

# Supplementary Material

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## Abstract

Section 1 shows surface plots of 3D RQA ENTR values for 3 participants (p01, p02 and p03). Datasets are for (a) window size of 100, 250, 500 and 750 samples (w100, w250, w500, w750); (b) smoothnes: sg0, sg1 and sg2; (c) movement: Horizontal Normal (HN), Horizontal Faster (HF), Vertical Normal (VN) and Vertical Faster (VF); and (d) sensors: Sensor attached to Human (HS01), sensor attached to Robot (RS01).

## Contents

|          |                           |          |
|----------|---------------------------|----------|
| <b>1</b> | <b>3D RQA ENTR values</b> | <b>1</b> |
| 1.1      | Participant 01 . . . . .  | 1        |
| 1.2      | Participant 02 . . . . .  | 6        |
| 1.3      | Participant 03 . . . . .  | 11       |

## 1 3D RQA ENTR values

Location of code, data and figures for 3D RQA ENTR values is shown below

```
## Code
$HOME/srep2020/code/rscripts/G_3Drqa
'> source( paste( getwd(), '/C_3Drqa_plots_epsilon.R', sep=''), echo=TRUE )'

## Data
$HOME/srep2019/data/rqa$ tree -s

## Figures
$HOME/srep2020/docs/figures/rqa/src/3drqa_epsilon$ tree -s
```

Datasets for NN participants where NN is 01, 02 and 03 are:

```
RQAs_pNNw100.dt
RQAs_pNNw250.dt
RQAs_pNNw500.dt
RQAs_pNNw750.dt
```

### 1.1 Participant 01

Figures 1 and 2 are for a window size of 100 samples. Figures 3 and 4 are for a window size of 250 samples. Figures 5 and 6 are for a window size of 500 samples. Figures 7 and 8 are for a window size of 750 samples.

**p01-w100-HS01**

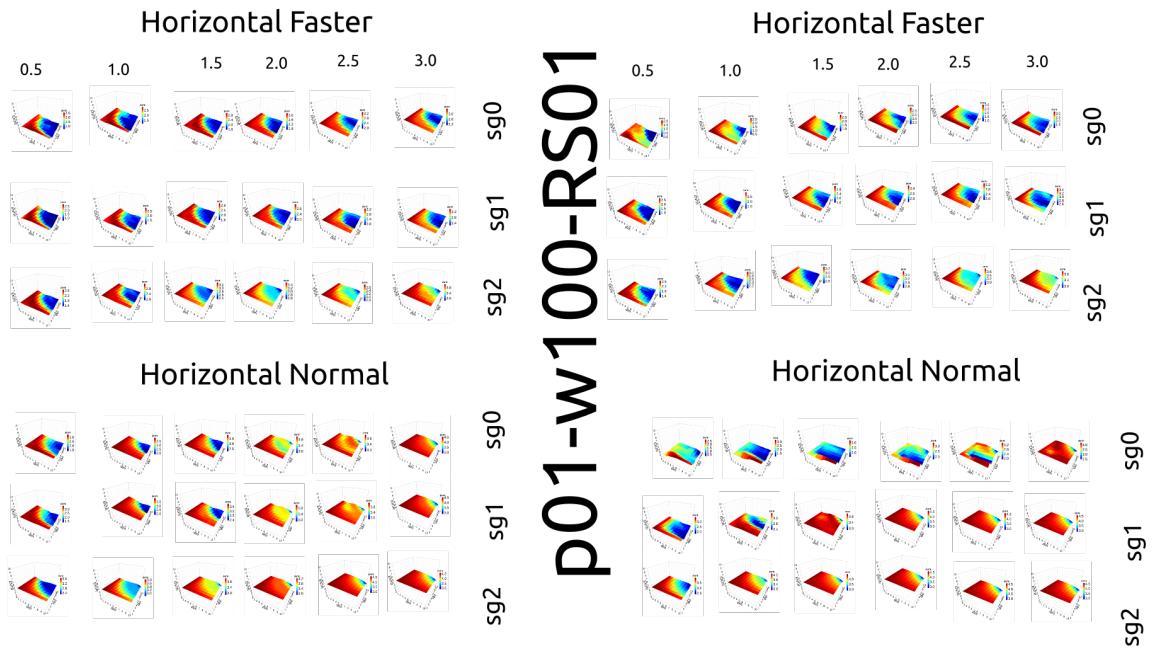


Figure 1: **RQA-Entr** for participant 01 performing horizontal movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

**p01-w100-HS01**

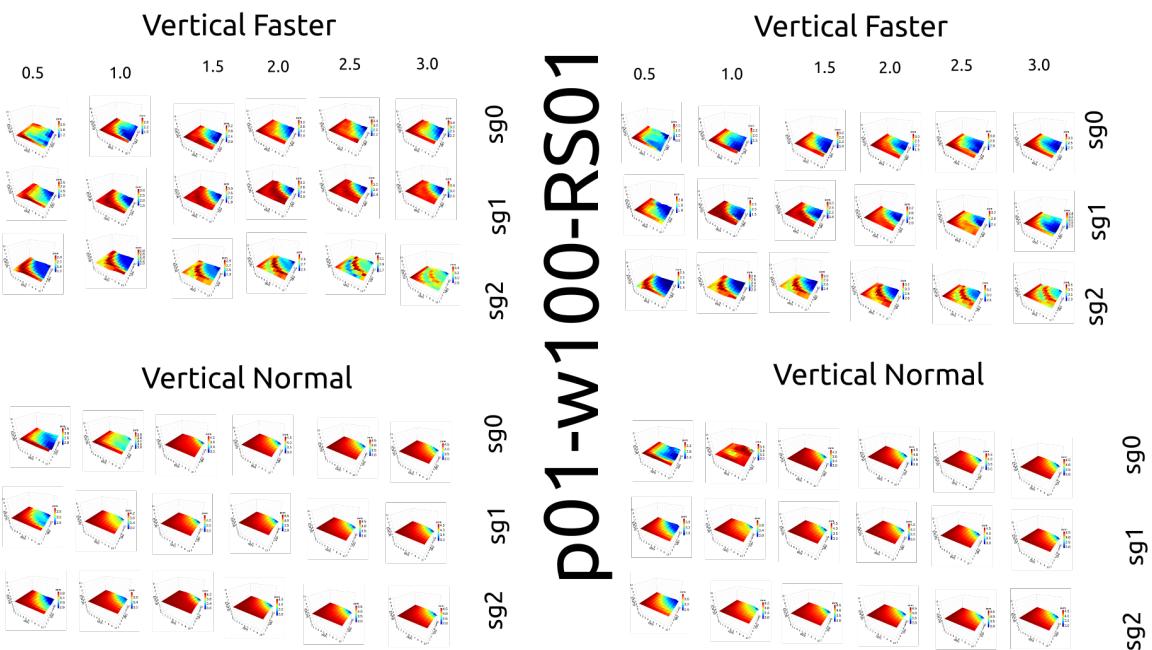


Figure 2: **RQA-Entr** for participant 01 performing vertical movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

