

Contents

I. An Interdisciplinary Review on Movement Behaviour Research

1. Movement Behaviour Research through History and
in Current Scientific Disciplines 1
H. Lausberg

2. Empirical Research on Movement Behaviour and its Link
to Cognitive, Emotional, and Interactive Processes..... 13

2.1 Different classes of movement behaviour reflect and
affect cognitive, emotional, and interactive processes..... 13

2.1.1 Gesture and spatial cognition..... 14

2.1.2 Self-touch and arousal..... 16

2.1.3 Posture and mood..... 18

2.1.4 Rest positions and quality of interaction..... 19

2.1.5 Summary 19

2.2 Body movements are associated with implicit and
explicit cognitive, emotional, and interactive processes 20

2.3 Movement behaviour is organized in patterns 24

2.4 The temporal dimension of movement units provides insight
into the duration of the associated cognitive, emotional,
and interactive processes 27

2.5 Laterality preferences reflect hemispheric specialization
in the production of specific types of limb movements 29

2.5.1 The anatomical basis of assessing hemispheric specialization
based on laterality preference 29

2.5.2 Laterality preferences for gesture types in split-brain patients 31

2.5.3 Laterality preferences for different movement types
in healthy individuals 33

2.5.4 Summary 35

2.6 Conclusions for movement behaviour research methodology 36
H. Lausberg

3. Movement Behaviour Analysis across Scientific Disciplines 53

3.1 Some common shortcomings in movement behaviour
analysis methodology 53

3.2 Criteria for the review on coding systems 56

3.3 Comprehensive descriptive systems 59

3.4 Systems that classify movements according to function 62

3.5 Systems that classify alterations in movement behaviour	68
3.5.1 Movement psychopathology	68
3.5.2 Apraxia	72
3.6 Summary	75

H. Lausberg

II. The NEUROGES Coding System

4. The Aims and the Development of the NEUROGES Coding System	85
4.1 Aims of the NEUROGES system	85
4.2 Application	85
4.3 Criteria for the development	85
4.4 Methods of development	91
4.5 Development of the modules, categories, and values, and of the hierarchy	95
4.5.1 Module I	96
4.5.2 Module II	98
4.5.3 Module III	99
4.5.4 The hierarchy of the modules and categories	106

H. Lausberg

5. The NEUROGES Coding System: Design and Psychometric Properties	113
5.1 The NEUROGES design	113
5.1.1 The hierarchic structure of the NEUROGES system	113
5.1.2 Module I	116
5.1.2.1 The Activation category	117
5.1.2.2 The Structure category	117
5.1.2.3 The Focus category	121
5.1.2.4 Concatenation of the values of the StructureFocus and Contact units	125
5.1.3 Module II	125
5.1.3.1 The Contact category	127
5.1.3.2 Concatenation of the values of the StructureFocus and Contact units	128
5.1.3.3 The Formal Relation category	128
5.1.4 Module III	129
5.1.4.1 The Function category	131
5.1.4.2 The Type category	150
5.2 Psychometric properties	152
5.2.1 Objectivity	152

5.2.2 Reliability	153
5.2.3 Validity	154
5.2.3.1 The Activation category	155
5.2.3.2 The Structure category	155
5.2.3.3 The Focus category and the concatenated StructureFocus values	157
5.2.3.4 The Contact and Formal Relation categories	159
5.2.3.5 The Function and Type categories	160
5.2.4 Future perspectives	163
<i>H. Lausberg</i>	
6. Using 3D Kinematics for the Analysis of Hand Movement Behaviour: A Pilot Study and some Further Suggestions	
6.1 Introduction	169
6.2 Analysis of movement phases	170
6.3 Electromagnetic Motion Capturing	172
6.4 Method and data analysis	173
6.5 Results	177
6.6 Discussion	186
6.7 Outlook	187
<i>R. Rein</i>	
III. Coding Movement Behaviour with the NEUROGES-ELAN System	
7. The ELAN Annotation Tool	193
7.1 An introduction to the ELAN system	193
7.1.1 Beginnings of ELAN	193
7.1.2 Handling of audio and video in ELAN	193
7.1.3 Objectivity	194
7.2 Development over the years	195
7.2.1 Media recording, from low resolution to high definition	195
7.2.2 Working modes	195
7.2.3 Multiple file functions	196
7.2.4 Tier-based operations	197
<i>H. Sløetjes</i>	
8. NEUROGES in Combination with the Annotation Tool ELAN	199
<i>H. Lausberg, H. Sløetjes</i>	
9. Step by Step Instruction in NEUROGES Coding with ELAN	201
9.1 Download and install ELAN	201

9.2 Create a new annotation document	201
9.3 Organize the tiers	204
9.4 Create annotations	205
9.5 Change annotations	207
9.6 Tier-based operations	208
9.6.1 Copy a tier	208
9.6.2 Annotations from overlaps.....	208
9.6.3 Merge tiers.....	208
9.6.4 Compare annotators	209
9.7 Annotation statistics	210
9.8 Merge transcriptions.....	210
9.9 Export annotations.....	211

