

# VU Research Portal

## Cognitive performance across the lifespan and domains

Swagerman, S.C.

2016

### **document version**

Publisher's PDF, also known as Version of record

[Link to publication in VU Research Portal](#)

### **citation for published version (APA)**

Swagerman, S. C. (2016). *Cognitive performance across the lifespan and domains*.

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal ?

### **Take down policy**

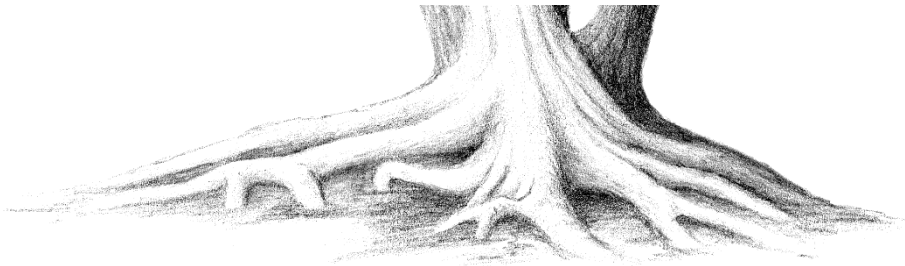
If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

### **E-mail address:**

[vuresearchportal.ub@vu.nl](mailto:vuresearchportal.ub@vu.nl)

# Chapter 3

**Sample description and data collection  
in the BrainScale study: an Adolescent  
Longitudinal Twin Study into the  
Genetic Etiology of Individual  
Differences**



The group of twins and their siblings in the BrainScale project forms a sample that is followed longitudinally since age 9. The BrainScale project is a cooperation between the NTR and the UMC Utrecht, studying the influences on brain and cognition throughout healthy development. Participants were invited for the first assessment in 2004 when the data collection started. This was around the 9<sup>th</sup> birthday of the twins, and over a 1.5 year period 330 children from 112 families participated. Between 2007 and 2009 the second assessment took place, this time around the 12<sup>th</sup> birthday of the twins. In total, 261 children were willing to participate again. Details of the data collection at ages 9 and 12 years are described in the dissertations of M. van Leeuwen (2008), J. S. Peper (2008) and I. L. C. van Soelen (2011). An overview of the project was also published in 2012 (van Soelen et al., 2012a). As part of this thesis project, twins and siblings were invited for the third time. This chapter provides the details of the third wave of data collection that took place between 2012 and 2014.

## Participants and return rate

All families that have participated at the first assessment (112 families with 224 twins and 96 siblings) were invited to participate again, with the exception of 3 families who had indicated that they did not want to be approached for follow-up. In total, 246 participants from 89 families agreed to participate (77% return rate) in this third wave. Reasons for not participating were: too busy with school and/or work (21), one or more family members did not want to participate (43), living abroad (5), or unable to reach by mail and phone (3). Of all individuals that originally participated but did not return at the third assessment, 37 were only part of the first wave. On the other hand, 31 individuals were not part of the second wave but decided to participate again (see Table 1 for the number of participants included at the neuropsychological assessment and MRI scans at three assessments). In total, a large number of participants have participated in all three assessments: 154 participants completed the MRI procedure and 212 participants finished cognitive testing on all time points.

Participants in the third assessment consisted of 176 twins (95 female, 81 male) and 70 siblings (44 female, 26 male) from 89 families. Twin pairs were almost equally distributed for zygosity: monozygotic male (16), dizygotic male (17), monozygotic female (22), dizygotic female (18) and dizygotic opposite sex (16). Twin pairs were incomplete in two families. Twins were 16 or 17 years old at the day of testing (mean age 16.85,  $SD = 0.36$ ). The mean age of the siblings was 19.26 ( $SD = 1.30$ ).

**Table 1.** Number of participants included in the neuropsychological tests and MRI scan at the first, second and third assessments.

Assessment	Neuropsychological testing	MRI scan
1+2+3	212	154
1+2	47	37
1+3	31	73
2+3	2	7
Only 1	37	37
Only 2	-	1
Only 3	1	7
Total	330	316

## Procedure

This study was approved by the Central Committee on Research involving Human subjects of the Netherlands (CCMO), and research procedures were performed in accordance with the Declaration of Helsinki.

Examples of letters, brochures and documents can be found in the appendices (6 – 10).

