VELFÆRDSTEKNOLOGISKE LØSNINGER TIL BØRN OG UNGE MED AD(H)D

Tobias Sonne

ADHD - foreningen

AARHUS UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE

CARLSBERGFONDET

UCL

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INDEN VI STARTER...

Mine forskningspublikationer er frit tilgængelige på:
www.researchgate.net (søg på Tobias Sonne)
samt på Aarhus Universitets hjemmeside.

AGENDA

- **Introduktion**
- 'The ADHD Design Framework'
- Eksempler på velfærdsteknologiske løsninger til børn med ADHD
  - 'Calming'-støtte (ChillFish)
  - Forældretrænings-støtte (Parent Guardian)
  - Koncentrations-støtte (CASTT)
  - Søvn-støtte (MOBERO)
- Afrunding

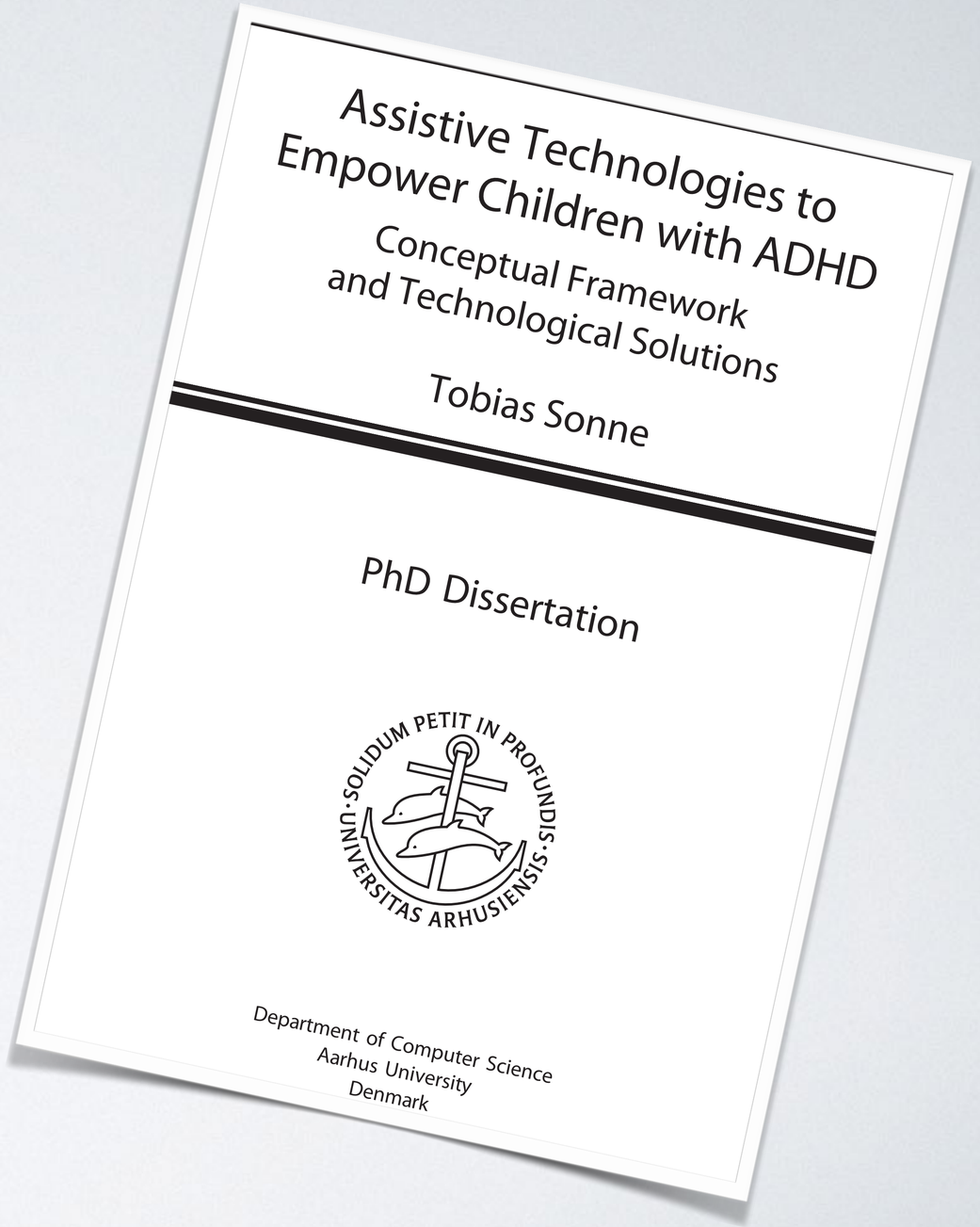
INTRODUKTION

- Hvem er jeg ?
- Hvad vil jeg snakke om idag ?
- Hvordan har jeg arbejdet med teknologistøtte til børn med ADHD ?

INTRODUKTION

Hvem er jeg?

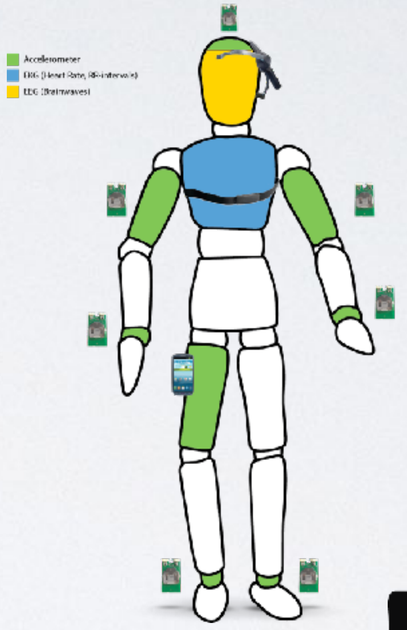
- Tobias Sonne
- Ph.d. i datalogi fra Aarhus Universitet - (teknologi støtte til børn med ADHD)
- Har indtil den 1.marts 2018 boet og arbejdet i London ved University College London
- Udover ADHD har jeg forsket I hvordan teknologi kan hjælpe med at forbedre søvnen for børn og unge 🛌
- Arbejder idag hos LEGO education



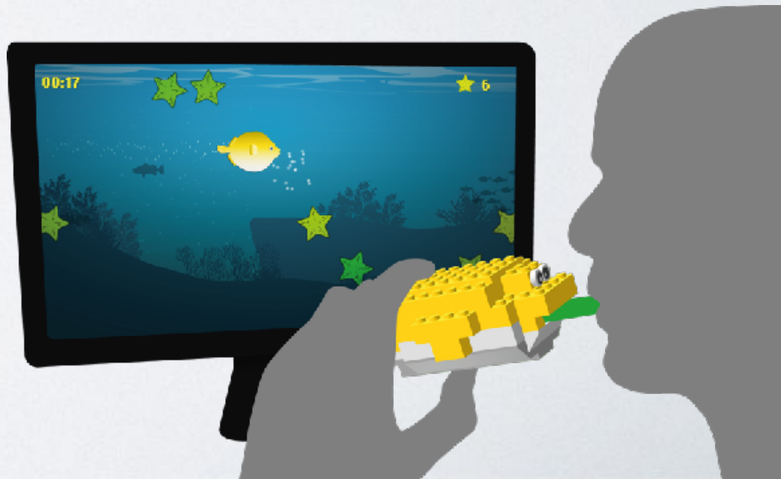
INTRODUKTION

Hvad vil jeg snakke om idag ?

- Bred indføring i de seneste strømninger indenfor teknologistøtte til ADHD området



- Min egen forskning i teknologier til børn med ADHD (koncentration, vredesudbrud og søvn)



INTRODUKTION

Hvordan har jeg arbejdet med teknologistøtte til børn med ADHD ?

Kaj Grønbæk

Institut for Datalogi,
Aarhus Universitet

Carsten Obel

Institut for Folkesundhed,
Aarhus Universitet

Per Hove Thomsen

Børne- og Ungdomspsykiatrisk
Hospital, Risskov, Aarhus

CENTER FOR ADHD

AARHUS KOMMUNE

INTRODUKTION

Hvordan har jeg arbejdet med teknologistøtte til børn med ADHD ?

Observationer, interviews, og litteratur reviews

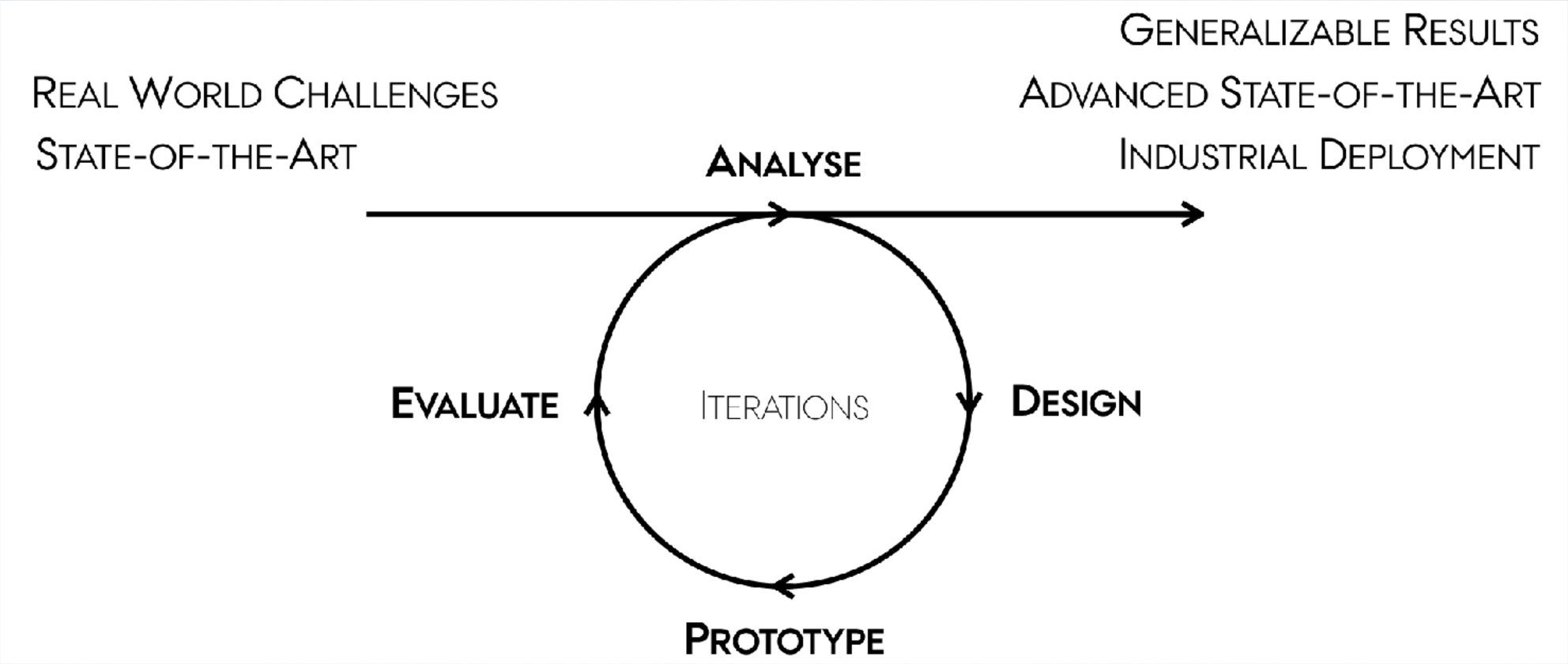
Hands-on training (Center for ADHD)

Design processer med ADHD professionelle and familier

Empiriske studier med børn med ADHD + familier.

INTRODUKTION

Hvordan har jeg arbejdet med teknologistøtte til børn med ADHD ?



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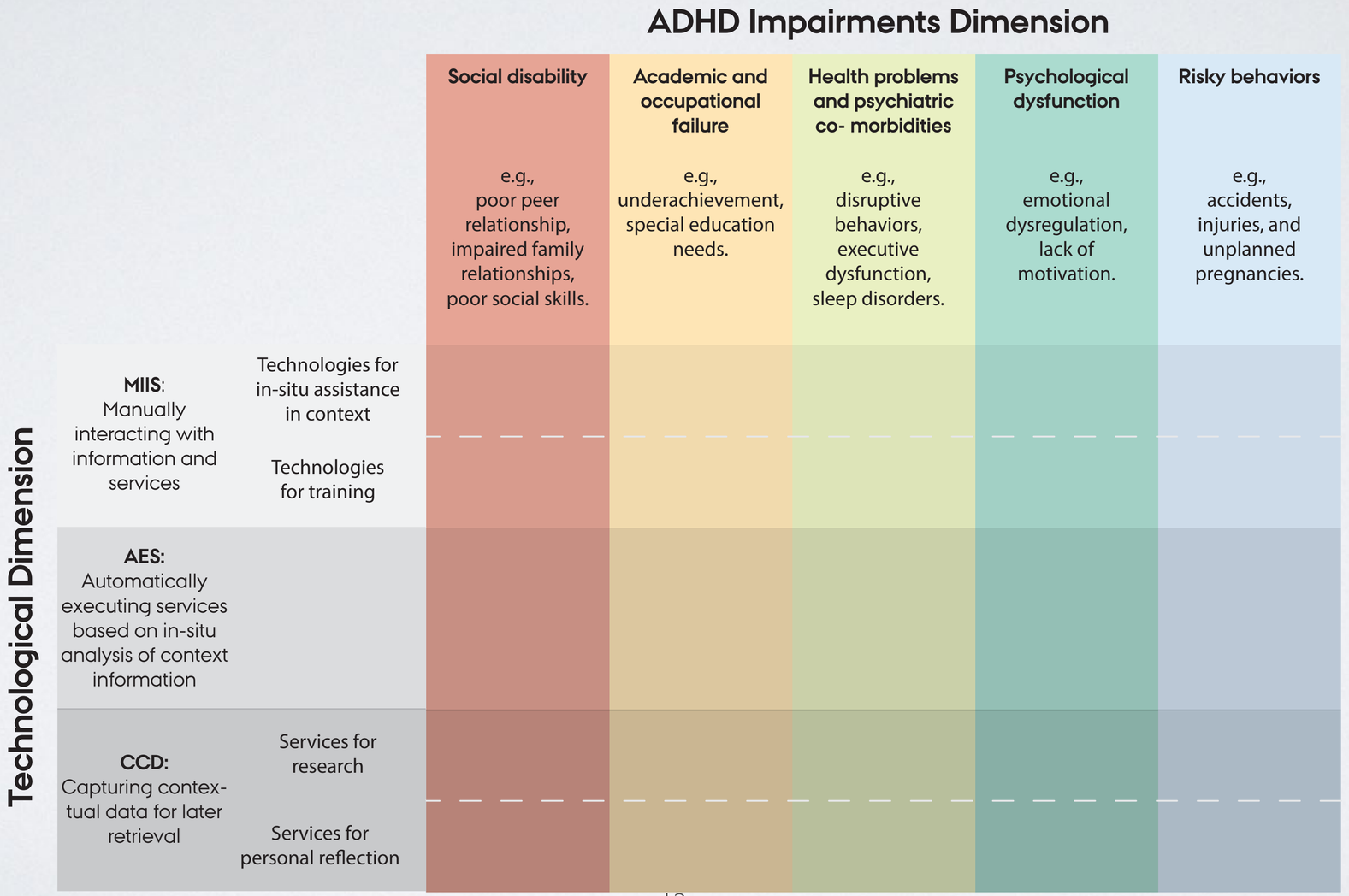
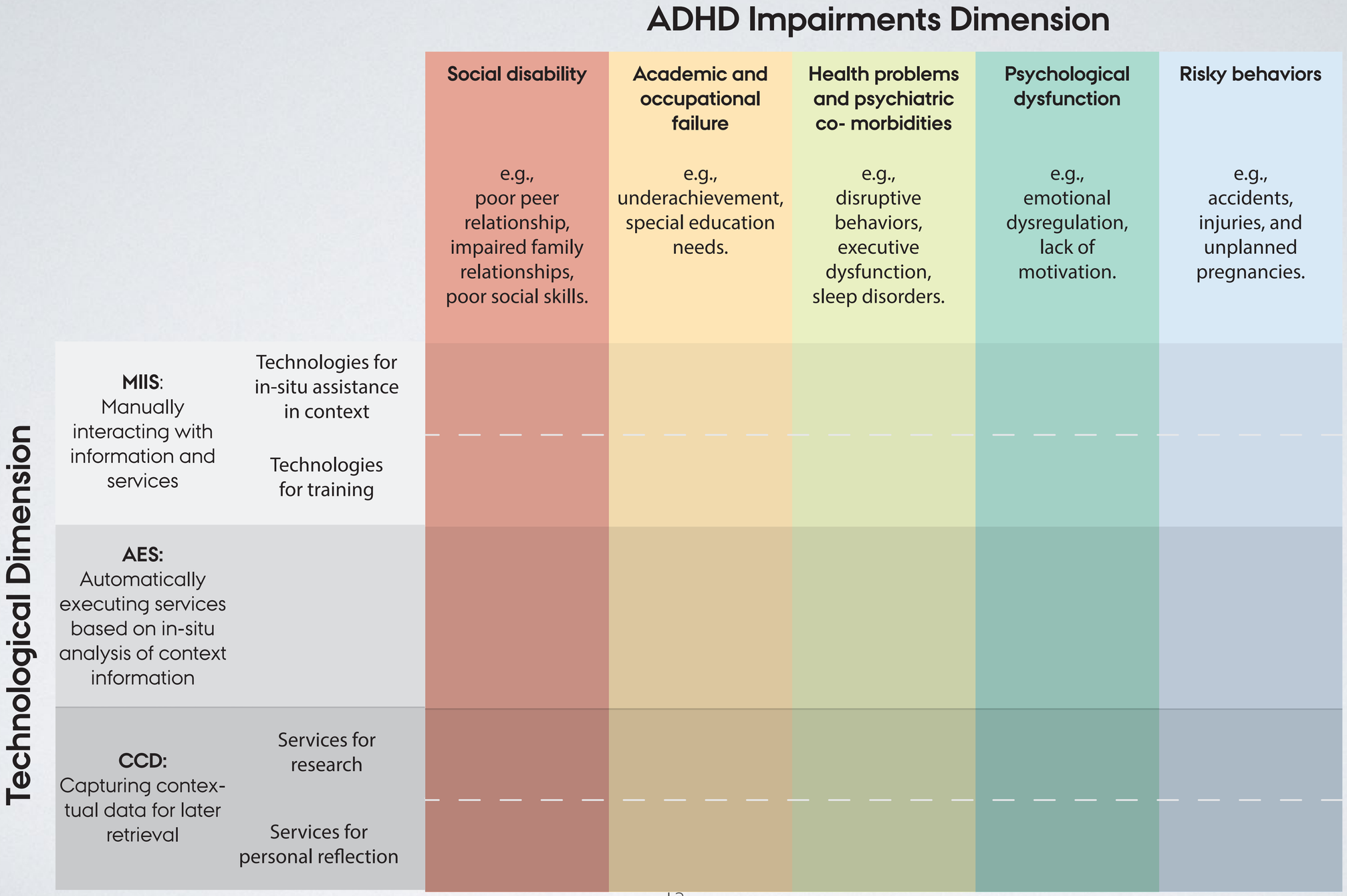
THE ADHD DESIGN FRAMEWORK




ADHD Impairments Dimension
Social disability
e.g., poor peer relationship, impaired family relationships, poor social skills.
Academic and occupational failure
e.g., underachievement, special education needs.
Health problems and psychiatric co- morbidities
e.g., disruptive behaviors, executive dysfunction, sleep disorders.
Psychological dysfunction
e.g., emotional dysregulation, lack of motivation.
Risky behaviors
e.g., accidents, injuries, and unplanned pregnancies.
Technological Dimension
MIIS: Manually interacting with information and services
Technologies for in-situ assistance in context
Technologies for training
AES: Automatically executing services based on in-situ analysis of context information
CCD: Capturing contex-tual data for later retrieval
Services for research
Services for personal reflection

ADHD Impairments Dimension

	Social disability	Academic and occupational failure	Health problems and psychiatric co- morbidities	Psychological dysfunction	Risky behaviors
	e.g., poor peer relationship, impaired family relationships, poor social skills.	e.g., underachievement, special education needs.	e.g., disruptive behaviors, executive dysfunction, sleep disorders.	e.g., emotional dysregulation, lack of motivation.	e.g., accidents, injuries, and unplanned pregnancies.

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Services for personal reflection

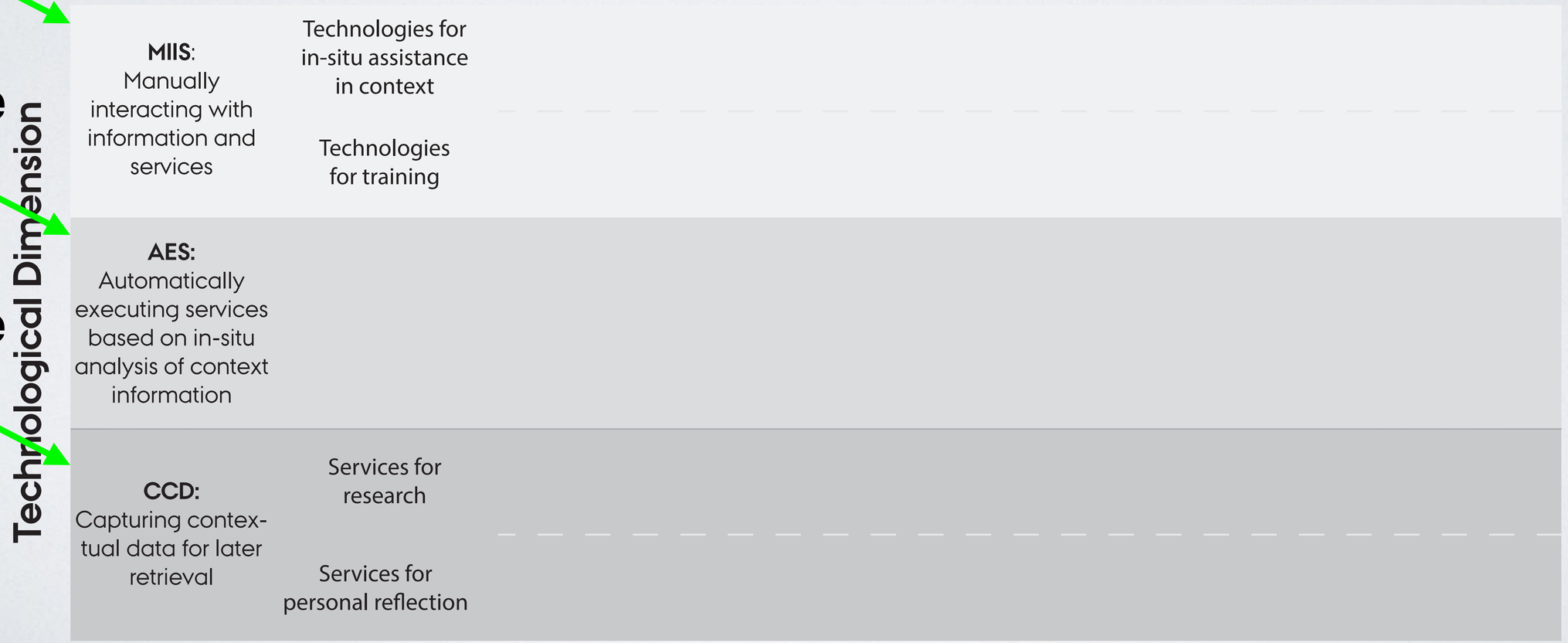
Faraone, S.V., Asherson, P., Banaschewski, T., Biederman, J., Buitelaar, J.K., Ramos- Quiroga, J.A., Rohde, L.A., Sonuga-Barke, E.J.S., Tannock, R., Franke, B., 2015. Attention-deficit/hyperactivity disorder. Nat. Rev. Dis. Primer 15020.

