

**Erasmus University Rotterdam, the Netherlands**  
**CSC PhD 2015 Project Description**

<b>School/Department:</b>	<b>Erasmus University Medical Centre / Department of Child and Adolescent Psychiatry</b>
<b>Project Title:</b>	<b>Cognitive Mismatch between children and parents: The role of environmental perturbations on brain development</b>
<b>Abstract:</b>	<p>Efficient cognitive function is carried out through the orchestration of multiple neural networks. During childhood, these networks mature in a manner necessary to optimize cognitive abilities. However, it is unclear how specific networks in the brain mature in the context of environmental factors that can alter development. Some environmental factors can be negative, whereas others may actually promote optimal brain development and strengthen the resilience of underlying neural networks. While the best available predictor of cognitive function in children is the cognitive function of their parents, not all children fit this model. Subgroups of children with very high functioning parents can have lower cognitive abilities. We believe that these children form an 'at-risk' group. Likewise, there are children with high cognitive abilities who stem from parents with comparatively lower cognitive abilities. These children form a 'resilience' group and it is this latter group of children, those children who have a significantly better IQ with respect to their parental IQ, whom we plan to study. Our <b>hypothesis</b> is that certain combinations of environmental factors will have the greatest effect on positive mismatch (resilience) in child IQ. Furthermore, children who show greater resilience will show greater brain connectivity, especially in networks linking the prefrontal cortex to distant brain regions, including the posterior parietal network.</p> <p>The primary aims of our study are to (1) test the relationship between parent and child positive IQ mismatch with multivariate measures of the environment reflecting early life experience; (2) test brain network characteristics of children who have a positive or negative mismatched IQ with their parents; and (3) assess to what extent environmental factors map onto the brain network characteristics in children with an IQ mismatch.</p>
<b>Requirements of candidate:</b>	<p>Master degree: Yes</p> <p>(Academic) Background: The background of the candidate should be in the area of neuroscience, computational neuroscience, medicine, or psychology. Candidates with a technical background, such as i engineering or physics are also welcome to apply, as a component of the project will involve multivariate statistics and/or machine learning algorithms.</p>

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	IELTS Grade: 7.0 ( <i>minimal 6.0 per component</i> ) or TOEFL: 100 ( <i>minimal 20 per component</i> )
<b>Supervisor information:</b>	<i>Dr. Tonya White</i> Email address: <a href="mailto:t.white@erasmusmc.nl">t.white@erasmusmc.nl</a> Website: <a href="http://www.erasmusmc.nl/kinderenjeugdpsychiatrie_psychol/research/onderzoeksprogramma/2528136/">http://www.erasmusmc.nl/kinderenjeugdpsychiatrie_psychol/research/onderzoeksprogramma/2528136/</a>

### Recent Publications (Since 2012)

Lukoshe A, Hokken-Koelega AC, van der Lugt A, **White T** (In Press) Reduced cortical complexity in children with Prader-Willi Syndrome and its associations with cognitive impairment and developmental delay. PLOS ONE.

Van der Knaap N, El Marroun H, Klumpers F, Mous S, Jaddoe V, Hofman A, Homberg J, **White T**, Tiemeier H, Fernandez G (In Press) Beyond classical inheritance: The influence of maternal genotype upon child's brain morphology and behavior. J Neurosci.

**White T**, Muetzel R, Schmidt M, Langeslag S, Jaddoe V, Hofman A, Calhoun V, Verhulst F, Tiemeier H (In Press) Time of acquisition and network stability in pediatric resting-state functional MRI. Brain Connectivity.

Ghassabian A, Steenweg-de Graaff J, de Rijke YB, Peeters R, Ross HA, Jaddoe VW, Hofman A, Verhulst FC, **White T**, Tiemeier H (In Press) Maternal urinary iodine concentration in pregnancy and children's cognition: Results from an iodine sufficient area. BMJ Open.

El Marroun H, White T, Verhulst FC, Tiemeier H (In Press) Maternal use of antidepressant or

anxiolytic medication during pregnancy and childhood neurodevelopmental outcomes: A systematic review. Eur Child Adol Psychiatr.

Basten M, van der Ende J, Tiemeier H, Althof, RR, Rijlaarsdam J, Jaddoe VW, Hofman A, Hudziak JJ, Verhulst FC, White T (In Press) Nonverbal intelligence in young children with dysregulation. Eur Child Adol Psychiatr.