### Invitation

All participants and their parents were sent an invitation letter including a brochure (Appendix 6-8) with more specific information about the study and procedure. Besides general information about the study purpose and procedure, it stated that participants would receive gift vouchers, and compensation for travel expenses. Participants were asked to come to the University Medical Center Utrecht (UMCU) for a six-hour visit. Further, as a token of appreciation, a summary of their results on the computerized tests (Appendix 4) and a printed image of their brain from the MRI scan would be mailed to them afterwards.

Following the invitation letter, participants were contacted by phone to inquire whether they had received the letter and were willing to participate. A telephone protocol was used that specified for each moment of contact: the date and time, what was discussed, whether each participant of a family was willing to participate, when to call back (if necessary), the reason for not participating (if applicable), the confirmed date of the appointment, and the date of sending the confirmation letter including study materials.

The twins and siblings in the BrainScale study could participate together or make separate appointments if this was preferred, for example because of different school or work schedules. In addition, participants could choose to start in the morning or the afternoon, and could take part in the study on weekdays as well as during the weekend.

## **Confirmation**

When families agreed to participate, each individual was sent a confirmation of the appointment and consent forms (Appendix 9 and 10). This confirmation letter further included the additional materials (for collection of cheek swabs and/or urine and saliva) and documents (instructions for buccal and/or hormone collection, questionnaires, MRI checklist, directions to the hospital).

## **Experimental procedures of the BrainScale study**

The data collection took place in the UMCU, similar to the second assessment. At the first assessment, the cognitive test protocol took place at the Vrije Universiteit Amsterdam and the MRI scan and physical examinations were made at UMCU. For a family of three children, the test day lasted approximately six hours (including lunch, test protocol is described in Table 2). Depending on the availability of the MRI scanner and the preference of the participants, the protocol for a family of three could be as follows: 1) morning neuropsychological tests, afternoon MRI scans (9:00-15:00); or 2) afternoon MRI scans, then neuropsychological tests (13:00-19:00); or 3) afternoon neuropsychological tests then MRI scans (14:00-20:00). If participants came alone, or with two persons, the protocol lasted 4 to 5 hours.

## **Instruments and measurements**

### **Changes and continuity in data collection**

Compared to the data collection on the first two assessments, most conditions and instruments have stayed the same on the third assessment, to the extent that this was possible. MRI scanners and protocols did not change, physical assessments were the same and participants collected urine and saliva at home in the same way on two consecutive days. However, the cognitive testing was adapted, so that psychometric IQ scores were now assessed by the test for adults and the collection of neurocognitive tests was replaced by an extensive computerized cognitive test battery. Details of the data collection of the third assessment will be described below. The main outcome variables of cognition, health and lifestyle variables collected at the third assessment are listed in Table 3, including the mean and SD separately for the twins and siblings.

### **Neuropsychological assessment**

#### ***The Computerized Neurocognitive Battery***

The test version and conditions of the CNB were similar to the settings as are described in Chapter 2. Within approximately 1.15 hour, performance scores - both accuracy and speed - on 17 tests were acquired.

**Table 2.** Test protocol for the third assessment.

<i>Welcome at the UMC Utrecht</i>	
Collection of questionnaires, saliva and urine samples, cheek swabs	15 minutes
Explain procedure and sign consent forms	15 minutes
<i>Neuropsychological test protocol</i>	
WAIS-III Intelligence test	45 minutes
Break	15 minutes
Computerized Neurocognitive Battery	75 minutes
Lunch break	45 minutes
<i>Afternoon program</i>	
MRI scan	50 minutes
Corsi task	5 minutes
Iowa Gambling task	10 minutes
One minute reading test	2 minutes
Physical examination (length, weight, blood pressure, Tanner stage)	10 minutes

Note: the order of the afternoon program was different for each participant because of MRI scanner availability, and could vary depending on the length of the neuropsychological test assessment.

## ***IQ***

A selection of subtests of the Wechsler Adult Intelligence Scale – Third version (WAIS-III, Wechsler, 1997) was administered (in order of administration: Vocabulary, Block Design, Similarities and Matrix Reasoning). Raw test scores were standardized based on the age of the participant. Then a correction for the number of excluded subtests was performed to be able to calculate IQ scores: the sum of the standardized score of Vocabulary and Similarities was multiplied by 2.5 (verbal IQ), the sum of standardized scores of Block Design and Matrix Reasoning was multiplied by 3 (performance IQ), the sum of verbal and performance IQ (total IQ).

