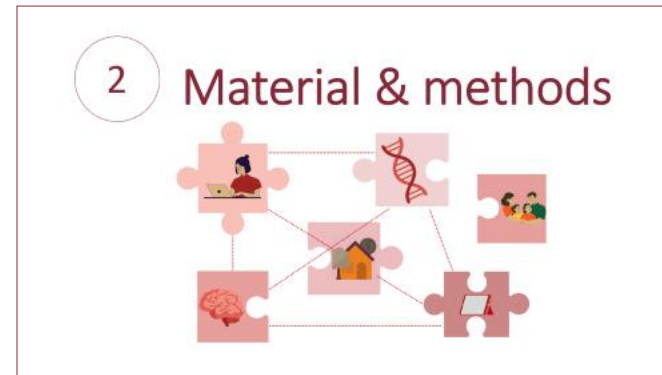
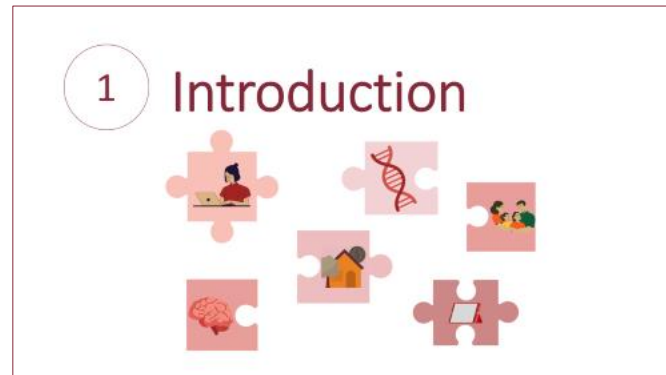


Do neuroplasticity and genetic factors contribute to cognitive training? An imaging-genetics study in healthy children.

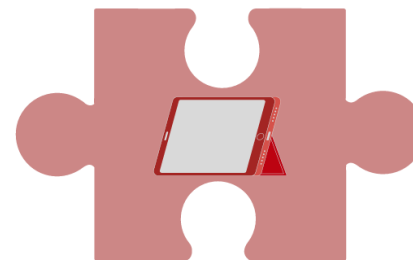
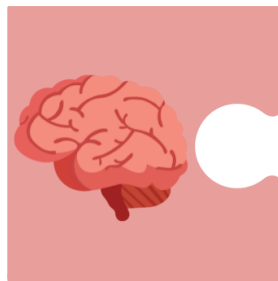
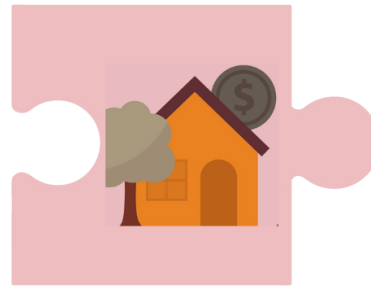
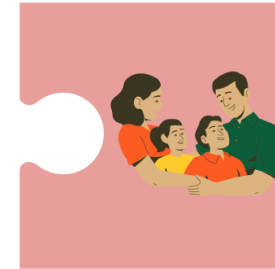
Iris MENU¹, Qin HE², Julie VICTOR³, Gabriela REZENDE¹, Lorna LE STANC¹, Julie VIDAL¹, Catherine OPPENHEIM², Edouard DUCHESNAY³, Boris CHAUMETTE², Olivier HOUDÉ^{1,4}, Grégoire BORST^{1,4,*}, & Arnaud CACHIA^{1,2,*}

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1

Introduction



1 Introduction

Inhibitory control (IC)

- Is important for academic achievement, physical and mental health (Diamond, 2013)
- can be improved with cognitive training programs (e.g., Diamond & Lee, 2011; Jaeggi et al., 2011)

Aim of this study: investigate genetic, cerebral and cognitive factors contributing to IC training receptivity

