



Food Choices, Lifestyles and the Prevention of Overweight and Obesity in Children: Evidence from the IDEFICS Cohort and the I.Family Study

Wolfgang Ahrens

University Bremen &

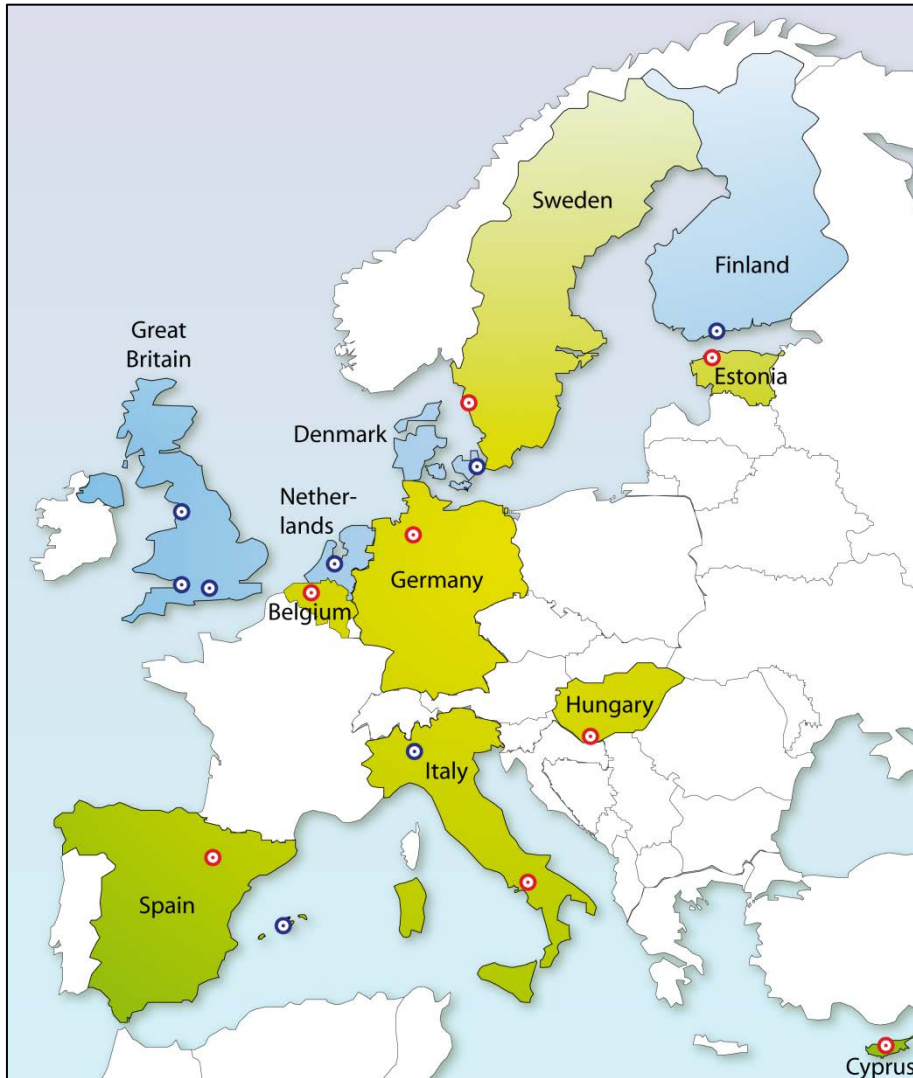
Leibniz Institute for Prevention Research and Epidemiology – BIPS

- on behalf of the I.Family consortium -

THE POWER OF PROGRAMMING 2016

International Conference on Developmental Origins
of Adiposity and Long-Term Health

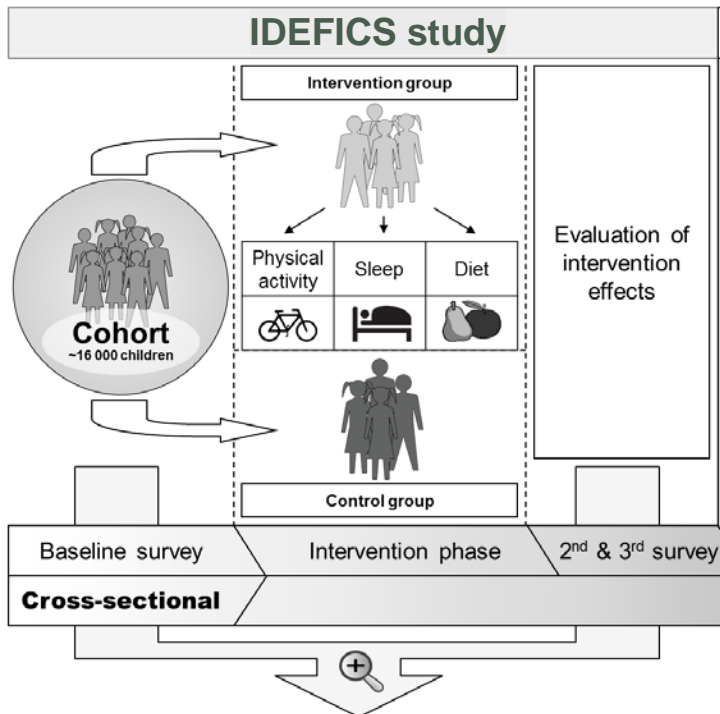




Partners

1. Strovolos, Cyprus
2. Ghent, Belgium
3. Copenhagen, Denmark
4. Tallin, Estonia
5. Helsinki, Finland
6. Bremen, Germany
7. Pécs, Hungary
8. Avellino, Italy
9. Milan, Italy
10. Utrecht, Netherlands
11. Palma de Mallorca, Spain
12. Zaragoza, Spain
13. Gothenburg, Sweden
14. Bristol, United Kingdom
15. Lancaster, United Kingdom
16. Andover, United Kingdom

