

University of Groningen

The influence of sex hormones on brain lateralisation

Beking, Tess; Geuze, Reint; Groothuis, Antonius

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version

Publisher's PDF, also known as Version of record

Publication date:

2015

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Beking, T., Geuze, R., & Groothuis, A. (2015). *The influence of sex hormones on brain lateralisation*. Poster session presented at NVG Annual General Meeting 2015, Soesterberg, Netherlands.

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

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.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

Sex hormones & brain lateralisation - Research Program -



T. Beking¹, R.H. Geuze¹, B.P.C. Kreukels² & A.G.G. Groothuis³

¹ University of Groningen (Clin. & Dev. Neuropsychology), ²Center of Expertise on Gender Dysphoria Amsterdam and ³University of Groningen (Behavioural Biology)

Introduction

There is long standing debate to what extent variation in lateralisation between and within individuals is due to early or late exposure to sex hormones. The relation between sex hormone exposure and functional lateralisation will be investigated as follows:

1. Correlate existing data on prenatal hormone exposure with brain lateralisation in healthy children of 15 years
2. Analyze brain lateralisation in individuals with Gender Dysphoria (GD) before and after hormone treatment

Hypotheses

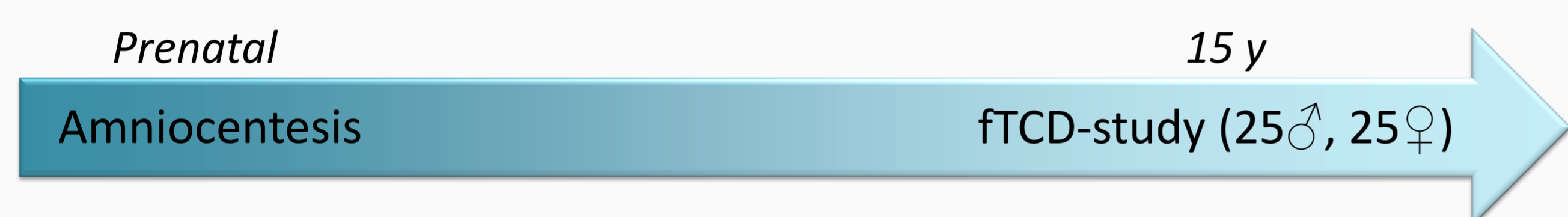
1. Prenatal testosterone masculinizes strength and direction of lateralisation¹
2. Hormone treatment influences strength and direction of lateralisation towards the experienced gender in individuals with GD

Method

Prenatal hormones

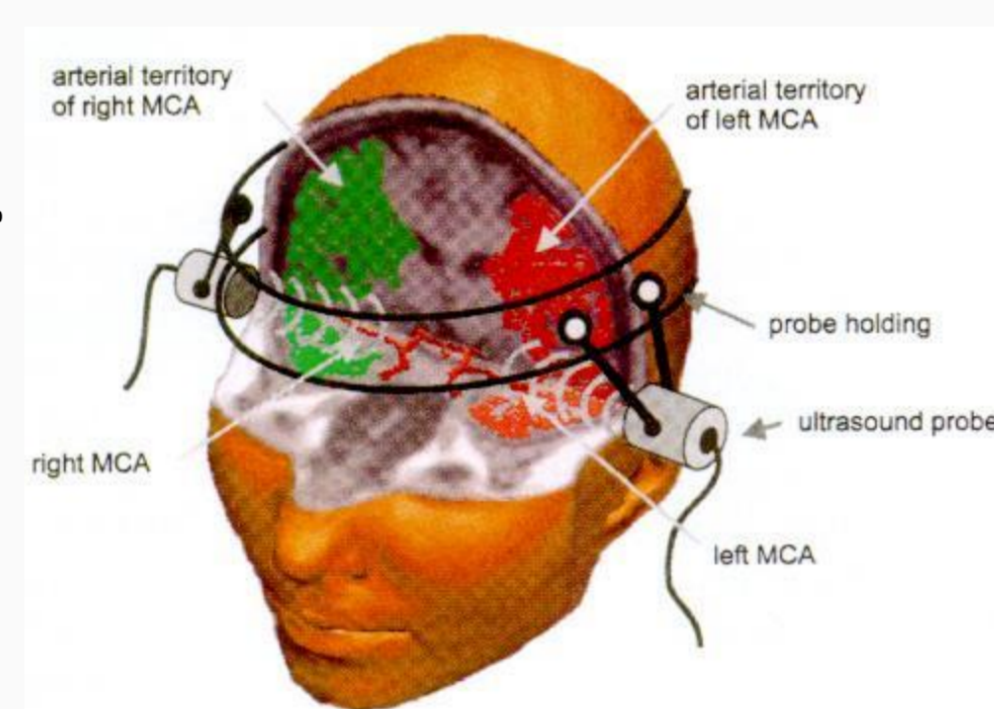
Amniocentesis was performed within the 14th-19th week of pregnancy, the same period as brain lateralisation is assumed to be modulated by the influence of steroid hormones. The children born from these pregnancies are 15 years old now.

