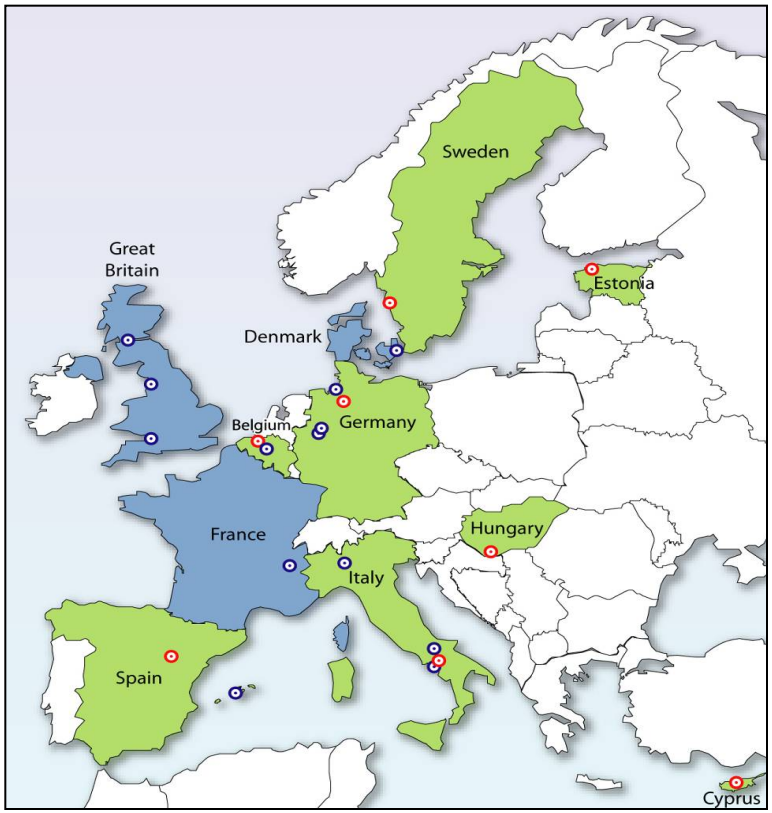
Primary prevention of obesity in European children: the IDEFICS story

IDEFICS cohort study (n=16,229)
with community - oriented intervention harmonized in 8 countries (green)



Baseline examinations

Ages 2-9 y

2006-2007

Intervention communities

Control communities

2007-2008

Followup examinations

Ages 4-11

2008-2009

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Communities included in Swedish arm of IDEFICS