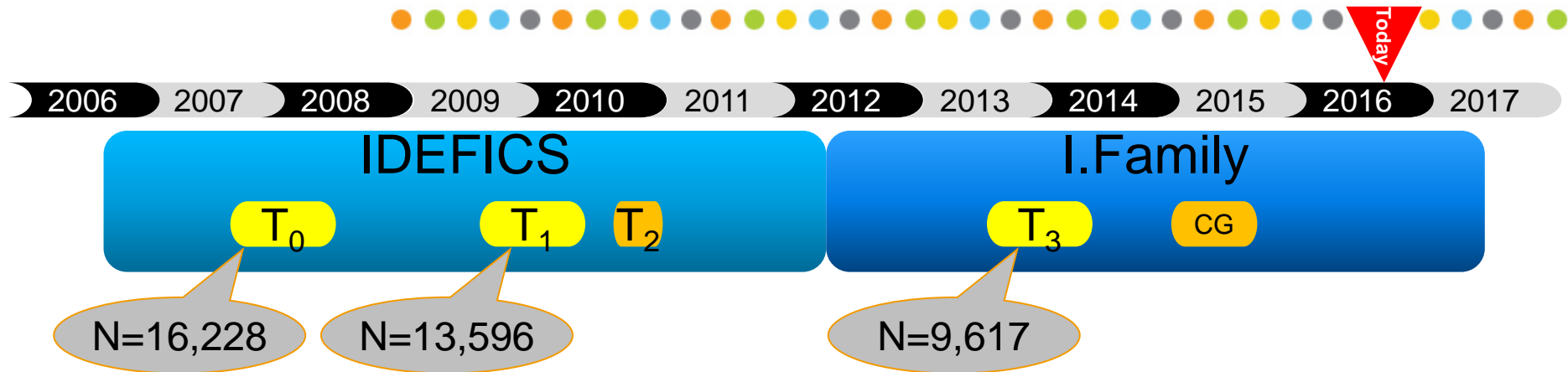
Longitudinal design of I.Family and concatenation with IDEFICS



| Determinants | Diet | Physical activity | Sleep | SES | Genes | Biomarker | Environ. & family life |
|--------------|--|---------------------------|--------------------|--------|--------|----------------|---|
| Assessment | FFQ 24h dietary recall | Quest. Accelerometers | Quest. | Quest. | Saliva | Urine Blood | Parental quest. School quest. GIS |
| per child | | | | | | | |
| Outcome | Lifestyle & nutrition related diseases and disorders | | | | | | |
| Assessment | Overweight & Obesity | Musculoskeletal disorders | Insulin resistance | | | | |
| | Anthropometry | Ultrasonography | Biomarkers | | | | |

Timeline of recruitment and follow-up

IDEFICS – I.Family cohort



- **T₃:** Follow-up of index children (plus siblings and parents)
- **CG:** Additional examinations in contrasting groups/ sub-groups: fMRI, GPS monitoring, sensory perception, canteen experiments
- **Endpoints:** Food choice, eating behaviour, health indicators (body composition, metabolic profile, bone health)

Exhaustive examination programme:

- Questionnaires, anthropometry, biosamples, accelerometry, physical fitness, taste, GIS, ...
- Standardised according to survey manual
- Central trainings (“train-the-trainer”) and subsequent local trainings
- Site visits and re-training if necessary

For an overview see:





IDEFICS Intervention

Community-orientied

Setting-based

Intervention mapping in 5 steps

3 x 2 key messages
(diet, stress, physical activity)

