

VARIABLE NAMES & EXPLANATIONS FOR MIDUS 3 PROJECT 5

Character 1: MIDUS Sample

C = MIDUS 3

Character 2: Project #

5 = Project #5

Character 3: Measure

S = Self-reports

B = Startle Eyeblink

C = Corrugator EMG

L = Zygomaticus EMG

R = Response Times

A = Response Accuracy

N = CANTAB Cognitive measures

D = Cube & Paper Test

F = Free Recall

T = Picture Ratings

P = Participant Characteristics

H = Handedness

O = Hearing Test

I = Filter for completed MRI

E = Extracted Structural Brain Measurements

W = Extracted Diffusion Weighted Imaging Measurements

For Ch3 = S (i.e., for Self-reports):

Characters 4 & 5: Scale

DP = Dispositional Positive Affect Scale (DPES)

PG = General Form of the Positive & Negative Affect Schedule (PANAS)

P1 = Now Form of the PANAS, Time 1 (prior to psychophysiology emotion response task)

P2 = Now Form of the PANAS, Time 2 (after psychophysiology emotion response task)

P3 = Now Form of the PANAS, Time 3 (prior to MRI emotion response task)

P4 = Now Form of the PANAS, Time 4 (after MRI emotion response task)

IR = Interpersonal Reactivity Index (IRI)

S1 = Spielberger State Anxiety Scale (STAI-X1), Time 1 (prior to psychophysiology emotion response task)

S2 = Spielberger State Anxiety Scale (STAI-X1), Time 2 (after psychophysiology emotion response task)

S3 = Spielberger State Anxiety Scale (STAI-X1), Time 3 (prior to MRI emotion response task)

S4 = Spielberger State Anxiety Scale (STAI-X1), Time 4 (after MRI emotion response task)

ST = Spielberger Trait Anxiety Scale (STAI-X2)

ER= Emotion Regulation Questionnaire, Reappraisal

ES = Emotion Regulation Questionnaire, Suppression

For Ch4 & 5 = DP:

Character 6: Subscale

C = Contentment
J = Joy
H = Hope
L = Love/Attachment
D = Desire
O = Compassion
P = Pride
G = Gratitude
A = Amusement
W = Awe
I = Interest

Characters 7 & 8: Measure

None = Summary Measures
Numbers = Individual Questions

For Ch4 & 5 = PG, P1, P2, P3, or P4:

Character 6: Subscale

P = Positive Affect
N = Negative Affect

Characters 7 & 8: Measure

None = Summary Measures
Numbers = Individual Questions

For Ch4 & 5 = IR:

Character 6: Subscale

PT = Perspective-Taking Scale
FS = Fantasy Scale
EC = Empathic Concern Scale
PD = Personal Distress Scale

Characters 7 & 8: Measure

None = Summary Measures
Numbers = Individual Questions

For Ch4 & 5 = S1, S2, S3, S4, or ST:

Characters 6 & 7: Measure

None = Summary Measures
Numbers = Individual Questions numbers.

For Ch4 & 5 = ER or ES:

Characters 6 & 7: Measure

None = Summary Measures
Numbers = Individual Questions numbers.

For Ch3 = B (i.e., for Eyeblink Startle):

C5B = number of valid eyeblink startle responses measured over entire paradigm.

Character 4: Picture Valence

N = Negative
O = Neutral
P = Positive

Character 5: Probe Time

E = Early (2900 ms after picture onset)

M = Mid (4400 ms after picture onset)

L = Late (5900 ms after picture onset)

Character 6: Metric

A = Amplitude (includes only responses, so assesses height of response)

M = Magnitude (includes no responses as a zero, so averaging will be affected by no responses)

For Ch3 = C or L (i.e., for Corrugator and Zygomaticus EMG):

C5C = filter for good corrugator data (bad corrugator data might exhibit high levels of noise and/or artifact)

C5L = filter for good zygomaticus data (bad corrugator data might exhibit high levels of noise and/or artifact)

Character 4: Picture Valence

N = Negative

O = Neutral

P = Positive

Character 5: Time

E = early (1-4 seconds following picture onset)

M = middle (5-8 seconds following picture onset)

L = late (9-12 seconds following picture onset)

For Ch3 = R or A (i.e., for reaction time and accuracy measures):