## ***Corsi block task***

The Corsi block task measures short-term spatial memory. On a computer screen, nine blocks were presented, that were scattered across the screen. These blocks would light up for one second, and the participants were instructed to click, using the computer mouse, the previously lighted blocks in exactly the same order. Immediately after the trial, participants received feedback on whether their response was correct or not. Starting with 2 trials with a length of 2 blocks, trials would increase in length by one block if the participant was successful on at least one of these trials, with a maximum of all 9 blocks. If both trials of a series were unsuccessful the test was terminated. The performance measure on this task was the total number of trials the participant completed successfully.

### ***Iowa gambling task***

The Iowa gambling task measures decision making and self-regulation in a delayed reward task, where the participant has to make decisions that may be more advantageous on either the short-term or the long-term (Bechara, Damasio, Damasio, & Anderson, 1994). Performance on this test is related to damage to the frontal cortex, addiction, and risk-taking behavior in adolescents (Brevers, Bechara, Cleeremans, & Noel, 2013; Crone & van der Molen, 2004). Four decks of cards were presented on the computer screen, each deck with a different reward schedule. Participants had to click on a deck in order to receive either an award (most often) or a penalty. The magnitude of the reward and the penalty depended on the deck. The deck that has high reward on the short-term will also include high penalty, whereas the deck with low reward on the short-term includes less penalty, making this more advantageous on the long-term. The task started with a fictional \$2000 and the participants were instructed to choose decks while trying to earn as much money as they could. The task finished after 100 cards. The outcome was the total amount of money at the end of the task.

### ***Reading ability***

The participants were instructed to read out loud, within one minute, as many words as possible from a card with 116 words. The list was adapted from the “Three Minutes Reading Task”, which is frequently used in the Dutch educational system (Cito, 1995).

### **Behavioral data**

#### ***Questionnaires***

Twins, siblings and their parents were asked to fill in standardized questionnaires. Participants filled in the Dutch Health and Behavior Questionnaire (DHBQ), which includes questions on emotional and behavior problems (Youth Self-Report, Achenbach, 1991), well-being, lifestyle, exercise behavior, sedentary behavior, and family functioning (van Beijsterveldt et al., 2013). Parents were asked to fill in the Adult Self-Report (ASR, Achenbach & Rescorla, 2003) about themselves (80 fathers, 88 mothers) and the Child Behavior Checklist (CBCL, Achenbach & Rescorla, 2001) about their children. We received 241 surveys from the participants and 423 from their parents. The DHBQ contains questions about the specific type of education.

#### ***Smoking behavior***

At the start of the testing day, participants were individually (in private) asked about their current or previous smoking behavior. When they mentioned they

had smoked or were still smoking, the researcher asked for the exact age of initiation (as close as possible), frequency of smoking and the age of quitting.

### ***Education***

Participants were asked about their own educational background, as well as that of their parents. Level of education was defined as the sum of years involved in elementary, secondary and higher education if the educational curriculum (per year) was completed.

### ***Medication***

Participants were asked to bring with them any packages of medication they used at the moment of testing, or had very recently used, but in this young group medication use was rare and complete information was not always provided by the participants. Concerning use of contraceptive pills, girls were asked to mention the brand of the pill on the questionnaire about urine collection.

### **Physical examination, hormone and buccal sample collection**

#### ***Length and weight***

Participants were asked to take off their shoes before body height and weight were measured.

#### ***Blood pressure and heart rate***

Blood pressure and heart rate were measured in a sitting position with an Omron automatic blood pressure monitoring device. The cuff was attached to the non-dominant arm. To measure blood pressure and heart rate, participants were asked to remain relaxed and still, and refrain from talking and laughing.

#### ***Tanner stage***

Tanner stages were determined with a self-report questionnaire, on the basis of secondary sexual characteristics using the five stages of development devised by Marshall & Tanner (1969; 1970, see for data on this sample Koenis et al., 2013). After explanation by the researcher, the researcher left the room and participants were asked to fill in their developmental status on black and white photographs of the different pubertal stages. Stage 1 represents no pubertal development and full maturation is represented at stage 5. Girls were asked about breast development and pubic hair growth; boys were asked about genital development and pubic hair growth. In boys, genital stage was divided in penis and testes development. Testes volume was reported on a 4-item scale (compared size with ovals: 1) 1-3 ml; 2) 4-6 ml; 3) 7-11ml; 4) 12-25 ml) and boys were also asked to rate testes volume with an orchidometer.