Programme:
10 modules at 4 levels

Participation
of stakeholders

Community

e.g.
Media campaign

Involvement of community partners

Intervention: 6 key messages

Nutrition



Daily water

→ **Less soft drinks**

Daily fruit &
vegetables

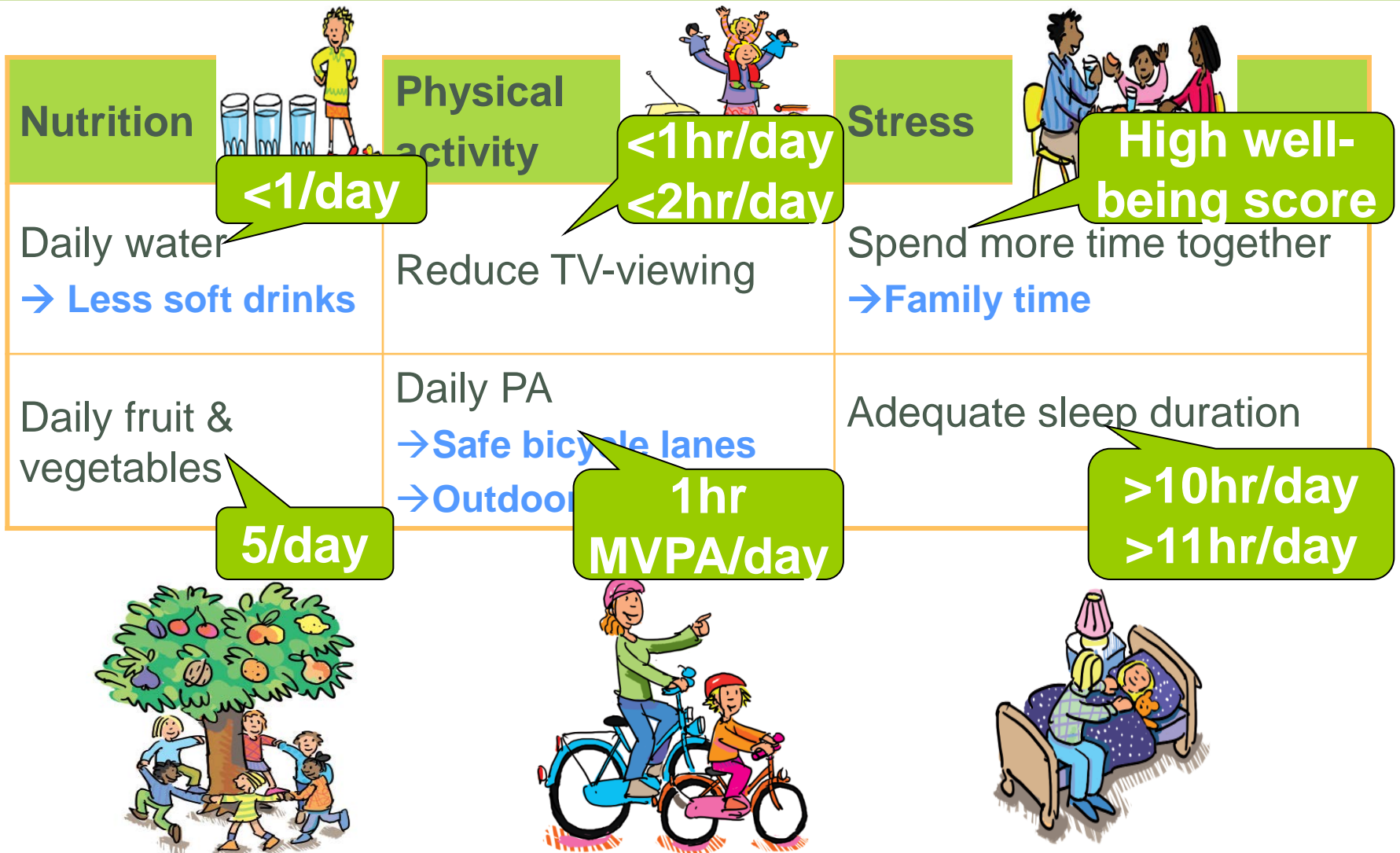


Excursion: Did we choose the right messages?

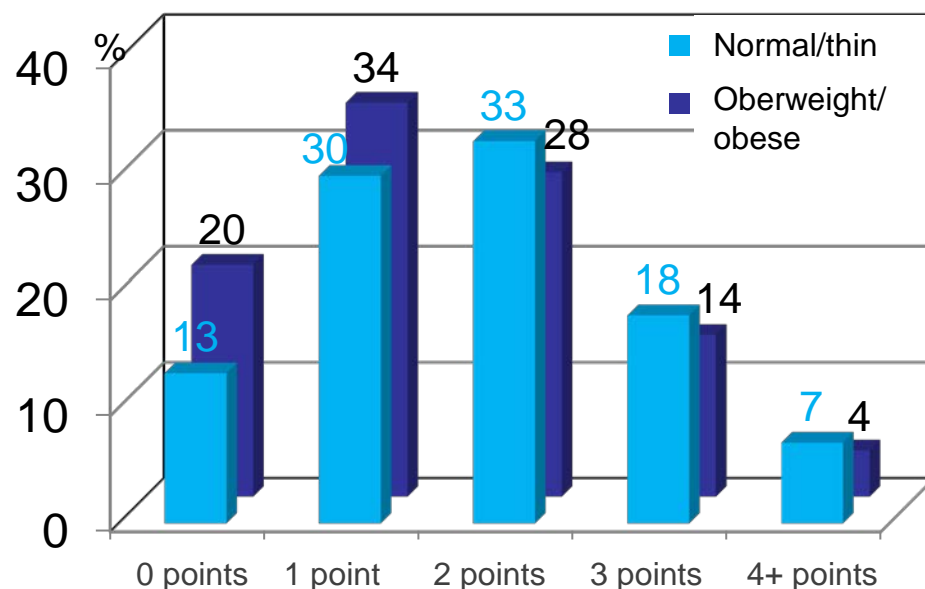
- Results of cross-sectional analysis at baseline