**p01-w250-HS01**

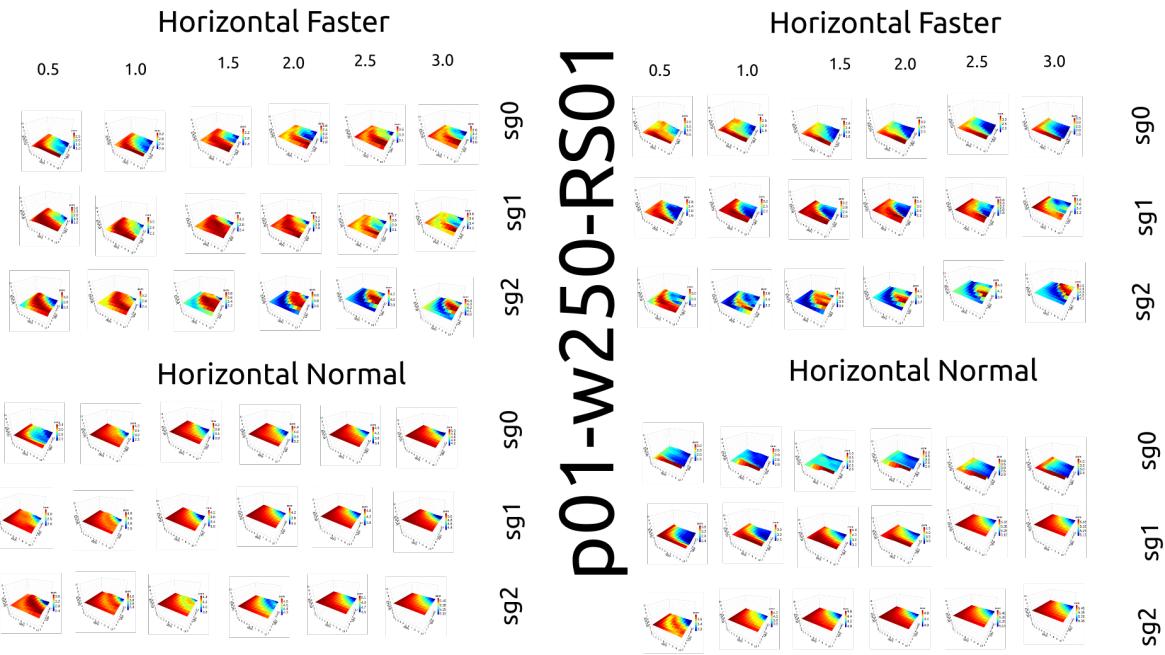


Figure 3: **RQA-Entr** for participant 01 performing horizontal movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

**p01-w250-HS01**

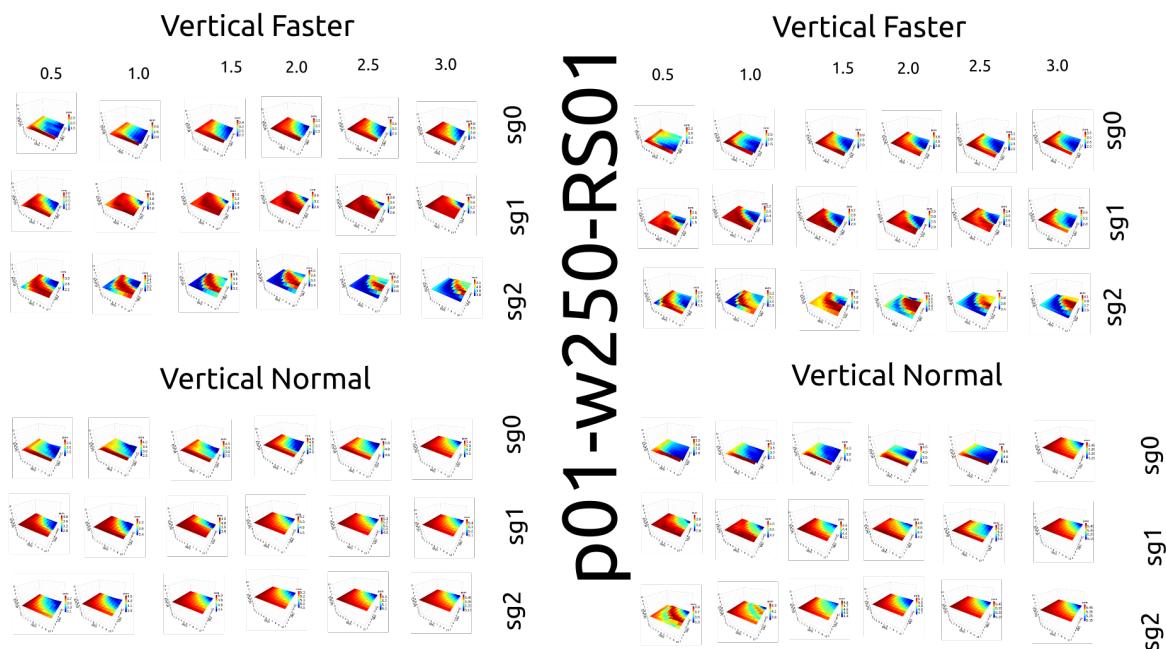
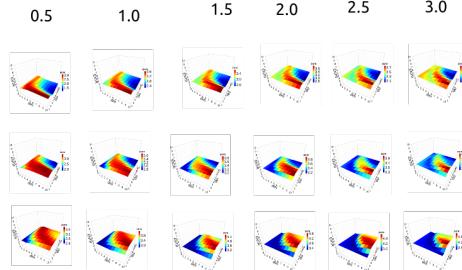


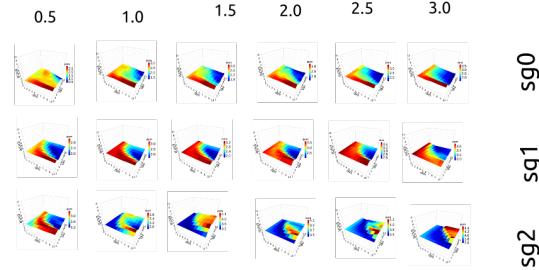
Figure 4: **RQA-Entr** for participant 01 performing vertical movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

p01-w500-HS01

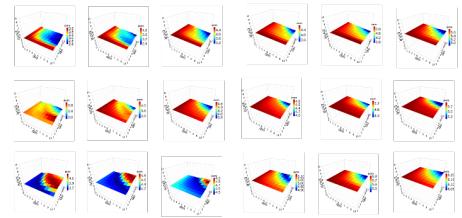
Horizontal Faster



Horizontal Faster



Horizontal Normal



Horizontal Normal

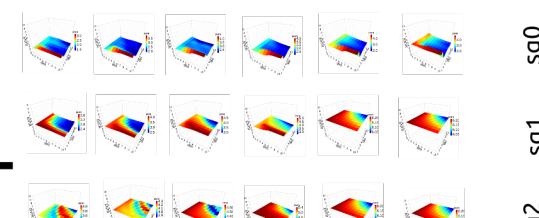
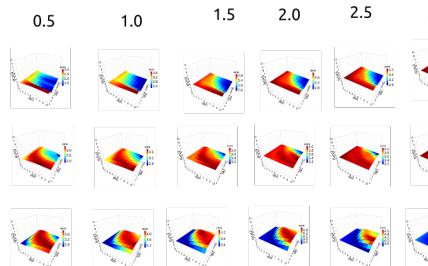