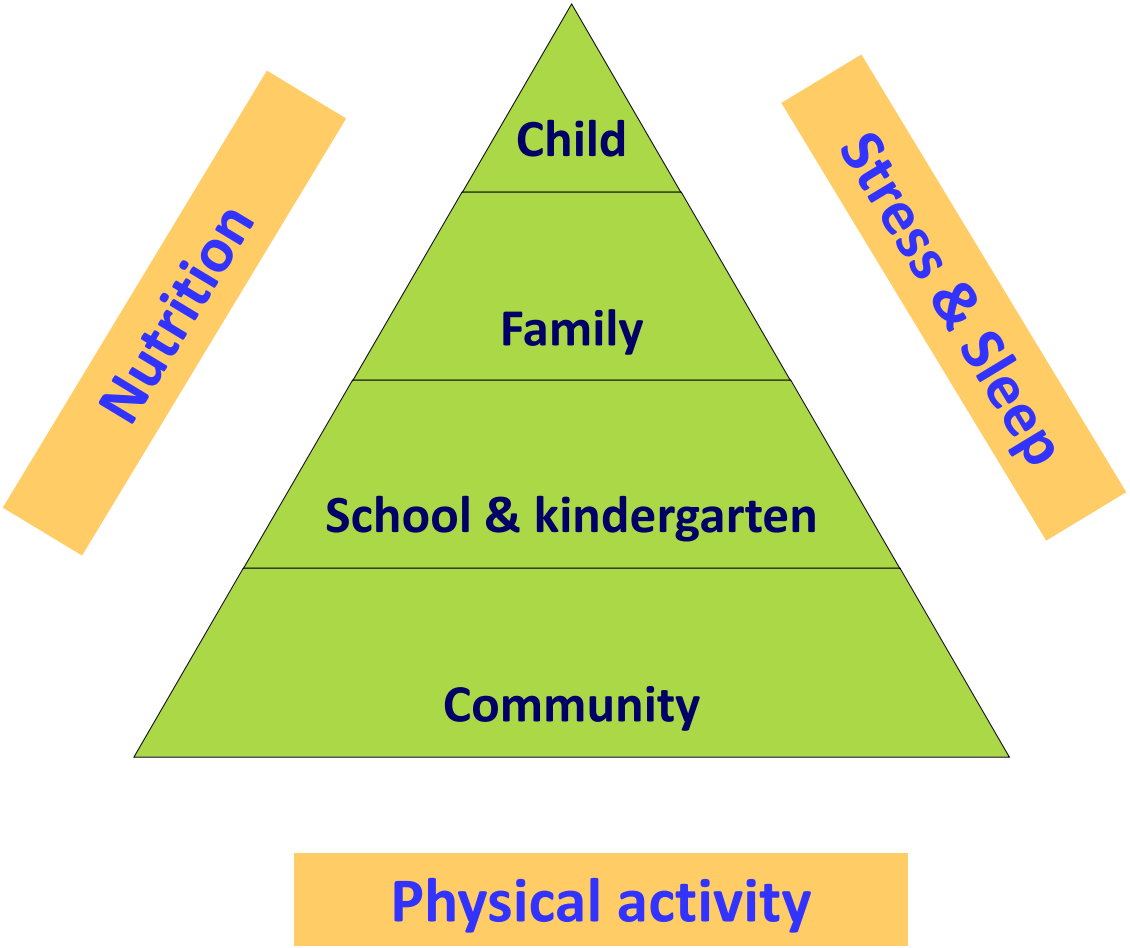
Alingsås: Control

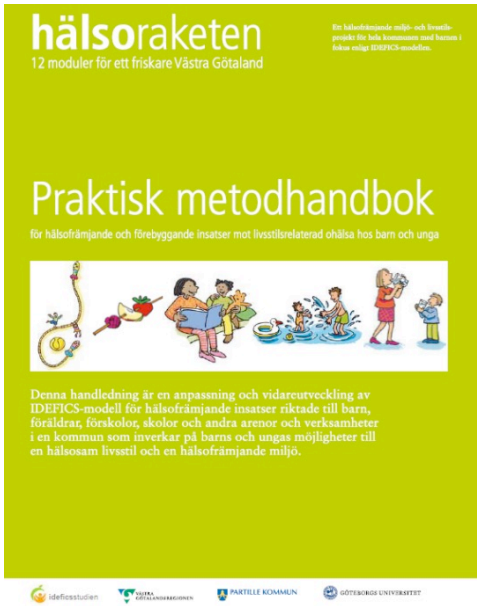
Partille: Intervention

Mölndal: Control

Targets & levels of harmonzed intervention ("Hälsoraketen" in Sweden)

ideficsstudy
Learning healthy living





https://www.yumpu.com/sv/document/read/19775072/halsoraketen-praktisk-metodhandbok-vastra-gotalandsregionen

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IDEFICS intervention: Key messages

Nutrition	Physical activity	Stress control
Increase water consumption	**Reduce time spent watching TV**	Spend more time together
Increase daily fruit and vegetables consumption	**Increase physical activity**	**Adequate sleep time**

