Developmental Computational Psychiatry

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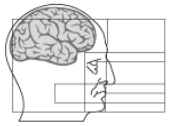

MAX PLANCK UCL CENTRE
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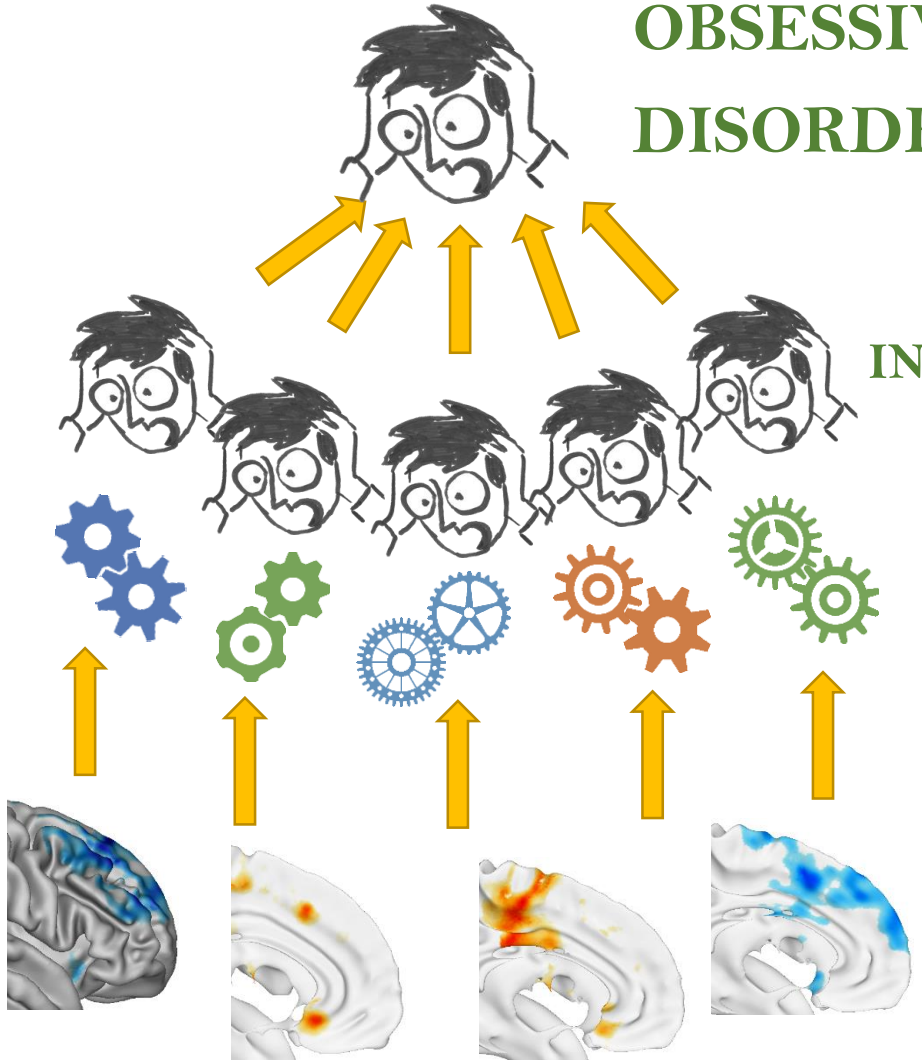
wellcome centre human neuroimaging

WHY COMPUTATIONAL PSYCHIATRY?



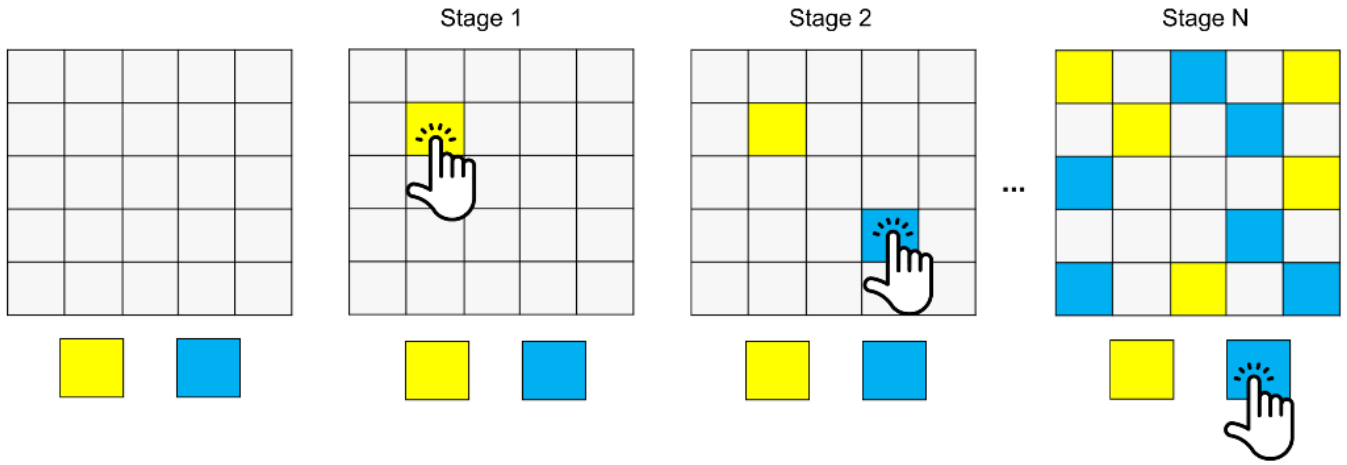
INDECISIVENESS IN OCD

some of the ways in which you act and think. Read each statement and put a tick in the appropriate box. Do not spend too much time on any statement. Answer quickly and honestly.