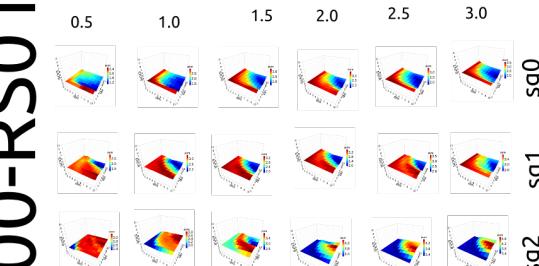
Figure 5: **RQA-Entr** for participant 01 performing horizontal movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

p01-w500-HS01

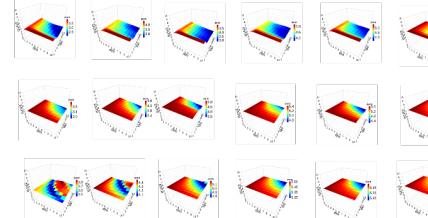
Vertical Faster



Vertical Faster



Vertical Normal



Vertical Normal

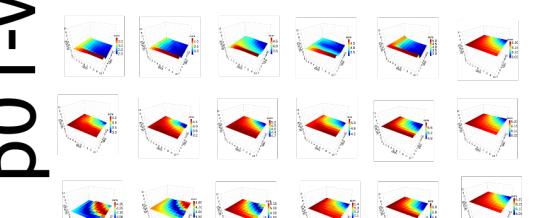
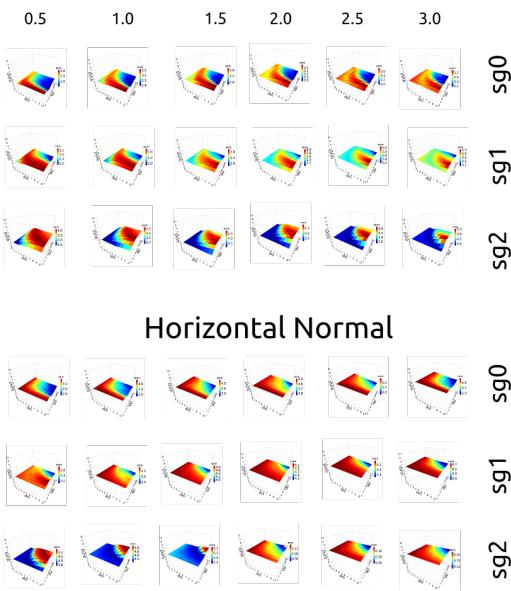


Figure 6: **RQA-Entr** for participant 01 performing vertical movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

**p01-w750-HS01**

Horizontal Faster



Horizontal Faster

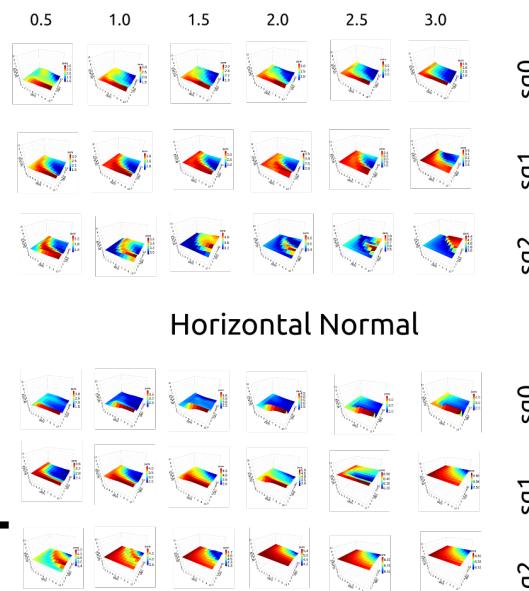
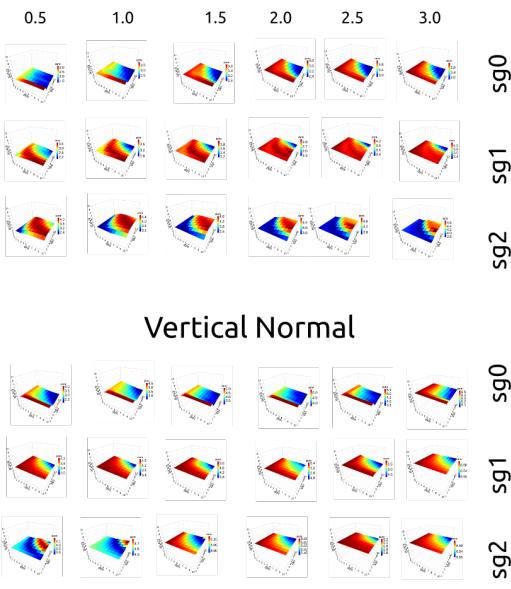


Figure 7: **RQA-Entr** for participant 01 performing horizontal movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

**p01-w750-HS01**

Vertical Faster



Vertical Faster

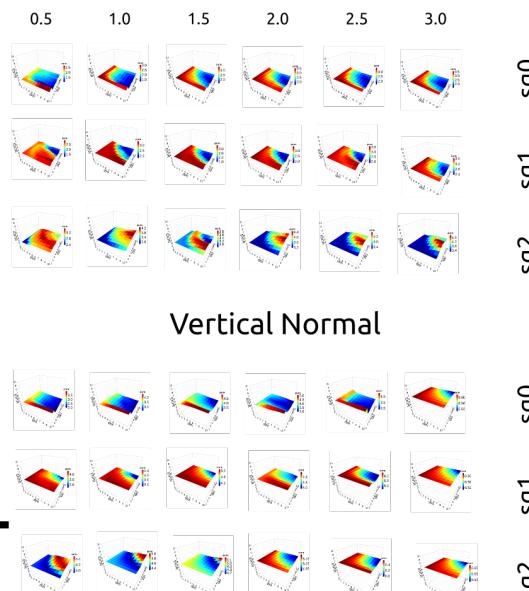


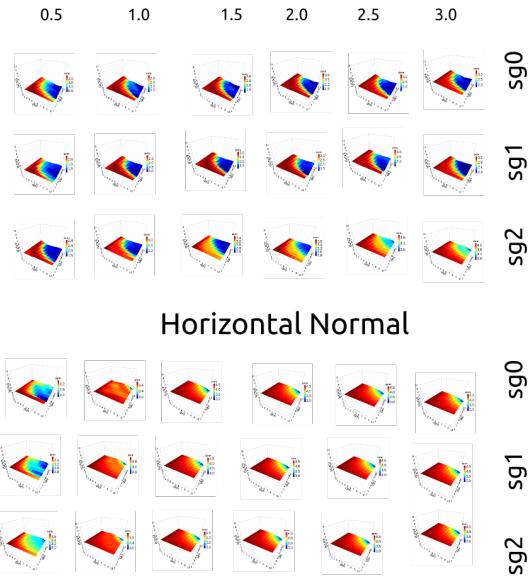
Figure 8: **RQA-Entr** for participant 01 performing vertical movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

## 1.2 Participant 02

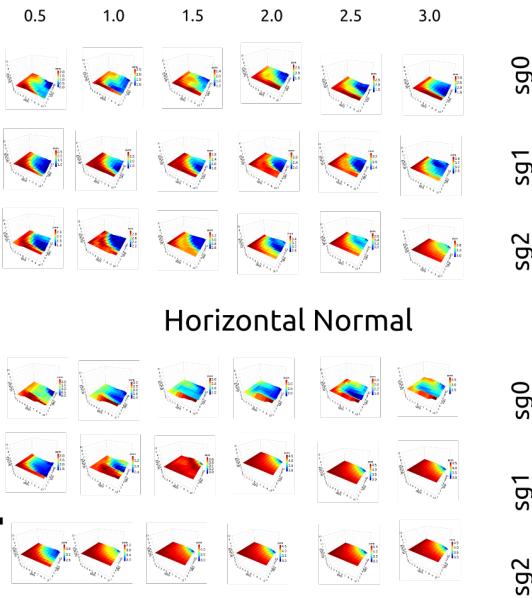
Figures 9 and 10 are for a window size of 100 samples. Figures 11 and 12 are for a window size of 250 samples. Figures 13 and 14 are for a window size of 500 samples. Figures 15 and 16 are for a window size of 750 samples.

