

Efficacy comparison of two programs for lifestyle change promotion directed to school children for obesity prevention: the Belo Horizonte Heart Study

Minas Gerais State Health Secretariat - Brazil

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Disclosure Statement of Financial Interest

I, Robespierre Costa Ribeiro **DO NOT** have a financial interest/arrangement or affiliation with one or more organizations that could be perceived as a real or apparent conflict of interest in the context of the subject of this presentation.

TIRE 10! Project: Cluster randomized controlled, multicomponent health-promotion community trial

$$n = \frac{[z_{1-\alpha/2}\sqrt{2\bar{p}(1-\bar{p})} + z_{1-\beta}\sqrt{\bar{p}_1(1-\bar{p}_1) + \bar{p}_2(1-\bar{p}_2)}]^2}{(\bar{p}_2 - \bar{p}_1)^2}$$

- To avoid **intra-class correlation**, the **design effect** was considered -- calculated to be 2.069 for the sedentary lifestyle variable in a previous study
- Each sample group: 403 x 2.069 = 834 children
- Final sample-size target*: 1668 + 500 = 2168 students, or **≈ 2200 students**.

* Assumes **≈30% attrition**

Behaviors Targeted for Change (Assessed by Questionnaire)

- Increased consumption of **fatty foods**,
- Decreased **F&V** intake (< 5 portions/day),
- Decreased **PA** (< 30 to 60 minutes a day of moderate to intense PA),
- Increased time spent in **sedentary activity**
 - Type I** - TV, DVD - for more than 2 hours a day
 - Type II** - games and computer use - for more than 2 hours a day

Cluster randomized controlled, multicomponent health-promotion community trial

Sample:

18 Elementary schools (public & private)

↓

n_{calc} : 2,200 children

Intervention (TAKE 10!®)

1191 (58.4%)

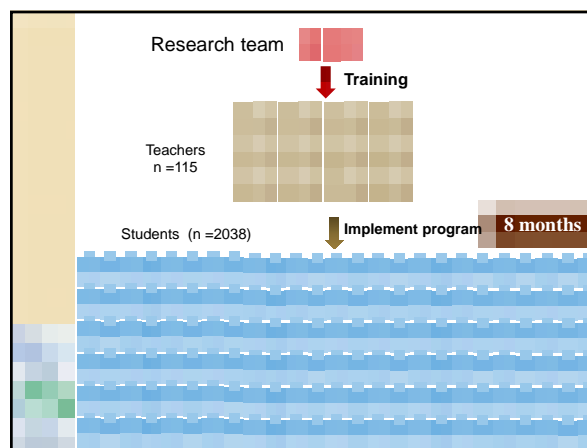
Comparison (control)

847 (41.6%)

Agita Galera "Shake it up, kids!"

2,038 children

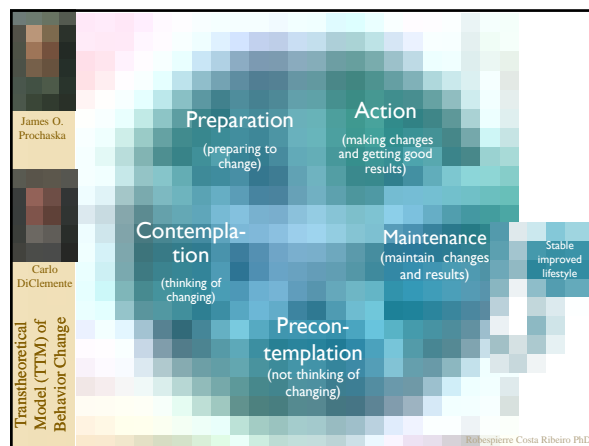
17% Lost



Matching: Intervention vs. Control			
Table 1:	Frequency distributions of the baseline covariates in the intervention and comparison schools		
INTERVENTION		COMPARISON	p-value
GENDER			
Girls	582 (50.4%)	399 (48.4%)	0.378*
Boys	572 (49.6%)	425 (51.6%)	
AGE			
Mean	9.4	1.5	0.09**
Standard deviation	9.3	1.6	
MOTIVATIONAL LEVEL (teachers)			
Motivated	24 (58.5%)	15 (41.7%)	0.140
Not motivated	17 (41.5%)	21 (58.3%)	
WEIGHT			
Excess bodyweight	166 (25.2%)	119 (25.9%)	0.809*
Normal weight	492 (74.8%)	371 (74.1%)	
* Pearson's Chi-Square test ** Student's T-test In parentheses: Control, N (%)			