Intervention: 6 key messages → recommendations



Sum of 6 key messages*: one point for each recommendation adhered to at baseline



| Score | Overweight/obesity (%) | Odds ratio ¹⁾ | 95%-CI |
|-----------|------------------------|--------------------------|-------------|
| 0 points | 27% | 1.00 | |
| 1 point | 22% | 0.81 | (0.65-1.01) |
| 2 points | 17% | 0.65 | (0.52-0.82) |
| 3 points | 16% | 0.66 | (0.51-0.86) |
| 4+ points | 12% | 0.54 | (0.37-0.80) |

1) Adjusted for sex and age

Main drivers: TV time, physical activity and sleep duration

*only based on children (n=5,343) with full information on all 6 variables

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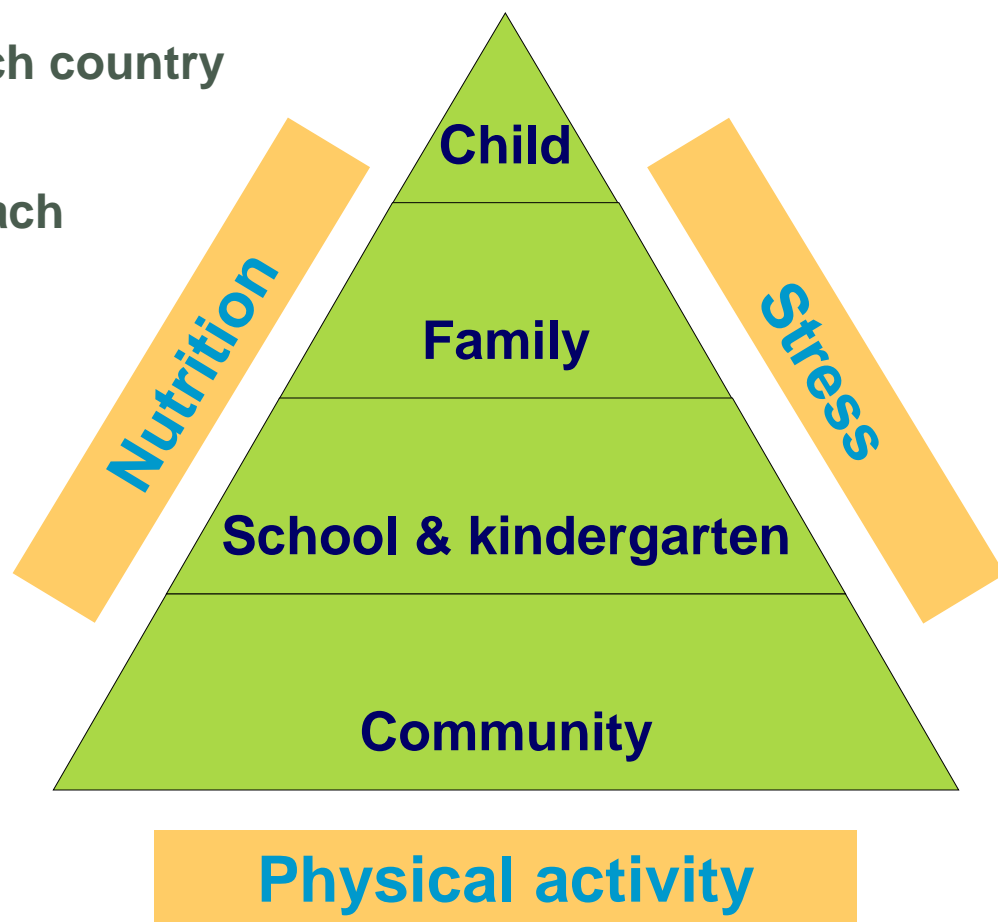
Community

e.g.
Media campaign

Involvement of community partners

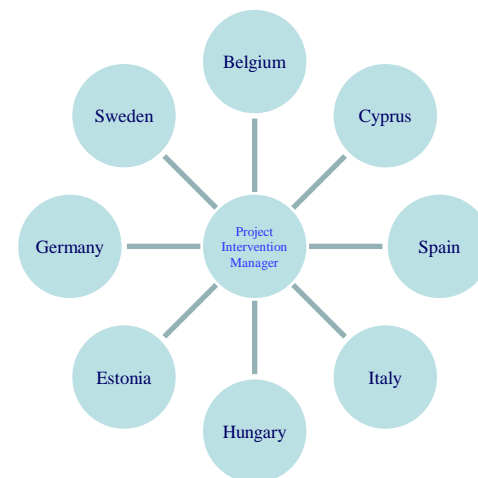
8 intervention centres in 8 European countries

- Control : intervention region in each country
- 500:500 preschoolers & 500:500 primary school children each
- Evaluation of:
 1. **Development of the programme**
(costs, expenditure of time, practical problems & solutions)
 2. **Process**
(participation, feasibility, acceptance, sustainability)
 3. **Effect**
(individual, various endpoints)



- ... addressing several levels
(non-selective primary prevention & health promotion)
 - **Community**
→ environment, social & political dimensions
 - **Pre-school/ primary school**
→ education, food preparation (catering), school neighbourhood
 - **Household/ family**
→ information, education, motivation
 - **Individual**
→ behaviour

- Establishment of
 - Central and local **project intervention managers**
 - Community platforms: **local intervention programme committees IPC** (local actors & stakeholders)
 - **Round tables**
- Standardised community intervention programme (CIP) **starting from schools/pre-schools**:
 - Intervention messages & communication strategies
 - Core settings & dissemination channels
 - Core intervention tools & modules