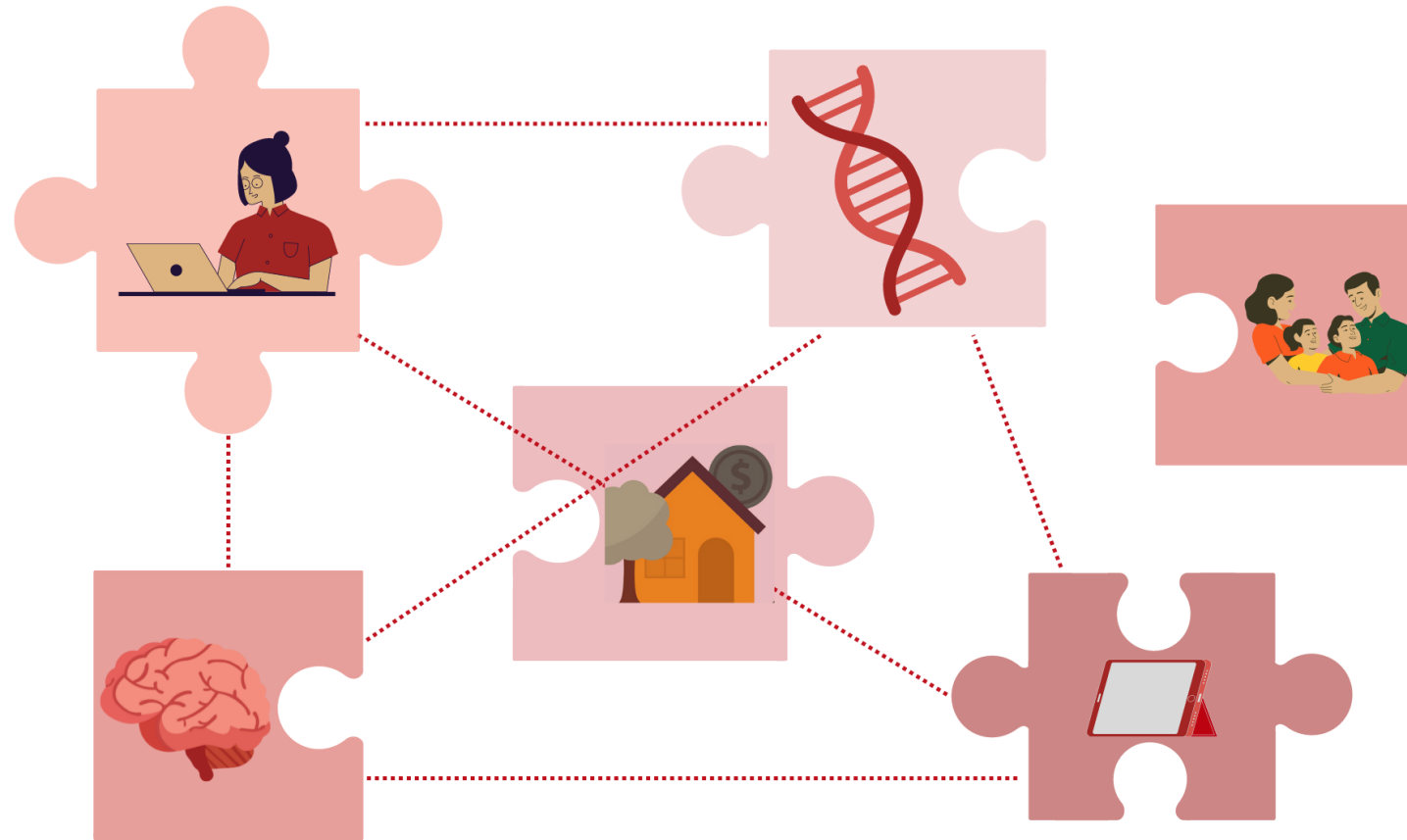
Several factors contribute to cognitive training gains

- basal cognitive level (Karchach & Kray, 2021)
- brain activity/anatomy (Baniqued et al., 2019; Chaddock-Heyman et al., 2020)
- genetic factors (Leckie et al., 2014)



2

Material & methods



2 Material and methods

TO PRE-TRAINING

111 children (9-10 years)

TRAINING

75 children (9-10 years)

T1 POST-TRAINING

75 children (9-10 years)



stop signal task
stop signal reaction time (in seconds)