THE FUTURE OF ASSISTIVE TECHNOLOGIES FOR THE ADHD DOMAIN

1. bølge

2. bølge

3. bølge



THE FUTURE OF ASSISTIVE TECHNOLOGIES FOR THE ADHD DOMAIN

1. **Bølge Teknologi:** Manuel teknologistøtte
   - Brugeren starter selv interaktionen med teknologien (fx starter TimeTimer app'en)
2. **Bølge Teknologi:** Automatisk teknologistøtte
   - Teknologien starter automatisk teknologistøtten baseret på kontekst /sensor data (fx højt detektering af højt stressniveau)
3. **Bølge Teknologi:** Automatisk + intelligent og 'selvlærende' teknologistøtte
   - Teknologien starter automatisk teknologistøtten og lærer af tidligere indsamlet data for at forbedre støtten (fx analyse af tidligere indsamlet (søvn)data giver forbedret forslag til adaptiv teknologistøtte)

THE FUTURE OF ASSISTIVE TECHNOLOGIES FOR THE ADHD DOMAIN

1. bølge

2. bølge

3. bølge

Technological Dimension

MIIS: Manually interacting with information and services

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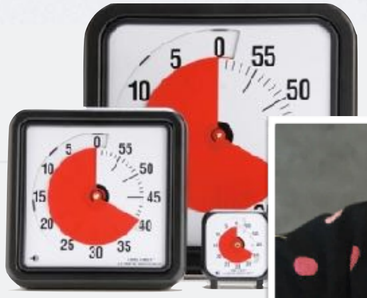

COGMED

Working Memory Training

AES: Automatically executing services based on in-situ analysis of context information

CCD: Capturing contex-tual data for later retrieval

Services for research

Services for personal reflection

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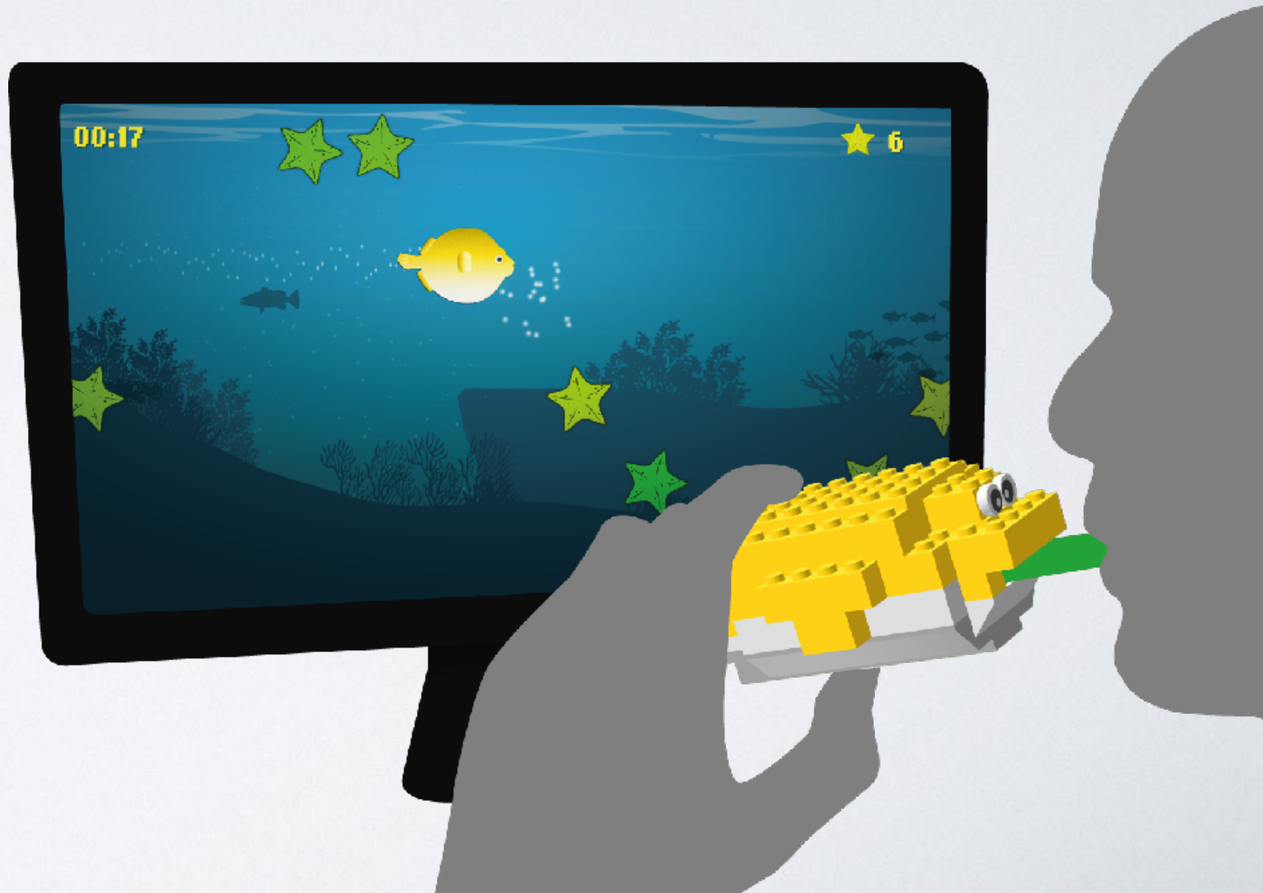
1. Bølge Teknologi

Sonne, T., & Jensen, M. M. (2016a). **ChillFish: A Respiration Game for Children with ADHD**. In Proceedings of the TEI '16: Tenth International Conference on Tangible, Embedded, and Embodied Interaction (pp. 271–278). New York, NY, USA: ACM. https://doi.org/10.1145/2839462.2839480

Sonne, T., & Jensen, M. M. (2016b). **Evaluating the ChillFish Biofeedback Game with Children with ADHD**. In Proceedings of the The 15th International Conference on Interaction Design and Children (pp. 529–534). New York, NY, USA: ACM. https://doi.org/10.1145/2930674.2935981

CHILLFISH

Calming Assistance



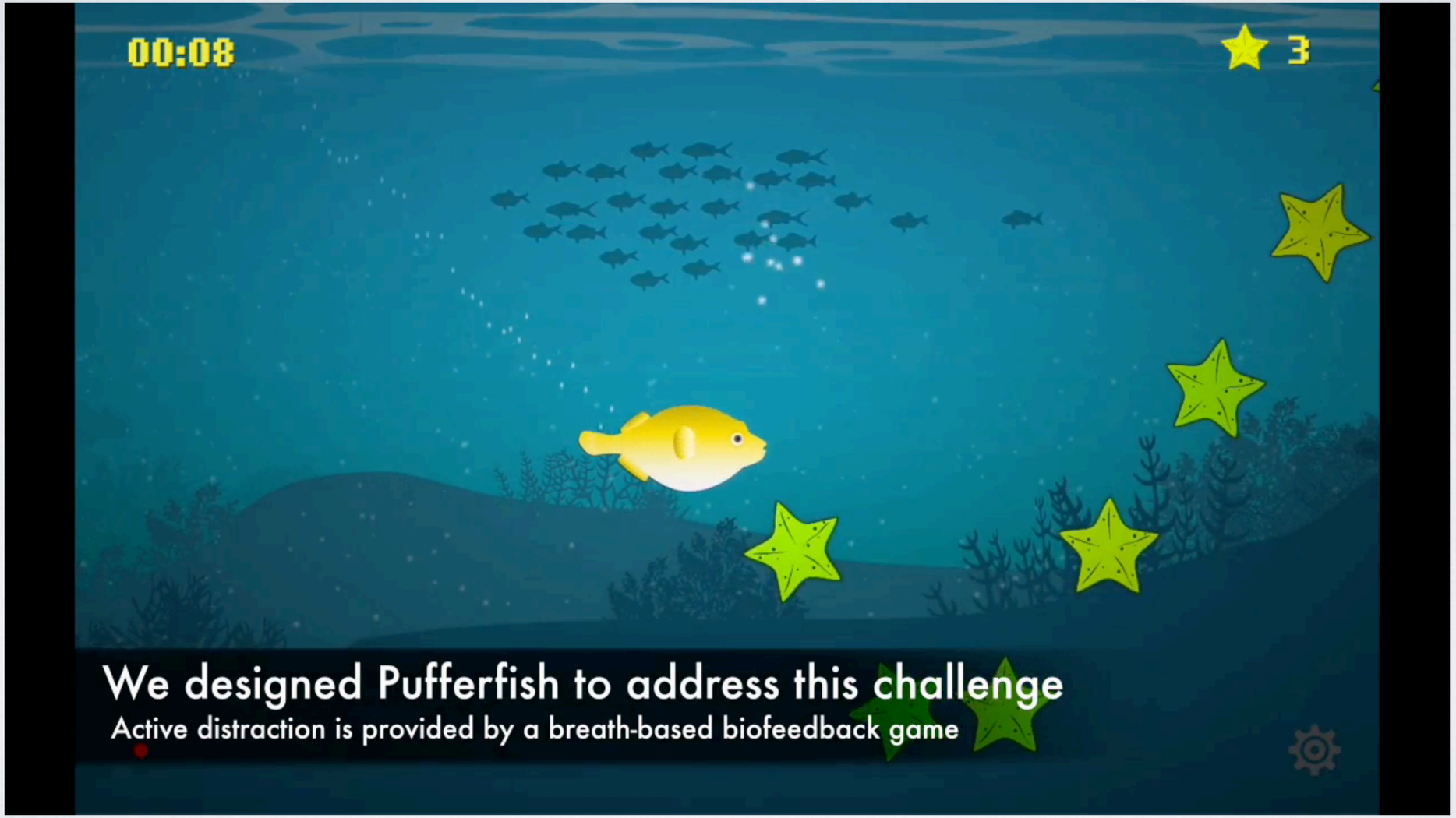
CHILLFISH

Eksisterende praksis

Åndedrætsøvelser

("luk øjnene og forestill dig
at du dufter til en rose...")

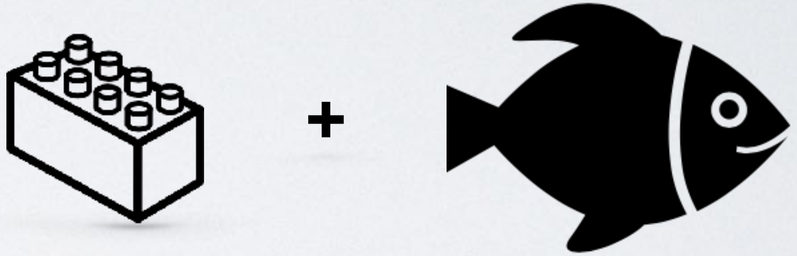
CHILLFISH (VIDEO)



CHILLFISH

Designet specielt til børn

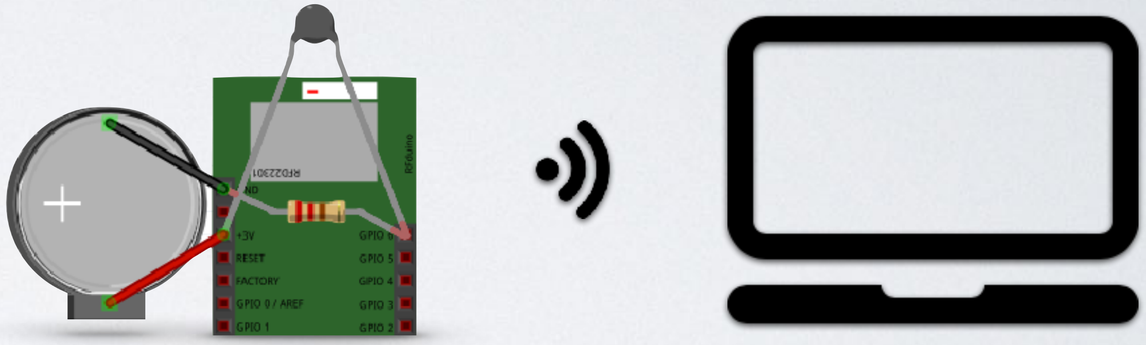
Designed for children
(Calming and playfull game experience)



Uses a tangible LEGO fish
to detect breathing patterns

CHILLFISH

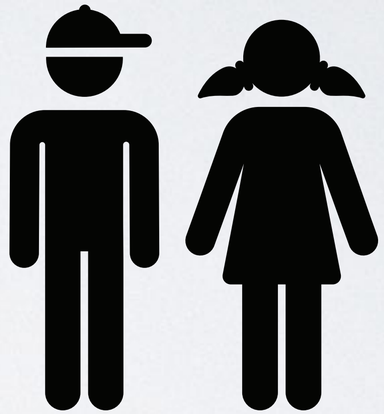
Teknisk implementering



CHILLFISH

Studier

16 voksne



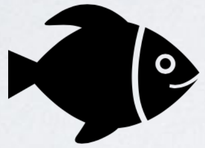
12 børn med ADHD

CHILLFISH

Study Design (1st study)

Conversation / introduction

2-4 min

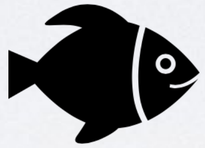


Play test: ChillFish

2 min

Play test: Pac-Man

2 min



Play test: ChillFish

2 min

Conversation / interview

2-6 min

Relaxation exercise

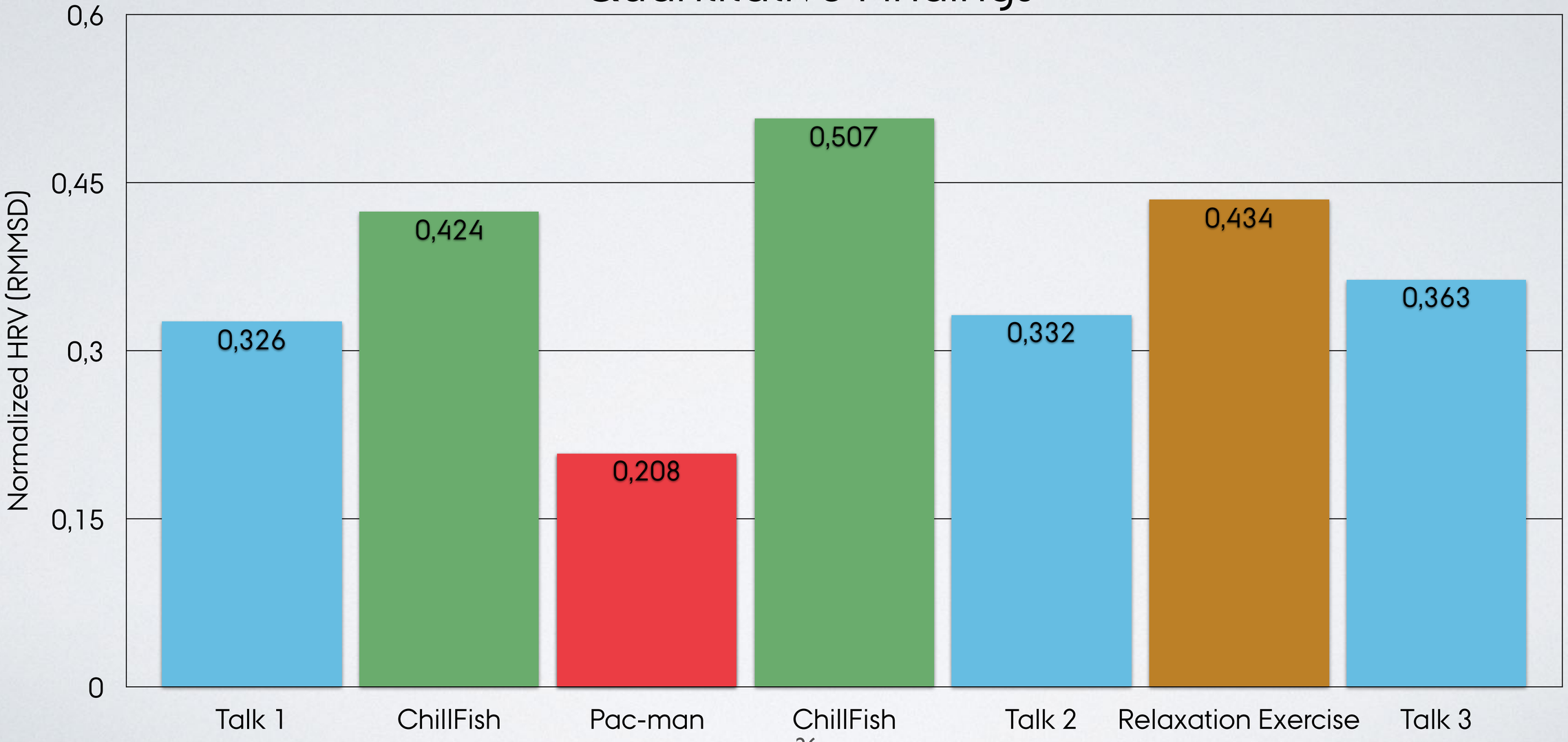
2 min

Conversation / interview

2-6 min

CHILLFISH

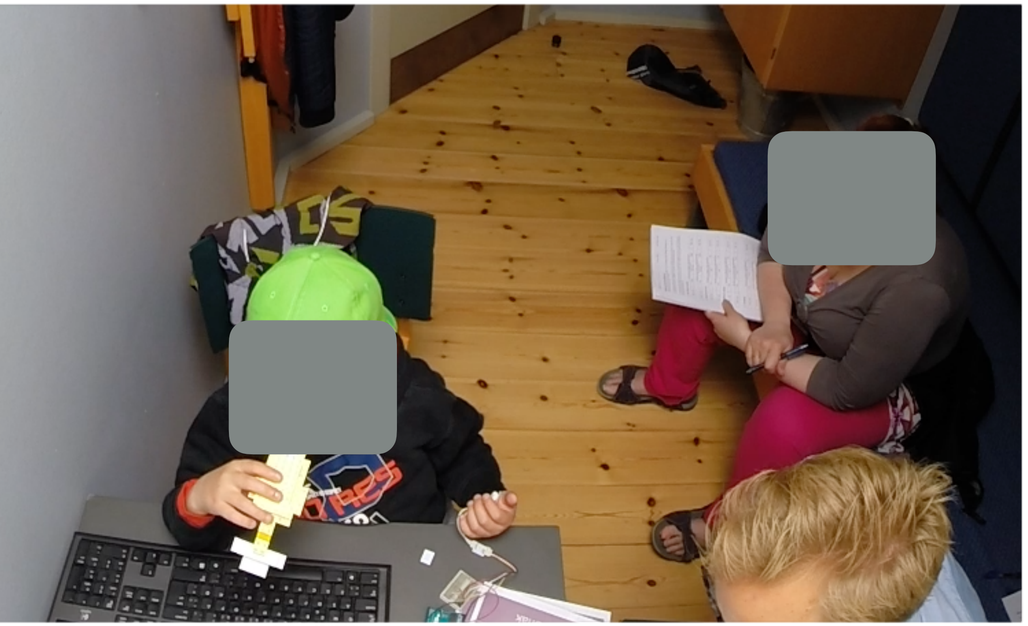
Quantitative Findings

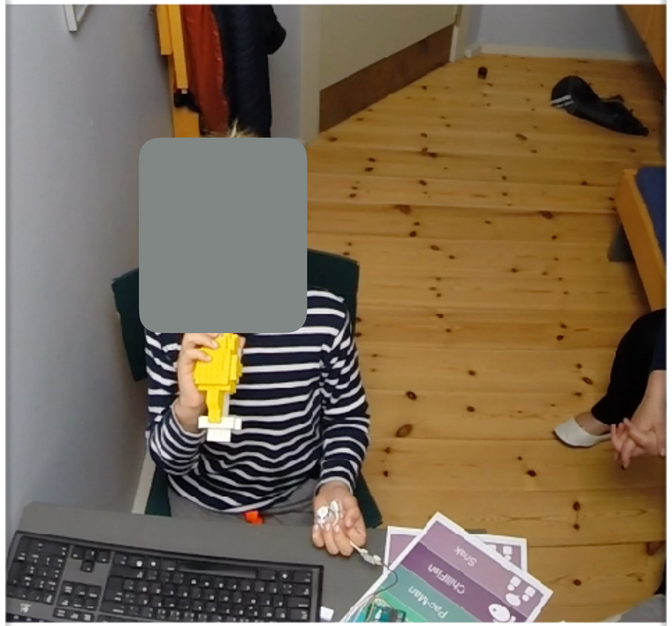


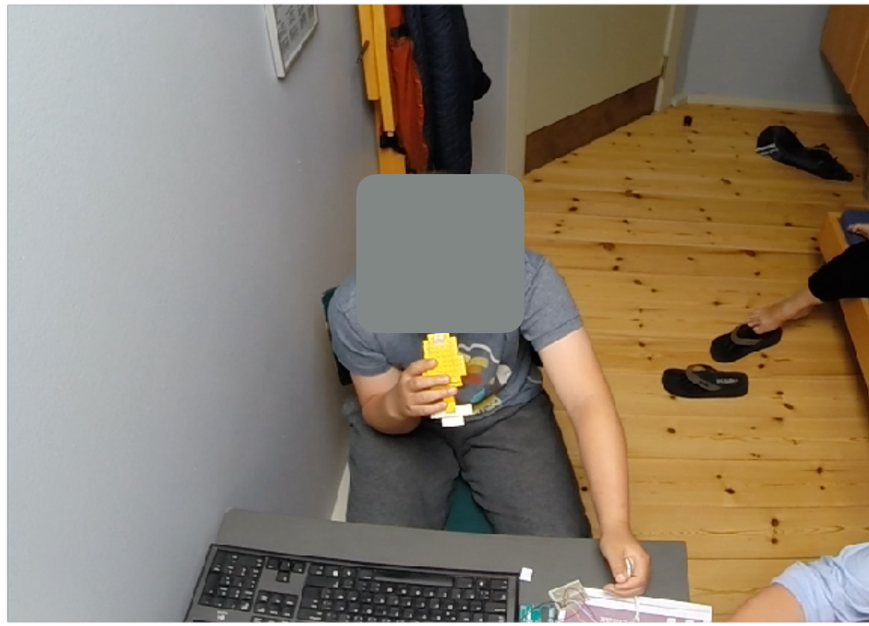
CHILLFISH

2nd study - Children with ADHD

ADHD - foreningen







CHILLFISH

Study Design (2nd study)

Participants: 12 **children with ADHD**

Procedure: Within-subject design, **six** activities, **counterbalanced**

Data collection: HRV + **EDA** + interviews + **questionnaires**

Data analysis: ANOVA + Tukey's post-hoc analysis. Affinity diagramming.