SOMETIMES

	Rarely	Occasionally	Often	Always
1. I plan tasks carefully.			✓	
2. I do things without thinking.	✓			

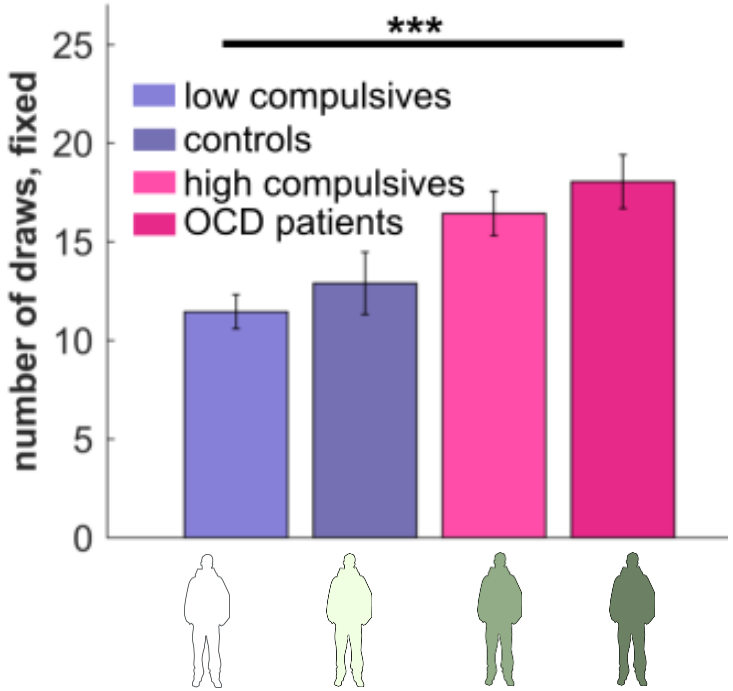
Information Gathering Task



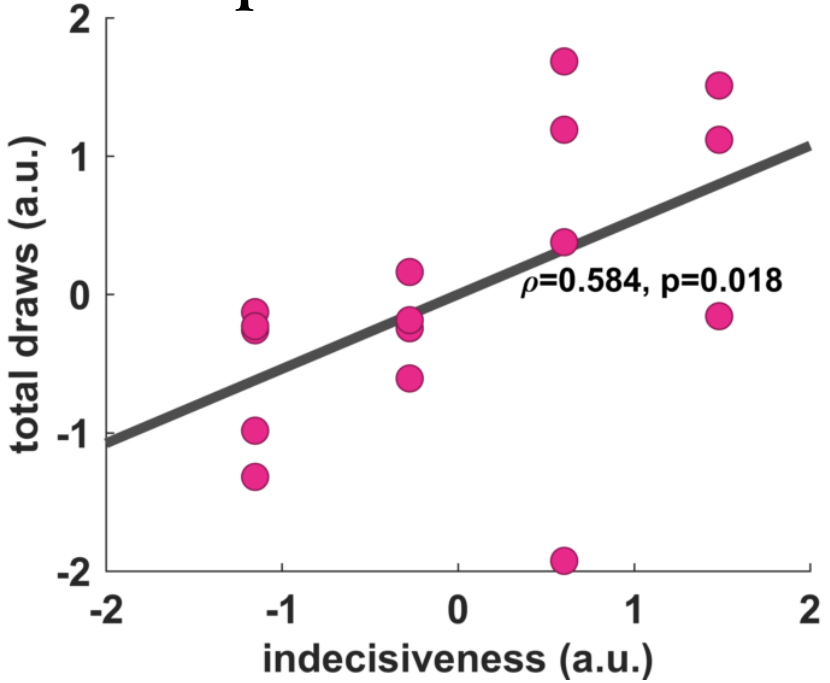
Clarke et al., 2006
Hauser et al., 2017, *PLoS Comput Biol*
Hauser et al., 2017, *Translat Psychiatry*

INDECISIVENESS IN OCD

Excessive information gathering along compulsivity spectrum



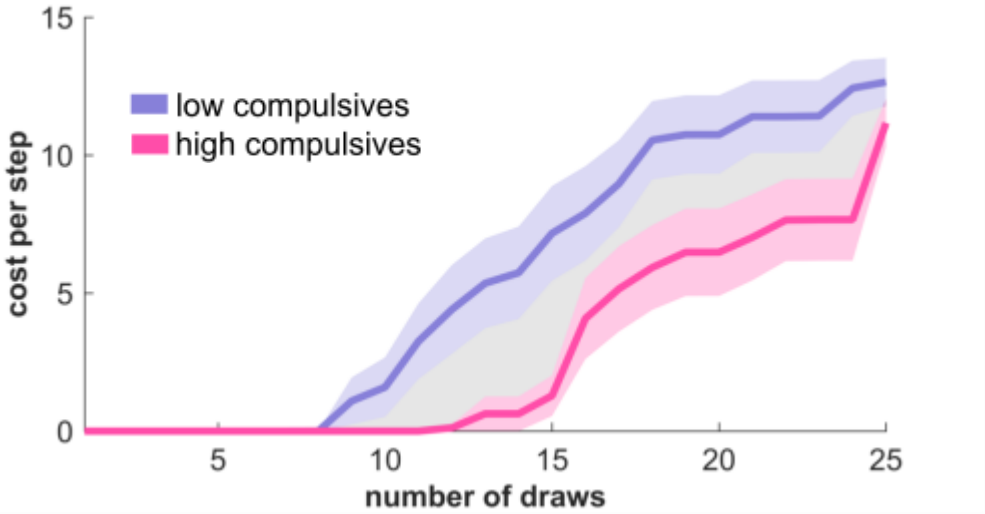
Reflects self-reports in OCD patients



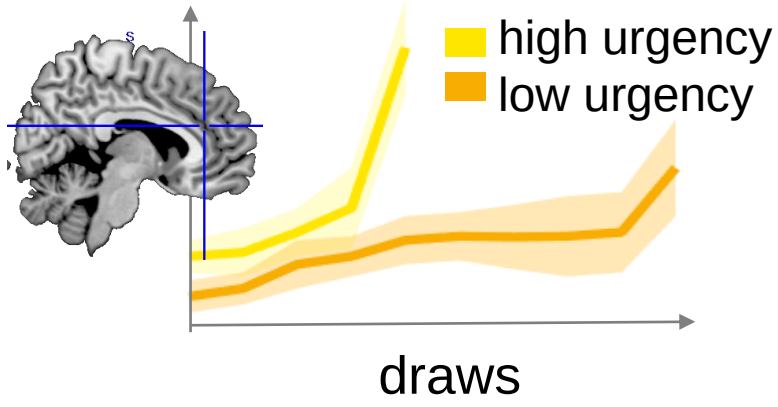
Hauser et al., 2017, *PLoS Comput Biol*
Hauser et al., 2017, *Translat Psychiatry*