**p02-w100-HS01**

Horizontal Faster



Horizontal Faster



Horizontal Normal

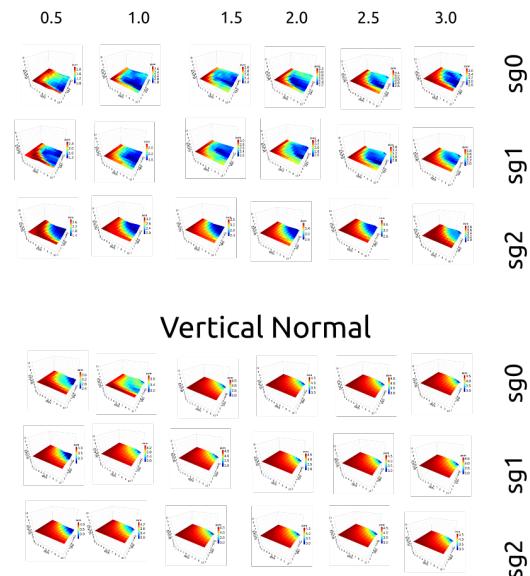
sg0  
sg1  
sg2

Horizontal Normal

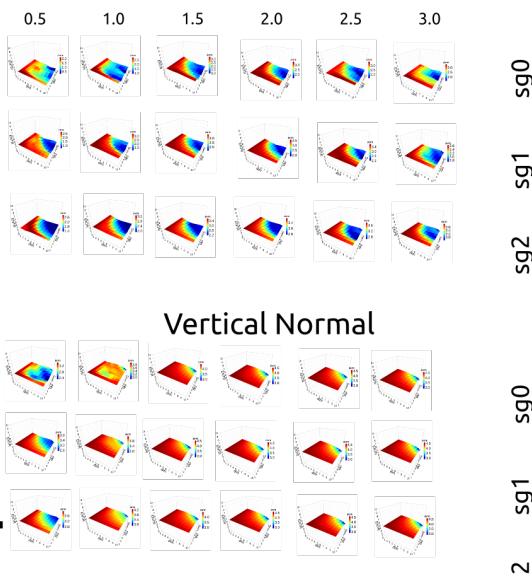
sg0  
sg1  
sg2

**p02-w100-HS01**

Vertical Faster



Vertical Faster



Vertical Normal

sg0  
sg1  
sg2

Vertical Normal

sg0  
sg1  
sg2

Figure 9: **RQA-Entr** for participant 02 performing horizontal movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

Figure 10: **RQA-Entr** for participant 02 performing vertical movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

**p02-w250-HS01**

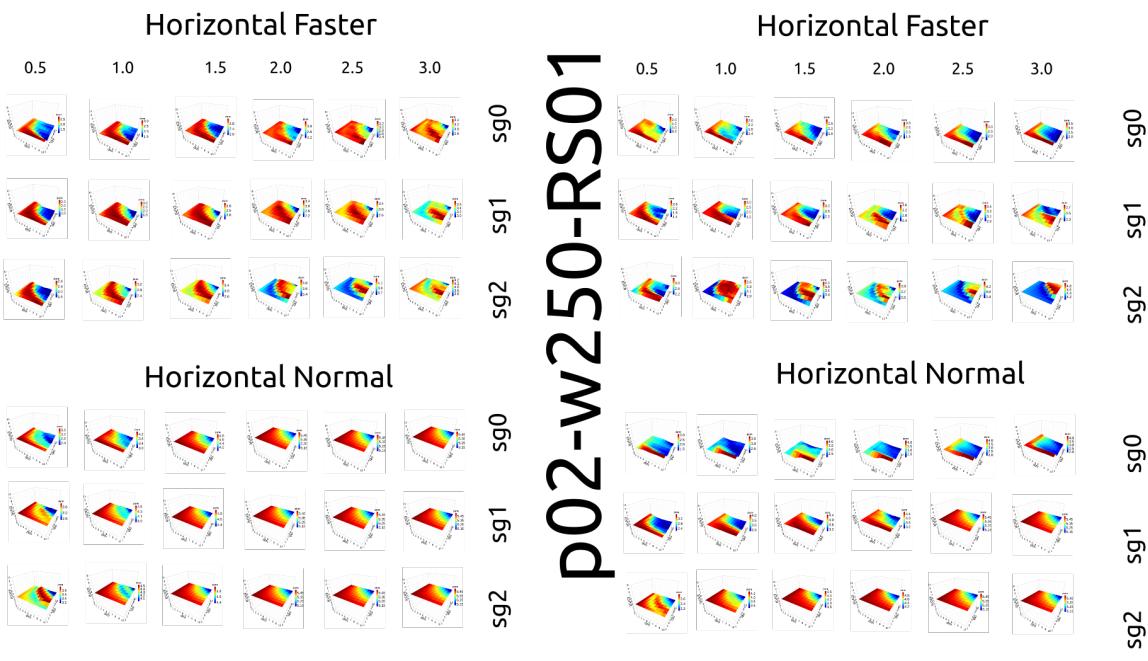


Figure 11: **RQA-Entr** for participant 02 performing horizontal movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