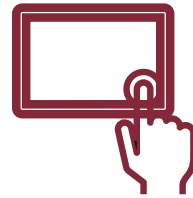
RED GREEN BLUE

color-word Stroop task
Stroop interference score (in seconds)



aMRI

GM volume in 8 regions of interest of the IC network: ACC, IFG, Putamen, Caudate (left & right)



Training
at home on tablet
5 sessions per week (1/day, 5d/w, 15 min)
5 weeks = 25 sessions



stop signal task
stop signal reaction time (in seconds)

RED GREEN BLUE

color-word Stroop task
Stroop interference score (in seconds)



aMRI

GM volume in 8 regions of interest of the IC network: ACC, IFG, Putamen, Caudate (left & right)

+

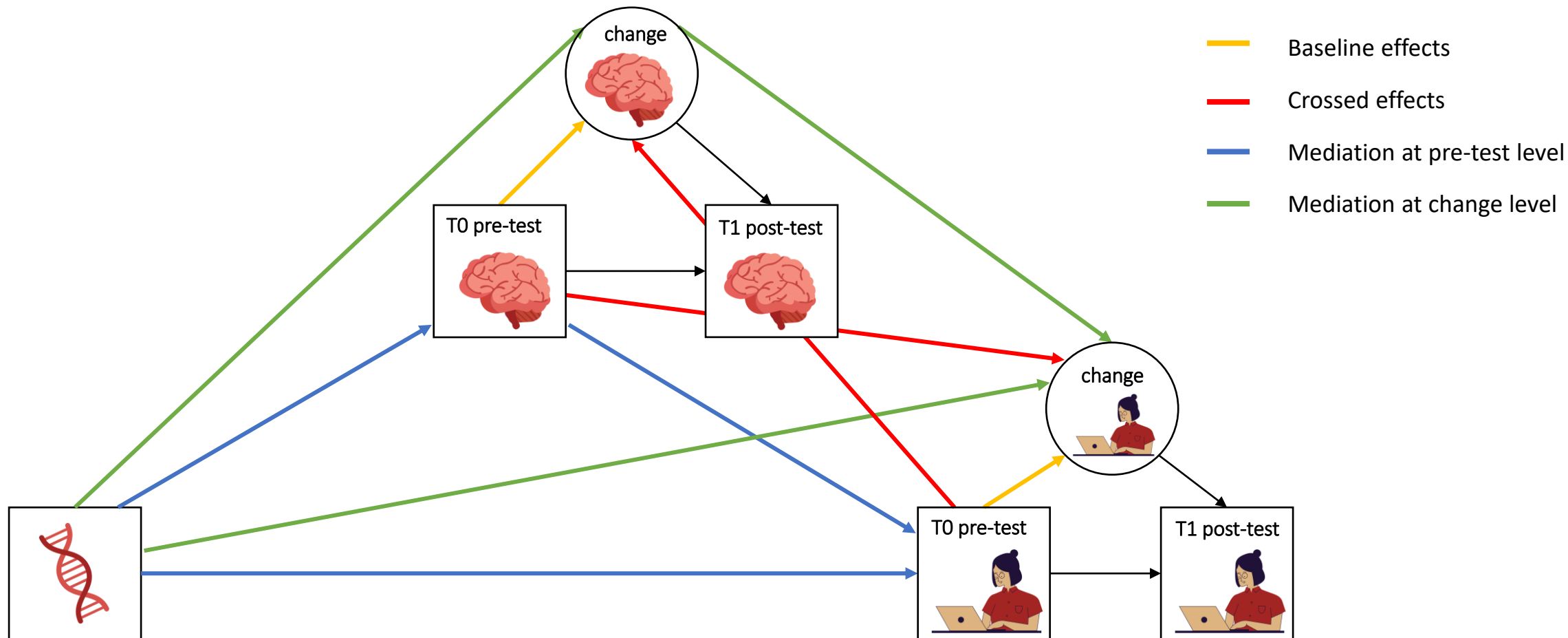


whole genome sample
polygenic risk score

Inhibitory control training (IC)
35 children
- color-word Stroop task
- stop signal task