**Table 3.** Overview cognition, health and lifestyle variables collected at the 3th assessment. Means and SD are given separately for twins and siblings.

Task or measure used	Main output phenotype	N total (twins/sibling	Mean $\pm$ SD twins	Mean $\pm$ SD siblings	N total 1 <sup>st</sup>	N total 2 <sup>nd</sup>
<b>Cognition</b>						
Age	Years	176 / 70	17.0 $\pm$ .4	19.3 $\pm$ 1.3		
Intelligence (WAIS)	Total IQ	176 / 70	10.4 $\pm$ 13.1	107.5 $\pm$ 14.1	224 / 102	178 / 81
	Verbal IQ	176 / 70	105.3 $\pm$ 13.6	108.2 $\pm$ 15.6	224 / 102	178 / 81
	Performance IQ	176 / 70	102.1 $\pm$ 12.0	108.0 $\pm$ 13.7	224 / 102	178 / 81
Reading ability (1 minute)	Total correct words	176 / 69	91.2 $\pm$ 14.8	95.8 $\pm$ 14.5	209 / 85	167 / 76
Spatial memory (Corsi)	Total correct items	176 / 70	9.2 $\pm$ 1.6	9.2 $\pm$ 1.7	221 / 101	173 / 79
Decision making (Iowa gambling)	Total gain across items	176 / 70	1678.1 $\pm$ 619.7	1858.6 $\pm$ 748.1	-	-
<b>CNB, Cognitive domain</b>						
Attention	True positive responses(#)	176 / 70	54.4 $\pm$ 4.9	55.9 $\pm$ 4.5	-	-
	Median RT (ms)	176 / 70	495.7 $\pm$ 43.2	486.4 $\pm$ 38.2	-	-
Abstraction / mental flexibility	Correct categories (#)	176 / 70	2.1 $\pm$ .6	2.1 $\pm$ .6	-	-
	Median RT (ms)	176 / 70	2359.2 $\pm$ 882.5	2471.7 $\pm$ 757.3	-	-
Working memory	True positive responses(#)	175 / 70	19.0 $\pm$ 1.7	19.1 $\pm$ 1.1	-	-
	Median RT (ms)	175 / 70	519.0 $\pm$ 107.7	524.4 $\pm$ 84.0	-	-
Verbal memory	Total correct (#)	176 / 70	36.7 $\pm$ 2.5	36.7 $\pm$ 2.6	-	-
	Median RT (ms)	176 / 70	1422.0 $\pm$ 199.5	1376.7 $\pm$ 198.0	-	-
Verbal memory - delayed	Total correct (#)	176 / 70	36.0 $\pm$ 2.9	35.8 $\pm$ 2.9	-	-
	Median RT (ms)	176 / 70	1402.5 $\pm$ 232.1	1355.0 $\pm$ 217.2	-	-
Face Memory	Total correct (#)	176 / 70	31.2 $\pm$ 3.5	31.8 $\pm$ 3.3	-	-
	Median RT (ms)	176 / 70	1959.0 $\pm$ 49.2	1945.4 $\pm$ 491.7	-	-
Face Memory -delayed	Total correct (#)	176 / 70	32.7 $\pm$ 3.5	32.4 $\pm$ 3.4	-	-
	Median RT (ms)	176 / 70	173.4 $\pm$ 425.1	1691.4 $\pm$ 325.7	-	-
Spatial memory	Total correct (#)	176 / 70	16.4 $\pm$ 2.2	16.5 $\pm$ 2.1	-	-
	Median RT (ms)	176 / 70	1696.9 $\pm$ 401.9	1707.1 $\pm$ 366.1	-	-
Spatial memory - delayed	Total correct (#)	176 / 70	15.8 $\pm$ 2.3	16.0 $\pm$ 2.7	-	-
	Median RT (ms)	176 / 70	1538.7 $\pm$ 353.5	1562.5 $\pm$ 297.5	-	-
Nonverbal reasoning	Total correct (#)	176 / 70	16.4 $\pm$ 4.0	17.7 $\pm$ 3.9	-	-
	Median RT (ms)	176 / 70	10195.2 $\pm$ 5135.5	11229.4 $\pm$ 5844.9	-	-
Language reasoning	Percentage correct (%)	176 / 70	65.4 $\pm$ 18.7	68.6 $\pm$ 19.5	-	-
	Median RT (ms)	176 / 70	8739.5 $\pm$ 3325.0	8513.8 $\pm$ 3271.0	-	-