CHILLFISH

Actual Study Design (2nd study)

Participants: ~~12~~ **3 children with ADHD**

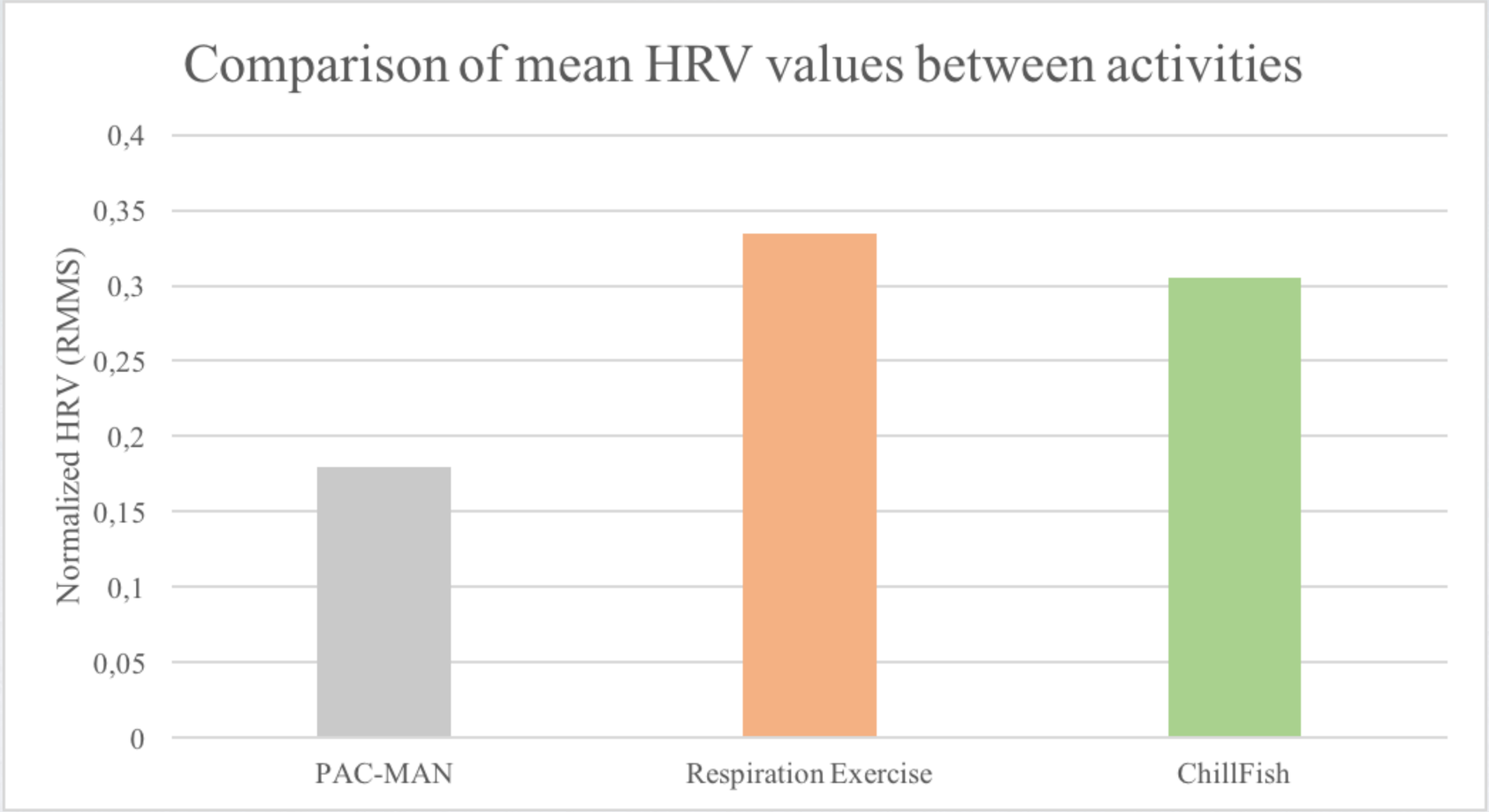
Procedure: Within-subject design, **six** activities, **counterbalanced**

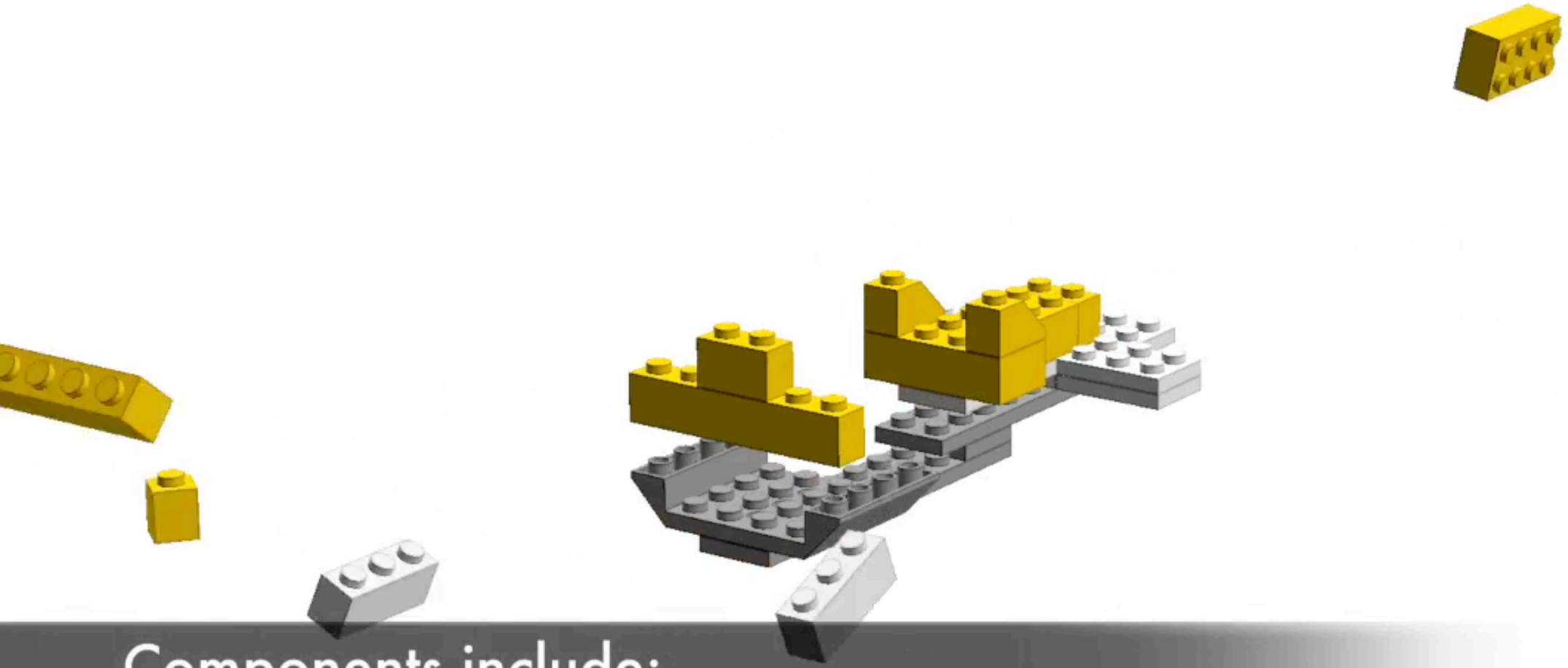
Data collection: HRV + ~~**EDA**~~ + interviews + **questionnaires**

~~Data analysis: ANOVA + Tukey's post-hoc analysis. Affinity diagramming.~~

CHILLFISH

Quantitative Findings (Children with ADHD)





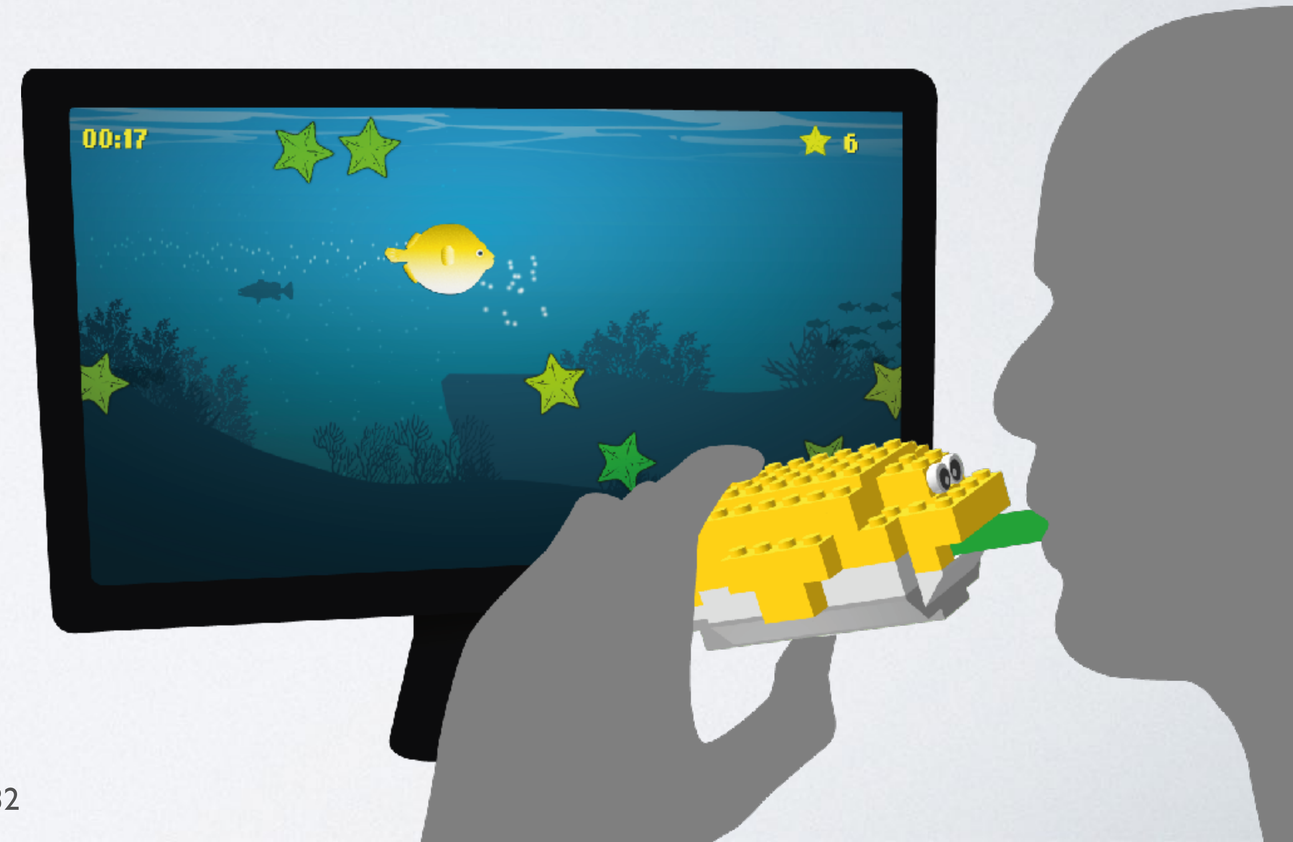
Components include:

Tangible controller made with LEGO® bricks

CHILLFISH

Opsummering

- ChillFish er det første biofeedback spil designed specifik til at hjælpe børn med ADHD til at falde til ro og slappe af.
- ChillFish er evalueret med både voksne og børn med ADHD
- ChillFish giver en ligende eller bedre afslappende effekt end en traditionelt åndedrætsøvelse.
- (Bonus) ChillFish er også testet med success på Skejby Sygehus i forbindelse med at børn fik taget blodprøver.



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2. Bølge Teknologi

PARENT GUARDIAN

Forældre(trænings)-støtte

Laura Pina, Kael Rowan, Asta Roseway, Paul Johns, Gillian R. Hayes, and Mary Czerwinski. 2014. In Situ Cues for ADHD Parenting Strategies Using Mobile Technology. In Proceedings of the 8th International Conference on Pervasive Computing Technologies for Healthcare (PervasiveHealth '14), 17–24. https://doi.org/10.4108/icst.pervasivehealth.2014.254958

PARENT GUARDIAN

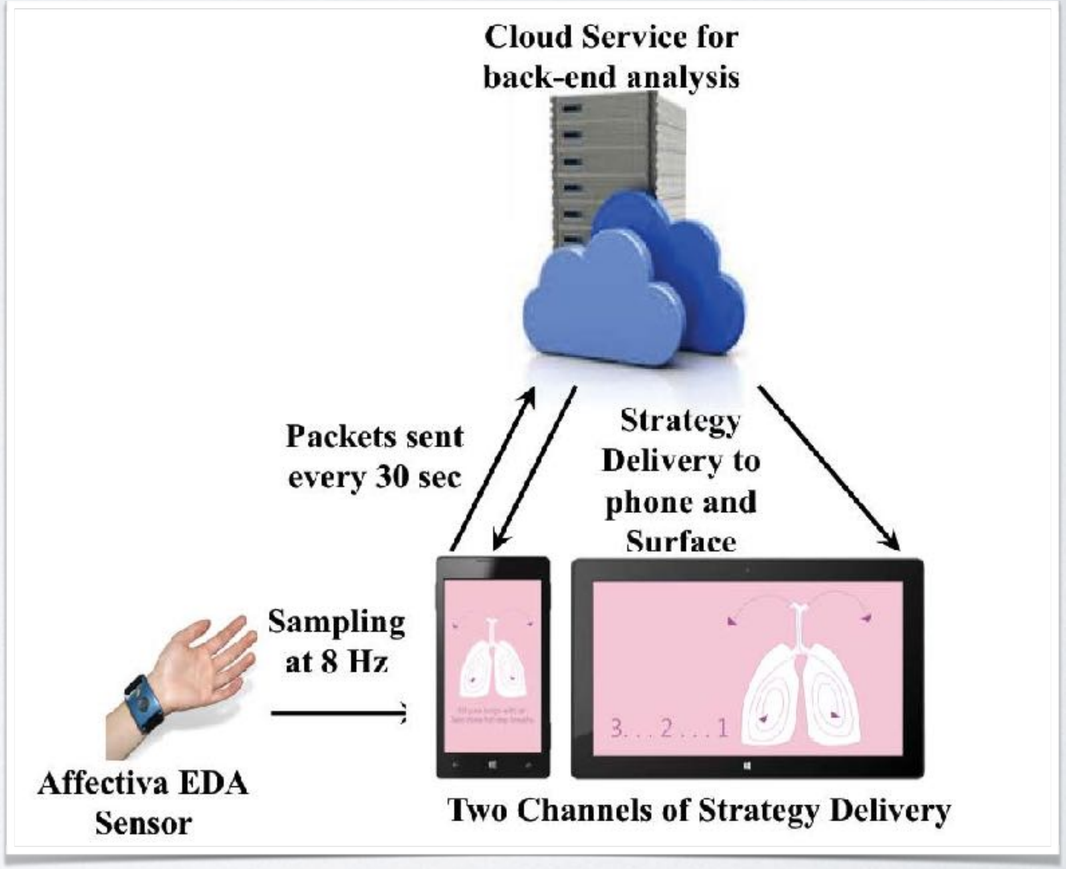
Formål

- Detektering af forældres stress-niveau via et armbånd
- Giver “in-the-heat” påmindelser om forældretræningsteknikker på telefon og tablet

PARENT GUARDIAN

Implementering

- EDA Armbånd måler stress niveau
- EDA data sendes trådløst fra armbånd til telefon hvert 8. sekund
- Data sendes til processering i skyen hver 30. sekund
- Hvis forhøjet stressniveau er detekteret, sendes en audio + visuel reminder om forældretræningsstrategi.

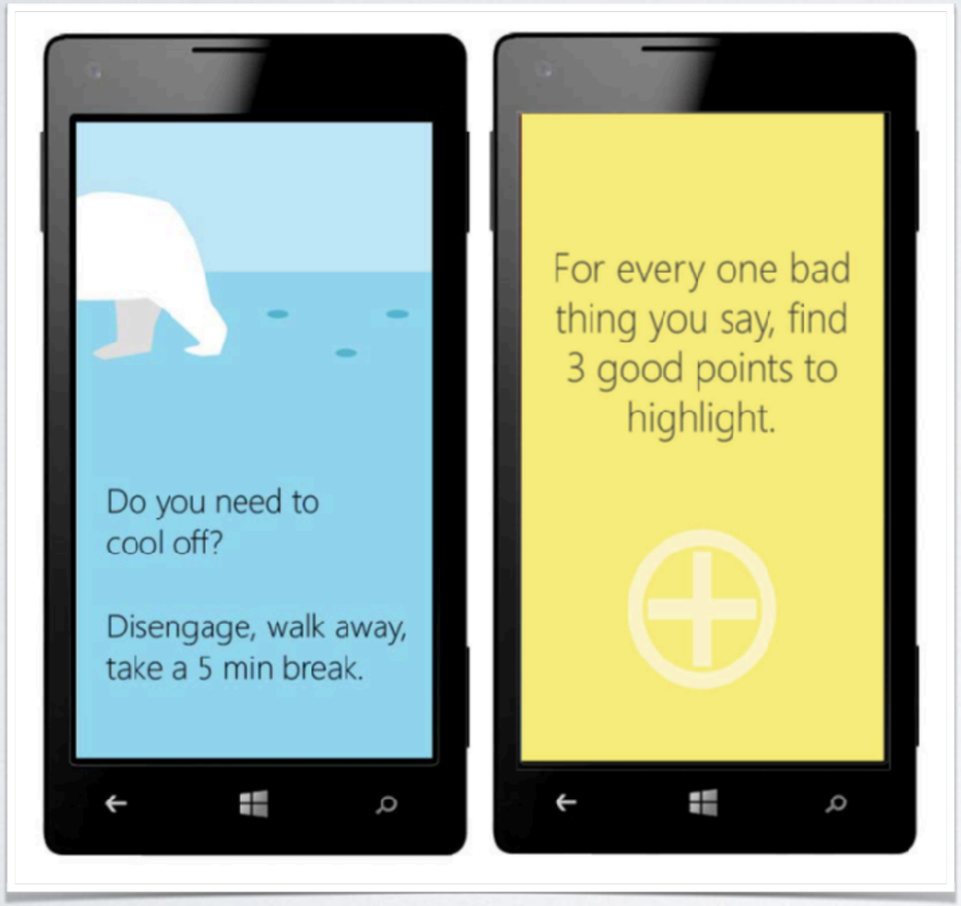


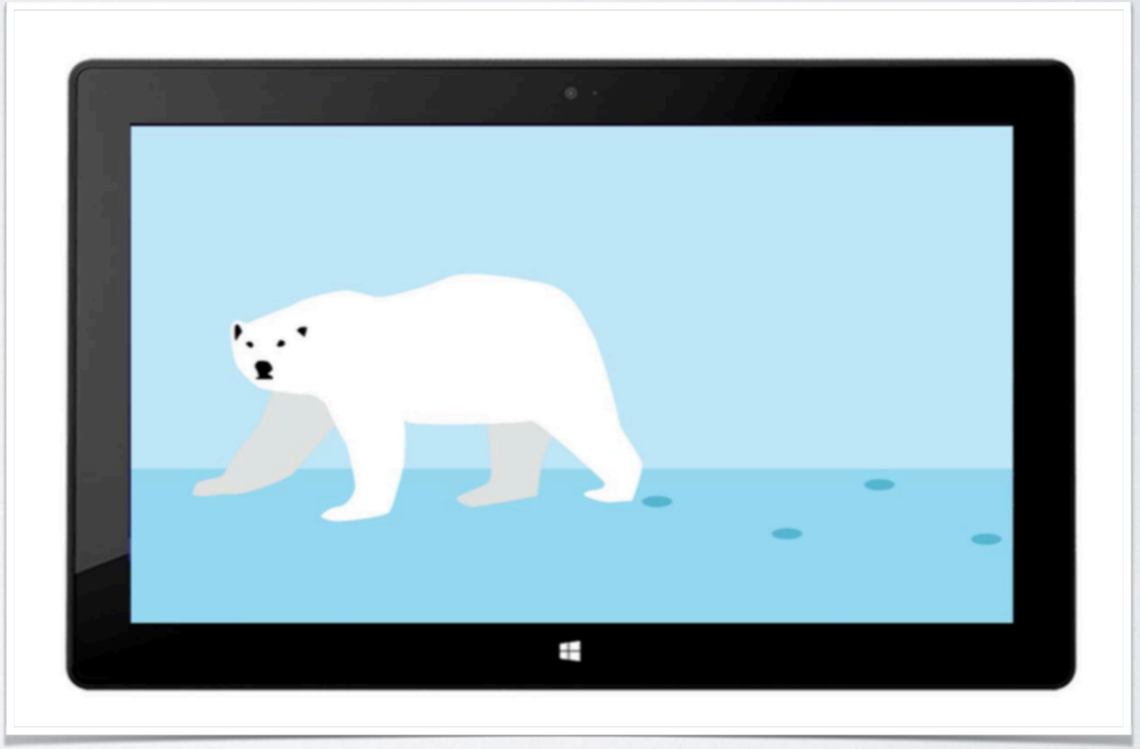
PARENT GUARDIAN

Reflective Strategies (Categorized by themes)	
Modeling Behavior	Model what you want to see
	You are your child's role mode. What do you want to teach?
★	When your child wants to show you something, show interest and ask questions. It means a lot to them.
	Give your child lots of physical affection -- children often like hugs, cuddles, and holding hands.
Planning For Consistent Behavior	Act, don't react.
	What is my plan for this situation? (What to do and say).
	Be consistent. Be predictable. Be prepared.
	Let your child know what the consequences will be if they misbehave.
	Have realistic expectations. All children misbehave.
★	If you're upset, delay the consequences until you can act on it with full reason. This also gives your child time to reflect on the incident and what the consequence should be.