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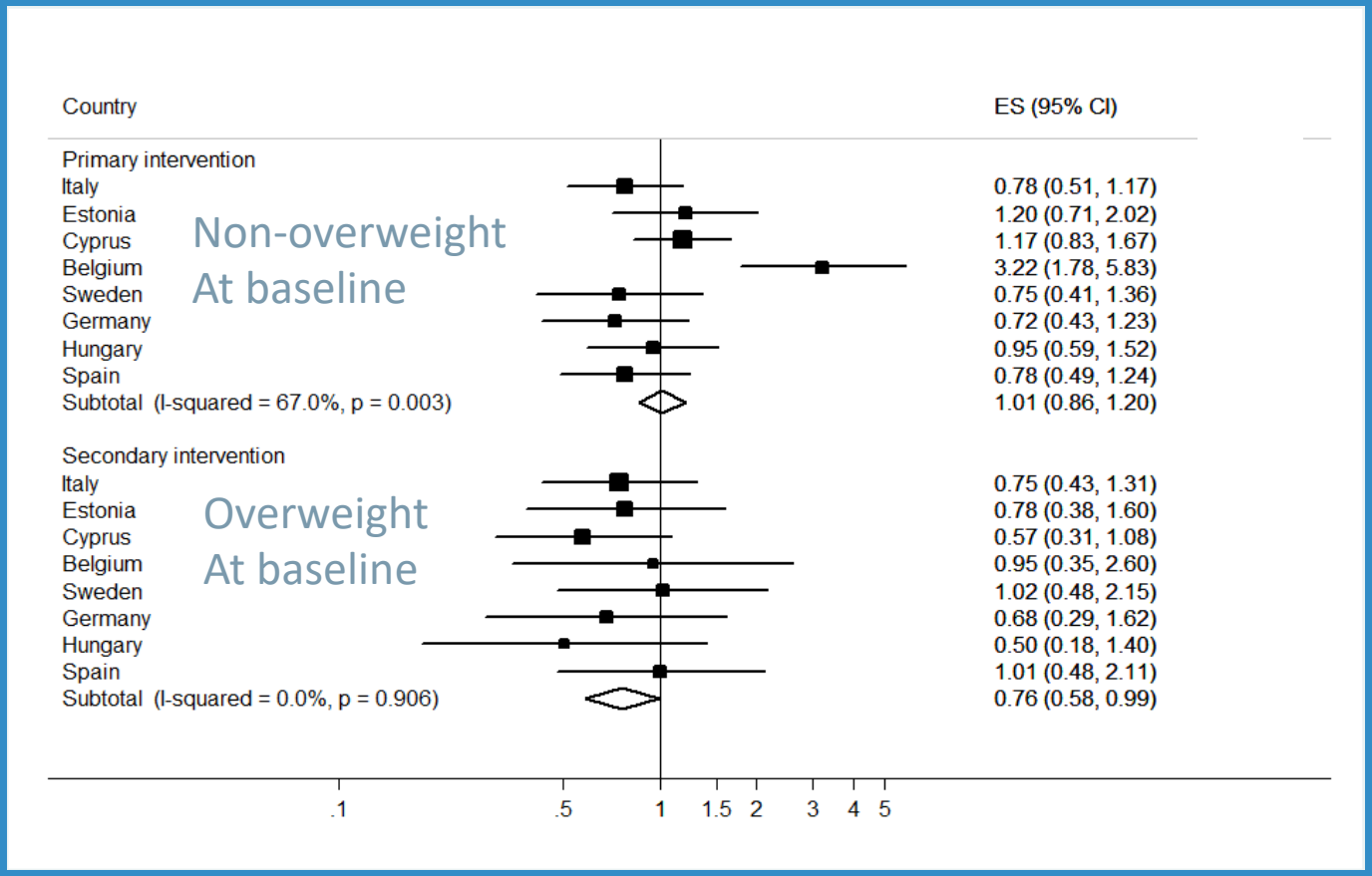
Did 1-year intervention work?