**p02-w250-HS01**

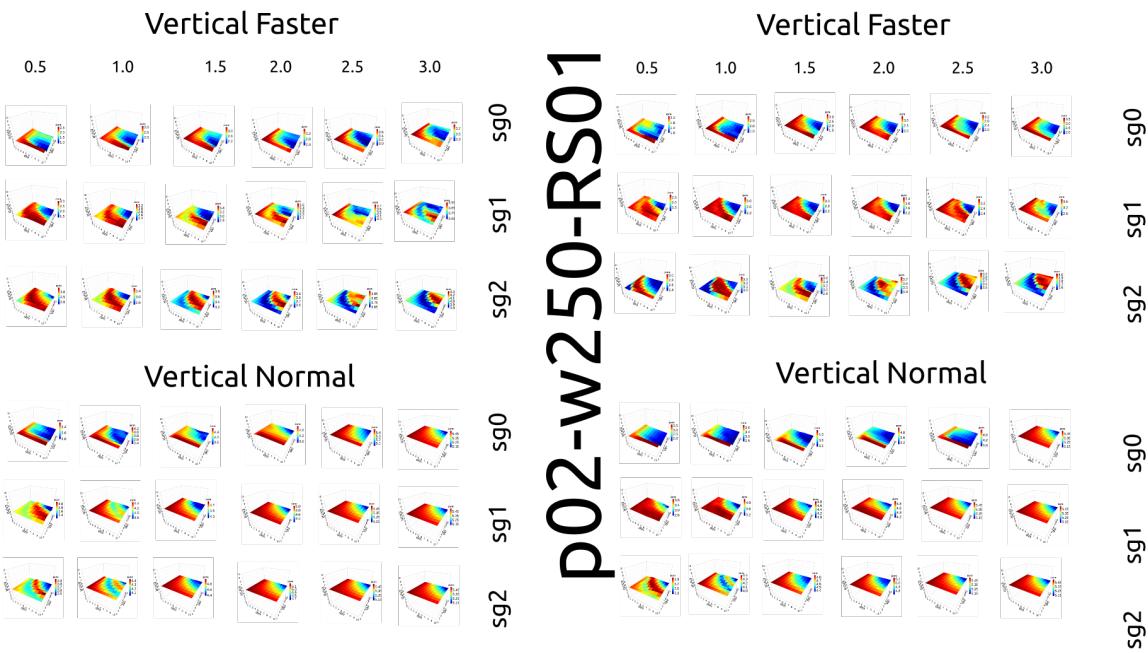
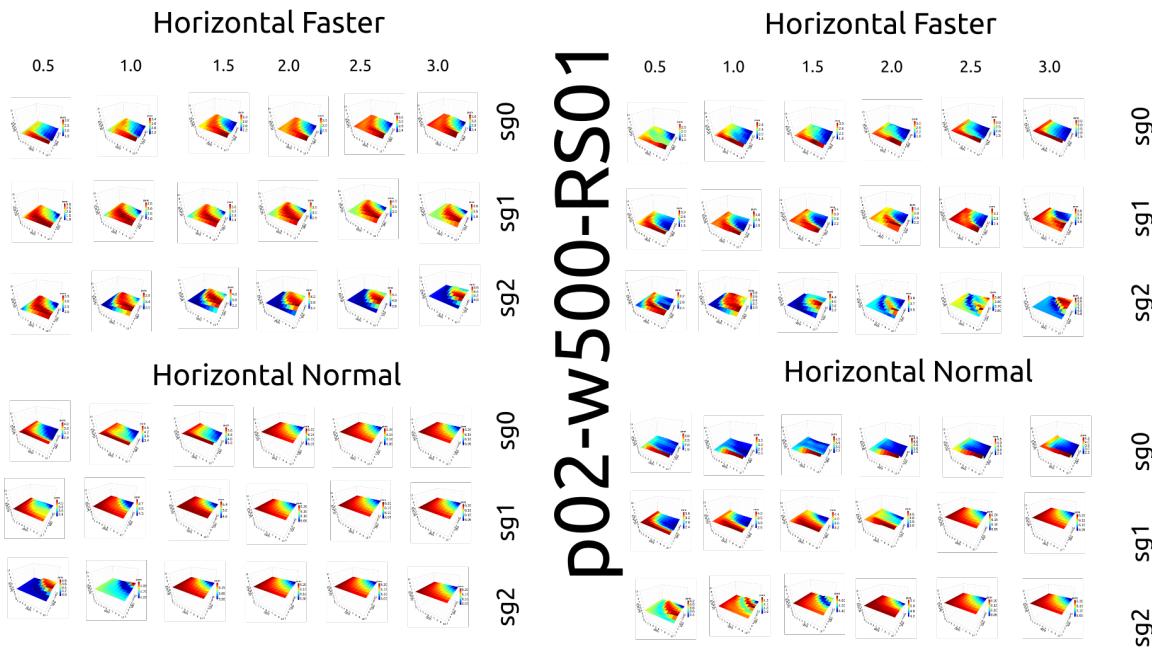
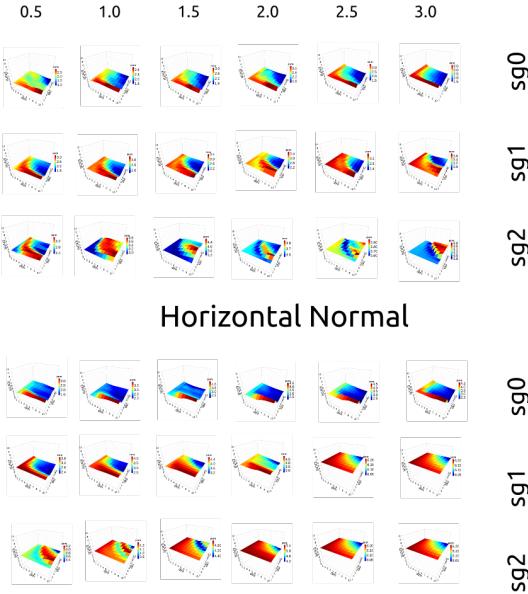


Figure 12: **RQA-Entr** for participant 02 performing vertical movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

**p02-w500-HS01**

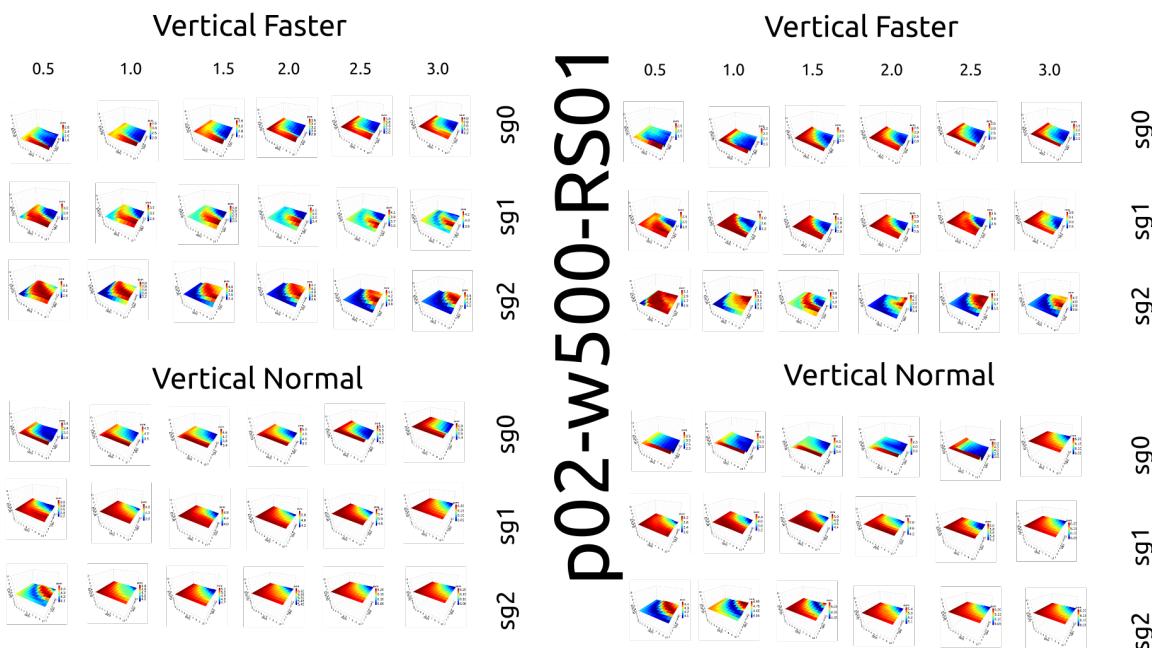


**Horizontal Faster**



**Horizontal Normal**

**p02-w500-HS01**



**Vertical Faster**

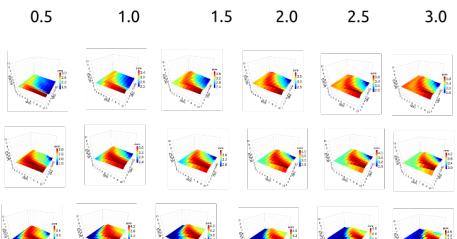
**Vertical Normal**

Figure 13: **RQA-Entr** for participant 02 performing horizontal movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

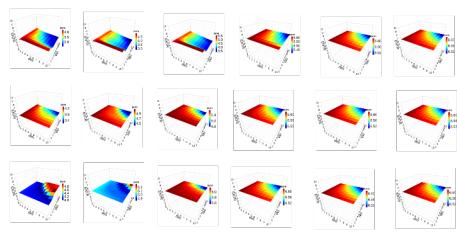
Figure 14: **RQA-Entr** for participant 02 performing vertical movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