Acknowledgement of positive behavior	For every one bad thing you say, find 3 good points to highlight.
	It's okay to have strong negative feelings. It's what we DO with these feelings in the moment that matters.
	Accept that you are not perfect and will make mistakes. Allow yourself "redos."
★	Think about one positive thing your child did today.
	None of us are perfect parents. Be kind to yourself.
★	Give your child descriptive praise when they do something that you would like to see more often, e.g., "Thank you for doing what I asked straight away".
	Give yourself time to unwind, every week treat yourself to something you enjoy.

PARENT GUARDIAN





PARENT GUARDIAN

Findings

“I heard my phone “ding” and I was too busy to answer it but I knew what it was and I visualized some of the prompts, mostly the “modeling” one and I went about my business then Patricia who has little messes all over the kitchen was asked to clean up after herself [...] well in this process of her cleaning she somehow is creating more messes for me and in the past I usually snap at her out of frustration but...I didn’t!!! I calmly explained how this makes more work for me and asked her to please focus on one mess at a time and get them cleaned up. It was so well received by her and I’m so proud of myself! Hopefully I can continue in this positive way.” ***<PG4, mother of two>***

PARENT GUARDIAN

Findings

"Yeah, in the car, waiting for the kids to come out of school. I know that David is going to be hyper, and I know he's going to be on-edge, and I know there's going to be something negative that happened at school, because these are givens with him. So, having the thing pop up and say, "can I help you?" and me picking through them and saying, "OK, I'll take three deep breaths."”

<PG8, mother of three>

PARENT GUARDIAN

Opsummering

- Wearable og mobilt system der giver “heat of the moment”-hjælp til at undgå/løse konflikter mellem børn og forældre.
- Kan detektere stress hos forældre via armbånd
- Når højt stress-niveau er detekteret vises en “forældretræningsstrategi” på mobil enhed og en tablet enhed (sat op som en billederamme)
- Studie viste stor tilfredshed hos forældre

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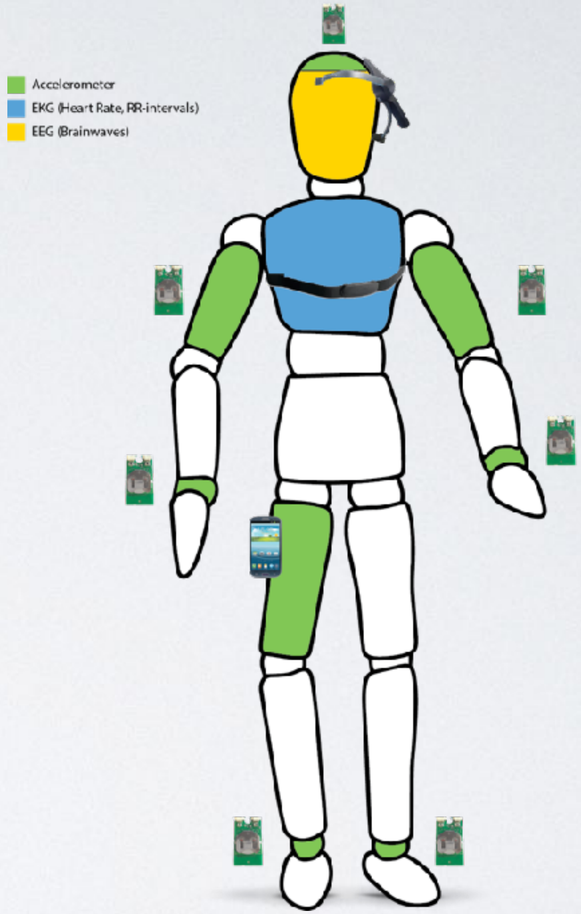
2.+3. Bølge Teknologi

CASTT

Koncentrations-støtte



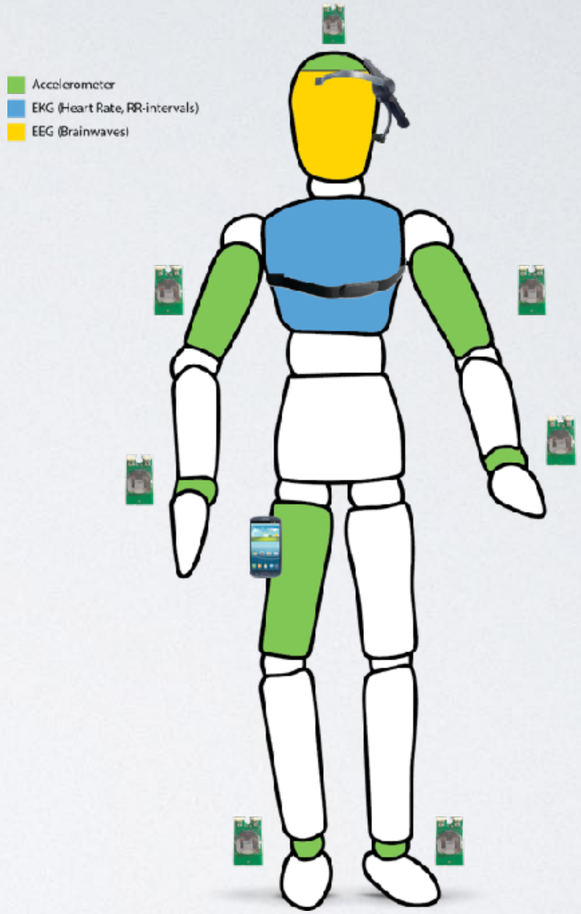
Sonne, T., Marshall, P., Obel, C., Thomsen, P. H., & Grønbæk, K. (2016). **An Assistive Technology Design Framework for ADHD**. In Proceedings of the Annual Meeting of the Australian Special Interest Group for Computer Human Interaction. New York, NY, USA: ACM.

Sonne, T., & Grønbæk, K. (2015). Designing Assistive Technologies for the ADHD Domain. In S. Serino, A. Matic, D. Giakoumis, G. Lopez, & P. Cipresso (Eds.), Pervasive Computing Paradigms for Mental Health (pp. 259–268). Springer International Publishing. https://doi.org/10.1007/978-3-319-32270-4_26

CASTT

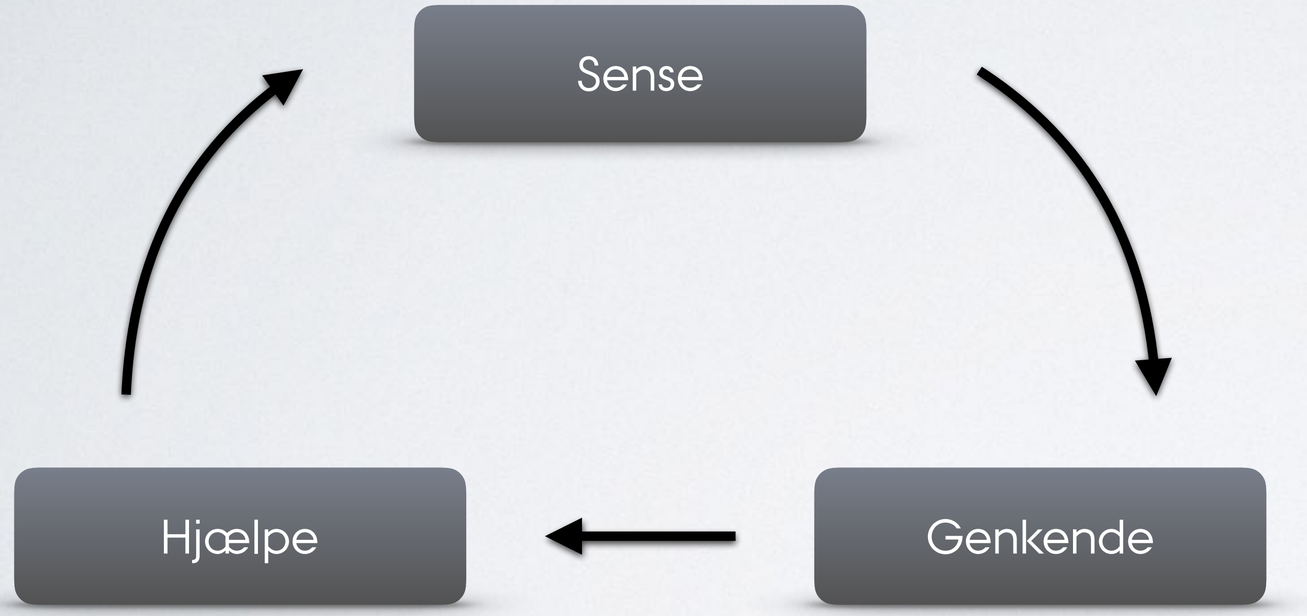
Formål

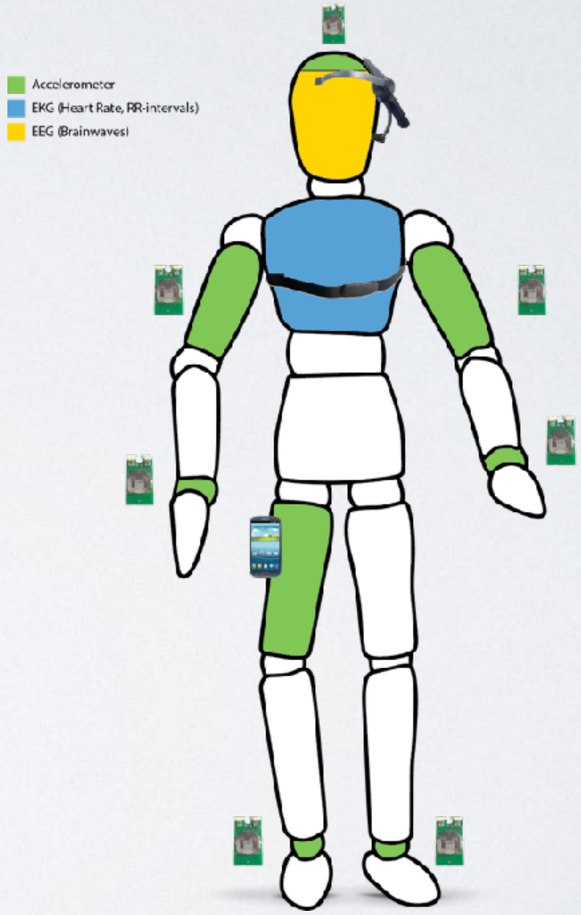
- Objektiv detektering af fysisk og fysiologisk aktivitet
- Bruge machine-learning (maskin-læring) til at genkende et udsnit af karakteristiske ADHD bevægelses-mønstre.
- **Undersøge hvordan teknologi kan støtte børn med ADHD til at vedholde og/eller genvinde koncentrationen i skolesituationer.**



CASTT

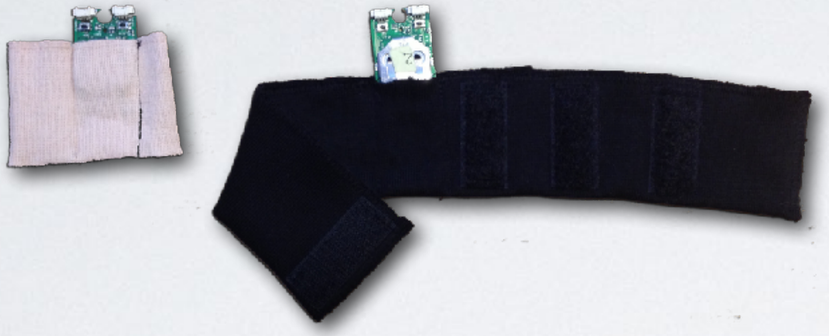
Implementering





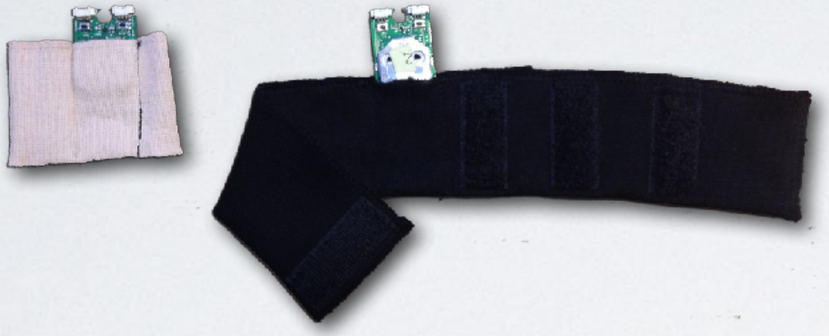
CASTT

Implementering



CASTT

Implementering



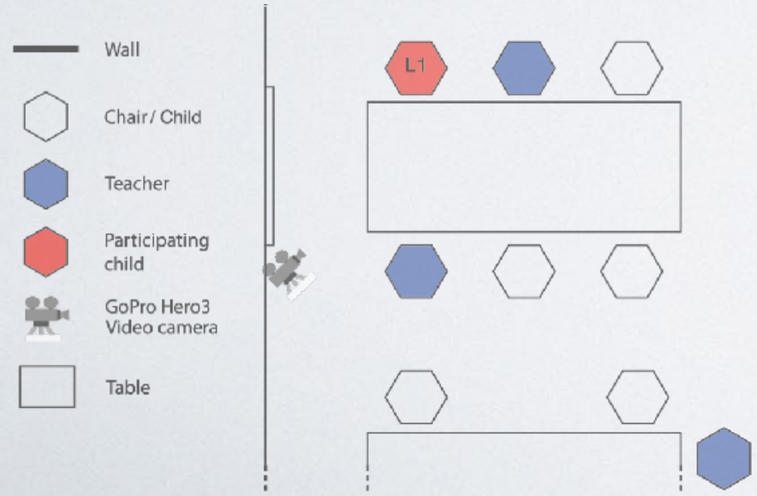
CASTT

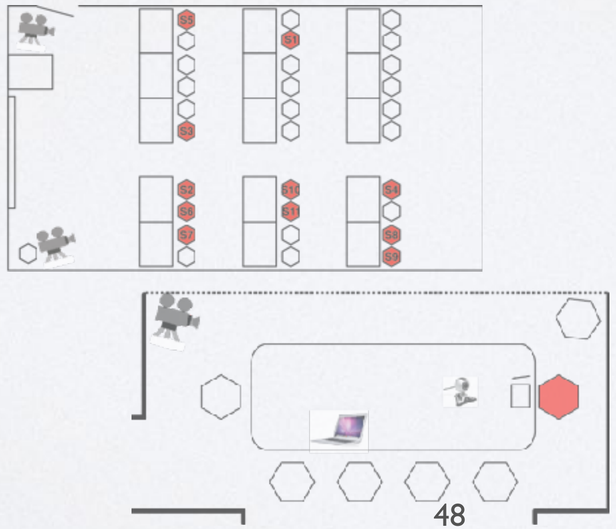
Empiriske studier

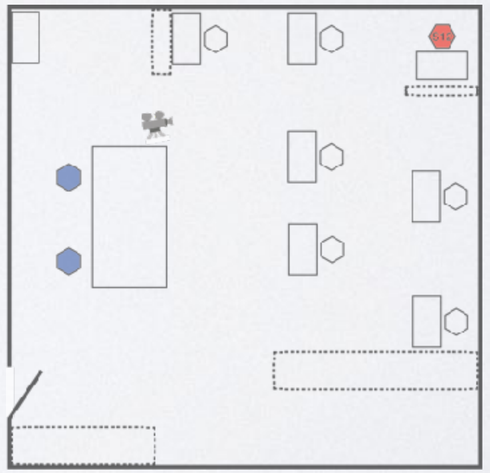
Fem forskellige skoler med:

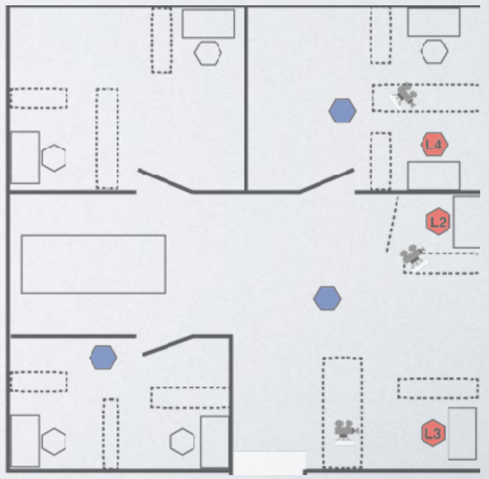
11 børn uden ADHD

6 børn med ADHD







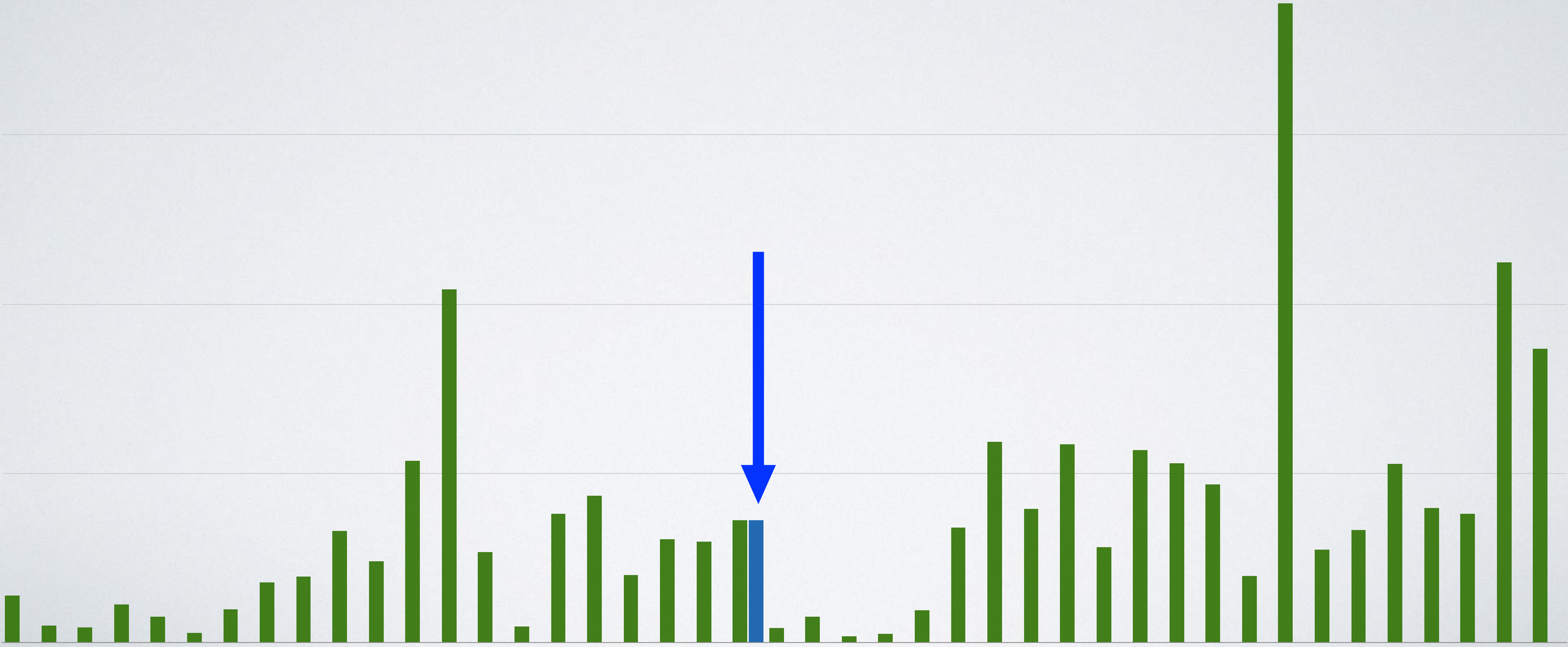


Video demo of the Child Activity Sensing & Training Tool (CASTT) Prototype

by Tobias Sonne
www.tobiassonne.com

BARNETS AKTIVITETSNIVEAU

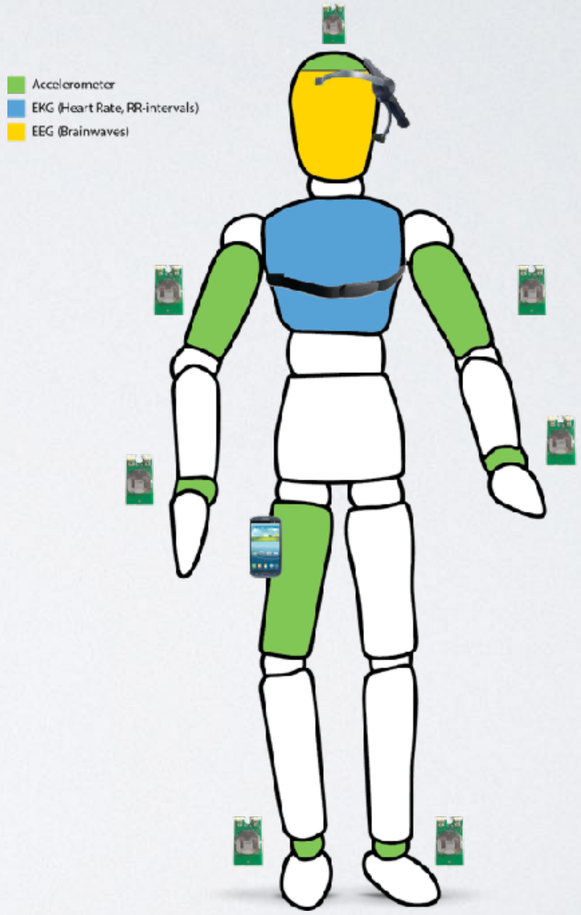
I 2 minutters Intervaller



CASTT

Opsummering

- CASTT er et wearable system som støtter børn med ADHD til at genvinde koncentrationen i skolesituationer.
- CASTT var iterativt designet og evalueret med 5 skoler med børn med og uden ADHD.
- CASTT studierne viste mulighederne for at støtte et barn med ADHD til at genvinde koncentrationen i 'kritiske' skole situationer.