- Intervention normalized weight in children with OWOB-



(Lissner, Obesity Research, 2015)

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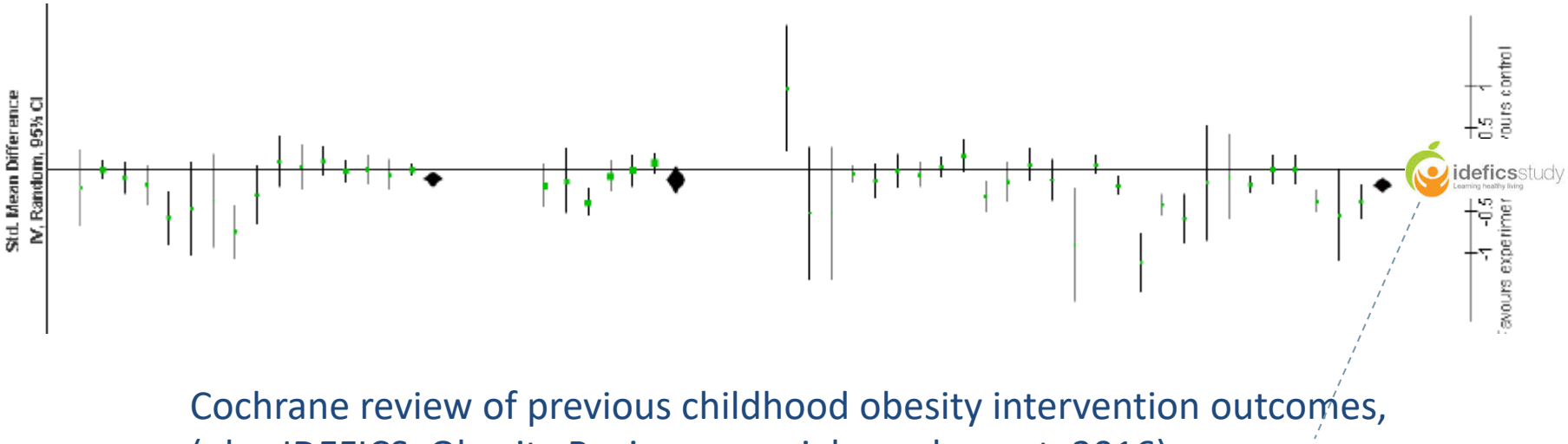
THE COCHRANE COLLABORATION®

physical activity dietary physical activity/dietary



Cochrane review of previous childhood obesity intervention outcomes, (plus IDEFICS, Obesity Reviews, special supplement, 2016)

Did the intervention have a longer-term impact on metabolic health?

- Six years later: I.Family study followed original cohort (n=16,229)
  - from ages 2-9 y to 9-16 y
- Physical examinations including:
  - BMI status (Cole z-scores) n=6,065
  - Additive metabolic syndrome risk score* n=3,639
    - WC, BP, HOMA-IR, TG, HDL-C
    - Similar follow-up rates in intervention and control groups