INDECISIVENESS IN OCD

delayed urgency in compulsivity

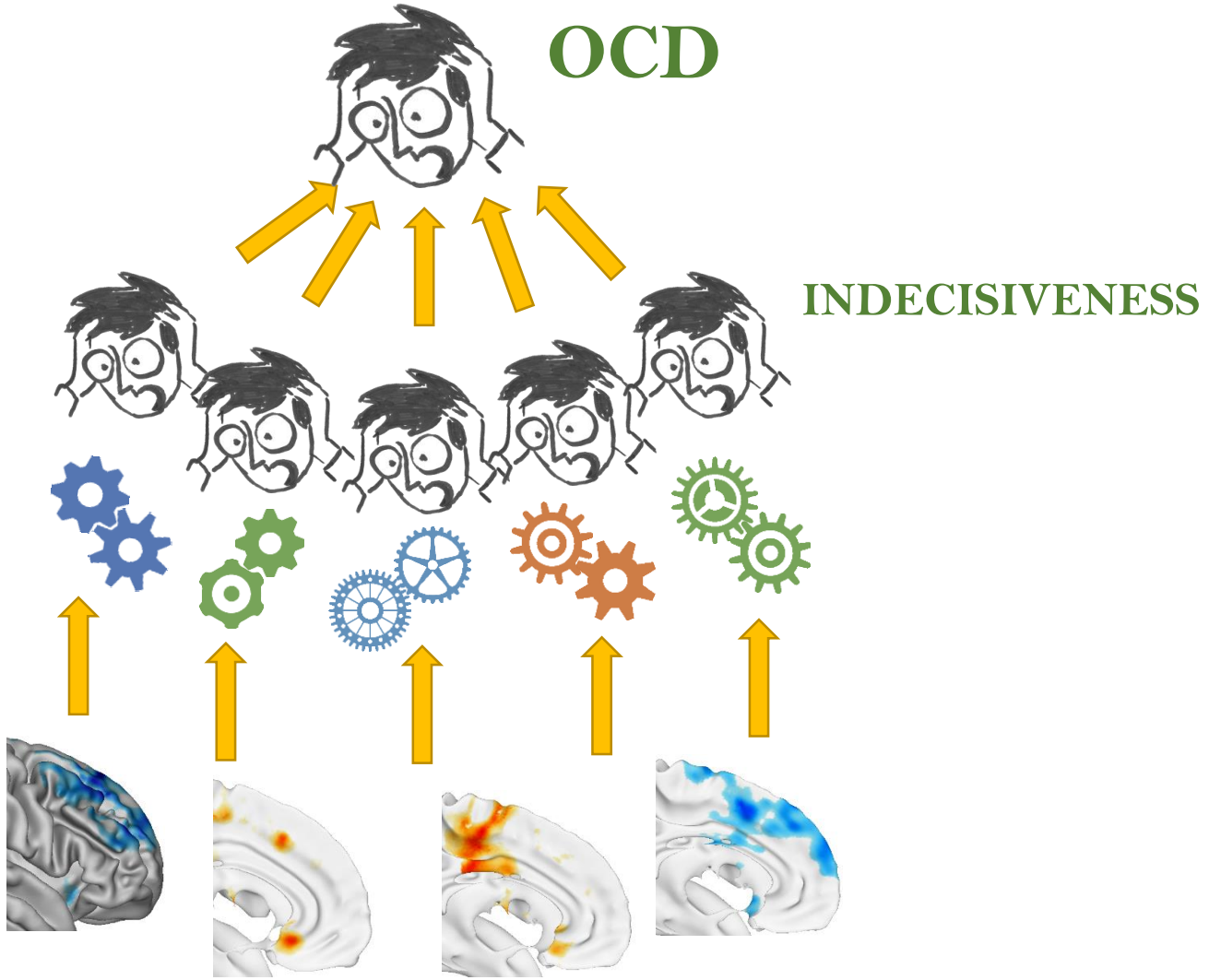


encoded in dACC theta(?)