AGENDA

- Introduktion
- 'The ADHD Design Framework'
- **Eksempler på velfærdsteknologiske løsninger til børn med ADHD**
  - 'Calming'-støtte (ChillFish)
  - Forældretrænings-støtte (Parent Guardian)
  - Koncentrations-støtte (CASTT)
  - **Søvn-støtte (MOBERO)**
- Afrunding

1-3. Bølge Teknologi

MOBERO

Søvn-støtte

Sonne, T., Müller, J., Marshall, P., Obel, C., & Grønbæk, K. (2016). **Changing Family Practices with Assistive Technology: MOBERO Improves Morning and Bedtime Routines for Children with ADHD**. In Proceedings of the 34th Annual ACM Conference on Human Factors in Computing Systems. New York, NY, USA: ACM.

Sonne, T., Marshall, P., Müller, J., Obel, C., & Grønbæk, K. (2016). **A Follow-up Study of a Successful Assistive Technology for Children with ADHD and Their Families.** In Proceedings of The 15th International Conference on Interaction Design and Children (pp. 400–407). New York, NY, USA: ACM.

MOBERO

Søvn problemer og ADHD

70%

of all children with ADHD have sleep problems

Anne Virring, Rikke Lambek, Per H. Thomsen, Lene R. Møller, and Poul J. Jennum. 2016. Disturbed sleep in attention-deficit hyperactivity disorder (ADHD) is not a question of psychiatric comorbidity or ADHD presentation. Journal of Sleep Research. http://doi.org/10.1111/jsr.12377

MOBERO

Søvn problemer og ADHD

Indlæring

Adfærd

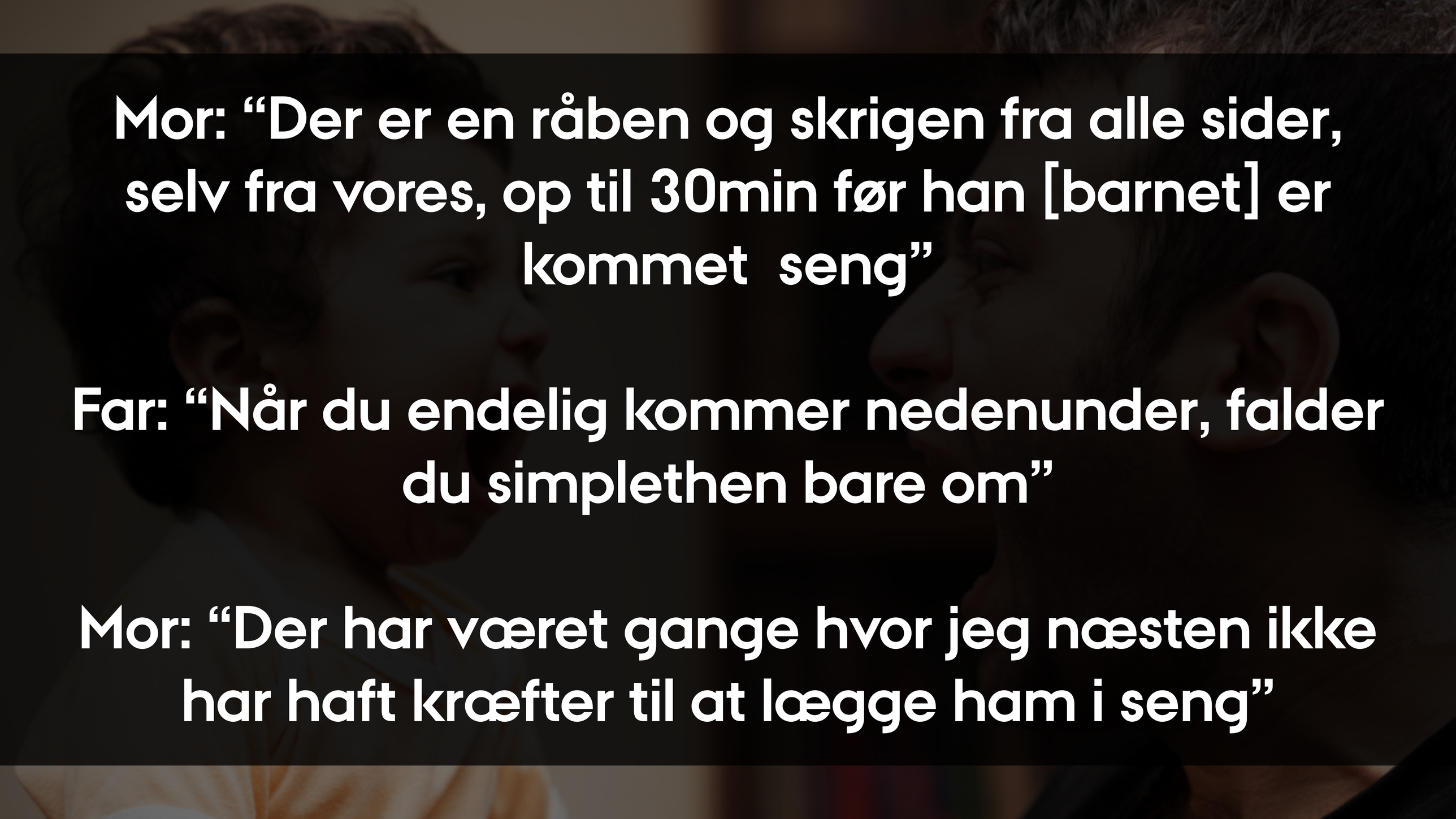
Wellbeing

Kognitive Funktioner

Cortese, S. et al. 2009. Sleep in Children With Attention-Deficit/Hyperactivity Disorder: Meta-Analysis of Subjective and Objective Studies. Journal of the American Academy of Child & Adolescent Psychiatry

Dewald, J.F. et al. 2010. The influence of sleep quality, sleep duration and sleepiness on school performance in children and adolescents: A meta-analytic review. Sleep Medicine Reviews.

Cortese, S. et al. 2009. Sleep in Children With Attention-Deficit/Hyperactivity Disorder: Meta-Analysis of Subjective and Objective Studies. Journal of the American Academy of Child & Adolescent Psychiatry



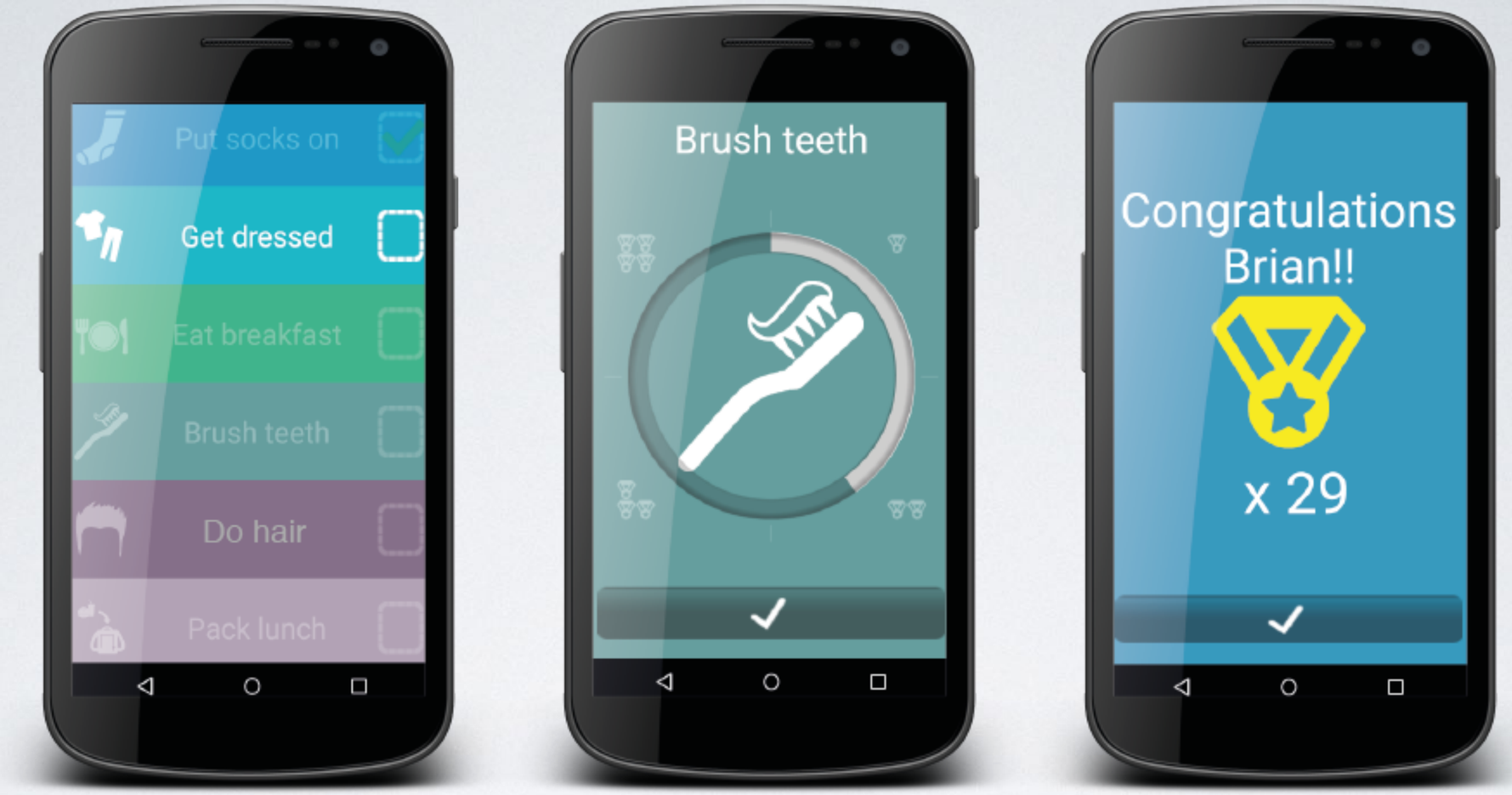
Mor: “Der er en råben og skrigen fra alle sider, selv fra vores, op til 30min før han [barnet] er kommet seng”

Far: “Når du endelig kommer nedenunder, falder du simplethen bare om”

Mor: “Der har været gange hvor jeg næsten ikke har haft kræfter til at lægge ham i seng”

MOBERO

Morning & **Be**dtime **Ro**utines



MOBERO

Morning & Bedtime Routines

1. Parent activites

2. Countdown timer

3. Child activities

4. A4 reward sheet

15 min prior to bedtime

Start of bedtime routines

MOBERO

Morning & **Bedtime** Routines

1. Parent activites

2. Countdown timer

3. Child activities

4. A4 reward sheet

15 min prior to bedtime

Start of bedtime routines

MOBERO

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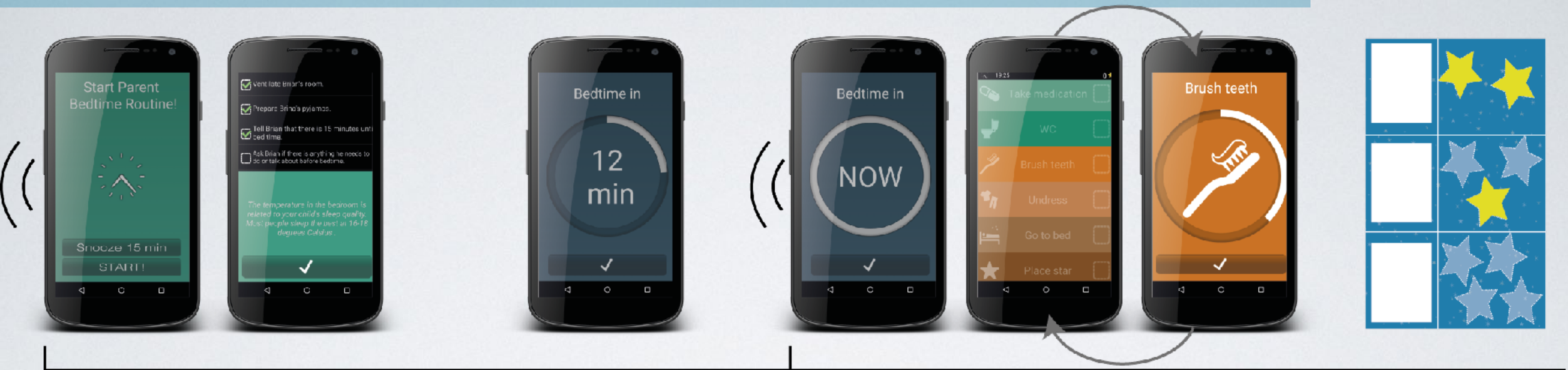
2. Countdown timer