Subjects



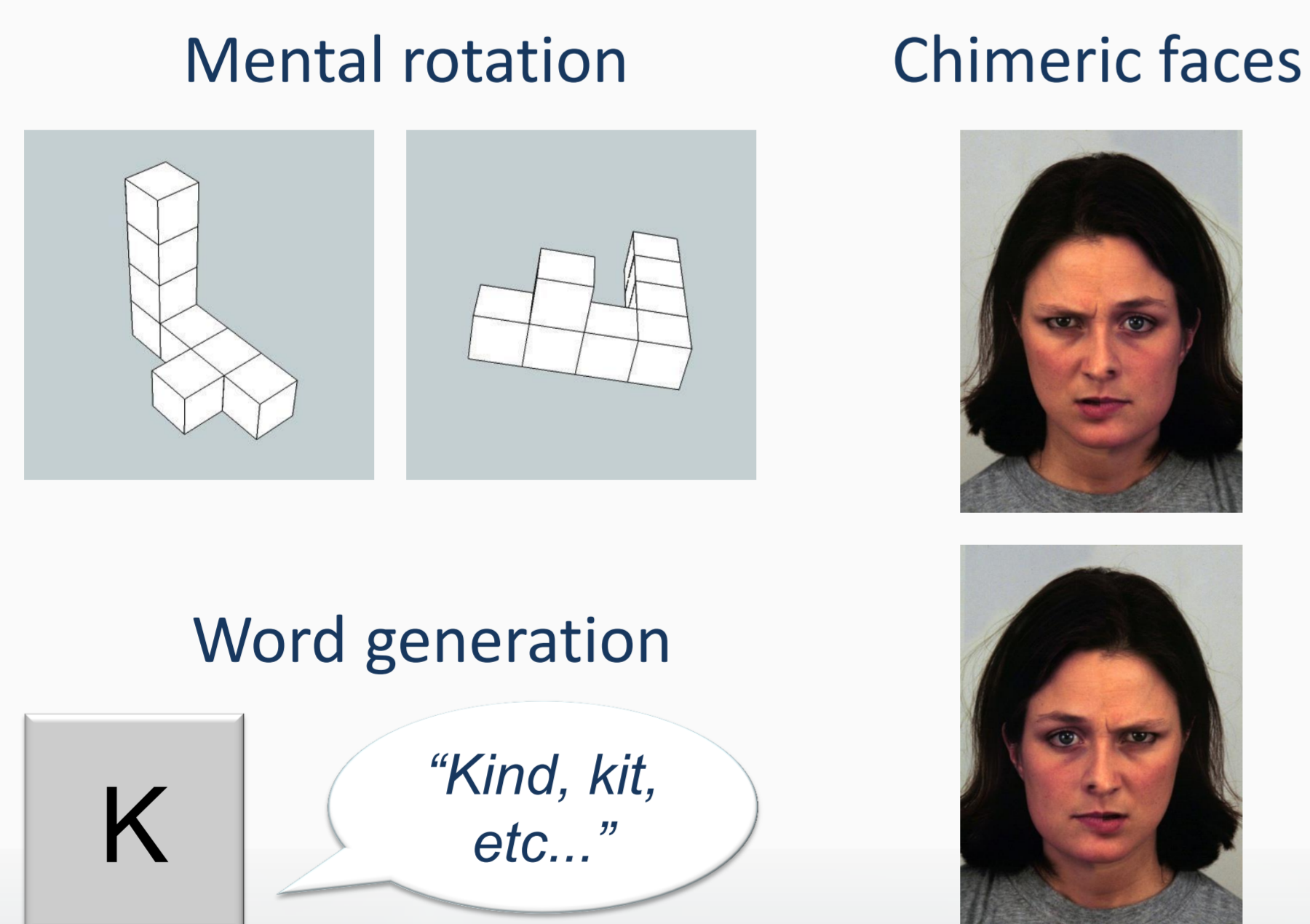
fTCD

Brain lateralisation will be measured with functional Transcranial Doppler sonography. fTCD measures the difference between the left and right hemisphere in blood flow velocity in the Middle Cerebral Arteries during a cognitive task.