Active control training (AC)
40 children
- trivia-like questions

2 Material and methods

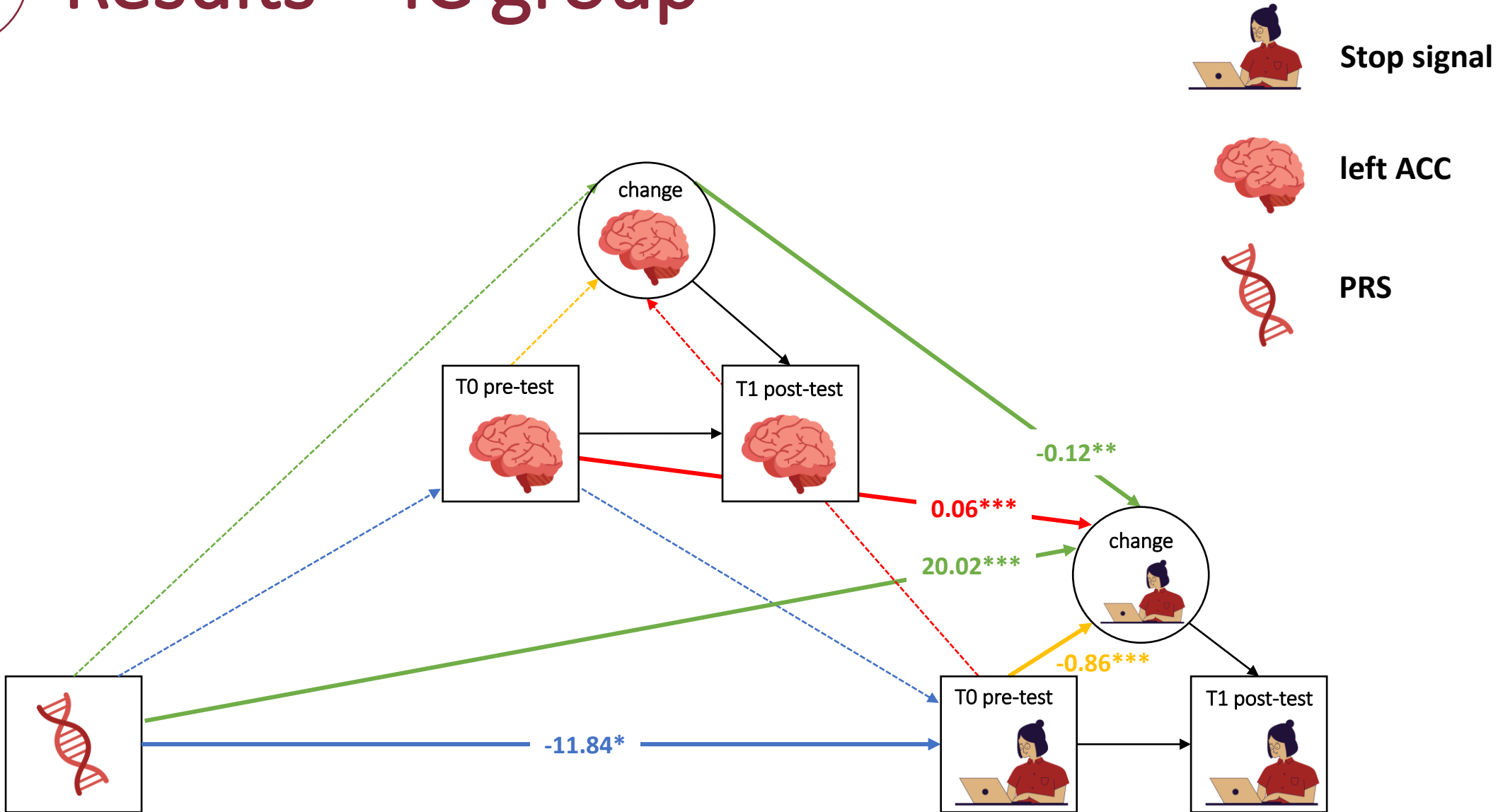


3

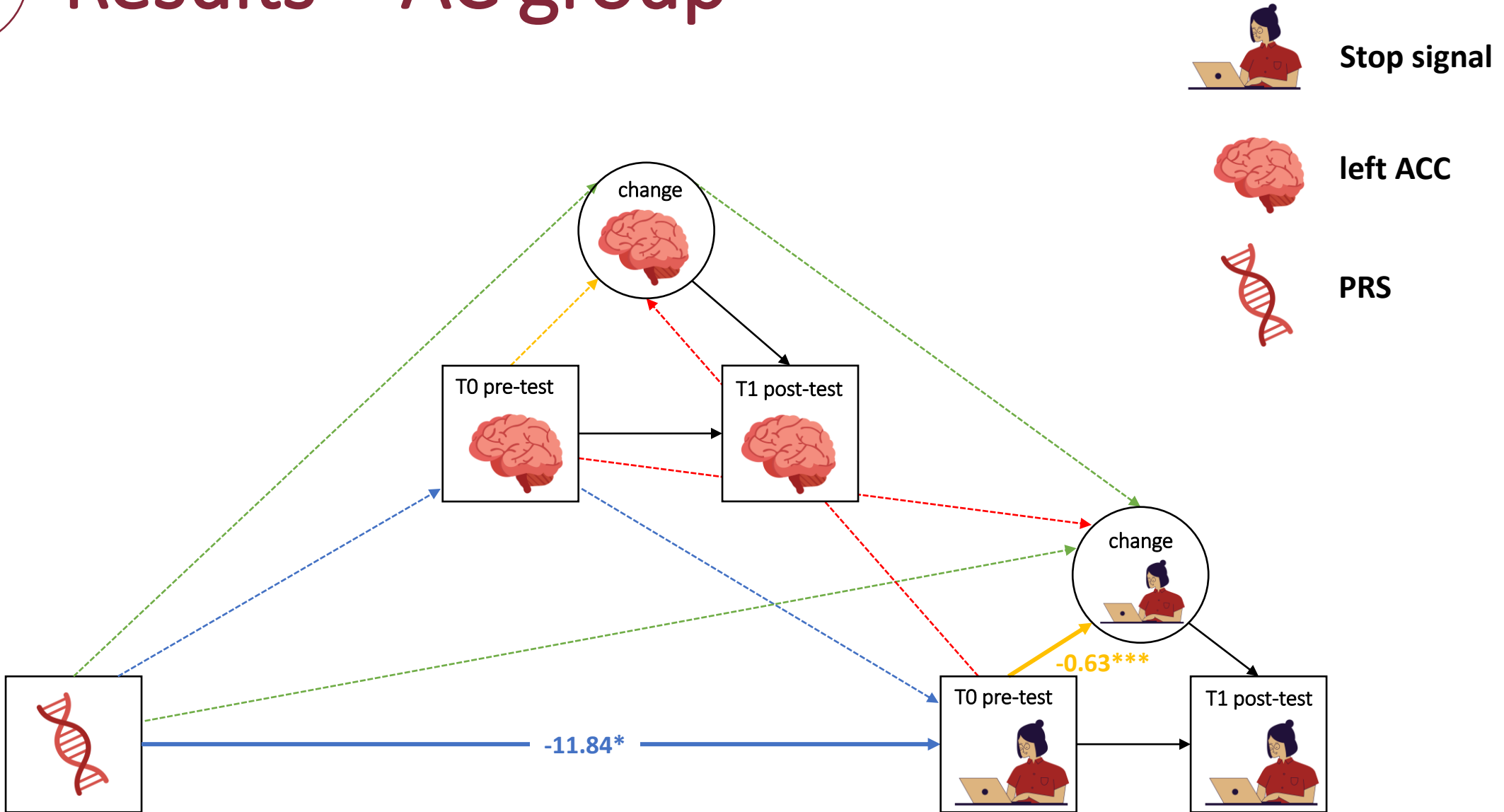
Results



3 Results – IC group



3 Results – AC group





Take-home message

1. Training-relative cognitive changes depends on the interrelation of factors at different levels:

- molecular (genetics),
- neural (basal and change of grey matter volumes)
- and cognitive (basal level)

2. Structural Equation Models are a great tool for multilevel longitudinal data analyses



Julia Mathan
Poster 2-G-326

Poster 1-A-11

6:30pm – 7:15pm

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