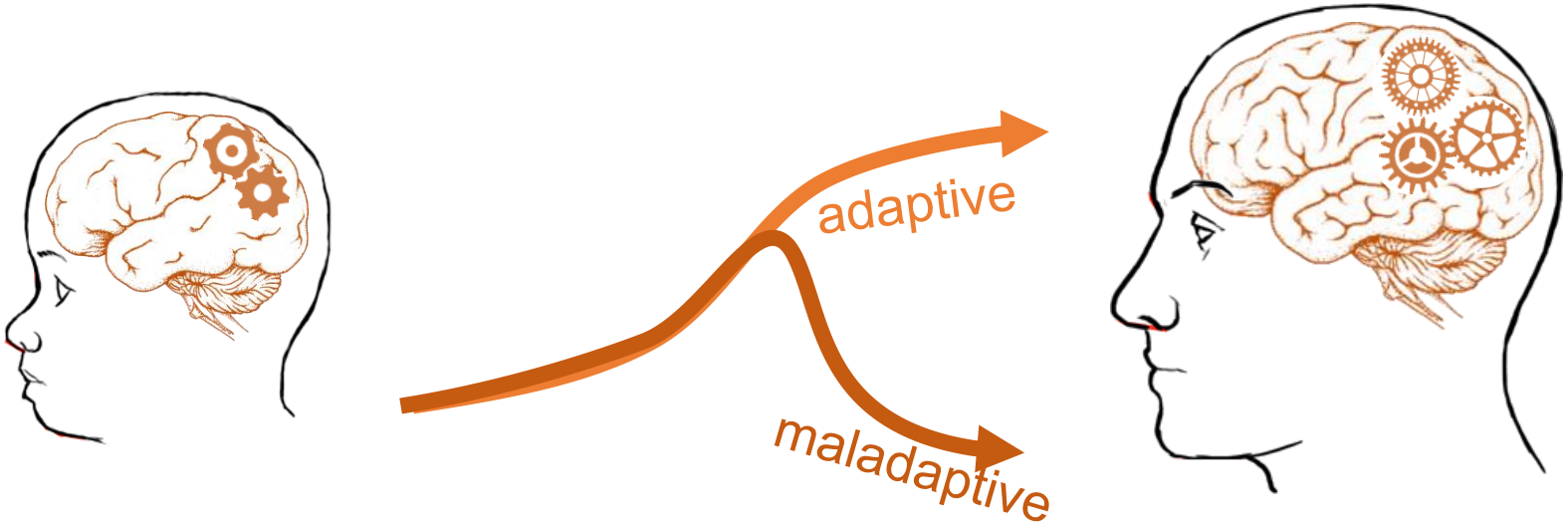


Hauser et al., 2017, *PLoS Comput Biol*
Hauser et al., 2017, *Translat Psychiatry*

Why Developmental Computational Psychiatry?

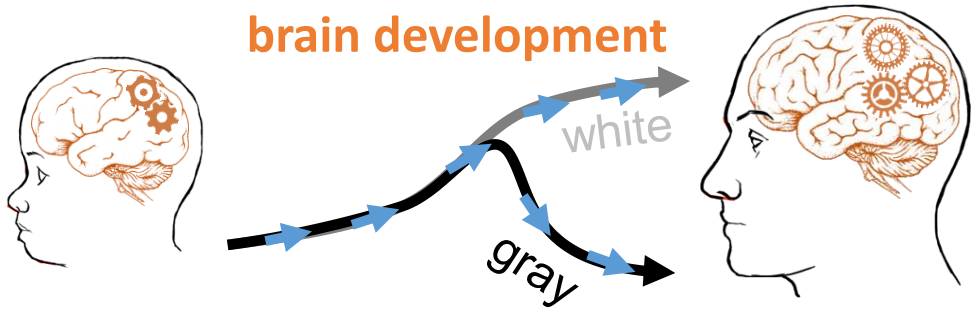


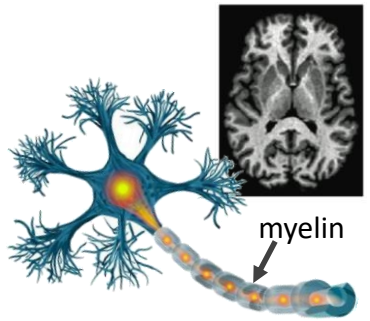
Why Developmental Computational Psychiatry?



Hauser et al., 2018, *JCPP*

IS (WHICH) BRAIN DEVELOPMENT LINKED TO PSYCHIATRIC SYMPTOMS?



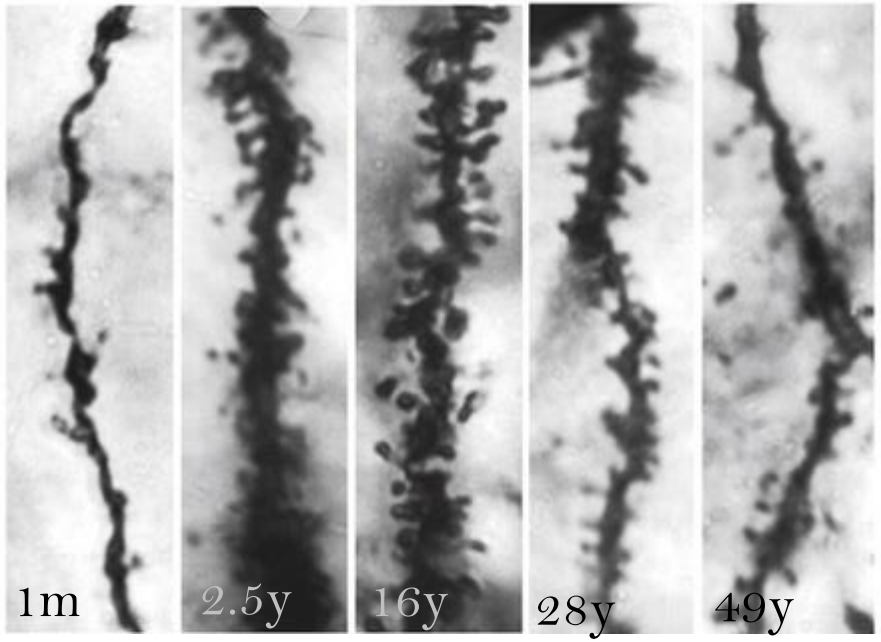


MT
(magnetisation transfer)

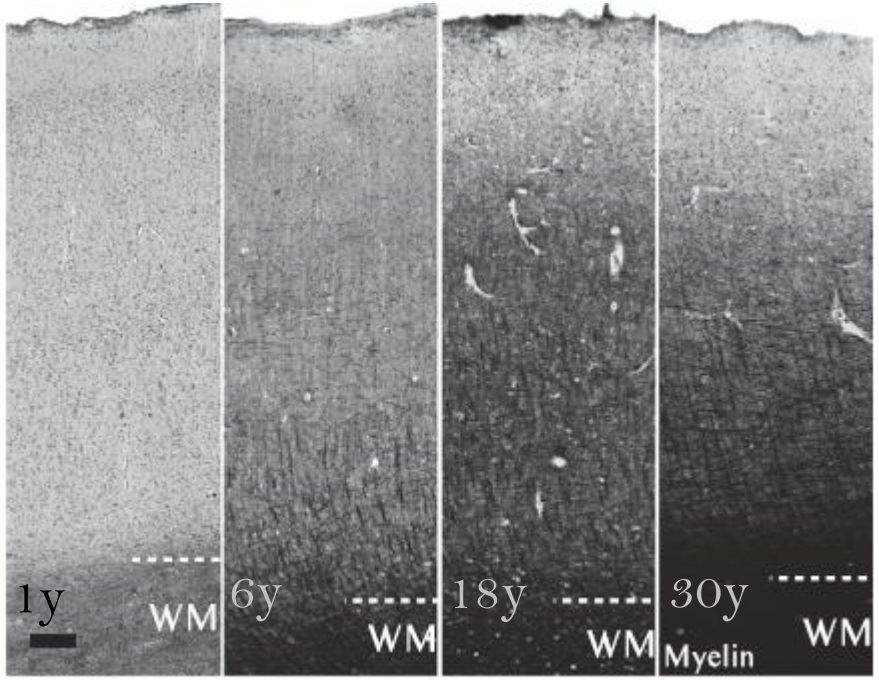
NSPN
NeuroScience in Psychiatry Network

- subjects = 318
- 14-26y

synaptic pruning (dendritic density)