H. Slöetjes

IV. Obtaining Data on Movement Behaviour

10. Study Designs in Movement Behaviour Research.....	213
10.1 Different types of study designs across scientific disciplines.....	213
10.1.1 Movement behaviour that is spontaneously displayed in natural settings	213
10.1.2 Indirect elicitation of movement behaviour by using stimuli other than movement instructions.....	214
10.1.3 Movement tasks - direct instructions to perform specific body movements	216
10.2 Recommendations for study designs.....	218

H. Lausberg

11. Speakers Adapt their Hand Movement Behaviour to the Content of Visual Stimuli.....	225
11.1 Introduction	225
11.2 Methods	228
11.2.5 Participants	228
11.2.2 Stimuli	228
11.2.3 Procedure and materials	229
11.2.4 Gesture coding and interrater agreement	229
11.2.5 Statistical analysis	229
11.3 Results	230
11.3.1 Interrater agreement	230
11.3.2 Frequency	231

11.3.3 Proportion of time	233
11.4 Discussion	234
11.5 Conclusion.....	235

H.Skomroch, K. Hogrefe, R. Rein

V. Establishing Interrater Agreement

12. Rater Training and Rating Procedures	239
12.1 Naïve raters base their judgements on wrong premises.....	239
12.2 Self-perception is crucial for objective movement behaviour Assessment	240
12.3 Recommendations for rater training	241
12.4 Recommendations for rating procedures in empirical studies	243

H. Lausberg

13. The NEUROGES Interactive Learning Tool	249
--	-----

J. Bryjová

14. Calculating Temporal Interrater Agreement for Binary Movement Categories	253
14.1 Establish values for merged annotations.....	253
14.2 Create overlaps from annotations of both raters	255
14.3 View statistics	256
14.3.1 Export the new annotations.....	257
14.3.2 Enter the data into an excel file	258

K. Petermann, H. Skomroch, D. Dvoretzka

15. The Modified Cohen's Kappa: Calculating Interrater Agreement for Segmentation and Annotation	261
15.1 Introduction	261
15.1.1 The heart of it all: segmentation & annotation	261
15.1.2 Cohen's Kappa: calculation and properties	262
15.2 Description of the algorithm	265
15.3 Results	269
15.4 Discussion	273
15.5 Further suggestions for future reliability studies	275

H. Holle, R. Rein

16. Recommendations for Assessing the Level of Interrater Agreement	279
16.1 Interrater agreement in previous studies	
using the NEUROGES system.....	279
16.2 Filter of segmentation processes and interrater agreement	283
16.3 Recommendations for coding and consensus procedure	286

H. Skomroch

VI. Evaluating Data on Movement Behaviour

17. Statistical Evaluation and Data Presentation	289
17.1 Introduction	289
17.1.1 Different measures of body movements	289
17.1.2 Exporting NEUROGES-data from ELAN for	
statistical analysis	291
17.1.3 Reference data for different contexts	294
17.2. Methods.....	295
17.2.1 Sample and procedure: description of regular activities.....	295
17.2.2 Sample and procedure: semi-standardized interviews	296
17.2.3 Calculating interrater agreement	299
17.2.4 Statistical analyses	300
17.3 Results	301
17.3.1 Descriptions of regular activities	301
17.3.2 Semi-structured interview on emotional scenarios (LEAS)	304
17.3.3 Semi-structured interview with intelligence test (HAWIE)	309
17.4 Discussion	313
17.4.1 Description of regular activities.....	313
17.4.2 Semi-structured interview on emotional scenarios (LEAS)	314
17.4.3 Semi-structured interview with intelligence test (HAWIE)	316
17.4.4 Summary	318

U. Sassenberg, I. Helmich

18. Evaluating NEUROGES Data on Interaction	323
18.1 Background of the NEUROGES Interaction Coding.....	323
18.2 Rationale of the NEUROGES Interaction Coding.....	324
18.2.1 The Kinesic Turn-Taking category	324
18.2.2 The Formal Matching category	324
18.3 Analysis of interactive processes with the NEUROGES system	325
18.3.1 Kinesic Turn-taking in psychotherapy	325
18.3.2 Kinesic Turn-taking and rapport.....	329

18.3.3 Formal Matching and therapeutic relationship	330
18.3.4 Summary	331
18.4 Procedures in NEUROGES-ELAN	331
18.4.1 The Kinesic Turn-Taking category	331
18.4.2 Procedure for calculating Kinesic Turn-Taking with SPSS	331
18.4.3 Procedure for calculating Interactive Overlap	336
18.4.4 The Formal Matching category	339
<i>H. Lausberg, D. Dvoretzka, M. Kryger</i>	