... an overview of the intervention & its evaluation

Obesity Reviews

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Special Issue: Prevention of childhood obesity: Results from the IDEFICS study

December 2015

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Pages 1–174

Issue edited by: Stefaan De Henauw, Tom Baranowski, Iris Pigeot

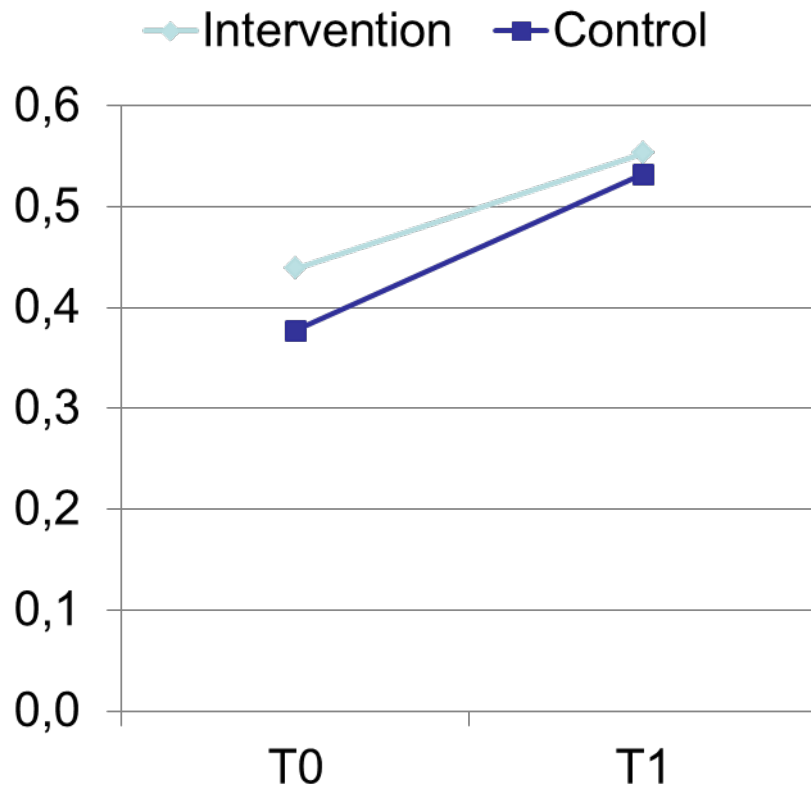


Results ...