* Similar to Eisenmann 2008

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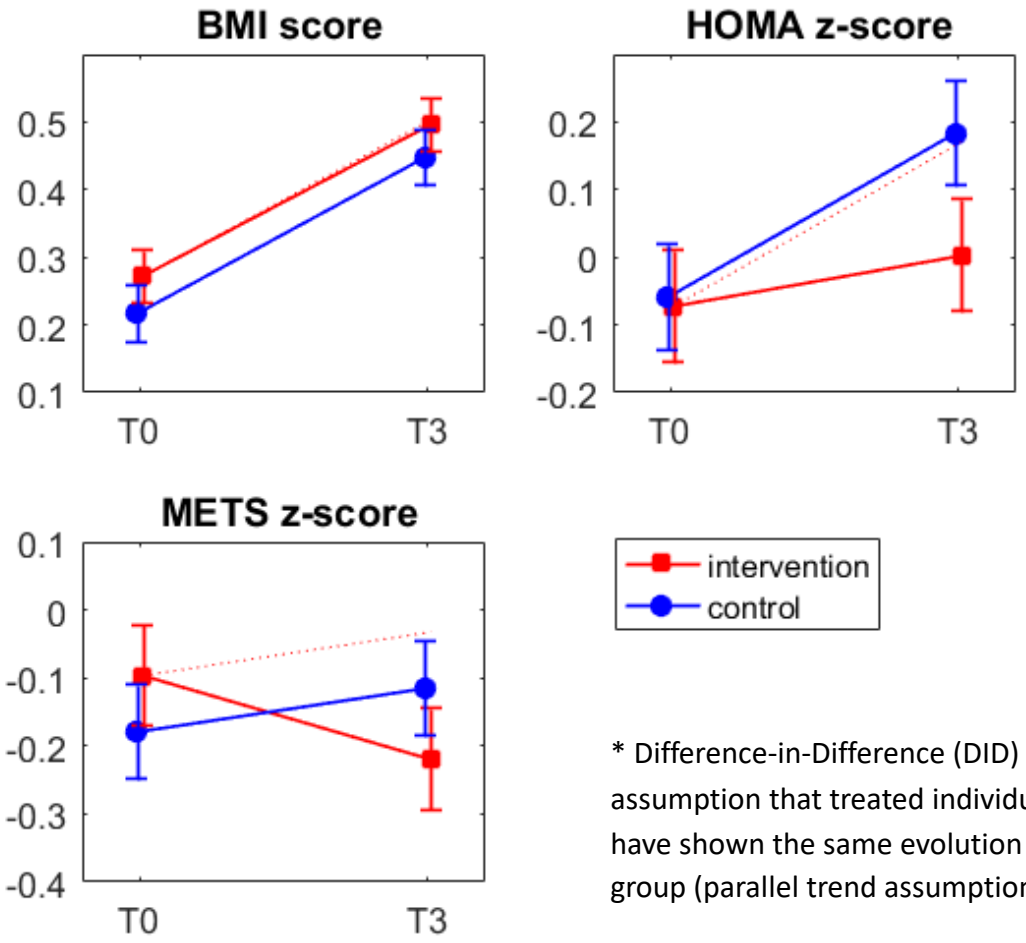
SEVENTH FRAMEWORK PROGRAMME

Intervention effect = difference between observed mean values in the treated at T3 followup and the mean value that would have been expected if they had not received a treatment (red dotted line)*



* Difference-in-Difference (DID) analysis, based on the assumption that treated individuals left untreated would have shown the same evolution over time as the control group (parallel trend assumption).

Difference in differences (DID) using a repeated-measures model [a]

Outcome	Intervention effect = difference in differences (DID)
BMI (Cole 2012)	-0.01 (-0.05, 0.04)
HOMA	-0.17 (-0.32, -0.02)*
Met Score	-0.19 (-0.28, -0.09)***

[a] adjusted for sex, country, age at baseline (T0) and for within-subject correlations = 0.69 (z-BMI), 0.12 (z-HOMA), 0.49 (METS)

Conclusions – *very preliminary*

Metabolic risk trajectories in intervention and control groups during the transition to adolescence:

- No differences-in-differences in BMI after 6 years
- Changes in metabolic score and HOMA favoring intervention group, despite no DID in BMI

→ *Long-term follow-up in intervention studies for prevention of obesity in children may observe improvements in metabolic health that are "beyond BMI".*

Thank you for your attention!