**p02-w750-HS01**

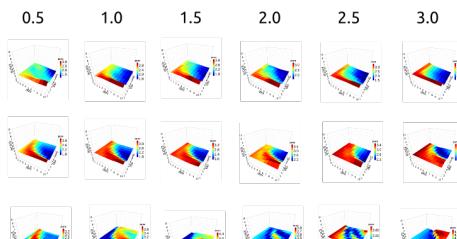
Horizontal Faster



Horizontal Normal



Horizontal Faster



Horizontal Normal

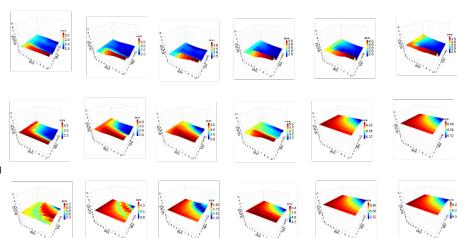
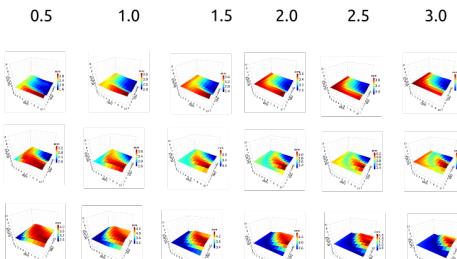


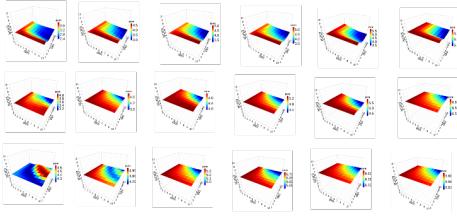
Figure 15: **RQA-Entr** for participant 02 performing horizontal movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

**p02-w750-HS01**

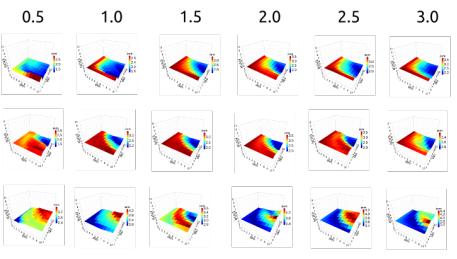
Vertical Faster



Vertical Normal



Vertical Faster



Vertical Normal

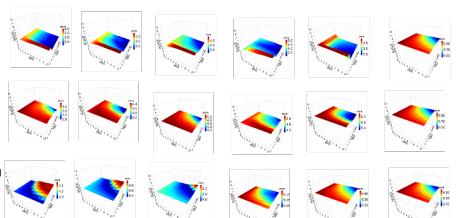


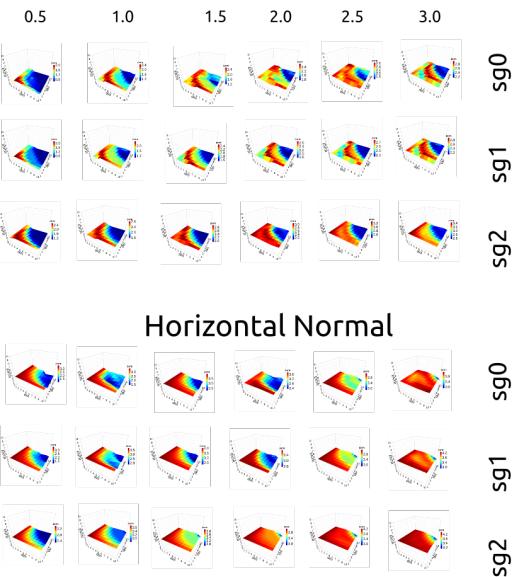
Figure 16: **RQA-Entr** for participant 02 performing vertical movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

### **1.3 Participant 03**

Figures 17 and 18 are for a window size of 100 samples. Figures 19 and 20 are for a window size of 250 samples. Figures 21 and 22 are for a window size of 500 samples. Figures 23 and 24 are for a window size of 750 samples.

**p03-w100-HS01**

Horizontal Faster



Horizontal Faster

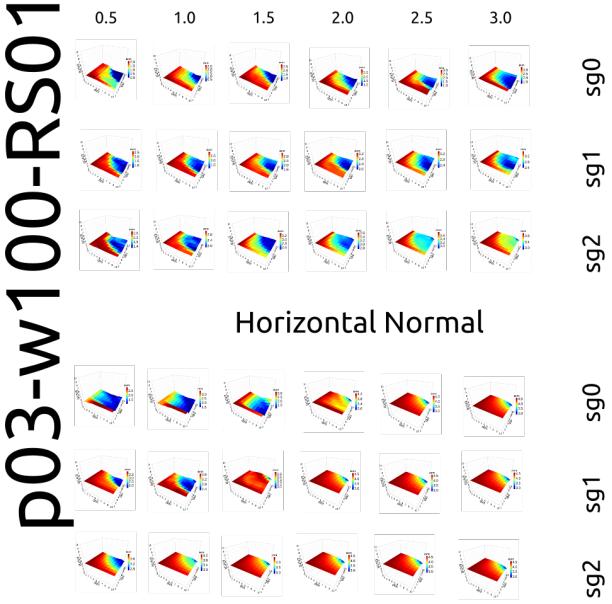
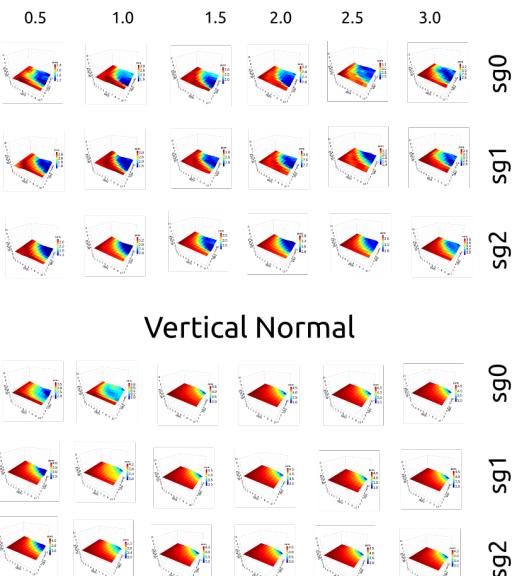


Figure 17: **RQA-Entr** for participant 03 performing horizontal movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