Character 4: Picture Valence

N = Negative

O = Neutral

P = Positive

For Ch3 = N (i.e., for CANTAB cognitive assessments):

Character 4: Test type

M = Motor Screening Task

I = Intra-Extra Dimensional Set Shift

A = Affective Go/No-Go

S = Information Sampling Task

T = Attention Switching Task

E = Emotion Recognition Task

G = Cambridge Gambling Task

For Ch4 = M:

Character 5: Measure

E = Mean Error

L = Mean Latency

For Ch4 = I:

Character(s) 5 (& 6): Measure type

Numbers = Stage-related measures. See concordance table for list of measures

T = Totals
C = Calculated Measures

For Ch5 = T or C:

Characters 6 & 7: Measure

Numbers = Total measures. See concordance table for list of measures

For Ch4 = A:

Character 5: Measure

R = Affective Response Bias (Mean)

L = Mean Correct Latency

T = Total Commissions/Omissions

For Ch5 = L:

Characters 6 & 7: Trial Type

Numbers = Condition (Positive/Negative/Neutral, Shift/Non-shift)

For Ch5 = T:

Character 6: Responses/Non-responses

M = Total Commissions

O = Total Omissions

Character 7: Trial Type

None = Total

Number = Condition (Positive/Negative/Neutral, Shift/Non-shift)

For Ch4 = S:

Characters 5 & 6: Measure

Numbers = See Concordance Table for list of measures

For Ch4 = T:

Character 5: Measure Type

T = Totals

P = Percentages

L = Latency-Related Measures

C = Cost-Related Measures

For Ch5 = T, P, or L:

Characters 6 & 7: Measure

Numbers = See Concordance Table for list of measures

For Ch5 = C:

Character 6: Measure/Trial Type

C = Mean Congruency Cost

S = Mean Switch Cost

For Ch6 = C or S:

Character 7: Response Type

C = Correct

I = Incorrect

None = All Responses (Correct & Incorrect)

For Ch4 = E:

Character 5: Measure Type

P = Percentages

T = Totals

L = Latency-Related Measures

For Ch5 = P or T:

Character 6: Response Type

C = Correct

I = Incorrect

Character 7: Stimulus Type

Number = See Concordance Table for list of measures

None = Total Correct (All Stimulus Types)

For Ch5 = L:

Characters 6 & 7: Stimulus/Response Type

Numbers = See Concordance Table for list of measures

None = Mean Overall Response Latency

For Ch4 = G:

Character 5: Measure Type

A = Delay Aversion

D = Deliberation Time

P = Overall Proportion Bet

Q = Quality of Decision-Making

J = Risk Adjustment

R = Risk Taking

Character 6: Trial Type

A = Ascending Trials

D = Descending Trials

None = All Trials

For Ch3 = D (i.e., Cube & Paper Test):

C5D = Cube & Paper Total Correct

Character 4: Measure

R = Cube & Paper Total Number of Responses

C = Cube subset

P = Paper subset

For Ch4 = C or P:

Character 5: Subset - Correct vs Number of Responses

A = Number of Correct Response

B = Number of Responses

For Ch3 = F (i.e., Free Recall):

Character 4: Measure

R = Total Recalled

M = Seen MRI pictures in addition to psychophysiology task picture prior to completing free recall

S = Total Recalled (Social)
X = Total Recalled (Non-Social)
P = Total Recalled (Positive)
N = Total Recalled (Negative)
O = Total Recalled (Neutral)

For Ch3 = T (i.e., Picture Ratings):

Character 4: Rating Scale

V = Valence

A = Arousal

Character 5: Picture Valence

P = Positive

N = Negative

O = Neutral

Character 6: Session

1 = Psychophysiology

2 = MRI

For Ch3 = P (i.e., Participant Characteristic):

C5PAGE = Age at P5 visit

C5PDATE_MO = Month of P5 data collection

C5PDATE_YR = Year of P5 data collection

For Ch3 = H (i.e., Handedness);

C5HAND = Handedness

For Ch3 = O (i.e., Hearing Test):

Character 4: Side of hearing test or hearing aid use

L = Left Ear

R = Right Ear

A = Hearing aid worn in at least one ear during test

For Ch4 = L or R:

Character 5: Frequency of tone

1 = 250 Hz

2 = 500 Hz

3 = 1000 Hz

4 = 2000 Hz

5 = 4000 Hz

For Ch3 = I (i.e., Filter for completed MRI):

C5IC = filter for completion of MRI imaging protocol (completed at least T1-weighted)

For Ch3 = E (i.e., Extracted Structural Brain Measurements):

Character 4: Measurement Type

A = Cortical Area
C = Cortical Curvature
T = Cortical Thickness
V = Cortical Volume
S = Subcortical Volume
B = Brain-Predicted Age

For Ch4 = A, C, T, V, S:

Character 5: Brain Hemisphere

L = Left Hemisphere
R = Right Hemisphere
N = N/A: Measure is bilateral

Character 6: Freesurfer Brain Atlas or Module

D = Destrieux
K = Desikan-Killiany
T = Desikan-Killiany-Tourville (DKT)
A = Aseg Subcortical Atlas or Hippocampal Subfield/Amygdala Nuclei

Module

Characters 7-8:

Numbers = See Concordance Table for list of measures

For Ch4 = B:

C5EB = Cole Brain Age Algorithm (PMID: 28765056)

For Ch3 = W (i.e., Extracted Diffusion Weighted Imaging Measurements):

Character 4: Measurement Type

F = Fractional Anisotropy (FA)
M = Mean Diffusivity (MD)
R = Radial Diffusivity (RD)
A = Axial Diffusivity (AD)
N = Mean Kurtosis (MK)
S = Radial Kurtosis (RK)
B = Axial Kurtosis (AK)
X = Axonal Water Fraction (AWF)
I = Intra-axonal diffusivity (ias_Da)
P = Extra-axonal radial diffusivity (eas_de_perp)
T = Extra-axonal tortuosity (eas_tort)
D = Neurite density index (NDI)
V = Orientation dispersion index (ODI)
C = Fraction of isotropic diffusion (FISO or CSF)

Character 5: Brain Hemisphere

G = Global Measure
L = Left Hemisphere
R = Right Hemisphere
N = N/A: Measure is bilateral

For Ch5 = G:

Character 6: Tissue type

None = White Matter
A = Gray Matter

C = Cerebro-spinal fluid

For Ch 5 = L, R, N:

Character 6: Method Used

I = IIT Atlas v4.1 (used in MR1 only)

K = IIT Atlas v5.0

J = JHU Atlas

Characters 7-8:

Numbers = See Concordance Table for list of measures

References:

Corrugator and zygomatic electromyography

Cacioppo, J. T., Petty, R. E., Losch, M. E., & Kim, H. S. (1986). Electromyographic activity over facial muscle regions can differentiate the valence and intensity of affective reactions. *Journal of Personality and Social Psychology*, 50(2), 260–268.

<http://doi.org/10.1037/0022-3514.50.2.260>

Larsen, J. T., Norris, C. J., & Cacioppo, J. T. (2003). Effects of positive and negative affect on electromyographic activity over zygomaticus major and corrugator supercilii. *Psychophysiology*, 40(5), 776–785. <http://doi.org/10.1111/1469-8986.00078>

Cube & Paper

Gilbertson, M.W., Williston S.K., Paulus, L.A., Lasko, N.B., Gurvits, T.V, Shenton, M.E., Pitman, R.K., Orr, S.P. (2007). Configural cue performance in identical twins discordant for posttraumatic stress disorder: Theoretical implications for the role of hippocampal function. *Biol Psychiatry*, 62(5), 513-520.

Diffusion Weighted Imaging atlases

Mori S, Oishi K, Jiang H, et al. (2008) Stereotaxic white matter atlas based on diffusion tensor imaging in an ICBM template. *Neuroimage*, 40(2), 570–582.

doi:10.1016/j.neuroimage.2007.12.035

Qi, X., & Arfanakis, K. (2021). Regionconnect: Rapidly extracting standardized brain connectivity information in voxel-wise neuroimaging studies. *NeuroImage*, 225, 117462. <https://doi.org/10.1016/j.neuroimage.2020.117462>

Zhang S, Arfanakis K. (2018) Evaluation of standardized and study-specific diffusion tensor imaging templates of the adult human brain: Template characteristics, spatial normalization accuracy, and detection of small inter-group FA differences. *Neuroimage*, 172, 40-50.