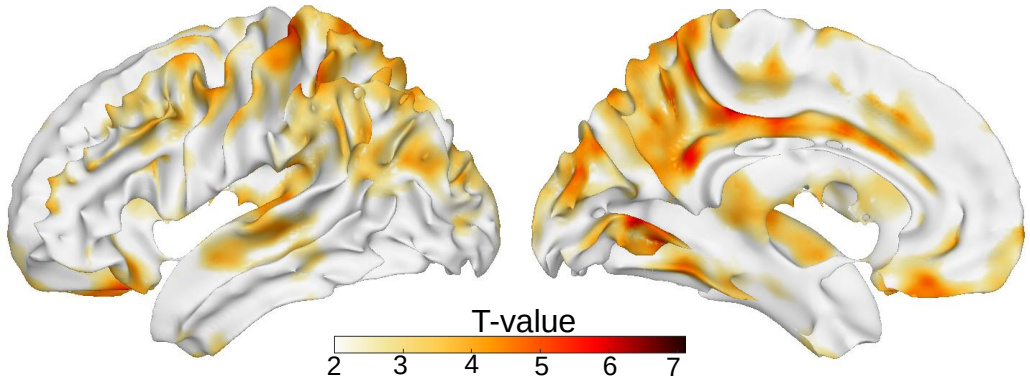
myelination



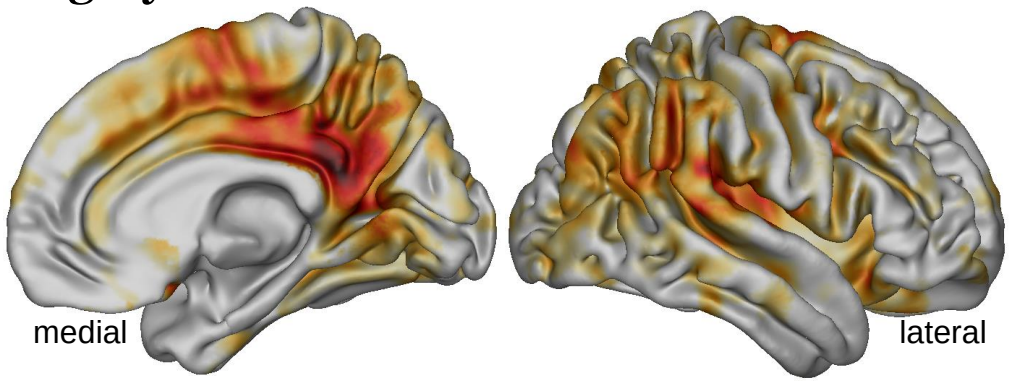
Paus et al., 2007
Petanjek et al., 2011
Miller et al., 2012