**Table 3 – continued.**

		Main output phenotype	N total (twins/siblings)	Mean ± SD twins	Mean ± SD siblings	N total 1 <sup>st</sup>	N total 2 <sup>nd</sup>
Spatial ability		Total correct (#)	176 / 70	13.6 ± 3.5	14.3 ± 3.7	-	-
		Median RT (ms)	176 / 70	9624.9 ± 2828.7	10177.5 ± 2443.2	-	-
Emotion Identification		Total correct (#)	176 / 70	33.6 ± 2.9	33.8 ± 2.8	-	-
		Median RT (ms)	176 / 70	1962.0 ± 368.7	202.6 ±	-	-
Emotion Differentiation		Total correct (#)	176 / 70	28.7 ± 3.2	29.5 ± 2.7	-	-
		Median RT (ms)	176 / 70	3164.2 ± 882.1	3266.9 ± 814.6	-	-
Age Differentiation		Total correct (#)	176 / 70	27.5 ± 3.3	28.1 ± 3.0	-	-
		Median RT (ms)	176 / 70	2546.5 ± 842.1	2626.9 ± 813.4	-	-
Sensorimotor speed		Total correct (#)	176 / 70	20.0 ± 0.0	20.0 ± 0.0	-	-
		Median RT (ms)	176 / 70	472.5 ± 1044.0	68.6 ± 102.6	-	-
Motor speed		Total taps in 1 minute	176 / 69	38.7 ± 78.3	59.6 ± 7.0	-	-
<b>Physical examination</b>							
Height		Centimeters	176 / 70	173.6 ± 8.2	175.1 ± 9.5	218 / 99	174 / 78
Weight		Kilogram	176 / 70	64.1 ± 9.5	7.1 ± 1.6	218 / 99	174 / 78
Diastolic blood pressure		mmHG	176 / 70	71.0 ± 9.4	72.7 ± 9.6	-	-
Systolic blood pressure		mmHG	176 / 70	129.1 ± 13.4	133.6 ± 14.4	-	-
Heart rate		Beats per minute	176 / 70	64.7 ± 11.6	65.1 ± 12.0	-	-
Smoking		Yes, no, stopped (%)	133 / 54	23, 71, 6	26, 70, 4	-	-
<b>Puberty</b>							
Tanner (stage 1:6)	Boys	Penis development	77 / 26	1, 2, 13, 42, 19	0, 0, 3, 11, 12	108 / 44	83 / 31
		Pubic hair	78 / 26	1, 0, 1, 1, 46, 13	0, 0, 0, 3, 15, 8	107 / 44	84 / 31
Testis size		78 / 26	0, 1, 34, 34	0, 2, 9, 15	-	-	
	Girls	Breast development	96 / 44	0, 0, 0, 40, 56	0, 0, 0, 6, 38	109 / 54	86 / 43
		Pubic hair	96 / 44	4, 4, 1, 13, 55, 19	0, 0, 1, 5, 20, 18	108 / 53	80 / 44
<b>Questionnaires</b>							
Child behavior checklist (CBCL)		Report by parents	174 / 69			158 / 92	198 / 81
Dutch health behavior questionnaire (DHBQ)		Report by participant	173 / 68			-	175 / 81
Adult self-rating (ASR)		Report by parents	80 fathers, 88 mothers			-	-

### ***Assessment of hormone levels***

Similar to the previous occasions, participants were asked to collect saliva and morning urine for the assessment of reproductive hormonal levels (LH, FSH and estrogen from urine), and testosterone from saliva (Koenis et al., 2013). Because of their hormonal cycle, girls were asked to collect urine and saliva for assessment of hormone levels at a specific time point during their menstrual cycle, namely in the early follicular phase when hormone levels are relatively low. To minimize effects of contraceptive pills, they were asked to collect morning urine and saliva at the 6<sup>th</sup> and 7<sup>th</sup> day of their menstrual cycle. They could send the samples by mail to the Vrije Universiteit Amsterdam (VU). Boys were asked to collect samples in the two days prior to the test day and bring the samples to the UMCU. They could also send the samples by mail.