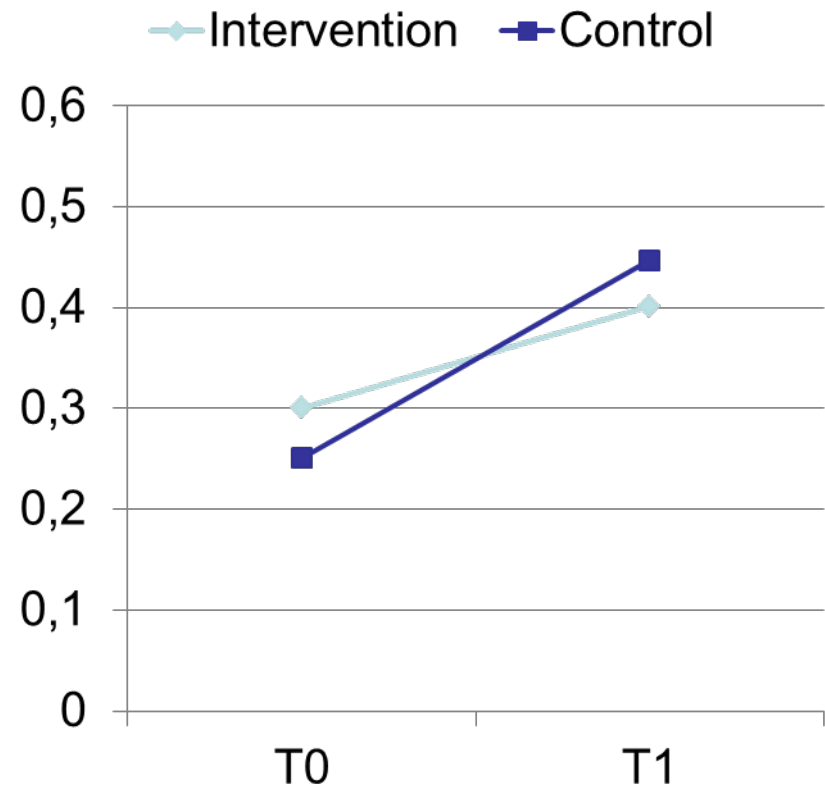


Change in BMI z-score – all countries combined

BMI z-Score, boys



BMI z-Score, girls



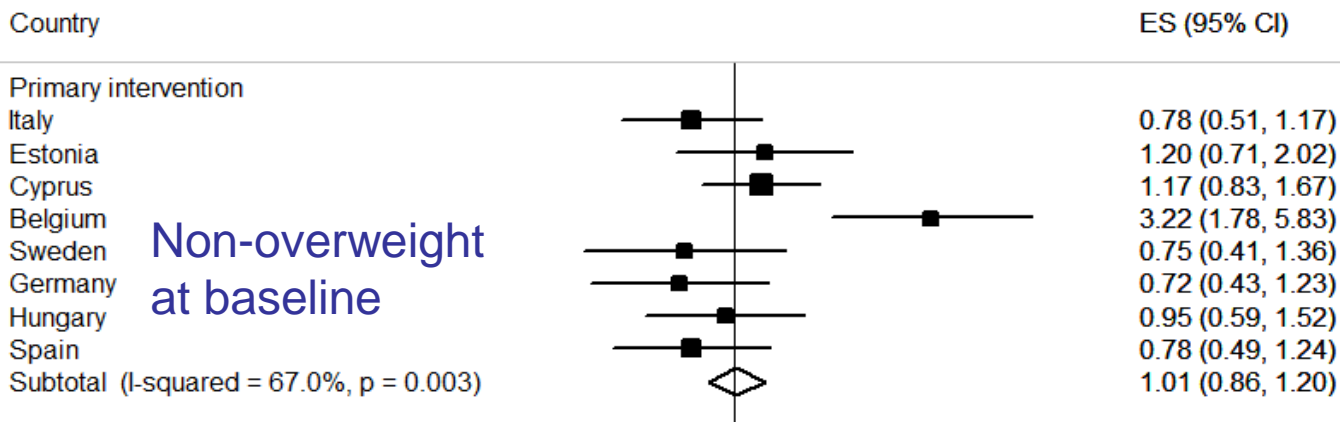
Changes in body composition – all countries combined

| Indicator | Condition | Boys | | | | Girls | | | |
|------------------------------|------------|----------|----------|-------------------------------|----------|----------|----------|-------------------------------|----------|
| | | T0 Mean* | T1 Mean* | Time X condition Effect size# | p-value* | T0 Mean* | T1 Mean* | Time X condition Effect size# | p-value* |
| BMI z-score | Intervent. | 0.439 | 0.553 | -0.041 | 0.333 | 0.300 | 0.401 | -0.095 | 0.042 |
| | Control | 0.377 | 0.532 | | | 0.251 | 0.447 | | |
| Body fat % | Intervent. | 16.942 | 19.275 | +0.654 | 0.007 | 18.159 | 20.222 | +0.353 | 0.090 |
| | Control | 17.038 | 18.717 | | | 18.466 | 20.176 | | |
| Waist-to-height ratio | Intervent. | 0.473 | 0.462 | +0.004 | 0.015 | 0.469 | 0.457 | +0.006 | <0.001 |
| | Control | 0.473 | 0.458 | | | 0.471 | 0.453 | | |

* Estimated marginal means and p-values calculated by mixed model analysis adjusted for age and parental education with country as a random effect.

Effect estimates: mean change in intervention group minus mean change in control group, adjusted for baseline values of age, parental education and for cluster factor country (that is, unit of randomisation).

Intervention effect by country & covariate adjusted pooled results



(Obesity Research, in press)

■ Biomarkers

(Mårild S et al.; IDEFICS consortium. Impact of a community based health-promotion programme in 2-9 year old children in Europe on markers of metabolic syndrome, the IDEFICS study. *Obes Rev* 2015;16 Suppl 2:41-56)

- **positive as well as negative and null effects; no obvious pattern**

■ Sleep

(Michels N et al.; IDEFICS consortium. Effect of the IDEFICS multi-level obesity prevention on children's sleep duration. *Obes Rev* 2015;16 Suppl 2:68-77)

- **small intervention effect on weeknight sleep duration**

■ Physical activity and sedentary behaviour

(Verbestel V et al ; IDEFICS consortium. Effectiveness of the IDEFICS intervention on objectively measured physical activity and sedentary time in European children. *Obes Rev* 2015;16 Suppl 2:57-67)

- **no intervention effects overall, but strong temporal trends**

■ Behaviours

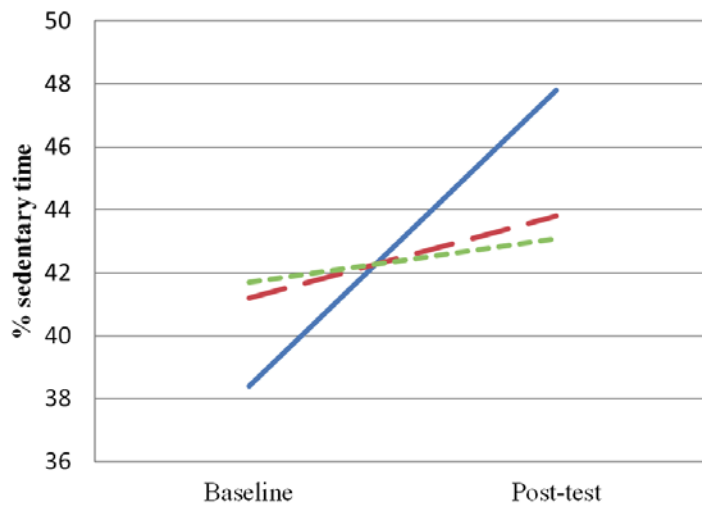
(De Bourdeaudhuij I et al.; IDEFICS consortium. Behavioural effects of a community-oriented setting-based intervention for prevention of childhood obesity in eight European countries. Main results from the IDEFICS study. **Obes Rev** 2015;16 Suppl 2:30-40)