NORMATIVE MYELIN MT DEVELOPMENT

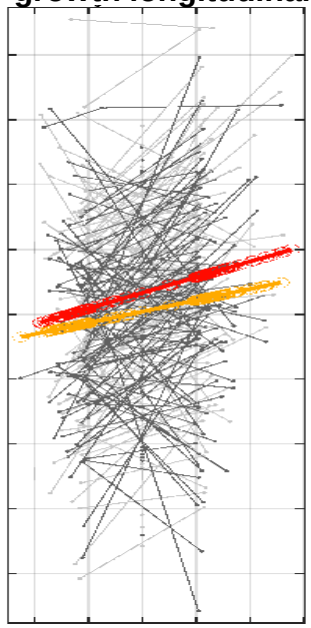
white matter



gray matter

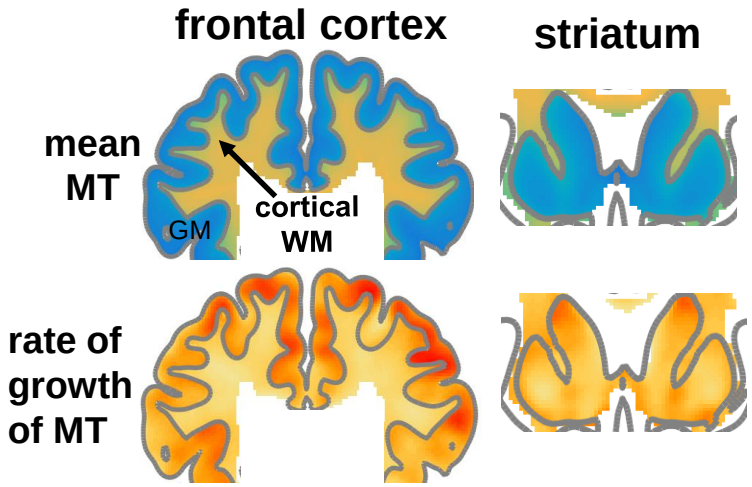


growth longitudinal



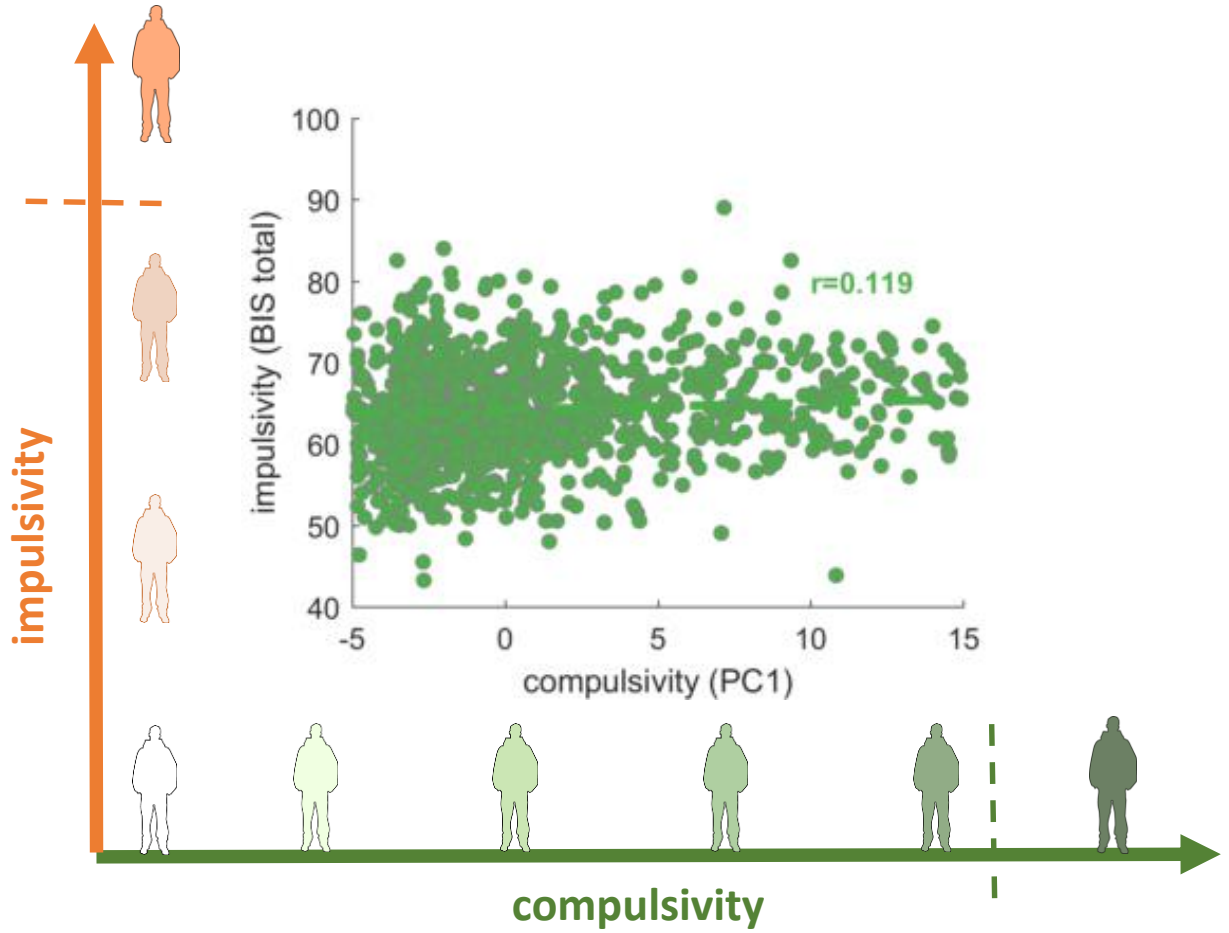
study time

data females
data males
model fem.
model mal.



Ziegler*, Hauser* et al., 2018, *bioRxiv*

IMPULSIVITY / COMPULSIVITY DIMENSIONS

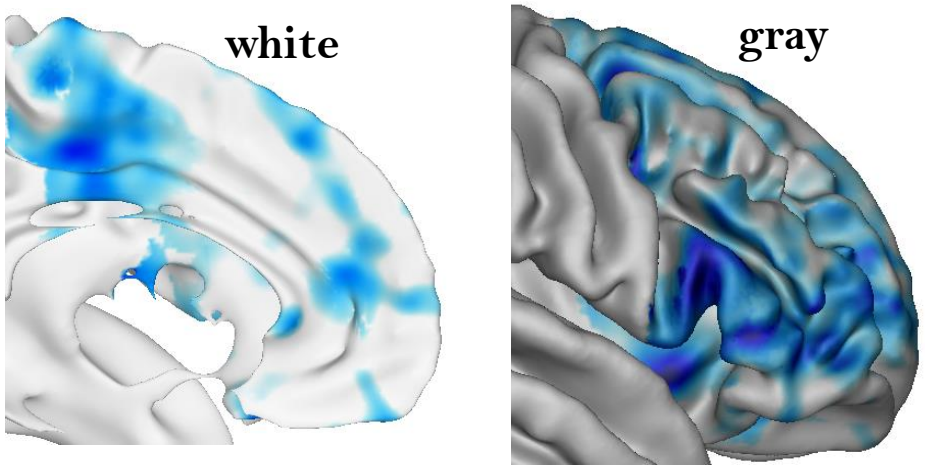


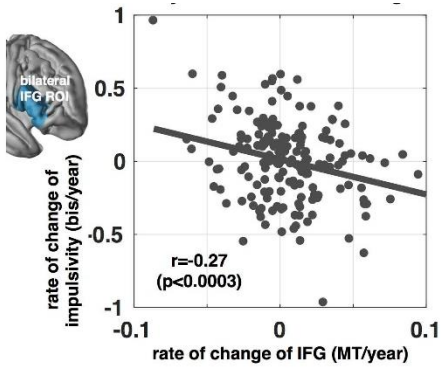
Ziegler*, Hauser* et al., 2018, *bioRxiv*