Participants were asked to fill in the time and date of the collection. Girls had a more extensive questionnaire that included questions about their menstrual cycle and contraceptive pill use.

Samples were stored in the refrigerator as soon as possible. After pipetting a small volume of urine for hormone level assessment, all samples were stored at -20°C at the VU. Saliva samples were stored at -20°C as soon as possible.

Urine samples were collected for 166 twins and 62 siblings. Saliva samples were collected for 166 twins and 63 siblings.

### ***Buccal epithelium***

Participants were asked to collect buccal swabs in the morning and evening, on 2 days. They were instructed not to eat, drink or brush their teeth prior to collection. Collection of buccal epithelium was done by rubbing cotton buds along the inside of the mouth. The swabs were then placed in a tube with buffer. Participants could bring the tubes with them to the UMCU at the test day, or send the tubes by postal mail. DNA was isolated at the *Avera Institute for Human Genetics*, Sioux Falls. All samples were tested on single nucleotide polymorphic (SNP) markers to establish zygosity (van Beijsterveldt et al., 2013).

### **MRI scan protocol**

At the third assessment of the BrainScale study, the same scan parameters were used as in the previous two test assessments (see Table 4) where participants were scanned at a Philips Achieva scanner at 1.5T at all measurements (Brouwer et al., 2012; Peper et al., 2008; van Soelen et al., 2012b). At the start of the test day, the scan procedure was explained to the participants. They were allowed to watch a movie or listen to music during the structural scans. During the last 10 minutes the resting state functional MRI scan was made, for which participants

were asked to close their eyes and try to think of nothing specific. Afterwards, participants were asked if they had remained awake during the scan and if they managed to think of nothing specific. The total scan protocol took about 45-50 minutes per child.

### ***Dental braces***

Presence of dental wires (top / bottom / both) was asked at the start of the test day since this may distort the MRI image.

**Table 4.** Scan protocol and MR acquisition details

MR acquisition details	Duration
1. Scout scan, sagittal T1 weighted; TR = 13 ms; TE = 4.6 ms	1 min.
2. Dual Echo – Turbo Spin Echo (DE-TSE) clinical scan, transversal T2 weighted; TR=2200 ms, TE= 9ms; 19 slices of 6 mm; slice gap 1 mm; flip angle 90°; FOV: 230 mm / 90%	2 min.
3. Three Dimensional - Fast Field Echo (3D-FFE) T1 weighted scan; coronal; 256 x 212 acquisition matrix; 256 × 256 reconstruction matrix; 160–180 contiguous slices of 1.2 mm; TR = 30 ms; TE = 4.6 ms; flip angle 30°; FOV: 256 mm / 65%	7 min.
4. Diffusion Tensor Imaging (DTI) scan using SENSE coil; 15-64 Directions; b-factor 1000; 60 slices of 2.5 mm; slice gap 0.0 mm; 96 x 96 acquisition matrix; reconstruction matrix 128 x 128; flip angle 90°; FOV: 240 mm; TE = 60–88 ms; no cardiac gating.	11 min.
5. Magnetization Transfer Imaging (MTI) scan; 60 transverse slices of 2.5 mm; slice gap 0.0 mm; 128 x 96 acquisition matrix; reconstruction matrix 128 x 128; flip angle 8°; FOV: 240 mm / 78%; TR = 37.5 ms; TE = 3.73 ms.	7 min.
6. Dual Echo - Turbo Spin Echo using SENSE, transversal T2 weighted; parallel imaging, sense factor 2; TR/TE1/TE2 6000/18/80 ms; 120 slices of 2 mm; 256 x 195 acquisition matrix; reconstruction matrix 256 x 256; slice gap 0 mm; flip angle 90° ; FOV: 240 mm / 79 %	7 min.
7. Resting State Scan using SENSE coil; parallel imaging, sense factor 1.8; 3D T2* weighted field echo EPI (FEEPI) scan; Timeseries 800-1200 scans, single scan duration 0.5-0.7 sec; sagittal scan orientation; acquisition matrix: 64 x 33; reconstruction matrix: 64 x 64; flip angle 9°; 36 slices; FOV: 256 mm; 4 mm isotropic voxels; TR=21.1 ms; TE= 31.10 (shifted echo).	10 min.

Note: at first assessment, T2 (scan 6) and rs-fMRI (scan 7) were not included; all other scan parameters were the same.