- **no intervention effects, but strong temporal trends**

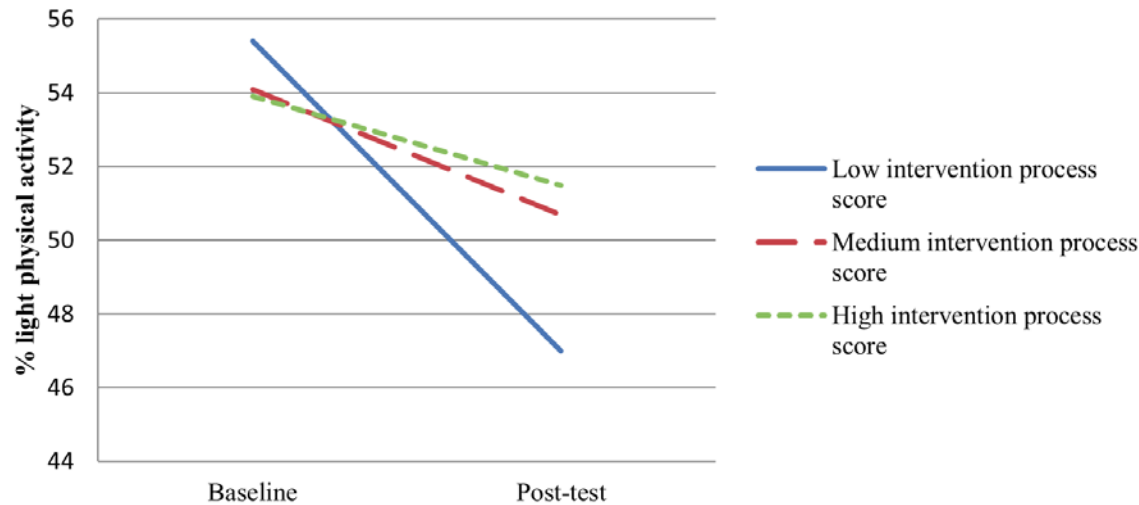
■ Partly large differences between countries, but no obvious pattern

Change in sedentary time and light PA – Belgium

Sedentary time

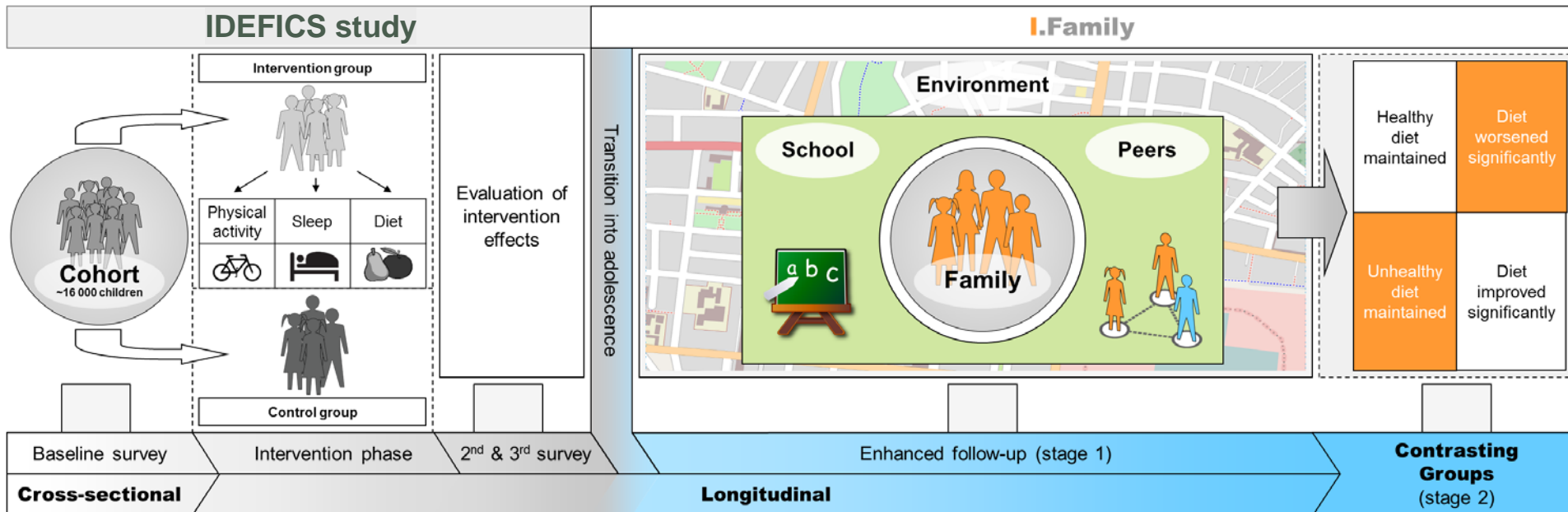


Light physical activity



- No clear beneficial effect of the intervention on weight status or body composition in children who were normal weight at baseline
- Greater probability of normalised weight status in children with prevalent overweight/obesity at baseline after 2 years → protective effect of the intervention against persistent overweight/obesity
- Prevention of unfavourable changes in sedentary time and light physical activity in schools achieving a medium or high intervention dose

Thank you!