Tasks

Individual strength and direction of lateralisation will be assessed during 3 tasks:



Additional data

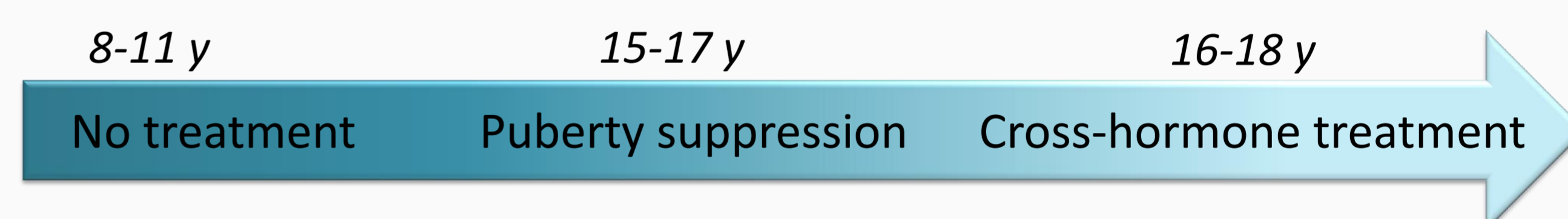
- Current hormone levels
- Handedness
- Aggression, Empathy
- Pubertal stage, Gender identity & Sexual orientation

Hormones later in life

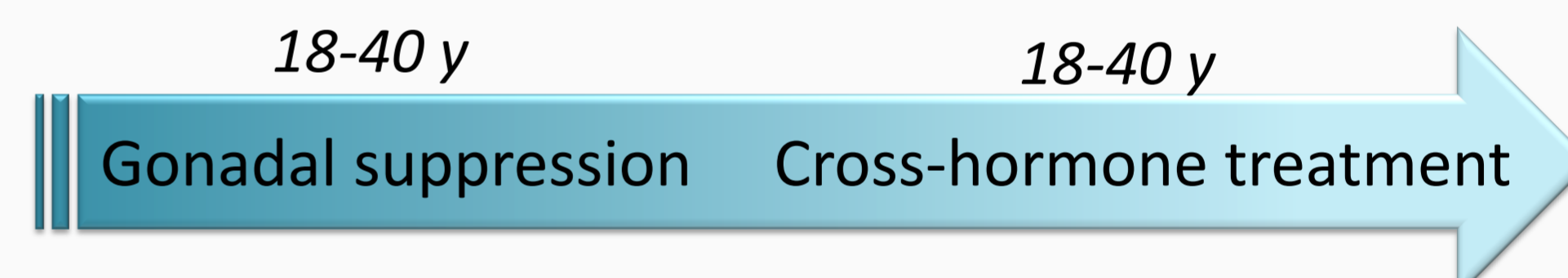
Individuals with Gender Dysphoria experience a strong incongruence between their gender identity and natal sex. Many individuals with Gender Dysphoria undergo cross-sex hormone treatment to align their body with their gender identity.

Subject groups

Treatment in adolescence:



Treatment in adulthood:



Group comparisons

The organisational effect on lateralisation: 8-11y GD vs. 8-11y controls

The effect of puberty on lateralisation: 8-11y controls vs. 15-17y controls

The effect of cross-sex hormones on lateralisation in adolescents: (GD cross-sex – GD puberty suppression) vs. controls

The effect of cross-sex hormones on lateralisation in adults: (GD cross-sex – GD gonadal suppression) vs. controls

fMRI

Brain lateralisation will be measured with fMRI.

Tasks

Word generation, Mental rotation and Facial emotion recognition.

Additional data:

- Current hormone levels
- In some cases: Diffusion Tensor Imaging, Voxel-based morphometry or Resting state connectivity

Points for Discussion

1. Suggestions for essential measurements in the "Prenatal hormones study"?
2. How to analyze lateralisation in existing fMRI-data?