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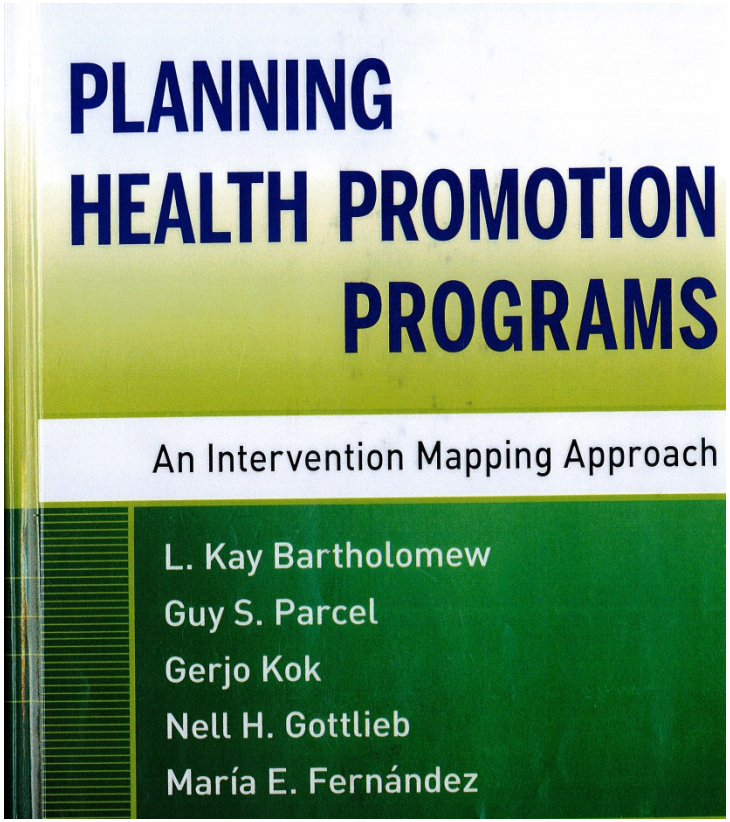
SEVENTH FRAMEWORK PROGRAMME

"The biggest problem in the world could have been solved when it was small"
Witter Bynner 1881-1968, poet, writer, scholar

Intervention Mapping Approach



Step 1: assess problem and its behavioral and environmental causes

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

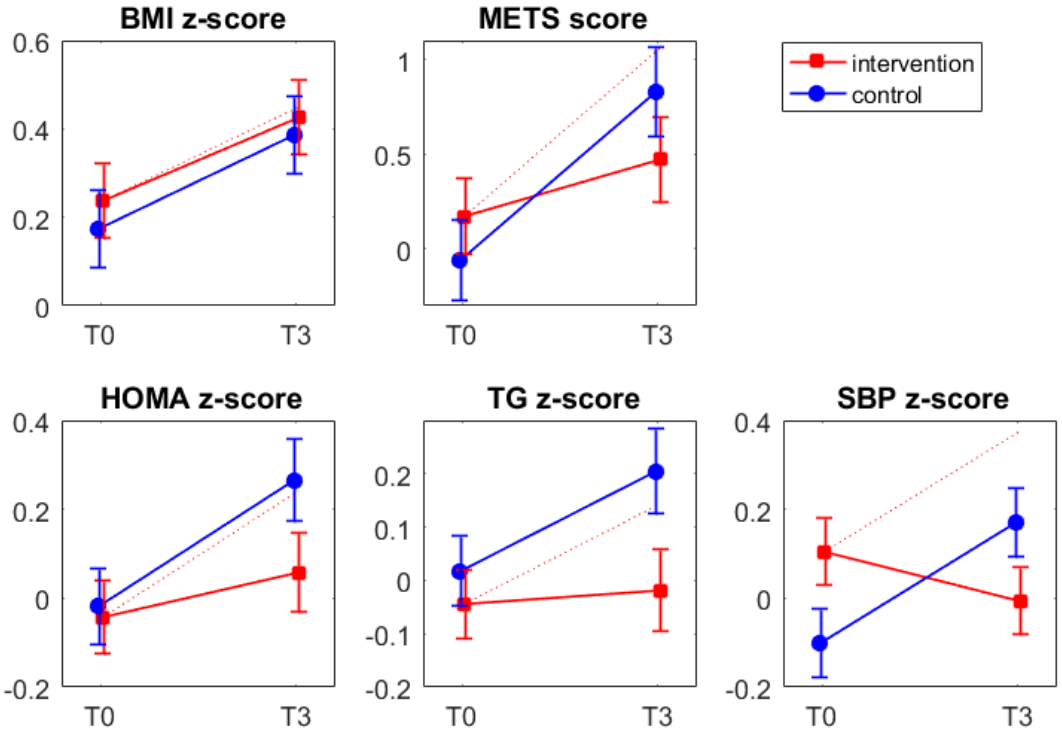
Step 3: planner seeks theory best methods for changing behaviors and structures