3. Child activities

4. A4 reward sheet



15 min prior to bedtime

Start of bedtime routines

MOBERO

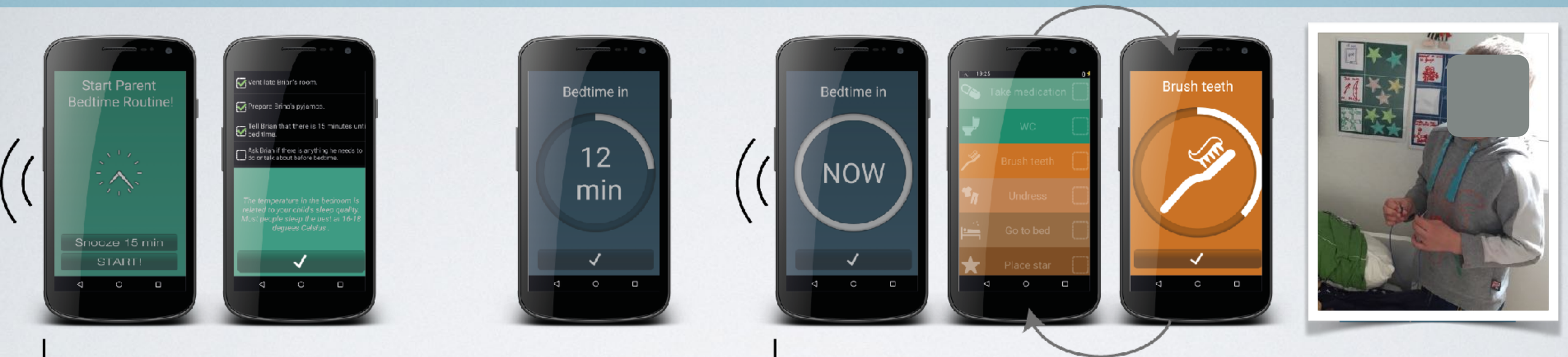
Morning & **Bedtime** Routines

1. Parent activites

2. Countdown timer

3. Child activities

4. A4 reward sheet



15 min prior to bedtime

Start of bedtime routines

MOBERO

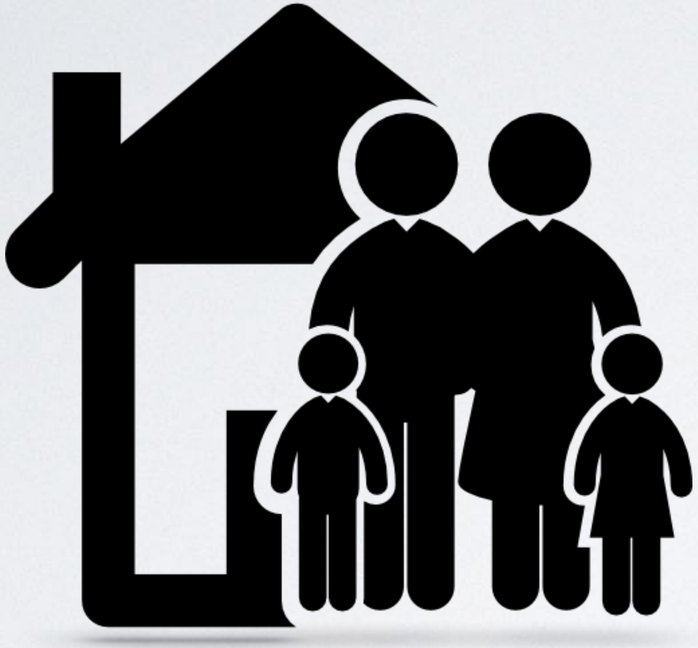
Morning & **Bedtime** Routines

MOBERO

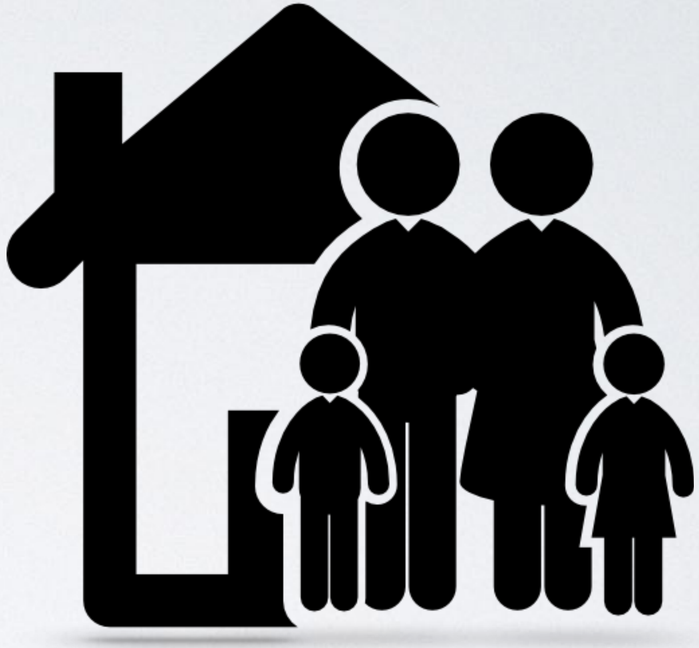
Studie opbygning

MOBERO

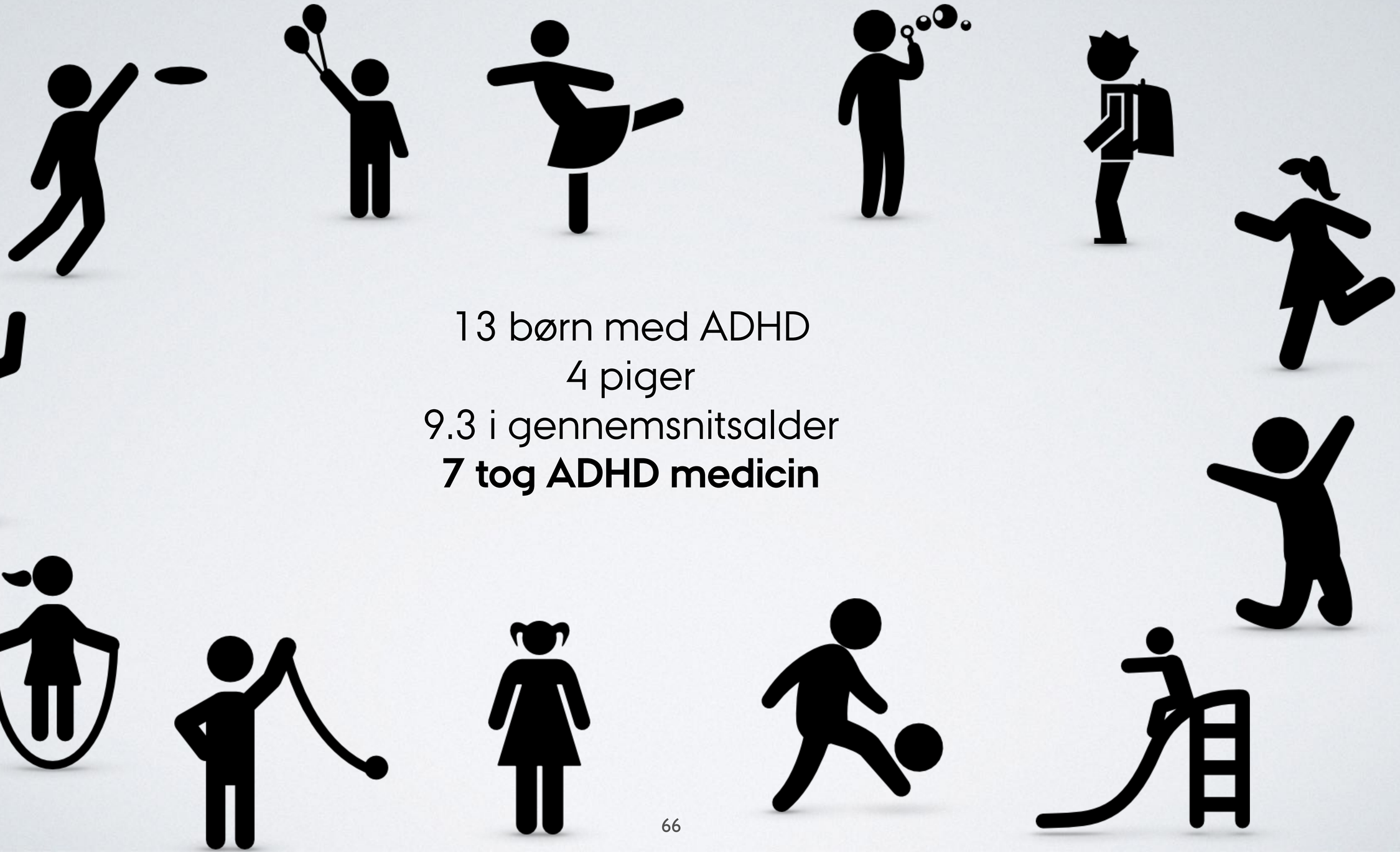
Pre-study



4 weeks



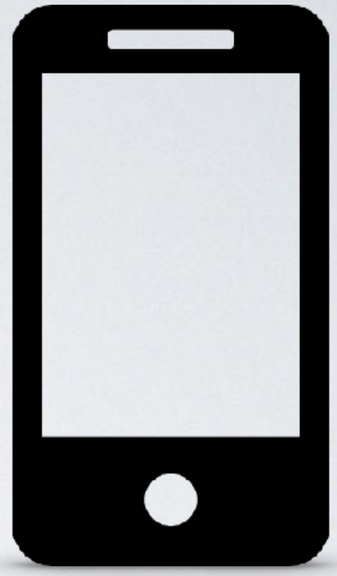
3 weeks



13 børn med ADHD
4 piger
9.3 i gennemsnitsalder
7 tog ADHD medicin

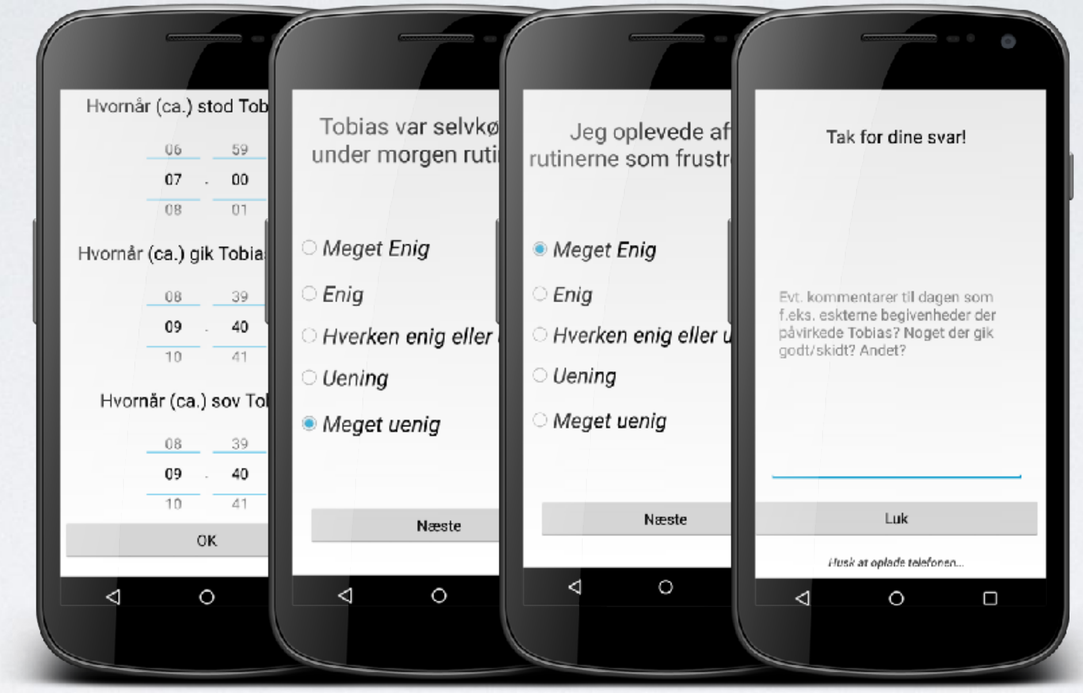
Baseline

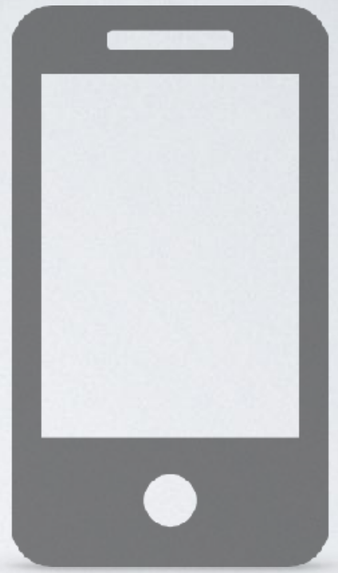
2 uger



Intervention

2 uger





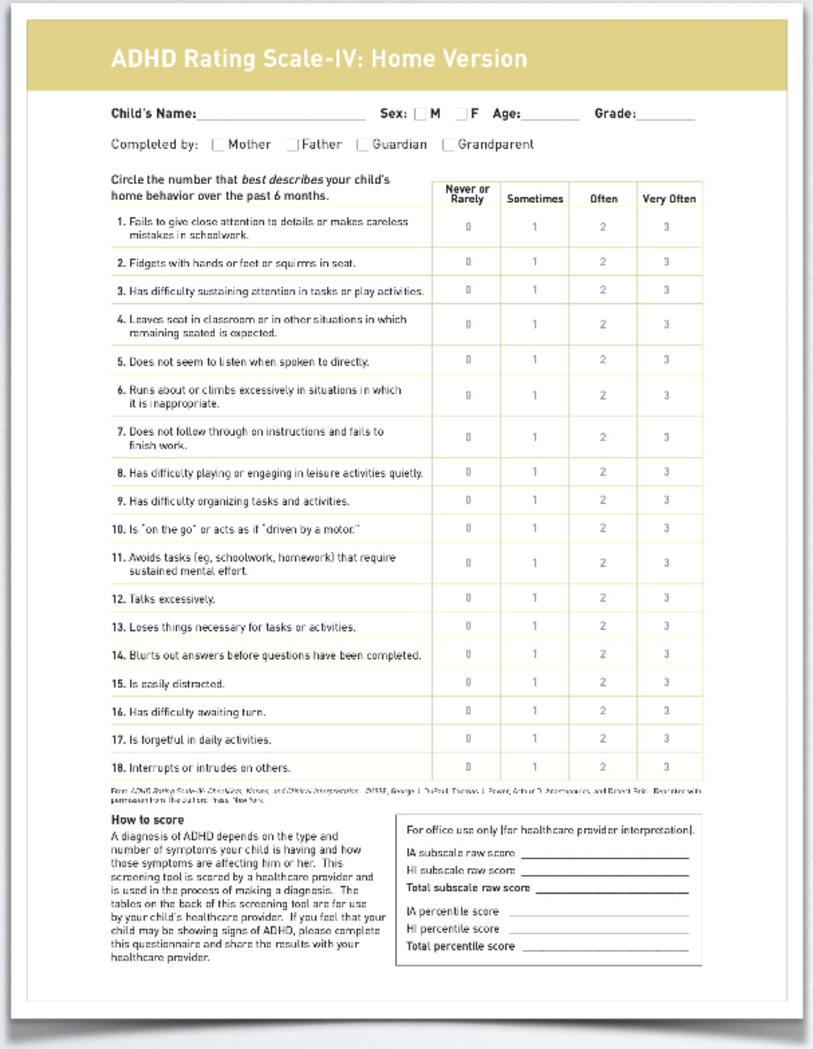
Baseline

2 uger

Intervention

2 uger

ADHD Rating Scale-IV (ADHD-RS)



ADHD Rating Scale-IV: Home Version

Child's Name:_____ **Sex:** ☐ **M** ☐ **F** **Age:**_____ **Grade:**_____

Completed by: ☐ Mother ☐ Father ☐ Guardian ☐ Grandparent

Circle the number that *best describes* your child's home behavior over the past 6 months.	Never or Rarely	Sometimes	Often	Very Often
1. Fails to give close attention to details or makes careless mistakes in schoolwork.	0	1	2	3
2. Fidgets with hands or feet or squirms in seat.	0	1	2	3
3. Has difficulty sustaining attention in tasks or play activities.	0	1	2	3
4. Leaves seat in classroom or in other situations in which remaining seated is expected.	0	1	2	3
5. Does not seem to listen when spoken to directly.	0	1	2	3
6. Runs about or climbs excessively in situations in which it is inappropriate.	0	1	2	3
7. Does not follow through on instructions and fails to finish work.	0	1	2	3
8. Has difficulty playing or engaging in leisure activities quietly.	0	1	2	3
9. Has difficulty organizing tasks and activities.	0	1	2	3
10. Is "on the go" or acts as if "driven by a motor."	0	1	2	3
11. Avoids tasks (eg, schoolwork, homework) that require sustained mental effort.	0	1	2	3
12. Talks excessively.	0	1	2	3
13. Loses things necessary for tasks or activities.	0	1	2	3
14. Blurts out answers before questions have been completed.	0	1	2	3
15. Is easily distracted.	0	1	2	3
16. Has difficulty awaiting turn.	0	1	2	3
17. Is forgetful in daily activities.	0	1	2	3
18. Interrupts or intrudes on others.	0	1	2	3

From ADHD Rating Scale-IV: Checklists, Norms, and Clinical Interpretation. ©1998, George J. DuPaul, Thomas J. Power, Arthur D. Anastopoulos, and Robert Reid. Reproduced with permission from the publisher. [illegible]

How to score

A diagnosis of ADHD depends on the type and number of symptoms your child is having and how those symptoms are affecting him or her. This screening tool is scored by a healthcare provider and is used in the process of making a diagnosis. The tables on the back of this screening tool are for use by your child's healthcare provider. If you feel that your child may be showing signs of ADHD, please complete this questionnaire and share the results with your healthcare provider.

For office use only [for healthcare provider interpretation].

IA subscale raw score _____

HI subscale raw score _____

Total subscale raw score _____

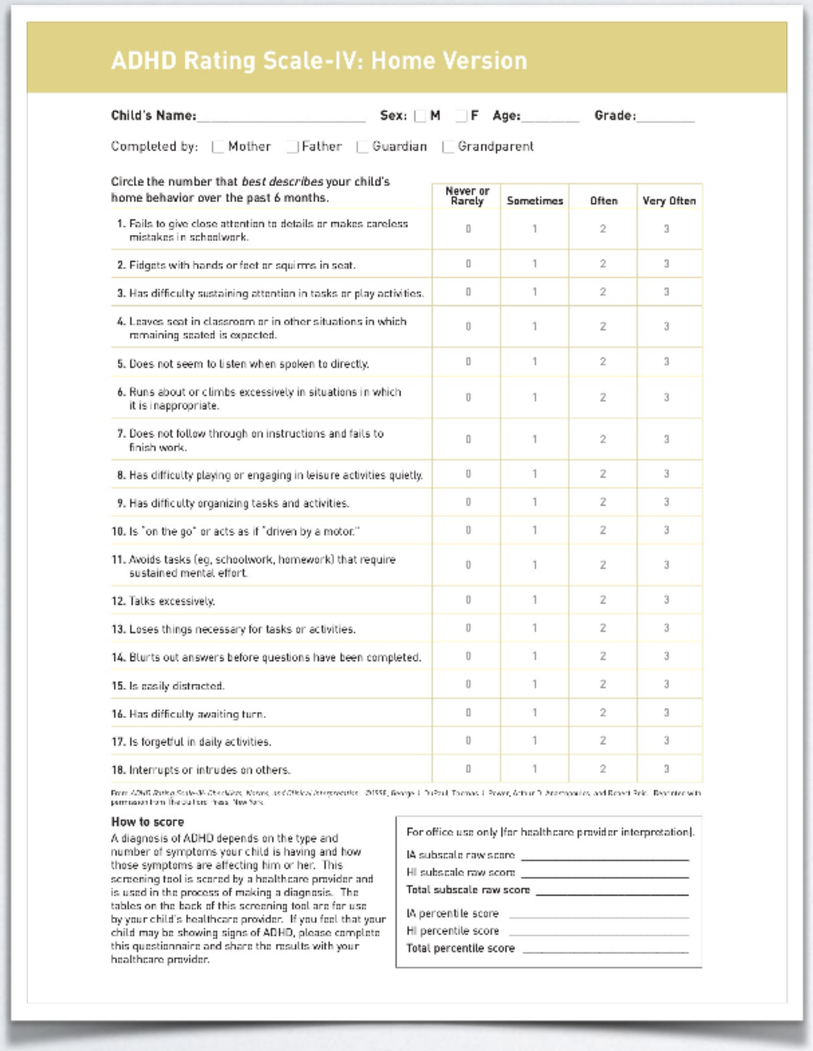
IA percentile score _____

HI percentile score _____

Total percentile score _____

Faries, D.E. et al. 2001. Validation of the ADHD Rating Scale as a clirlician administered and scored instrument. Journal of Attention Disorders.

ADHD Rating Scale-IV (ADHD-RS)



ADHD Rating Scale-IV: Home Version

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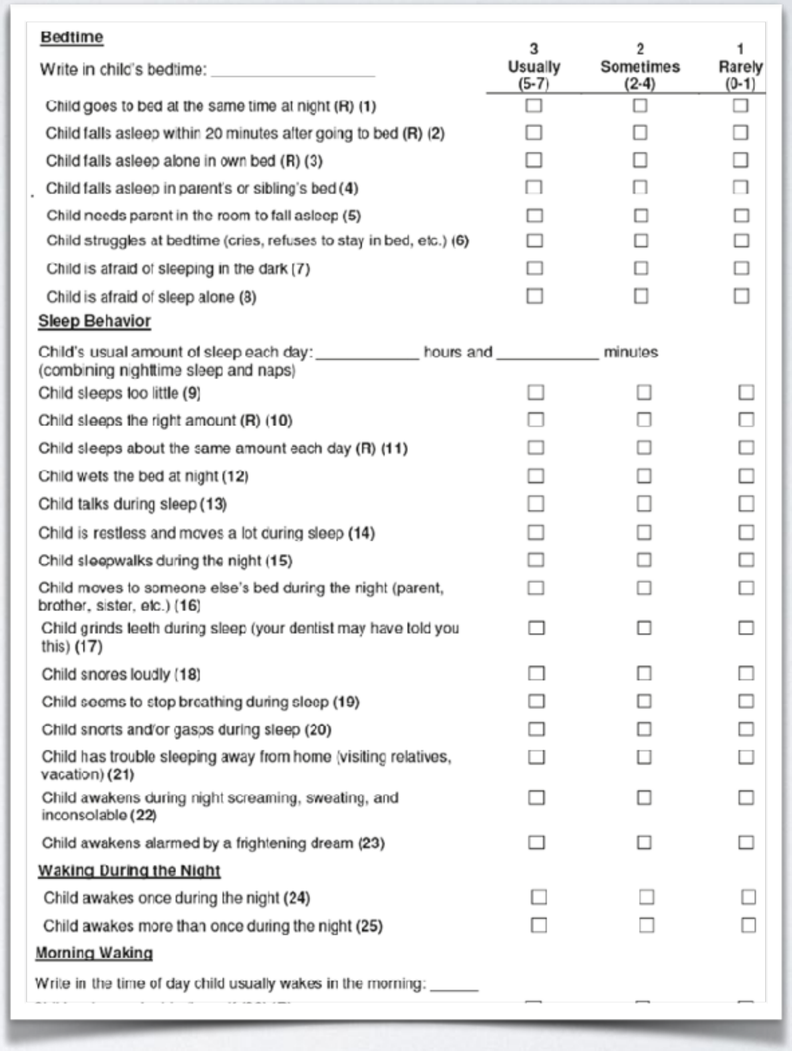
For office use only [for healthcare provider interpretation].

IA subscale raw score _____
HI subscale raw score _____
Total subscale raw score _____

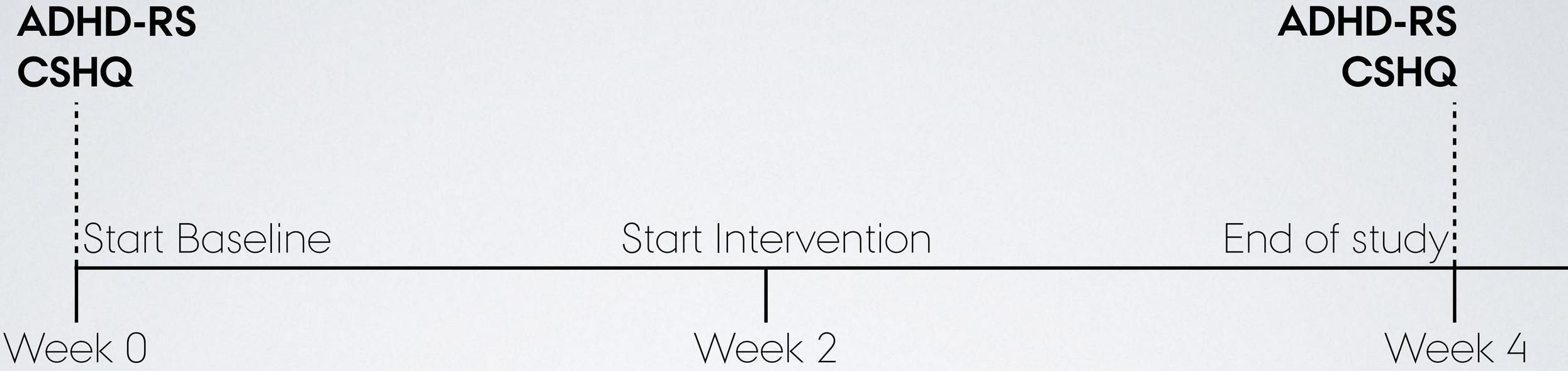
IA percentile score _____
HI percentile score _____
Total percentile score _____

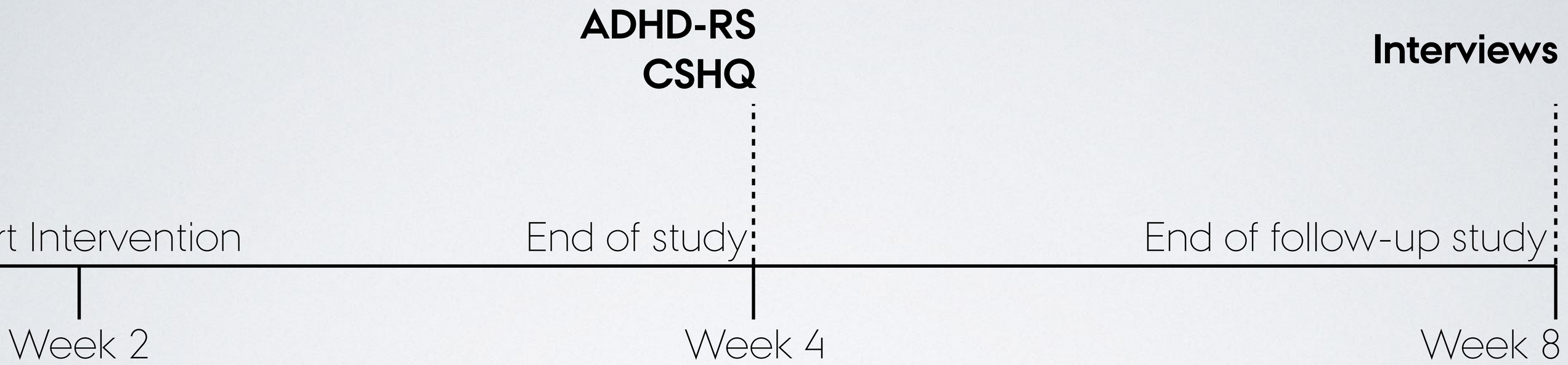
The Children's Sleep Habits Questionnaire (CSHQ)



Bedtime Write in child's bedtime: _____	3 Usually (5-7)	2 Sometimes (2-4)	1 Rarely (0-1)
Child goes to bed at the same time at night **(R) (1)**	☐	☐	☐
Child falls asleep within 20 minutes after going to bed **(R) (2)**	☐	☐	☐
Child falls asleep alone in own bed **(R) (3)**	☐	☐	☐
Child falls asleep in parent's or sibling's bed **(4)**	☐	☐	☐
Child needs parent in the room to fall asleep **(5)**	☐	☐	☐
Child struggles at bedtime (cries, refuses to stay in bed, etc.) **(6)**	☐	☐	☐
Child is afraid of sleeping in the dark **(7)**	☐	☐	☐
Child is afraid of sleep alone **(8)**	☐	☐	☐
Sleep Behavior			
Child's usual amount of sleep each day: _____ hours and _____ minutes (combining nighttime sleep and naps)			
Child sleeps too little **(9)**	☐	☐	☐
Child sleeps the right amount **(R) (10)**	☐	☐	☐
Child sleeps about the same amount each day **(R) (11)**	☐	☐	☐
Child wets the bed at night **(12)**	☐	☐	☐
Child talks during sleep **(13)**	☐	☐	☐
Child is restless and moves a lot during sleep **(14)**	☐	☐	☐
Child sleepwalks during the night **(15)**	☐	☐	☐
Child moves to someone else's bed during the night (parent, brother, sister, etc.) **(16)**	☐	☐	☐
Child grinds teeth during sleep (your dentist may have told you this) **(17)**	☐	☐	☐
Child snores loudly **(18)**	☐	☐	☐
Child seems to stop breathing during sleep **(19)**	☐	☐	☐
Child snorts and/or gasps during sleep **(20)**	☐	☐	☐
Child has trouble sleeping away from home (visiting relatives, vacation) **(21)**	☐	☐	☐
Child awakens during night screaming, sweating, and inconsolable **(22)**	☐	☐	☐
Child awakens alarmed by a frightening dream **(23)**	☐	☐	☐
Waking During the Night			
Child awakes once during the night **(24)**	☐	☐	☐
Child awakes more than once during the night **(25)**	☐	☐	☐
Morning Waking			
Write in the time of day child usually wakes in the morning: _____			

Owens, J.A. et al. 2000. The Children's Sleep Habits Questionnaire (CSHQ): psychometric properties of a survey instrument for school-aged children. Sleep.