Freesurfer-Based Structural MRI atlases and Modules

Desikan-Killiany-Tourville (DKT) Brain Atlas

Klein, A., & Tourville, J. (2012). 101 labeled brain images and a consistent human cortical labeling protocol. *Frontiers in neuroscience*, 6, 171. <https://doi.org/10.3389/fnins.2012.00171>

Desikan-Killiany Brain Atlas

Desikan R.S., Ségonne F., Fischl B., Quinn B.T., Dickerson B.C., Blacker D., Buckner R.L., Dale A.M., Maguire R.P., Hyman B.T., Albert M.S., & Killiany R.J. (2006). An automated labeling system for subdividing the human cerebral cortex on MRI scans into gyral based regions of interest. *Neuroimage*, 31(3), 968-980.

Destrieux Brain Atlas

Fischl B., van der Kouwe A., Destrieux C., Halgren E., Ségonne F., Salat D.H., Busa E., Seidman L.J., Goldstein J., Kennedy D., Caviness V., Makris N., Rosen B., & Dale A.M. (2004). Automatically parcellating the human cerebral cortex. *Cereb Cortex*, 14(1), 11-22.

Aseg Subcortical Brain Atlas

Fischl B., Salat D.H., Busa E., Albert M., Dieterich M., Haselgrove C., van der Kouwe A., Killiany R., Kennedy D., Klaveness S., Montillo A., Makris N., Rosen B., & Anders M. Dale A.M.

(2002). Whole brain segmentation: automated labeling of neuroanatomical structures in the human brain. *Neuron*, 33, 341-355.

Hippocampal Subfields

Iglesias, J.E., Augustinack, J.C., Nguyen, K., Player, C.M., Player, A., Wright, M., Roy, N., Frosch, M.P., Mc Kee, A.C., Wald, L.L., Fischl, B., and Van Leemput, K.(2015). A computational atlas of the hippocampal formation using ex vivo, ultra-high resolution MRI: Application to adaptive segmentation of in vivo MRI. *Neuroimage*, 115, 117-137

Amygdala Nuclei

Saygin ZM & Kliemann D (joint 1st authors), Iglesias JE, van der Kouwe AJW, Boyd E, Reuter M, Stevens A, Van Leemput K, Mc Kee A, Frosch MP, Fischl B, Augustinack JC. (2017). High-resolution magnetic resonance imaging reveals nuclei of the human amygdala: manual segmentation to automatic atlas. *Neuroimage*, 155, 370-382.

Brain-Predicted Age

Cole JH, Leech R, Sharp DJ, for the Alzheimer's Disease Neuroimaging Initiative (2015). Prediction of brain age suggests accelerated atrophy after traumatic brain injury. *Ann Neurol* 77(4): 571-581.

Cole, J. H., & Franke, K. (2017). Predicting Age Using Neuroimaging: Innovative Brain Ageing Biomarkers. *Trends in Neurosciences*, 40(12), 681–690.

<http://doi.org/10.1016/j.tins.2017.10.001>

Cole JH, Poudel RPK, Tsagkrasoulis D, Caan MWA, Steves C, Spector TD, Montana G. Predicting brain age with deep learning from raw imaging data results in a reliable and heritable biomarker. *Neuroimage*. 2017 Dec;163:115-124. doi: 10.1016/j.neuroimage.2017.07.059. Epub 2017 Jul 29. PMID: 28765056.

Cole JH, Ritchie SJ, Bastin ME, Valdes Hernandez MC, Munoz Maniega S, Royle N et al. (2018). Brain age predicts mortality. *Molecular psychiatry*, 23: 1385-1392.

DPES

Shiota, M. N., Keltner, D., & John O. P. (2006). Positive emotion dispositions differentially associated with Big Five personality and attachment style. *Journal of Positive Psychology*, 1, 61-71.

ERQ

Gross, J.J., & John, O.P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85, 348-362.

IRI

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology*, 10, 85.

PANAS

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology*, 54, 1063-1070.

STAI-X

Spielberger, C. D., Gorsuch, R. L., Lushene, R., Vagg, P. R., & Jacobs, G. A. (1983). *Manual for the State Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.