**p03-w100-HS01**

Vertical Faster



Vertical Faster

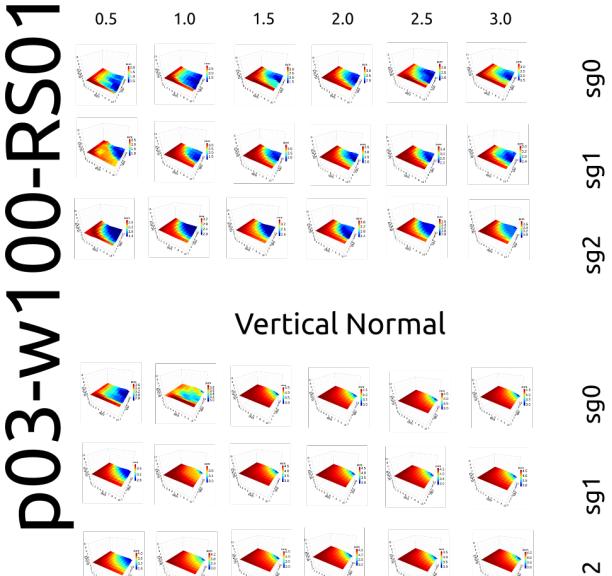
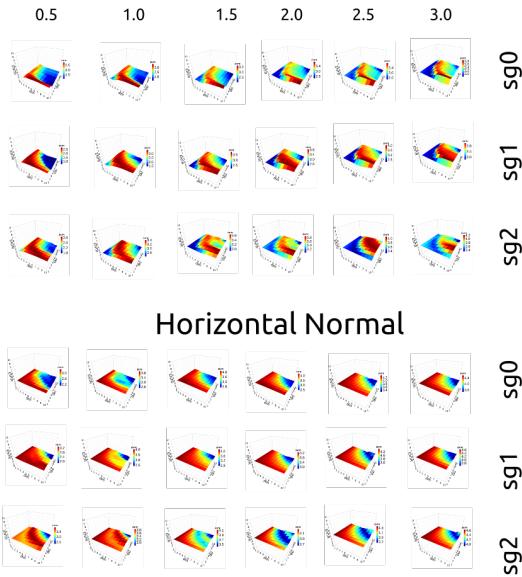


Figure 18: **RQA-Entr** for participant 03 performing vertical movements for a window size of 100 samples. Code and data to reproduce the figure is available in [1].

**p03-w250-HS01**

Horizontal Faster



Horizontal Faster

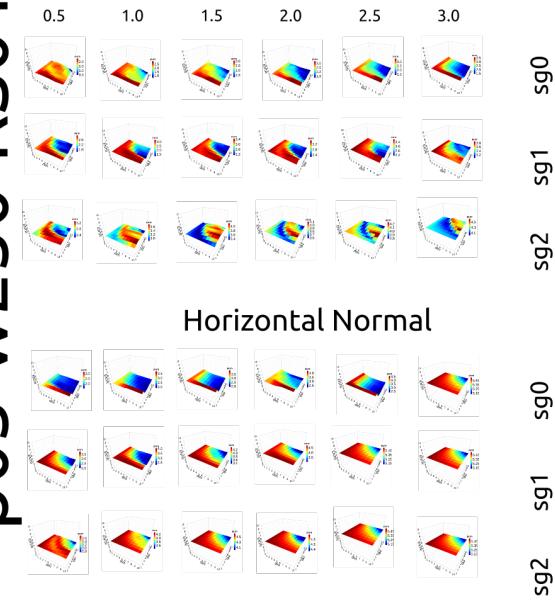
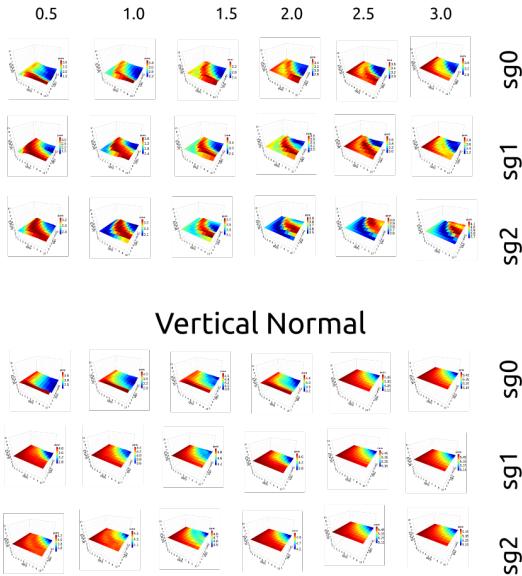


Figure 19: **RQA-Entr** for participant 03 performing horizontal movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

**p03-w250-HS01**

Vertical Faster



Vertical Faster

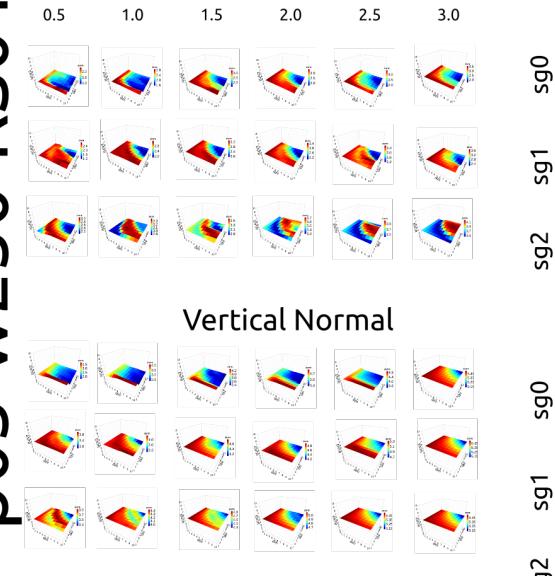


Figure 20: **RQA-Entr** for participant 03 performing vertical movements for a window size of 250 samples. Code and data to reproduce the figure is available in [1].

# p03-w500-HS01

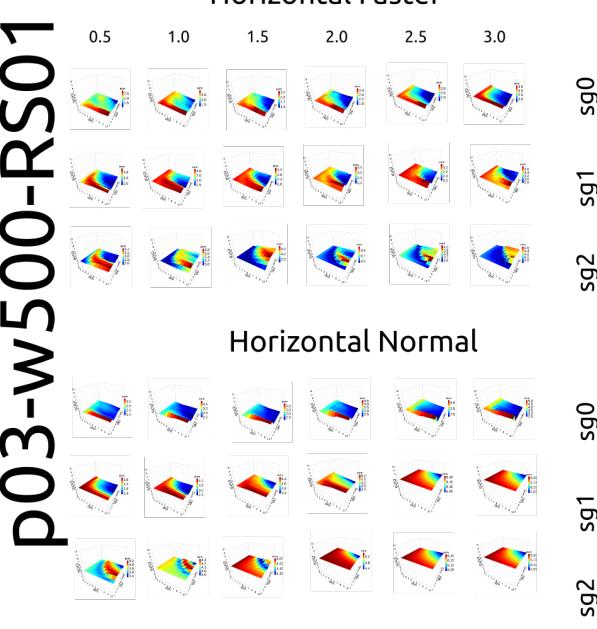
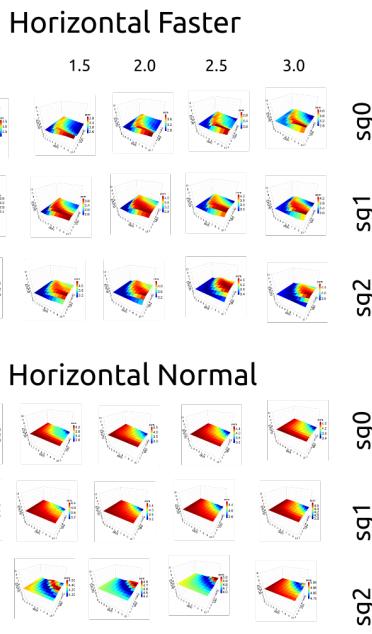


Figure 21: **RQA-Entr** for participant 03 performing horizontal movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