Mous SE, Muetzel RL, El Marroun H, Polderman TJC, van der Lugt A, Jaddoe VW, Hofman A, Verhulst FC, Tiemeier H, Posthuma D, **White T** (In Press) Cortical thickness and inattention/hyperactivity symptoms in young children: A population-based study. *Psychological Medicine*.

Ghassabian A, El Marroun H, Peeters R, Jaddoe VW, Hofman A, Verhulst FC, Tiemeier H, **White T** (In Press) Downstream effects of maternal hypothyroxinemia in early pregnancy: Nonverbal IQ and brain morphology in school age children. *J Clin Endocrinol Metab*.

Schneider CE, **White T**, Hass J, Geisler D, Wallace SR, Roessner V, Holt DJ, Calhoun VD, Gollub RS, Ehrlich S (In Press) Smoking status as a potential

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confounder in the study of brain structure in schizophrenia. *J Psychiatr Research*.

Mous SE, Karatekin C, Kao CY, Gottesman II, Posthuma D, **White T** (In Press) Gyrification abnormalities in children and adolescents with velocardiofacial syndrome and attention-deficit hyperactivity disorder: A pilot study. *Psychiatr Res Neuroimaging*.

Lukose A, **White T**, Schmidt MN, van der Lugt A, Hokken-Koelega AC (In Press) Divergent structural brain abnormalities between different genetic subtypes of children with Prader-Willi Syndrome. *J Neurodevelopmental Disorders*.

Van den Bosch G, Baartmans M, Vos P, Dokter J, **White T**, Tibboel D (In Press) Pain insensitivity syndrome misinterpreted as inflicted burns. *Pediatrics*.

El Marroun H, Schmidt M, Franken I, Jaddoe VWV, Hofman A, van der Lugt A, Verhulst FC, Tiemeier H, **White T** (In Press) Prenatal tobacco exposure and brain morphology: A prospective study in young children. *Neuropsychopharmacology*.

El Marroun H, **White T**, van der Knaap N, Homberg J, Fernandez G, Schoemaker N, Jaddoe V, Hofman A, Verhulst FC, Hudziak J, Stricker B, Tiemeier H (In Press) Prenatal exposure to selective serotonin reuptake inhibitors and autistic symptoms in young children. *Br J Psychiatr*.

Liu J, Chen J, Ehrlich S, Walton E, **White T**, Perrone-Bizzozero N, Bustillo, Turner JA, Calhoun VD (In Press) Methylation patterns in whole blood correlate with symptoms in schizophrenia patients. *Schiz Bull*.

Ehrlich S, Geisler D, Yendiki A, Panneck P, Roessner V, Calhoun VD, Magnotta VA, Gollub RL, **White T** (In Press) Associations of WM integrity and cortical thickness in patients with schizophrenia and healthy controls. *Schiz Bull*.

van den Bosch G, van Hemmen J, **White T**, Tibboel D, Peters JWB, van der Geest JN (In Press) Standard and individually determined thermal pain stimuli induce similar brain activations. *Eur J Pain*.

**White T**, Mous S, Karatekin C (In Press) Memory-guided saccades in youth-onset psychosis and attention-deficit/hyperactivity disorder (ADHD). *Early Intervention in Psychiatry*.

Hammerschlag AR, Polderman, TJC, de Leeuw C, Tiemeier H, **White T**, Smit AB, Verhage M, Posthuma D (2014) Functional gene-set analysis does not support a major role for synaptic function in attention deficit/hyperactivity disorder (ADHD). *Genes*. 5: 604-614.

Gollub RL, Shoemaker JM, King MD, **White T**, Ehrlich S, Sponheim SR, Clark VP, Turner JA, Mueller BA, Magnotta V, O'Leary DS, Ho BC, Brauns S, Manoach DS, Seidman LJ, Bustillo JR, Lauriello J, Bockholt HJ, Lim KO, Rosen BR, Schulz SC, Calhoun VD, Andreasen NC (2013) The MCIC collection: A shared repository of multi-site brain imaging data from a clinical investigation of schizophrenia. *Neuroinformatics*. 11: 367-388.

**White T**, El Marroun H, Nijs I, Schmidt MN, van der Lugt A, Wielopolski P, Jaddoe VWV, Hofman A, Krestin GP, Tiemeier H, Verhulst FC (2013) Pediatric population-based imaging and the Generation R Study: The intersection of developmental neuroscience and epidemiology. *Eur J Epidemiol*. 28: 99-111.