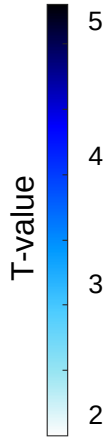
PSYCHIATRIC RISK ON MYELIN GROWTH

impulsivity

decreased growth

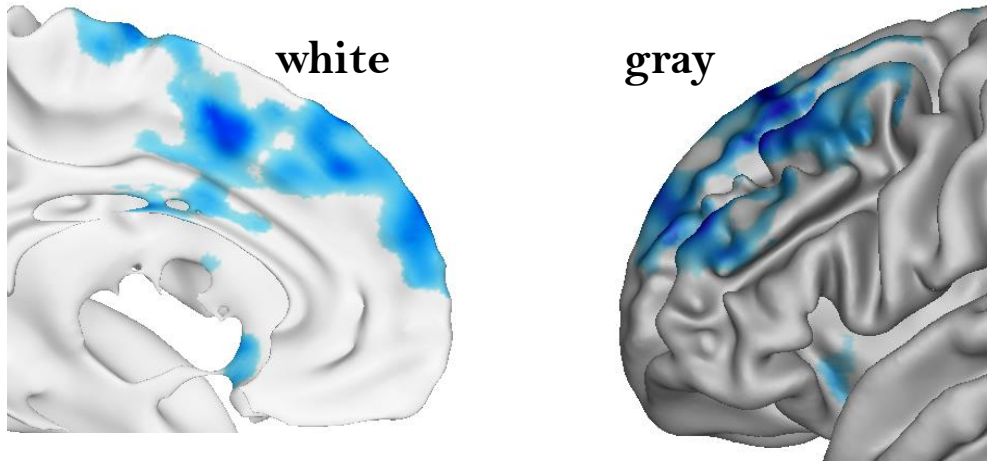




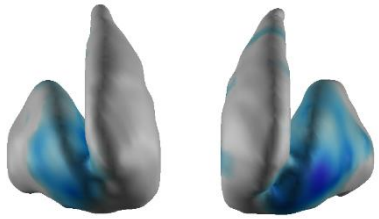


compulsivity

decreased growth

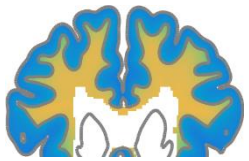


striatum

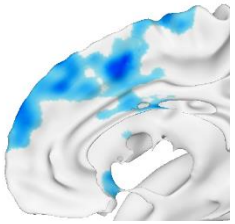


Ziegler*, Hauser* et al., 2018, *bioRxiv*

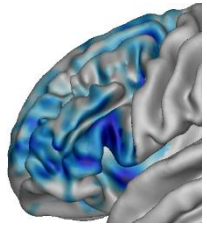
INTERIM SUMMARY



- ongoing myelin-related growth in white & gray matter



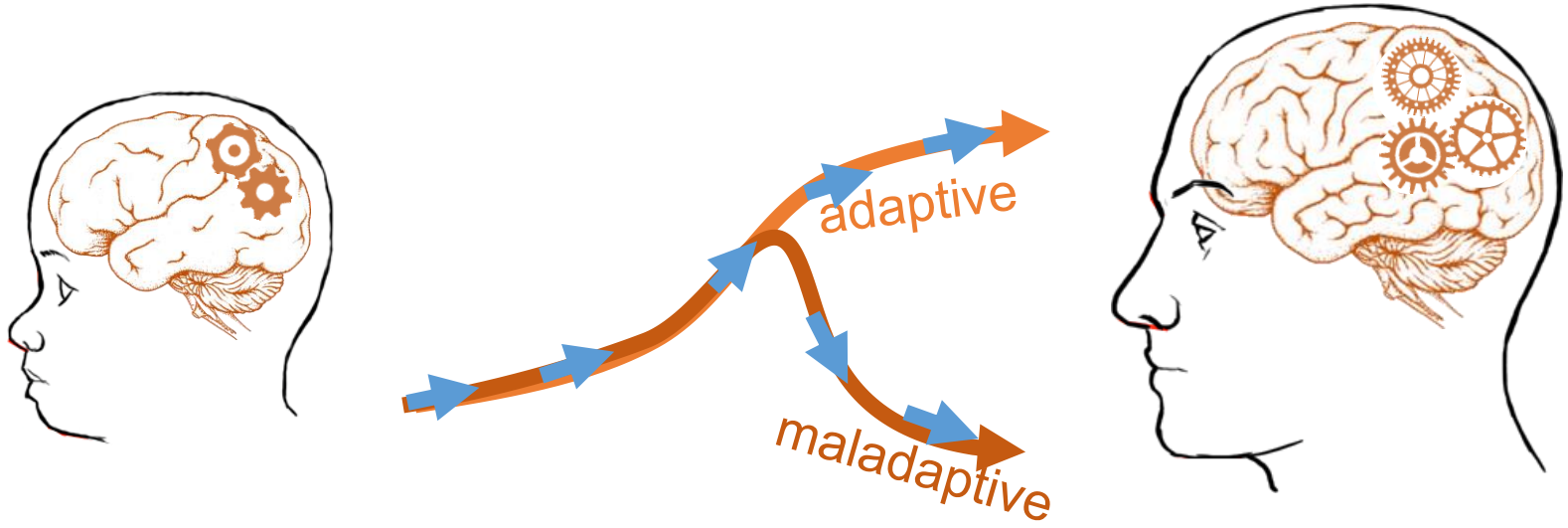
- compulsivity: cingulate, striatum



- impulsivity: inferior frontal cortex