ADHD-RS
CSHQ
ADHD-RS
CSHQ
Start Baseline
Start Intervention
End of study
Week 0
Week 2
Week 4

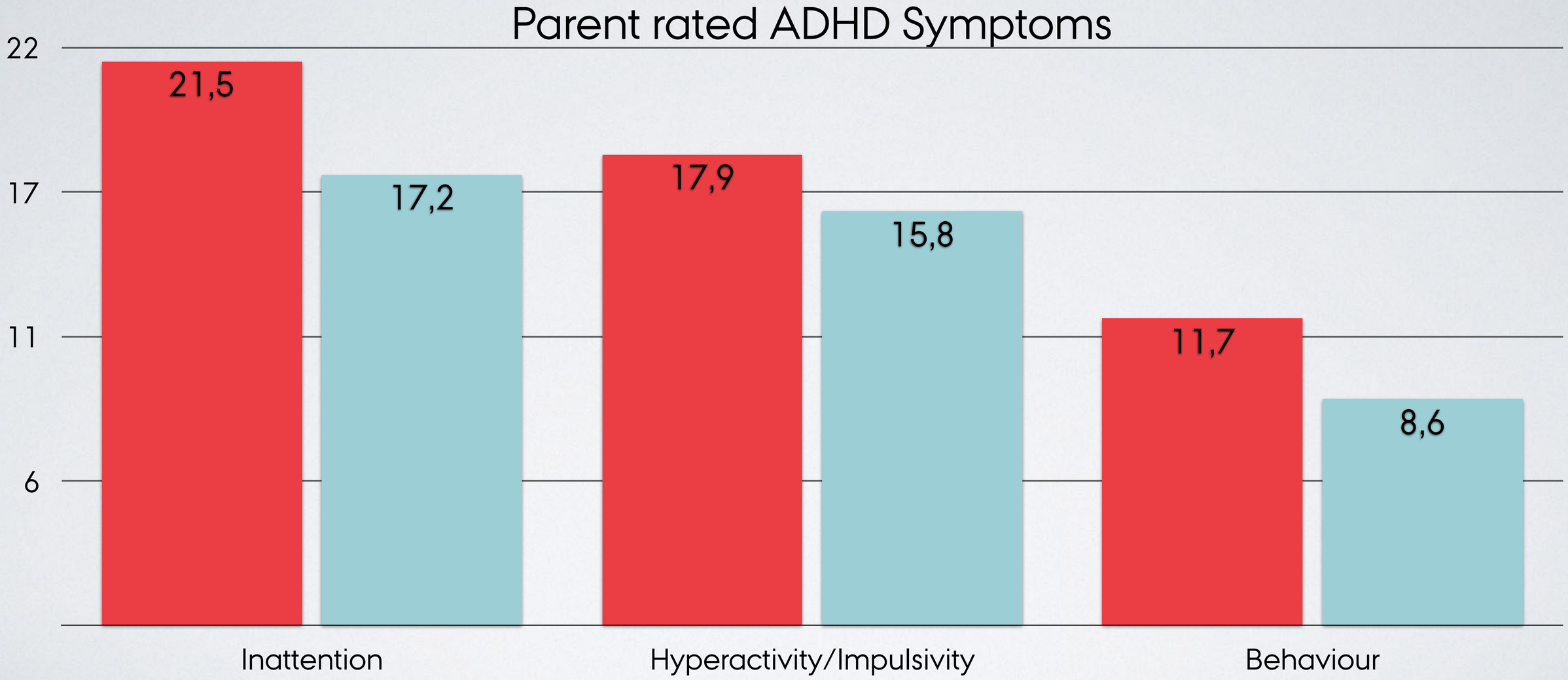

ADHD-RS
CSHQ
Interviews
rt Intervention
End of study
End of follow-up study
Week 2
Week 4
Week 8

ADHD SYMPTOMS

19%

reduction

ADHD-RS

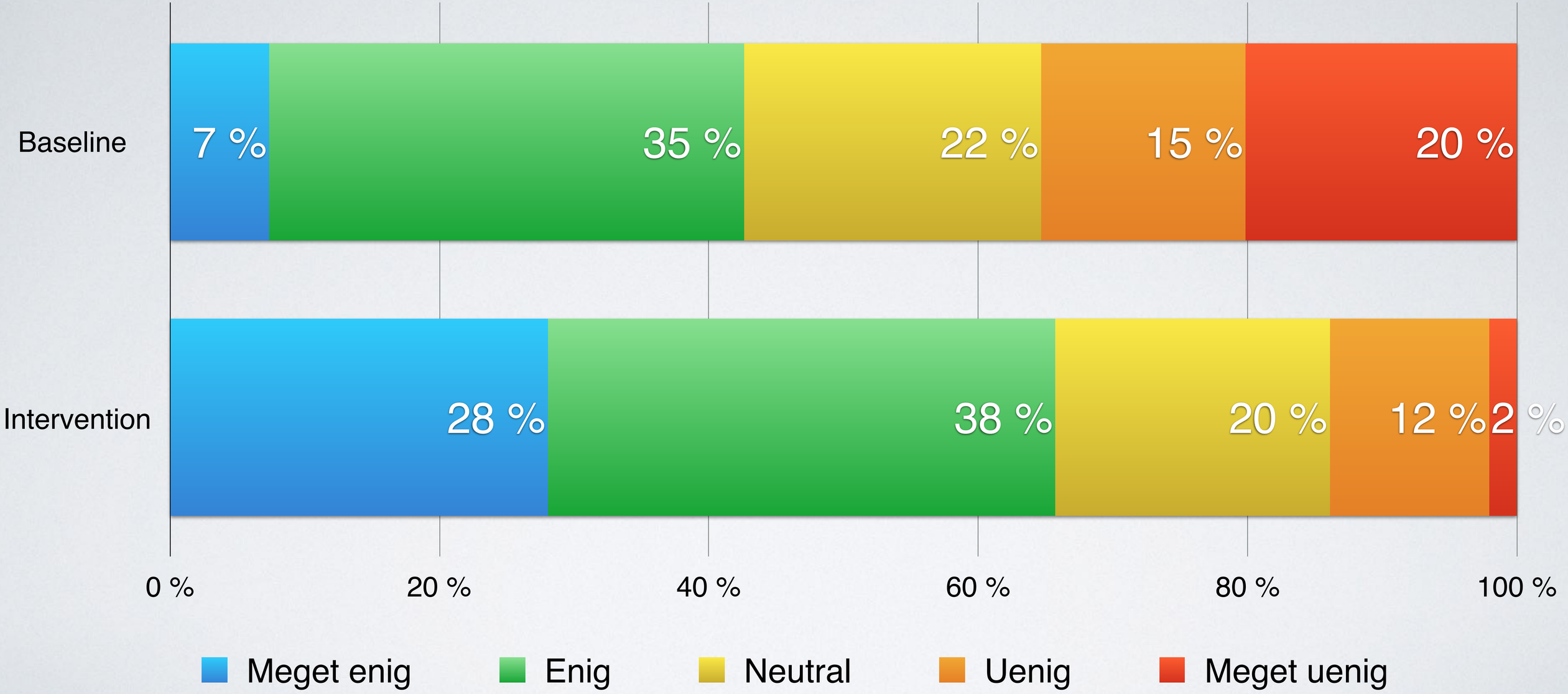

Parent rated ADHD Symptoms
22
17
11
6
21,5
17,2
17,9
15,8
11,7
8,6
Inattention
Hyperactivity/Impulsivity
Behaviour
Baseline
Intervention

SLEEP QUALITY

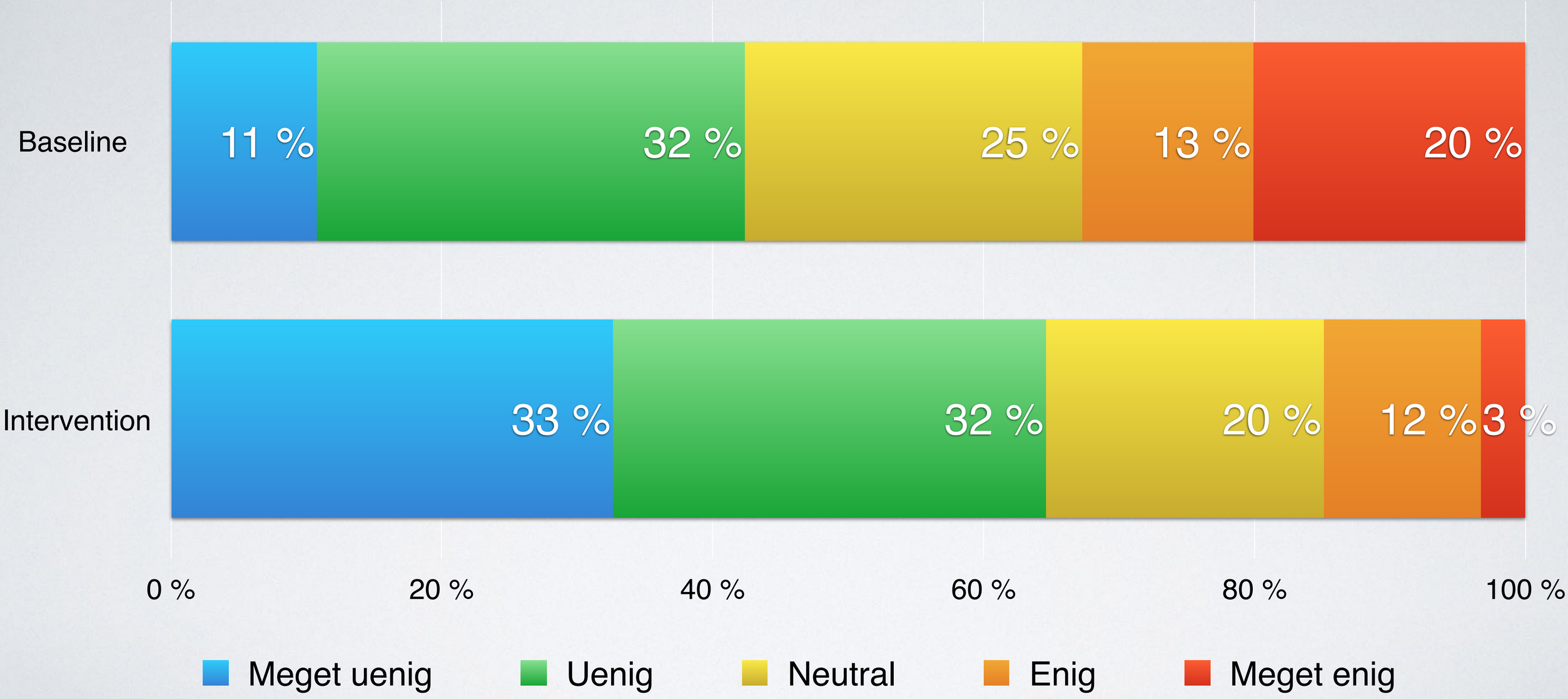
10%

improvement

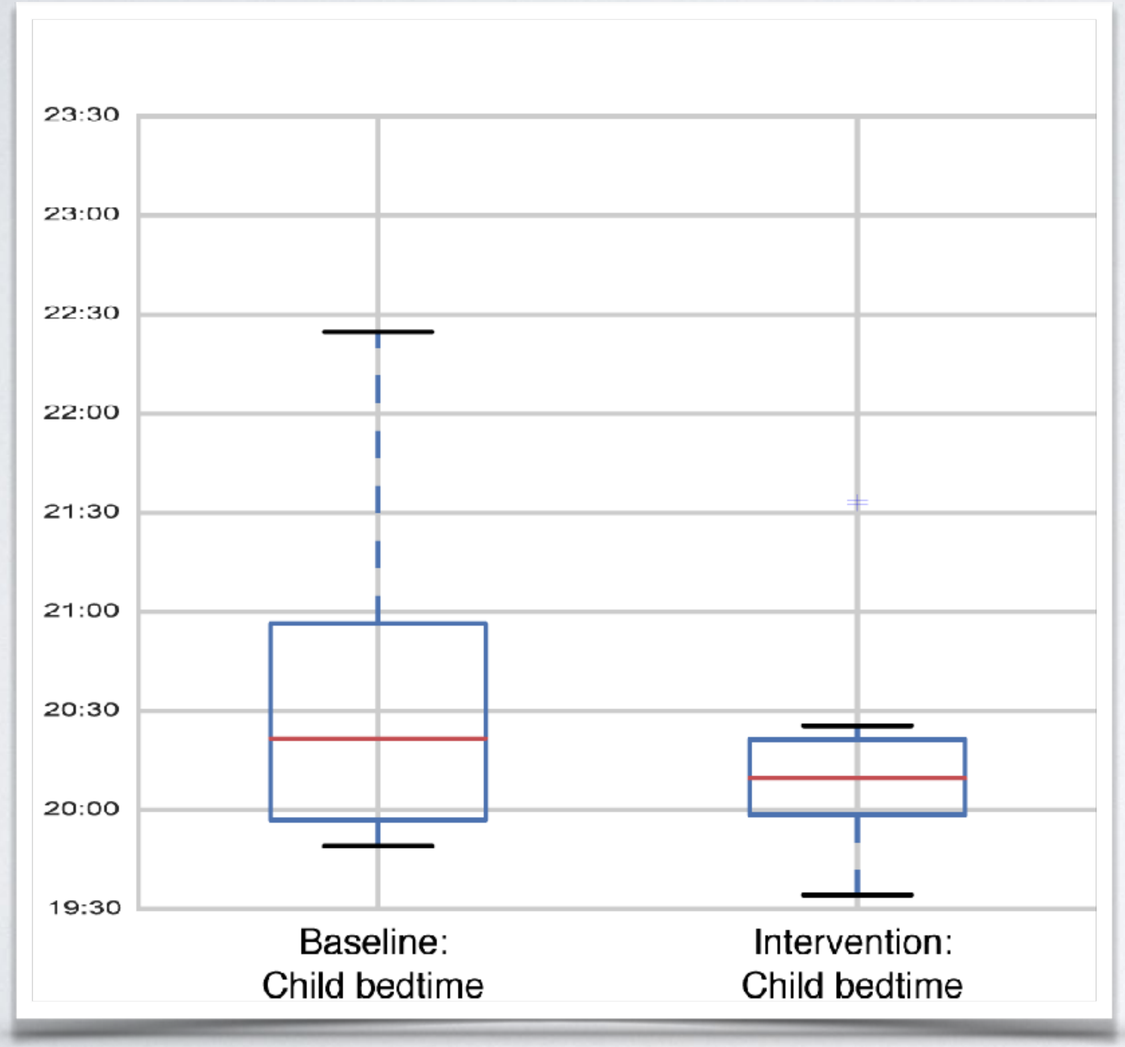
“[Barnets navn] var selvkørende under sengerutinen”

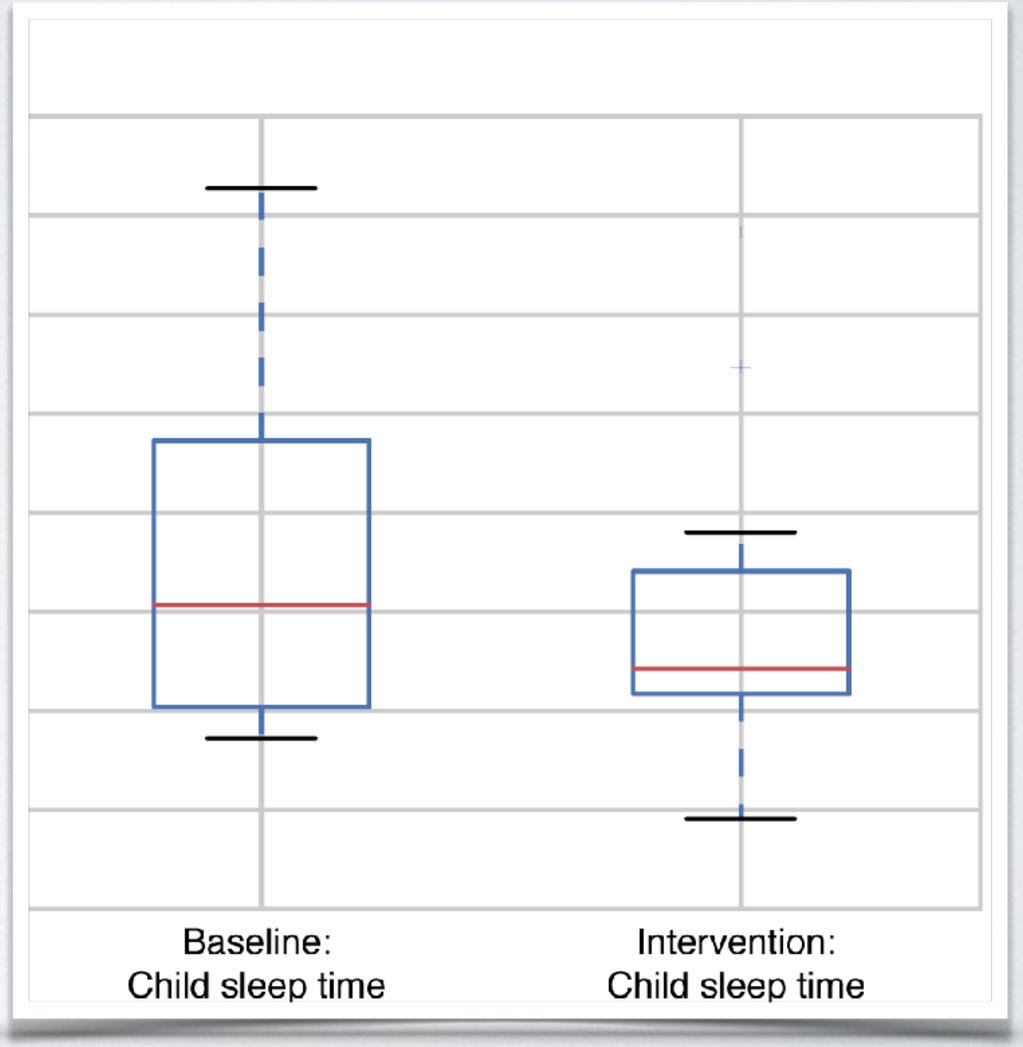


“Jeg oplevede sengerutinen som frustrerende”

