



CITO Stress

A pilot study on hair cortisol as a biomarker of stress in children

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Contents

- Background
 - Stress in children
 - Difficulties of measuring stress in children
 - Cortisol
 - Hair cortisol as a new biomarker of stress in children
- Pilot study
 - Research questions
 - Design
 - Methods and procedures
- Hair cortisol in a CYHC setting
 - Veni proposal
- Discussion
- Questions or comments?

Background

- Stress in children
 - Child abuse and neglect
 - Divorce of parents
 - Illness of family
 - Illness of the child
 - Growing up in poverty
 -
 - Achievement tests
- Accumulation of stress in the lower SES groups
- Health effects
 - Short run
 - Long run



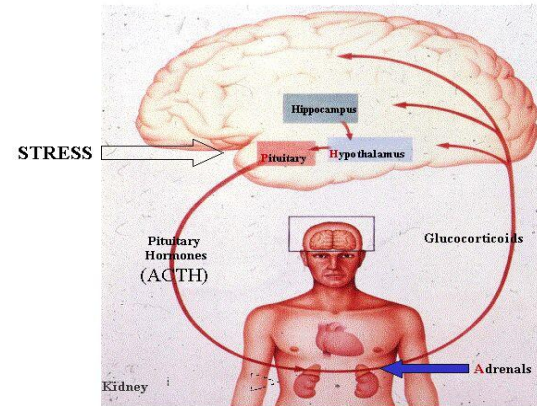
Background

- Difficulties of measuring stress in children
 - Questionnaires and observations
 - Reporting bias
 - Which children are affected most?

	Not True	Somewhat True	Certainly True
Considerate of other people's feelings	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Restless, overactive, cannot stay still for long	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Often complains of headaches, stomach-aches or sickness	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shares readily with other children (treats, toys, pencils etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Often has temper tantrums or hot tempers	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Rather solitary, tends to play alone	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally obedient, usually does what adults request	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many worries, often seems worried	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Helpful if someone is hurt, upset or feeling ill	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Constantly fidgeting or squirming	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Has at least one good friend	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Often fights with other children or bullies them	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often unhappy, down-hearted or tearful	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Generally liked by other children	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Easily distracted, concentration wanders	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Nervous or clingy in new situations, easily loses confidence	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Kind to younger children	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Often lies or cheats	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Picked on or bullied by other children	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Often volunteers to help others (parents, teachers, other children)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Thinks things out before acting	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Steals from home, school or elsewhere	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gets on better with adults than with other children	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Many fears, easily scared	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sees tasks through to the end, good attention span	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Cortisol

- Biomarker of stress response
- “fight or flight” mechanisms (acute stress)
- Saliva
- Urine
- Blood
- Hairs



Hair cortisol

- Relatively new biomarker of stress
- Advantages
 - Non-invasive
 - Not affected by day to day conditions
 - Chronic stress
 - Intra- and inter-individual differences
- Responsive enough?
- Usefulness in CYHC practice?



Pilot Study: CITO Stress

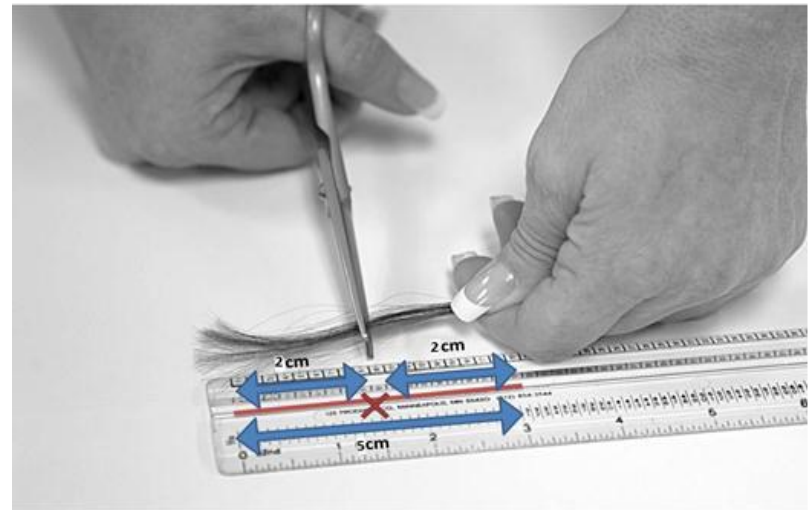


Research questions

- To what extent does the 'CITO eindtoets' affect hair cortisol concentrations (HCC)?
- Are HCC elevated in particular groups of students?
 - e.g. according to SES parents, sex, behavioral problems, other life events, subjective stress, health
- Is the effect of the 'CITO eindtoets' on HCC stronger in particular groups of students?
 - e.g. according to SES parents, sex, behavioral problems, other life events, subjective stress, health
- Are HCC associated with scores on the 'CITO eindtoets'?