www.idefics.eu

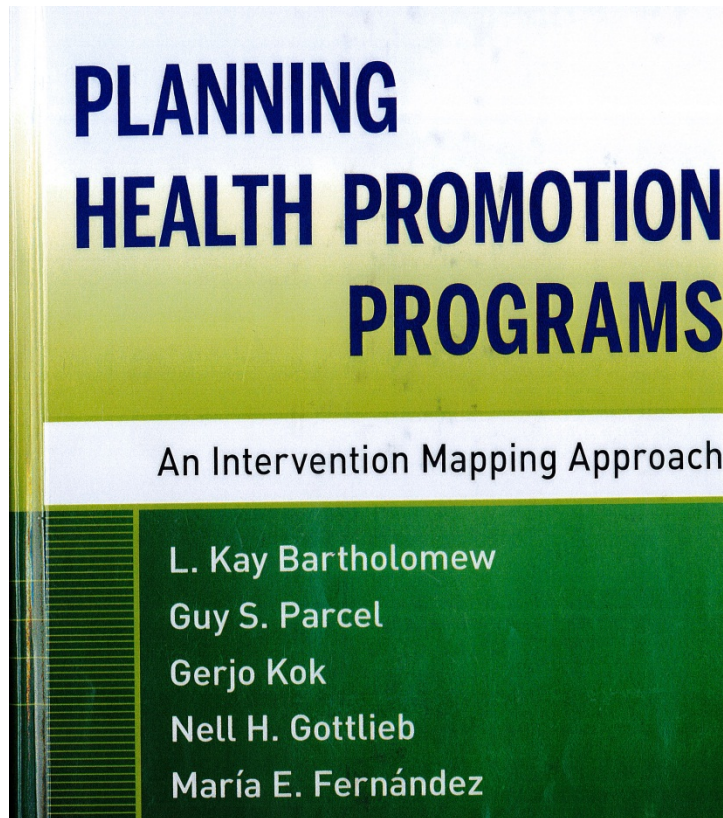
www.ifamilystudy.eu

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| Determinants | Psych. profile | Physical activity | Sleep | Social factors | Body comp. | Bio-marker | Family | Media | Genes | Sensory percept. | Environ- | Gene ex- | Social environ. | Setting factors |
|-------------------|--------------------------------------|--------------------------|----------------------------|----------------|----------------|----------------|-----------------------------|-------|--------|------------------|---|-----------------------------|----------------------------------|-----------------|
| Assessment | Neuro-psych. tests & quest. | Quest. Accelerometers | Quest. Activity monitor | Quest. | Anthro-pometry | Urine Blood | Quest. Pedigree analysis | CAQDA | Saliva | Taste threshold | GIS GPS | Blood microRNA profiling | Tween quest. Network analysis | Canteen exp. |
| per family member | | | | | | | | | | | | | | |
| Outcome | Eating behaviour, diet & food choice | | | | | | | | | | | | | |
| Assessment | FFQ Web-based 24h dietary recall | | | | | | | | | | Gene expression microRNA profiling fMRI | | | |

- Investigation of potential differences between participants and drop-outs at T_1 (χ^2 - and t-tests)
- Investigation of potential differences between intervention and control region at T_0 (χ^2 - and t-tests)
- **Intention-to-treat:** mixed effect models (repeated measurements), stratified by sex
 - adjusted for age at baseline, social status (ISCED, max. of both parents)
 - country as random effect
 - setting as random effect
- **Interaction effect of time and condition** → **intervention effect**
- **Complete-case analysis** for biomarkers as outcome
- **Country-specific analyses**

Intervention mapping approach: six steps



Step 1: Assess problem and its behavioural and environmental causes

Step 2: Specify who and what will change as a result of the intervention

Step 3: Seek theory best methods for changing behaviours and structures

Step 4: Develop protocol and materials

Step 5: Run programme

Step 6: Evaluate

■ Process evaluation:

- Parental exposure to IDEFICS messages much less pronounced than intended
- Information via kindergarten better than via communities
- Differences among countries with respect to various messages

■ Limitations:

- High **drop-out**
- Imprecise **assessment e.g. of dietary behaviour**
- No **proof of efficacy of modules** before this effectiveness trial
- **Duration of intervention** perhaps too short
- **Penetrance** too low
- Expectations on engagement of **communities, actors and teachers** too high

De Bourdeaudhuij I et al.; IDEFICS consortium. Implementation of the IDEFICS intervention across European countries: perceptions of parents and relationship with BMI. Obes Rev 2015;16 Suppl 2:78-88

Verloigne M et al.; IDEFICS consortium. Process evaluation of the IDEFICS school intervention: putting the evaluation of the effect on children's objectively measured physical activity and sedentary time in context. Obes Rev 2015;16 Suppl 2:89-102

- Harmonisation of intervention ⇔ **local adaptation** ⇒ challenging task
- Extra efforts needed to **reach less advantaged SES groups**
- Involvement of **parents most difficult**
- **Patience needed to get a programme accepted**
 - ⇒ local actors have to be convinced
 - ⇒ takes some time
- **Evaluation perhaps most difficult part**
 - ⇒ large number of questionnaires reduced willingness to participate
- **Addressing individual behaviour not sufficient**
 - ⇒ **“causes of causes”**