Step 4: development of protocol and materials

Step 5: program implementation

Step 6: Evaluation

Intervention (DID) effect given by the difference between observed mean values in the treated at T3 followup and the mean value that would have been expected if they had not received a treatment (red dotted line)

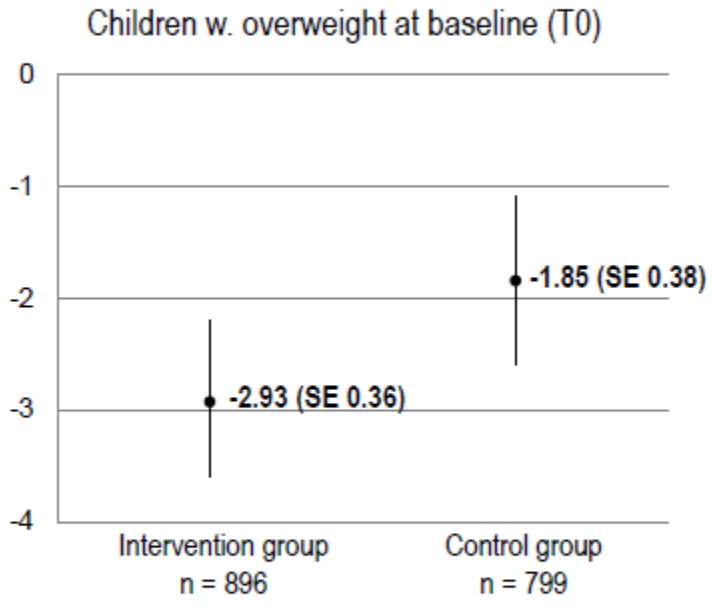


Subsample with all measures available

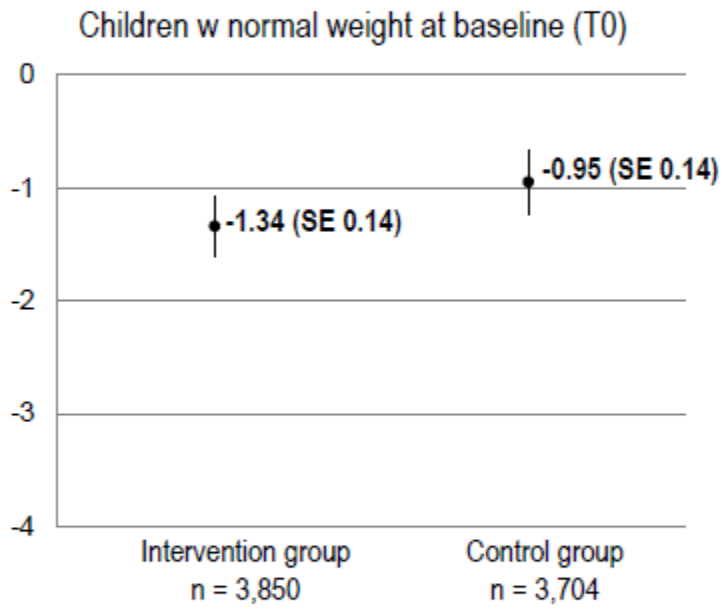
Complete case analysis

Outcome	Intervention effect = DID
BMI z-score (Cole 2012)	-0.02 (-0.11, 0.07)
METS score	-0.69 (-0.98, -0.39)***
(z – METS score	-0.23 (-0.33, -0.13)***
Waist circumference z-score	0.08 (-0.04, 0.20)
HOMA z-score	-0.24 (-0.40, -0.08)**
SBP z-score	-0.39 (-0.50, -0.28)***
DBP z-score	-0.54 (-0.66, -0.42)***
HDL z-score	-0.07 (-0.16, 0.03)
TG z-score	-0.18 (-0.29, -0.06)**