Design

- Quasi-experiment
- 3 primary schools in Maastricht area
- Control group
 - ‘groep 7’, n=40
- Experimental group
 - ‘groep 8’, n=80
- At least 5 cm of hair
 - First 2 cm from the scalp represent ‘high stress’ period.
 - Most distal 2 cm represent ‘low stress’ period.



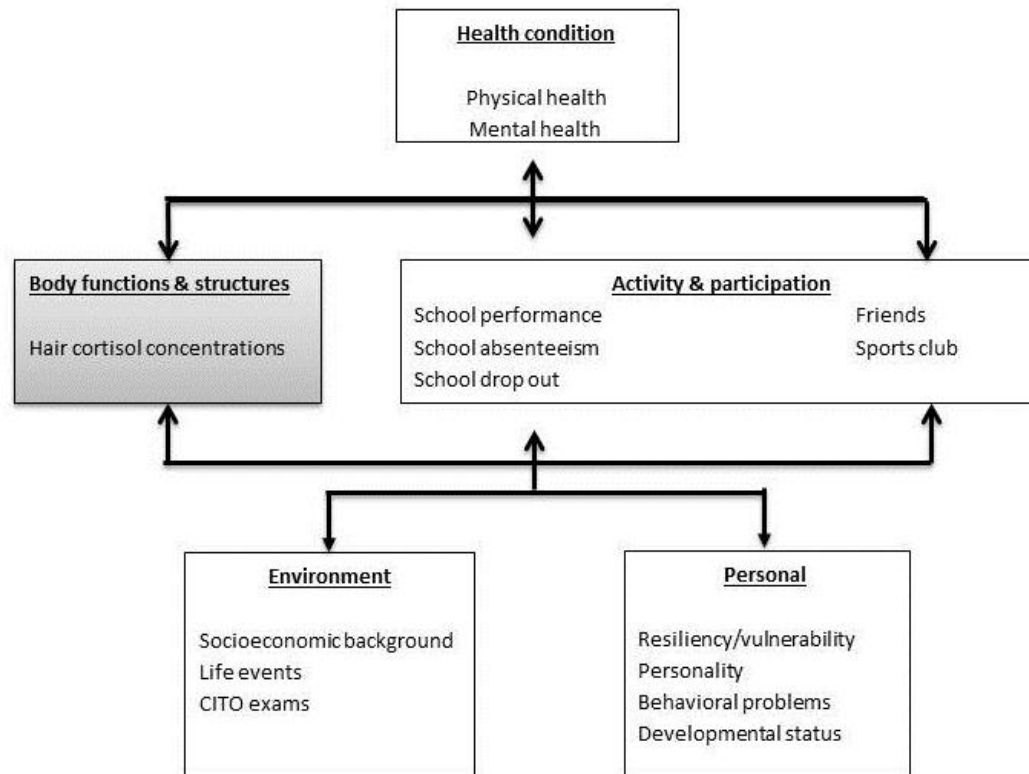
Procedures

- February 11-13, 2014: CITO eindtoets!!!
- Informed consent parents and children ≥ 12
- Parent questionnaire
 - socioeconomic background, family situation
- Questionnaire for the child
 - Life events, subjective stress
- Data from visit to GGD (groep 7)
 - E.g. SDQ, D-C:0-3
- Cutting the hairs
 - End of april/beginning of may 2014
 - 2-3 small hair strands, overall diameter approx. half a pencil
- Biochemical analyses of hair samples
 - University of Amsterdam
- Comparing HCC
 - Low stress vs high stress, groep 7 vs groep 8, low SES vs high SES, boys vs girls, etc

Hair cortisol in a CYHC setting

“When CYHC professionals are able to use children’s hair cortisol as an additional biomarker of stress, they will be better equipped to - in an early phase – detect and monitor children most affected by stressors”

ICF-CY



Veni proposal



To study:

1. Environmental, personal, and health-related determinants of HCC in children at the transition from primary to secondary school
 - Pilot study

2. The relation between HCC and future health outcomes and school performance
 - Follow up of children from primary school into secondary education

Veni proposal



Netherlands Organisation for Scientific Research

3. Whether HCC is related to concurrent measures of stress and psychosocial problems
 - Collection of hair samples in children presented with psychosocial problems in CYHC
 - SDQ/CBCL vs HCC
4. Whether HCC is responsive to the effect of stress-reducing interventions in CYHC
 - Follow-up of children presented with psychosocial problems in CYHC
 - Collection of hair samples after one year.
5. The ethical and practical issues related to the use of HCC in CYHC
 - Semi-structured interviews with CYHC professionals and parents
 - Privacy, medicalisation, stigmatisation, user friendliness, feasibility.

Discussion

- Pilot study
 - Are enough children and parents willing to participate (power)?
 - Is hair cortisol really responsive enough to find an effect of the CITO toets?
- HCC in a CYHC setting
 - Are CYHC professionals willing to participate?
 - Cost-effectiveness?
 - Practical?
 - Ethical?

Thank you for your attention!