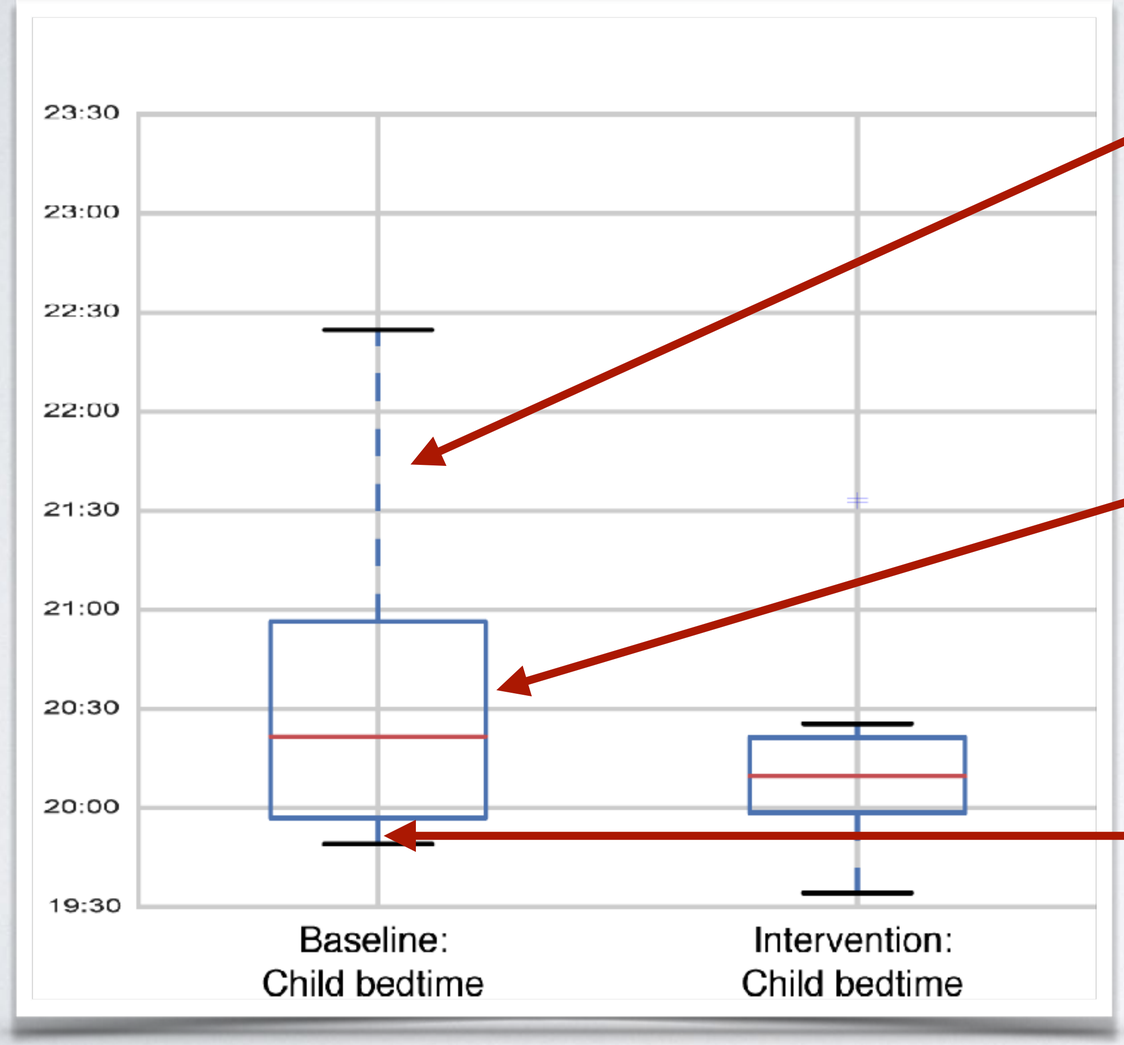


BEDTIME CONSISTENCY





BEDTIME CONSISTENCY

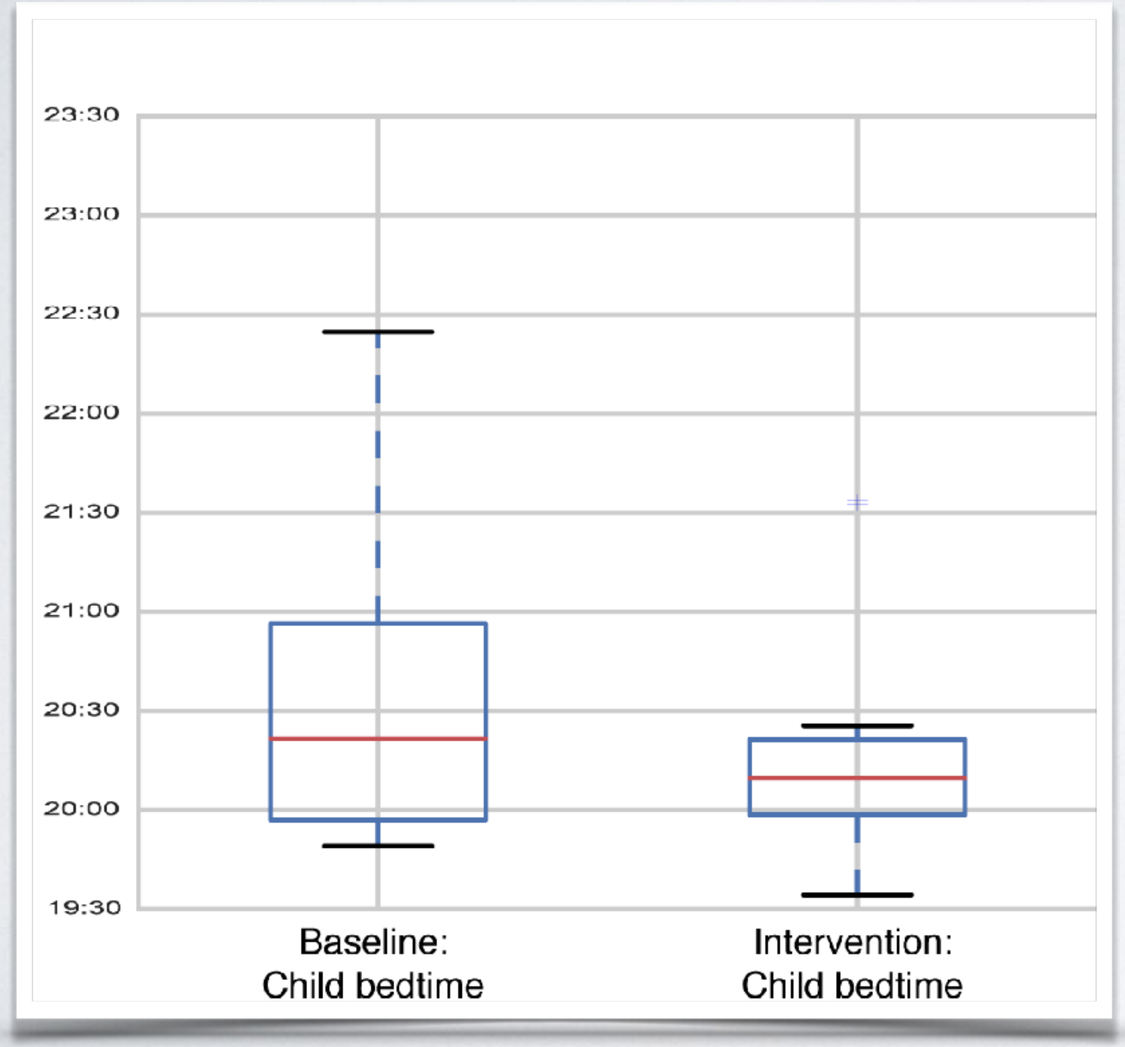


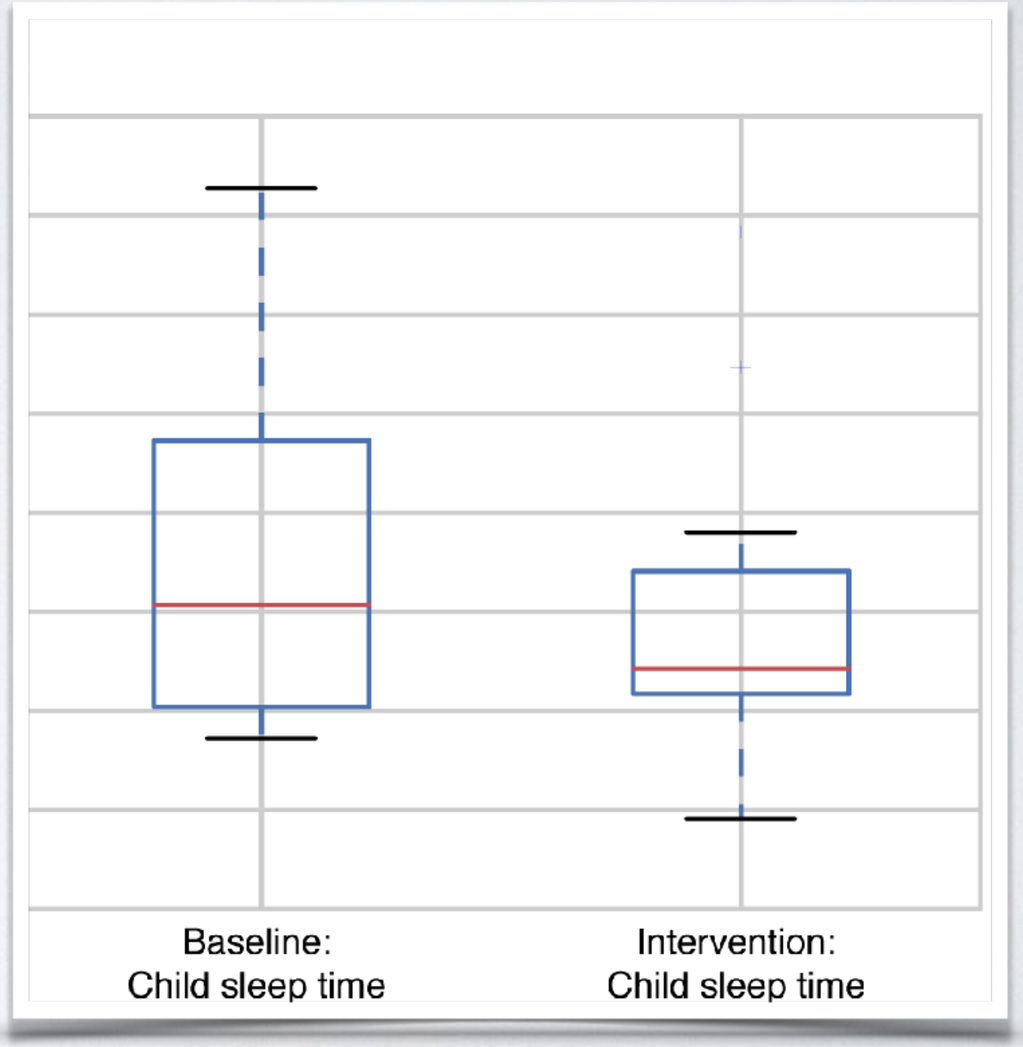
~25% af børnene gik i seng mellem 20:58 og 22:28

~50% af børnene gik i seng mellem 19:58 og 20:58

~25% af børnene gik i seng mellem 19:50 og 19:58

BEDTIME CONSISTENCY



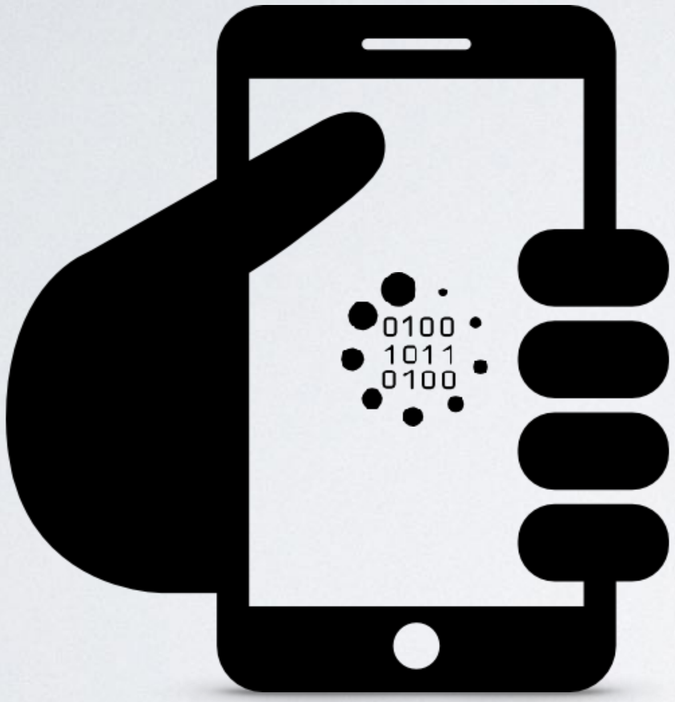


QUALITATIVE FINDINGS

MOBERO

QUALITATIVE FINDINGS

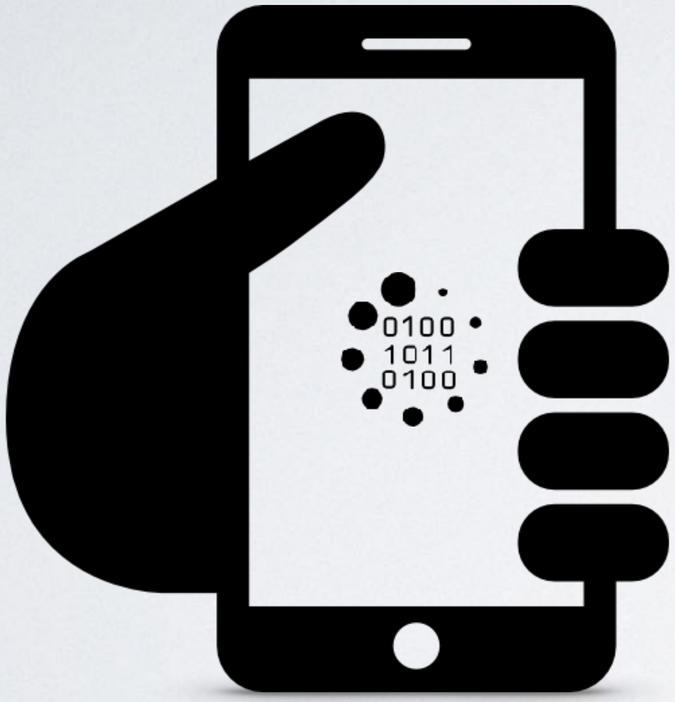
The qualities of a technological approach



"Also, it [a paper-based tool] is not involving in the same way, I mean, a piece of paper appeals to something for adults right?"

QUALITATIVE FINDINGS

The qualities of a technological approach



"We have tried several different [physical] charts, but after a few days there are torn apart or have vanished. This [MOBERO] is always there, so that is convenient"

QUALITATIVE FINDINGS

Positive effects of using rewards

"[...] she can see them when she goes to bed, and she is very proud when she earns a star [...]"

QUALITATIVE FINDINGS

Positive effects of using rewards

"[...] if you give children opportunities they really want to do it well and that is what I think this app [MOBERO] does, it gives children an opportunity.

QUALITATIVE FINDINGS

Children do not question tasks in MOBERO

"Because it is on the phone
he accepts the sequence completely"

QUALITATIVE FINDINGS

Children do not question tasks in MOBERO

"I do not have to tell him to wash his hands.
Before, he did not want to
and there would be a bloody fight
if he had to wash his hands
– and now he also just does that"

QUALITATIVE FINDINGS

Children do not question tasks in MOBERO

"[...] then he put his socks on, he has never done that before, but now there is an activity saying "put socks on", and then he just does it (laughing)

QUALITATIVE FINDINGS

Children integrated MOBERO into their daily routines

"He [the child] thinks today is the worst day in his life
because you come and pick up
the phone [MOBERO]"

QUALITATIVE FINDINGS

MOBERO can be misused by the parents

Father: “Before he had it as the yolk of an egg [...] there are many privileges that are [now] totally taken from him.”

Mother: “Yes, it may well be too many changes at once”

QUALITATIVE FINDINGS

Visualizing time can be a double edged sword

"It very quickly becomes about doing things as fast as possible, and if the time goes too fast he becomes enormously sad and angry especially with the clothing [activity] because it was set a little too fast"

MOBERO

Opsummering

- 4 ugers studie med 13 børn med ADHD og deres familier der benyttede MOBERO
- Forældrene rapporterede:
  - 19% Reduktion i ADHD symptomer
  - 10% Forbedret søvnkvalitet
  - Lavere frustration hos forældrene omkring morgen og sengerutiner
  - Højere grad af selvstændighed hos børnene

AGENDA

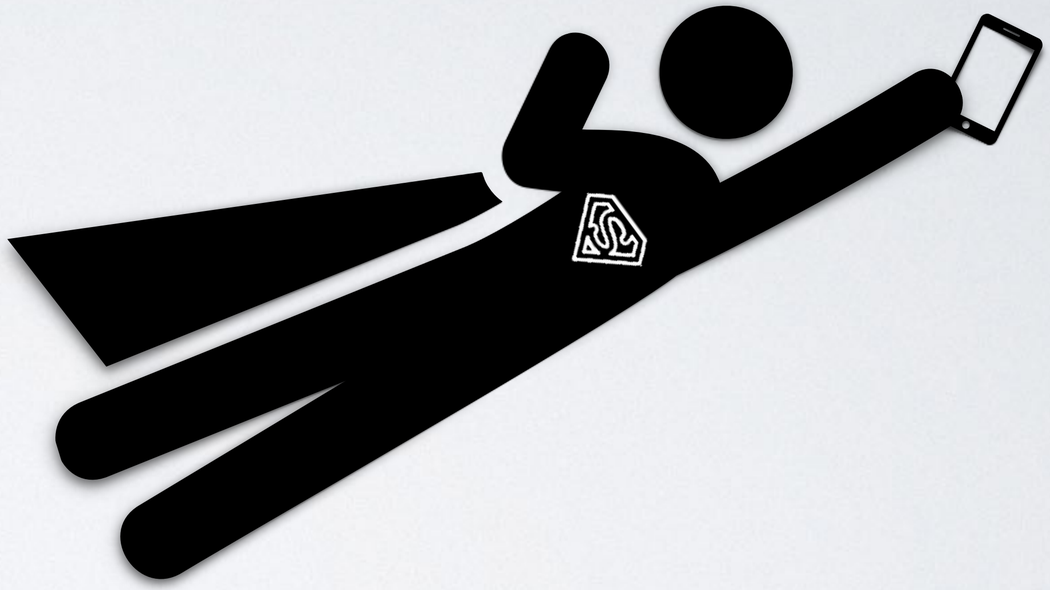
- Introduktion
- 'The ADHD Design Framework'
- Eksempler på velfærdsteknologiske løsninger til børn med ADHD
  - 'Calming'-støtte (ChillFish)
  - Forældretrænings-støtte (Parent Guardian)
  - Koncentrations-støtte (CASTT)
  - Søvn-støtte (MOBERO)
- **Afrunding**

AFRUNDING

- Teknologi holder unikke muligheder for at forbedre eksisterende praksis, analoge redskaber og give støtte til børn med ADHD og deres familier / pårørende / lærere.

- **CASTT**, **ChillFish** og **MOBERO** er eksempler på hvordan teknologi kan støtte og styrke børn med ADHD (og deres familier).

- Personligt mener jeg at teknologi **bør støtte** og **ikke erstatte** fagprofessionelle og/eller eksisterende behandlinger.



AFRUNDING - FREMTIDEN

Fremtidens teknologi vil ændre velfærds(teknologi)området radikalt

- Wearable computing
- Big Data & Machine Learning (ofte '3. bølge teknologier')

Trine Wigh Arildskov

Psykolog, ph.d.studerende, Ph.d.-studerende

Oversigt | Aktiviteter | Publikationer

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TAK TIL

TAK TIL

CARLSBERGFONDET

TAK TIL

ADHD - foreningen

TAK FOR JERES TID

Tobias Sonne

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AARHUS
UNIVERSITY
DEPARTMENT OF COMPUTER SCIENCE

CARLSBERGFONDET

UCL

2. Bølge Teknologi

Backup slide

McHugh et al. "'*Hearts on their sleeves': the use of systemic biofeedback in school settings.*" Journal of Family Therapy 32.1 (2010): 58-72.

JOURNAL OF FAMILY THERAPY
ASSOCIATION FOR FAMILY THERAPY AND SYSTEMIC PRACTICE

Journal of Family Therapy (2010) **32**: 58–72
0163-4445 (print); 1467-6427 (online)

'Hearts on their sleeves': the use of systemic biofeedback in school settings

Brenda McHugh,[a] Neil Dawson,[a] Anthony Scrafton[a] and Eia Asen[a]

This article describes how a biofeedback device is used to 'externalize' internal physiological states. Heart rate monitors, emitting audible signals when a specific threshold is reached, are fitted to children and members of the family. This can help all those present to make connections between problematic behaviours and internal states of emotional/physical arousal. Devices may be worn for up to twenty-four hours and computer graph printouts of fluctuating heart rates can assist in contextualizing problematic interactions, particularly if other family members are also fitted with heart rate monitors. In this way biofeedback becomes 'systemic' as people are alerted to the interconnectedness of each others' states. Participants are not only helped to identify stressors leading to heightened states of emotional arousal and resulting 'out-of-control' behaviours, but also to find ways of employing (self-)calming strategies. This article outlines the application of systemic biofeedback in school settings with children at risk of exclusion. With the help of these biofeedback devices pupils begin to manage themselves in situations which would previously have resulted in stressed, angry or violent behaviours.

Keywords: *multi-family therapy school*; *systemic biofeedback*.

Introduction

Violence and antisocial behaviour are the most common reasons given for the exclusion of children from school. School exclusion reports often describe a young person's violent actions as 'unprovoked'; it is frequently not the level of the violence that concerns the professionals involved so much as their own inability to understand the motivation and make sense of what happened. They perceive the escalation to anger and violence as too quick, too extreme and not justified by

Teknologistøtte til børn med emotionelle vanskeligeder (*nævner børn med ADHD, men ikke hovedfokus for artiklen*)

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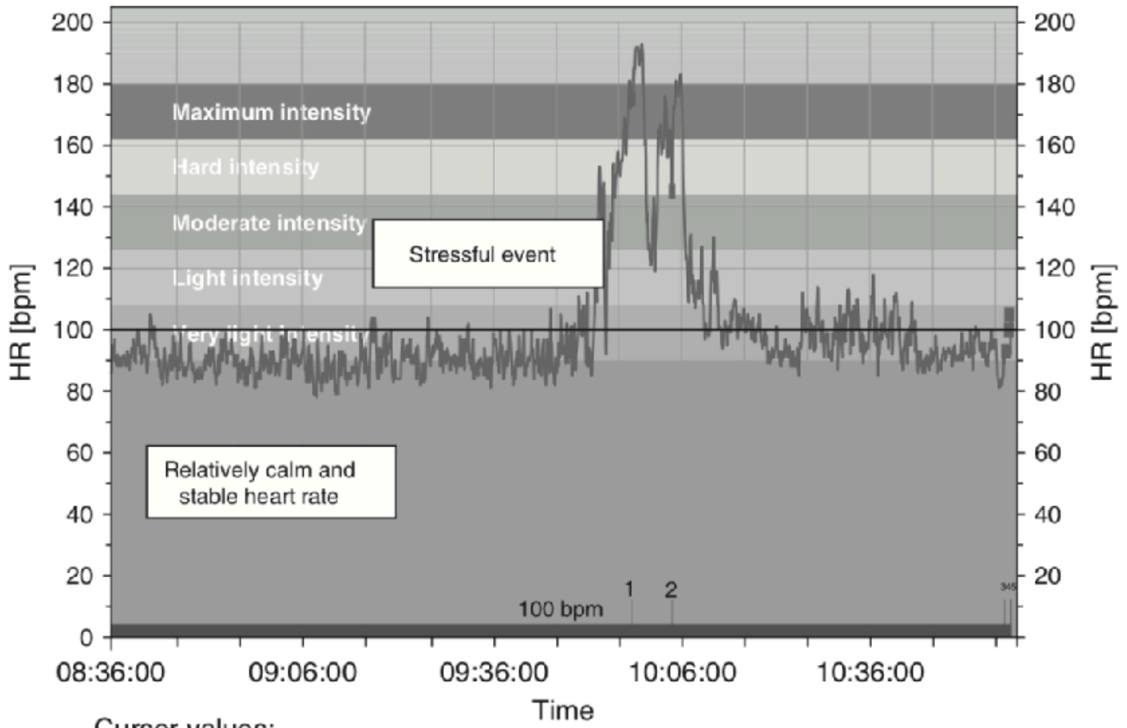

Figure 1. A typical computer-generated printout of heart rate over time.

HEARTS ON THEIR SLEEVES..

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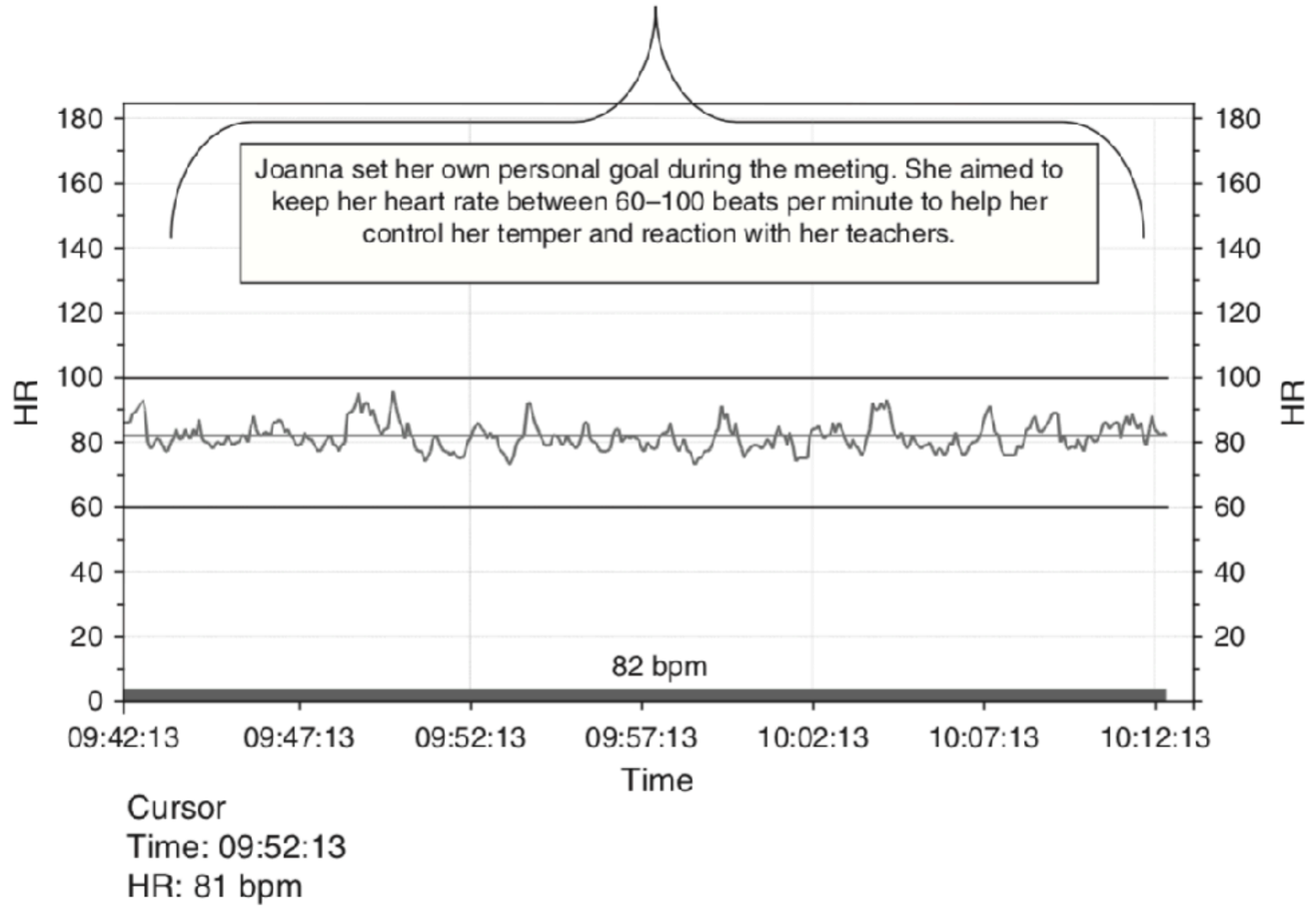

Figure 4. Heart rate of a 15-year-old girl during a school disciplinary meeting.

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