# p03-w500-RS01

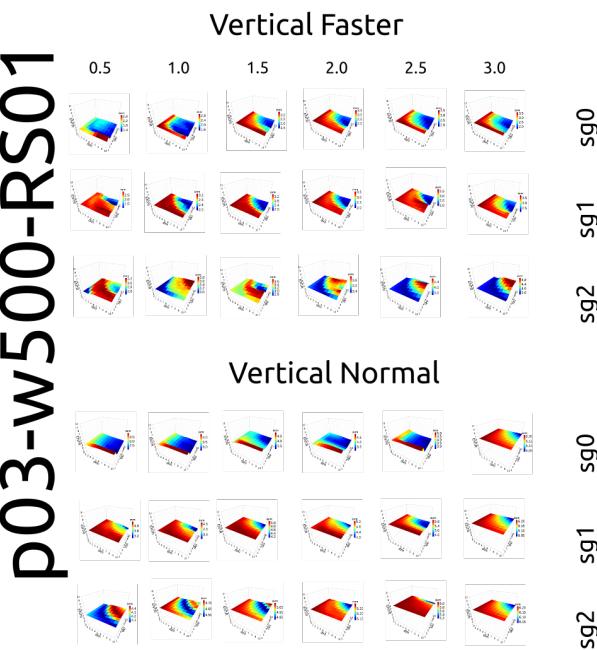
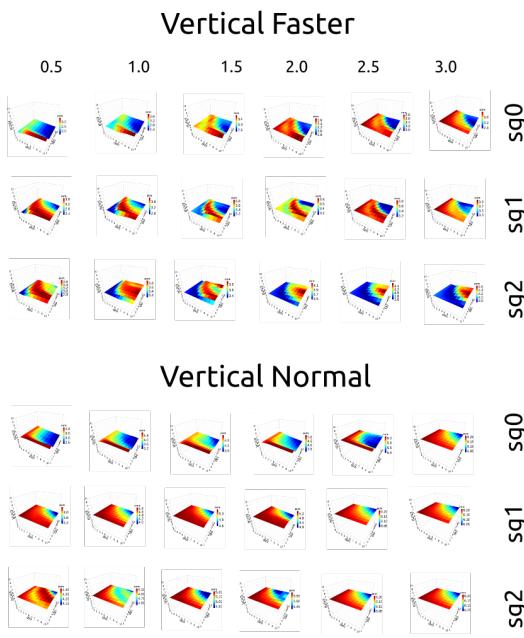


Figure 22: **RQA-Entr** for participant 03 performing vertical movements for a window size of 500 samples. Code and data to reproduce the figure is available in [1].

**p03-w750-HS01**

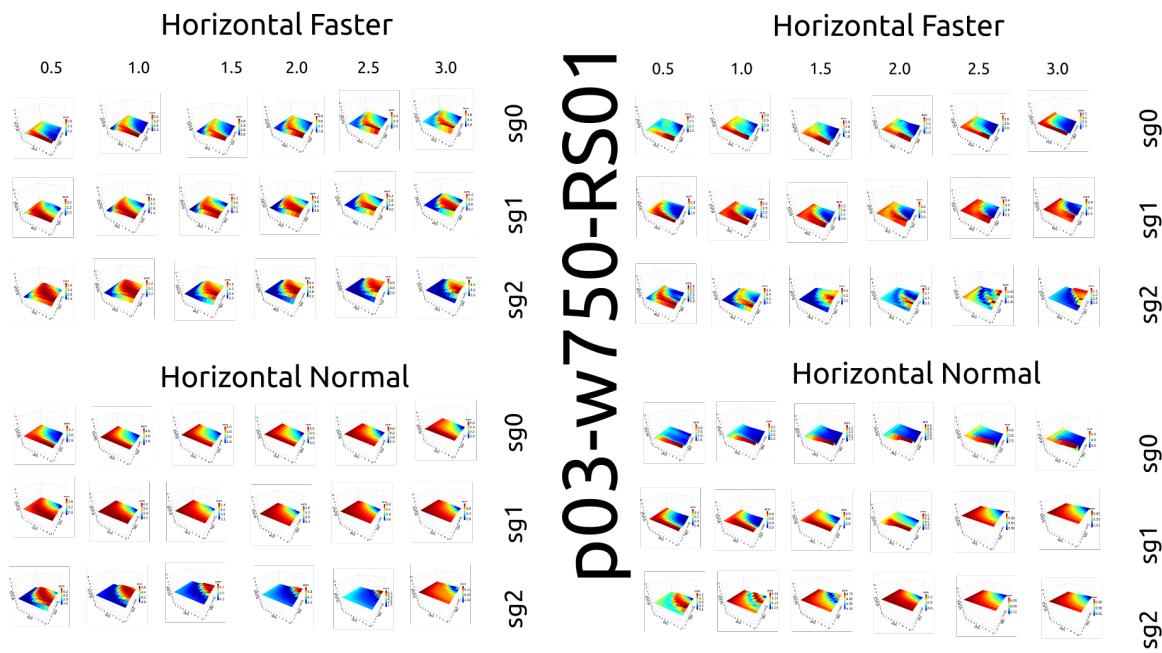


Figure 23: **RQA-Entr** for participant 03 performing horizontal movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

**p03-w250-HS01**

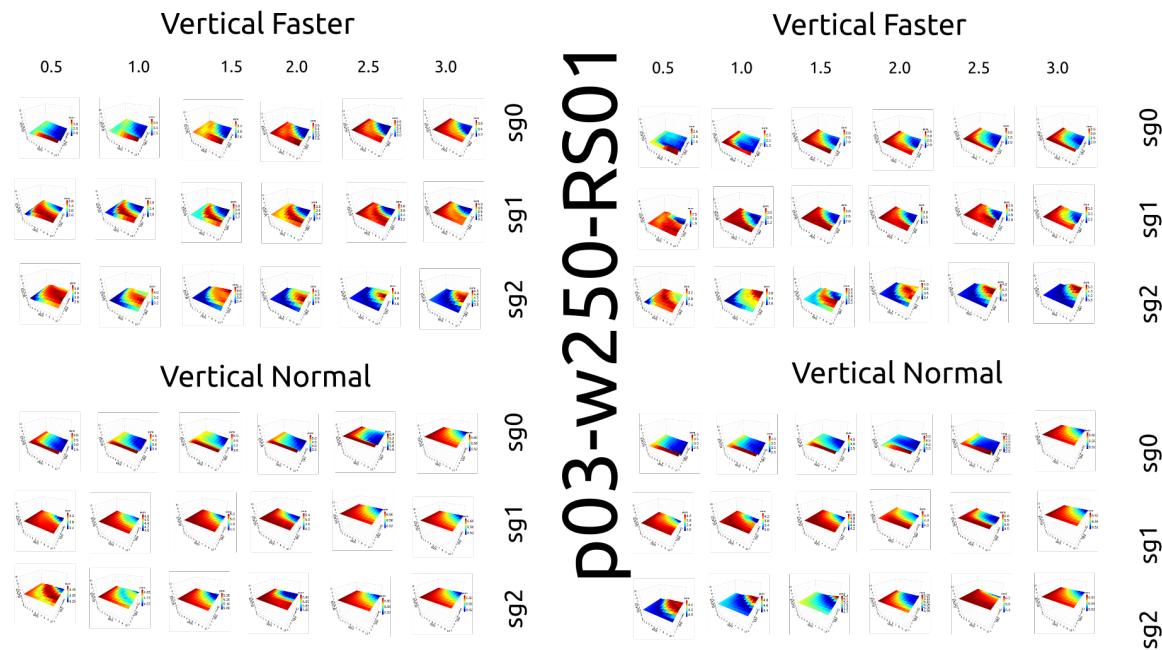


Figure 24: **RQA-Entr** for participant 03 performing vertical movements for a window size of 750 samples. Code and data to reproduce the figure is available in [1].

## References

- [1] Miguel Xochicale. *Github repository: Recurrent Quantification Analysis of Human-Humanoid Interaction Activities*, 2020.