Change from T0 to T1 in propensity for consuming sugar (%)



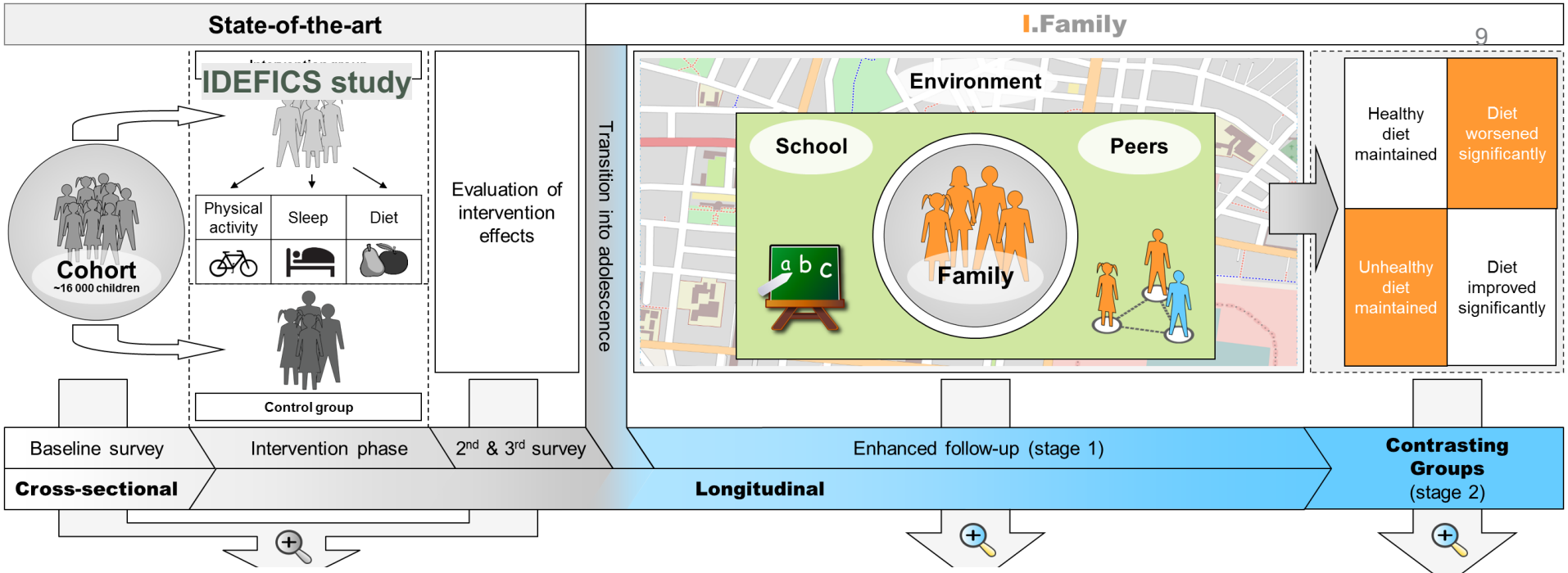
P-value = 0.02



P-value = 0.048

Models adjusted for country, sex of the child, age and propensity for consuming sugar at baseline

I.Family: Determinants of food intake during transition to adolescence



www.idefics.eu

Determinants							
Assessment	FFQ 24h dietary recall	Quest. Accelero-meters	Quest.	Quest.	Saliva	Urine Blood	Parental quest. School quest. GIS

per child

Outcome	Lifestyle & nutrition related diseases and disorders		
	Overweight & Obesity	Musculoskeletal disorders	Insulin resistance
Assessment	Anthropometry	Ultrasonography	Biomarkers

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Determinants														
Assessment	Neuro-psych. tests & quest.	Quest. Accelero-meters	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

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