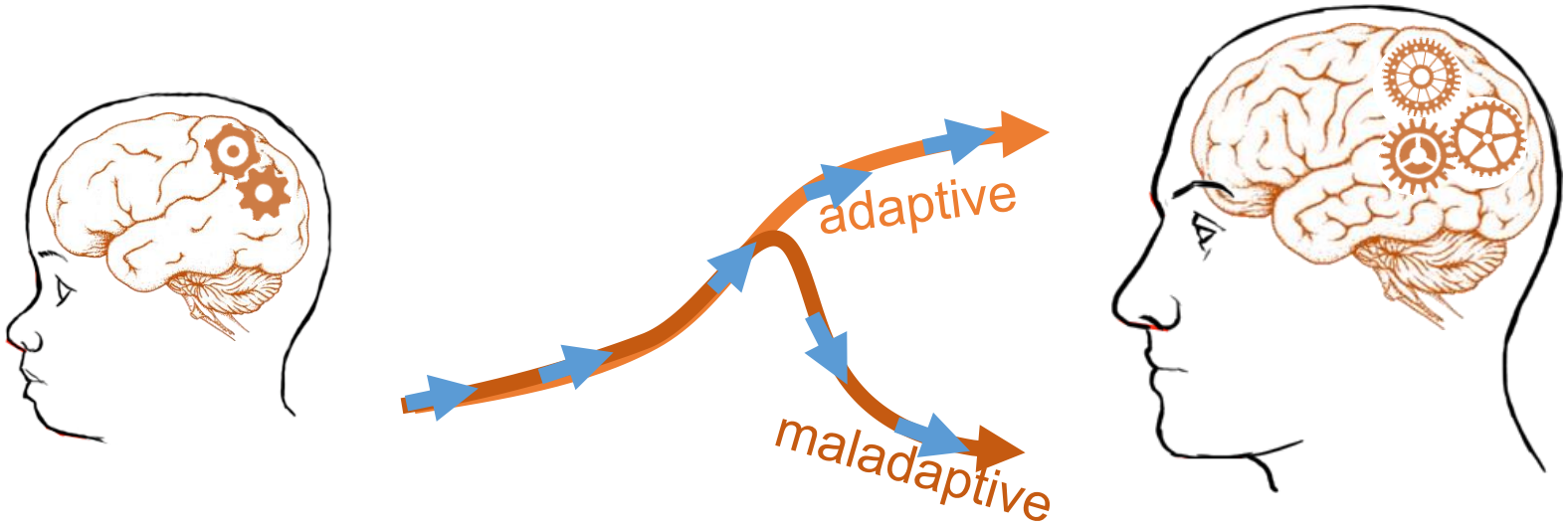
Ziegler*, Hauser* et al., 2018, *bioRxiv*

How to do Developmental Computational Psychiatry?



Hauser et al., 2018, *JCPP*

CHALLENGES – FEASIBILITY



Challenges:

- normative development
- capturing maladaptive development
- directionality/causality
- environmental influences
- sensitive tasks

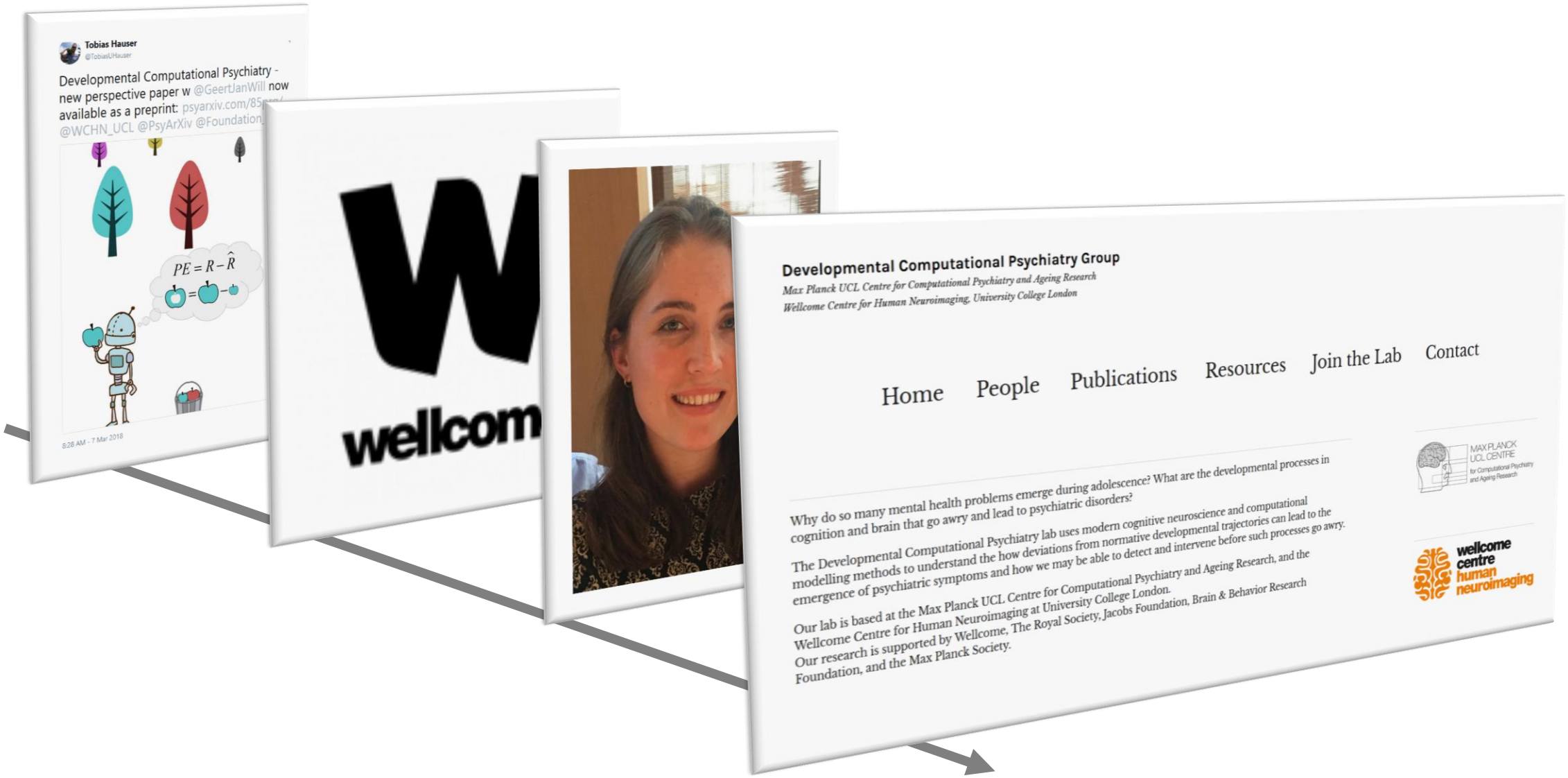
Solutions:

✓ non-clinical studies
✓ risk-enhanced samples

✓ longitudinal studies
✓ covariates
✓ ensuring reliability

Hauser et al., 2018, *JCPP*

HOW FAR HAVE WE COME?



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