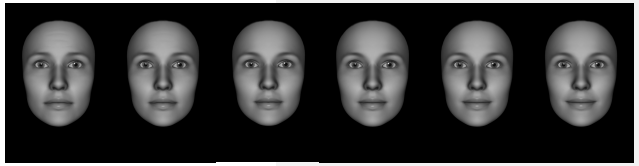




RESULTS – DAO

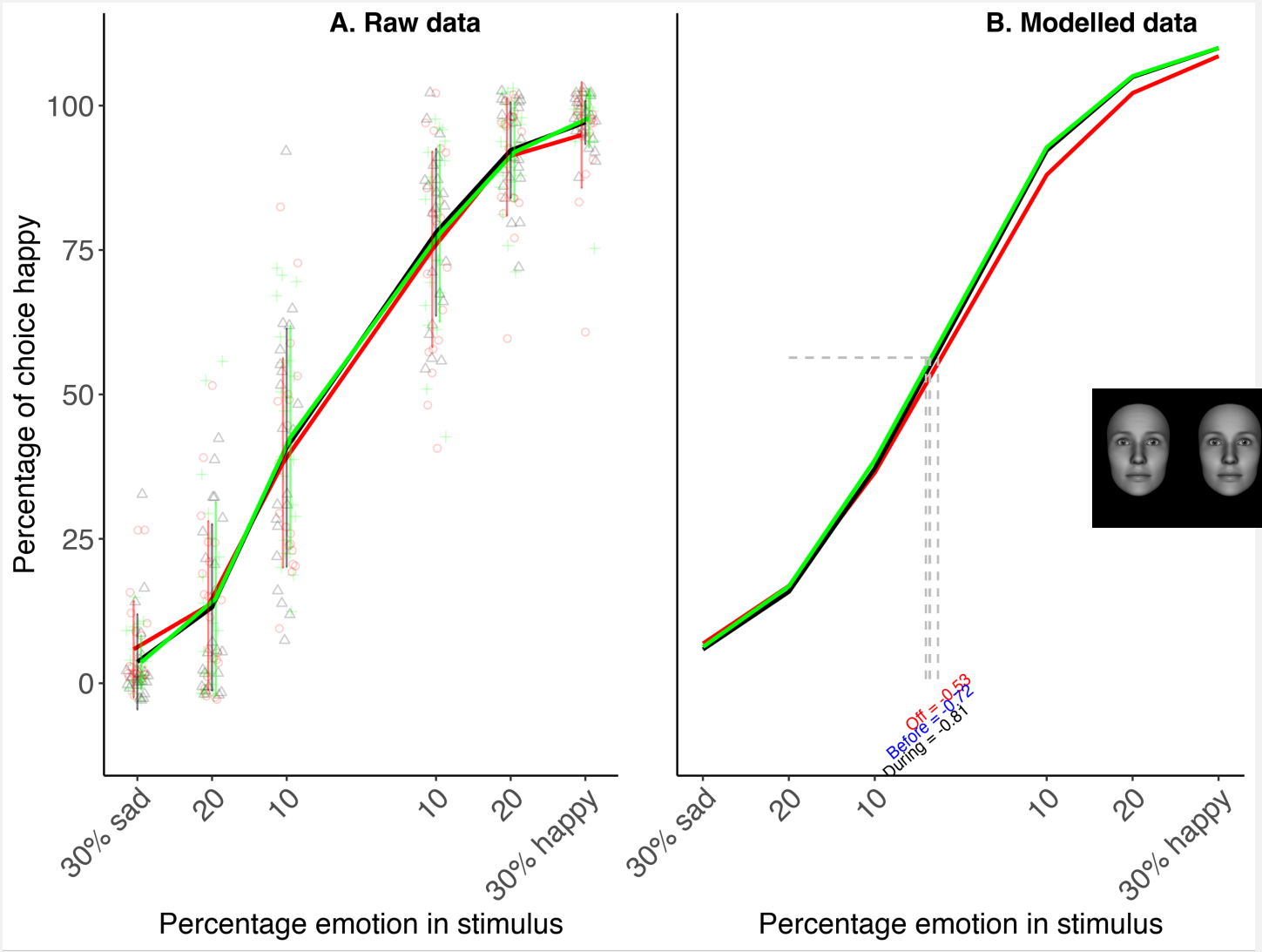
University of Essex

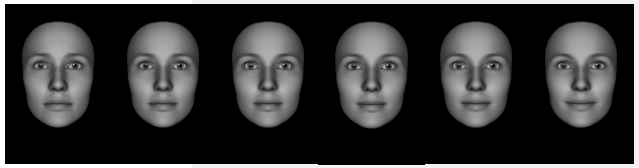




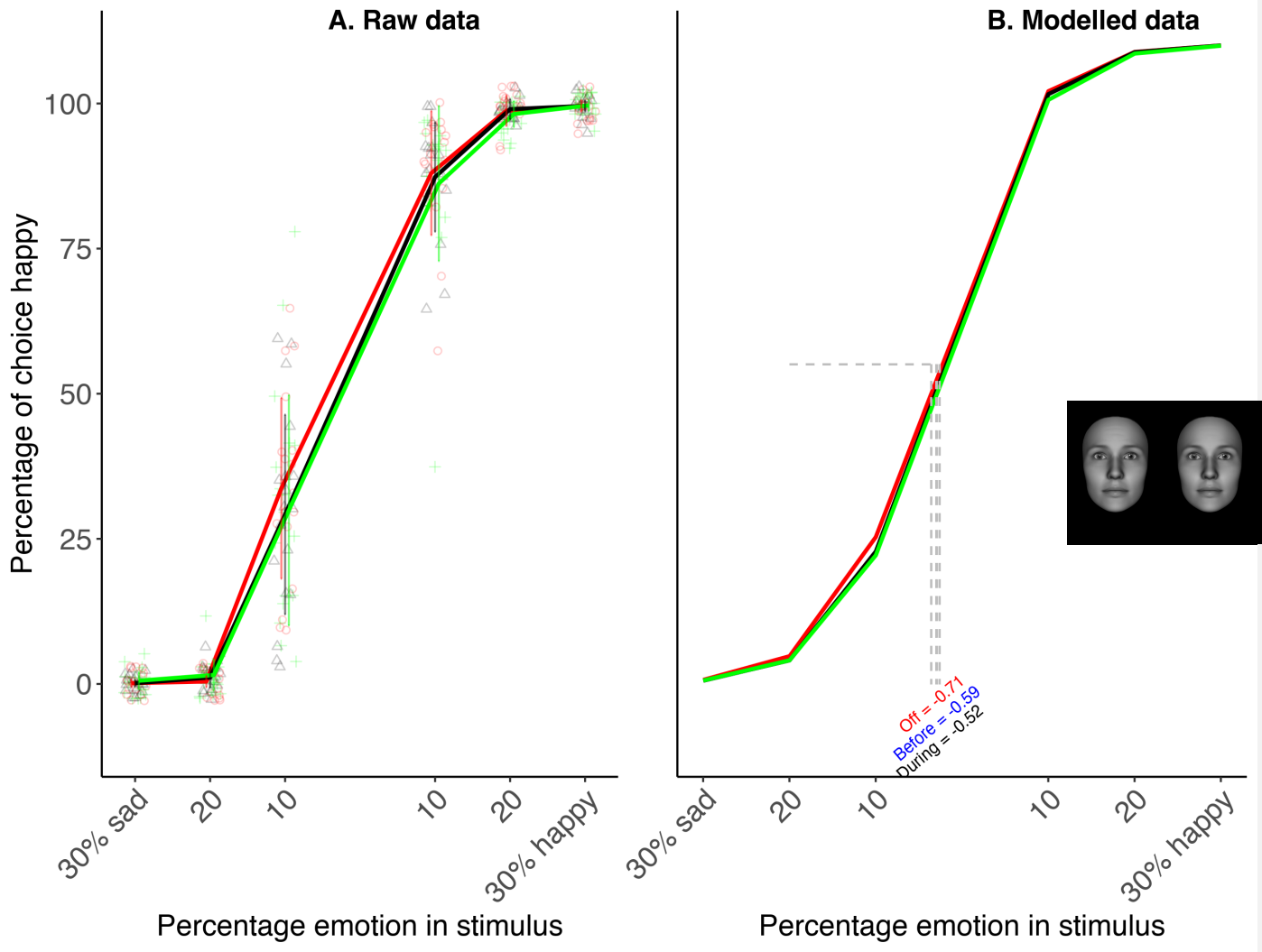
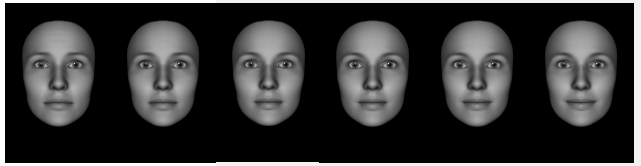
RESULTS – ZM

University of Essex





RESULTS – DAO


A. Raw data
B. Modelled data
Percentage of choice happy
100
75
50
25
0
30% sad
20
10
10
20
30% happy
Percentage emotion in stimulus
Off = -0.71
Before = -0.59
During = -0.52
NMES
off
before
during