Brauns S, Gollub RL, Walton E, Hass J, Smolka MN, **White T**, Wassink TH, Calhoun VD, Ehrlich S (2013) Genetic variation in GAD1 is associated with cortical thickness in the parahippocampal gyrus. *J Psychiatr Res*. 47(7): 872-879.

Vrshek-Schallhorn S, Wahlstrom D, **White T**, Luciana M (2013) The effect of acute tyrosine phenylalanine depletion on emotion-based decision

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making in healthy adults. *Pharmacol Biochem & Beh.* 105: 51-57.

Hass J, Walton E, Kirsten H, Liu J, Priebe L, Wolf C, Karbalai N, Gollub R, **White T**, Roessner V, Muller KU, Paus T, Smolka MN, Schumann G, Scholz M, Cichon S, Calhoun V, Ehrlich S (2013) A genome-wide association study suggests novel loci associated with a schizophrenia-related brain-based phenotype. *PloS one* 8(6): e64872.

**White T**, Ehrlich S, Ho B, Manoach D, Caprihan A, Schulz SC, Andreasen NC, Gollub R, Calhoun VC, Magnotta V (2013) Spatial characteristics of white matter abnormalities in schizophrenia. *Schiz Bull.* 39: 1077-1086.

Su S, **White T**, Schmidt M, Kao CY, Sapiro G (2013) Geometric computation of human gyrification indexes from magnetic resonance images. *Hum Brain Mapp.* 34: 1230-44.

Ghassabian A, Herba CM, Roza SJ, Govaert P, Schenk JJ, Jaddoe VW, Hofman A, **White T**, Verhulst FC, Tiemeier H (2013) Infant brain structures and risk of poor executive function and attention-deficit hyperactivity problems at preschool age: A prospective study. *J Child Psychol Psychiatr* 54: 96-104.

Langeslag SJE, Schmidt M, Ghassabian A, Jaddoe VW, Hofman A, van der Lugt A, Verhulst FC, Tiemeier H, **White TJH** (2013) Functional connectivity between parietal and frontal brain regions and intelligence in young children: The Generation R Study. *Hum Brain Mapp* 34: 3299-3307.

**White T**, Gottesman II (2012) Brain connectivity and gyrification as endophenotypes for schizophrenia: Weight of the evidence. *Curr Trends Med Chem.* 12: 2393-2403.

Tiemeier H, Velders FP, Szekely E, Roza SJ, Dieleman G, Jaddoe VW, Uitterlinden AG, **White T**, Bakermans-Kranenburg MJ, Hofman A, van IJzendoorn MH, Hudziak JJ, Verhulst FC

(2012) The Generation R Study: A review of design, findings to date, and a study of the 5-HTTLPR by environment interaction from fetal life onward. *J Amer Acad Child Adol Psychiatr* 51: 1119-1135.

Sui J, He H, Pearlson GD, Adali T, Kiehl KA, Yu Q, Clark VP, Castro E, **White T**, Mueller BA, Ho BC, Andreasen NC, Calhoun VD (2012) Three-way (N-way) fusion of brain imaging data based on mCCA+jICA and its application to discriminating schizophrenia. *NeuroImage* 66C: 119-132.

van den Bosch G, El Marroun H, Schmidt MN, Tibboel D, Manoach DS, Calhoun VD, **White T** (In Press) Brain connectivity during verbal working memory in children and adolescents. *Hum Brain Mapp.*

Jorge RE, Acion L, **White T**, Tordesillas Gutierrez D, Pierson R, Crespo Facorro B, Magnotta V (2012) White matter abnormalities in veterans with mild traumatic brain injury. *Amer J Psychiatr* 169: 1284-1291.

El Marroun H, Jaddoe VW, Hudziak JJ, Roza SJ, Steegers EAP, Hofman A, Verhulst FC, **White TJH**, Stricker BHC, Tiemeier H (2012) Maternal use of selective serotonin reuptake inhibitors, fetal growth and risk of adverse birth outcomes. *Arch Gen Psychiatr* 69: 706-714.

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**White T**, Moeler S, Schmidt M, Pardo J, Olman C (2012) Evidence for intact local connectivity but disrupted regional function in the occipital lobe in children and adolescents with schizophrenia. *Hum Brain Mapp* 33: 1803-1811.