* Pearson's Chi-square test ** Student's t-test

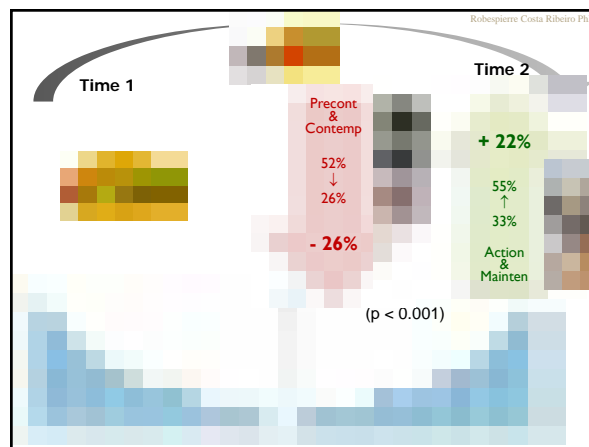
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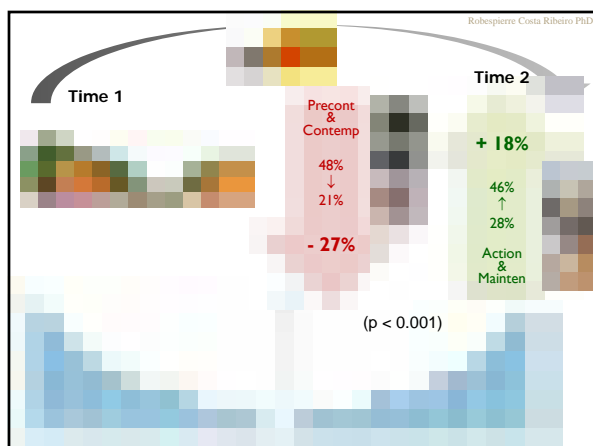
Stage of behavior change: Reduction in fatty foods consumption										
STAGE OF BEHAVIOR CHANGE	INTERVENTION (TIRE 10)						COMPARISON (Agita Galera)			
	TIME 1		TIME 2		p Value*	TIME 1		TIME 2		p Value*
	n	%	n	%		n	%	n	%	
	FATTY FOODS CONSUMPTION									
Precontemplation ↓	350	32%	92	10%	<0.001	120	16.4	165	25.0	0.045
Contemplation ↓	217	20%	154	16%		87	11.9	73	11.1	
Preparation ↑	208	19%	321	34%		197	26.9	125	19.0	
Action ↑	162	19%	203	21%		109	14.9	103	15.6	
Maintenance ↑	159	14%	189	20%		220	30.0	193	29.3	

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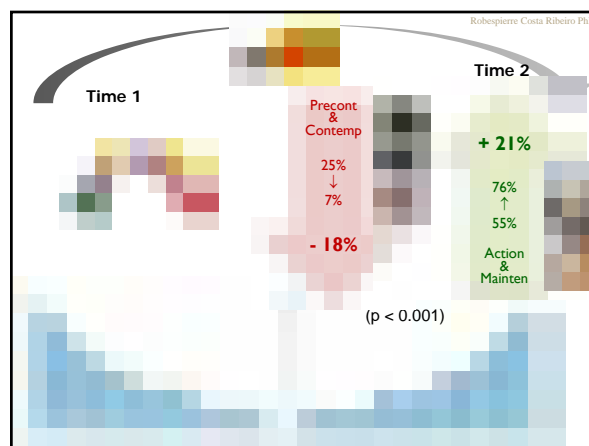
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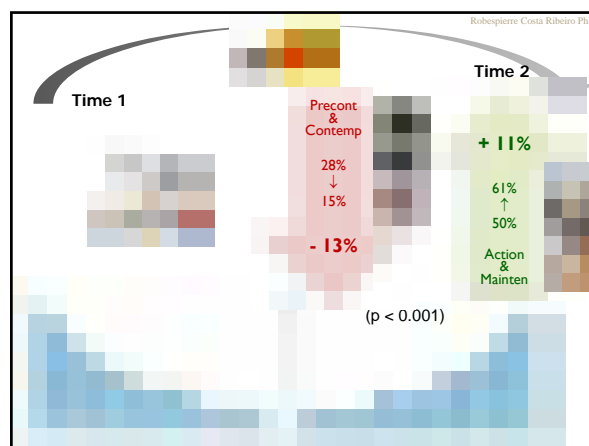
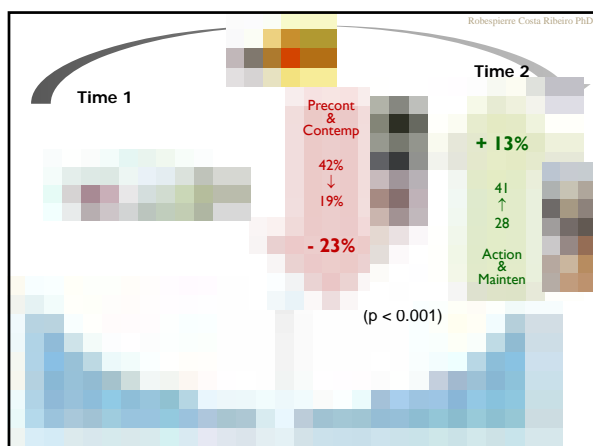
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Factors associated with improvements in the behavior-change stages*				
Factors (variables)	Ratio	RR (Relative Risk)	CI _{95%}	
			Inf.	Sup.
Reduced Fatty Food Consumption				
Intervention group (TAKE 10!)	TAKE 10!/Agita galera	1.79	1.61	2.02
Teachers Motivational Level	High / Low	1.81	1.93	3.48
School status	Public/ Private	1.22	1.06	1.41
Fruit & Vegetables Consumption (≥ 5 portions/day)				
Intervention group (TAKE 10!)	TAKE 10!/Agita galera	1.78	1.58	2.07
Teachers Motivational Level	High / Low	1.88	1.64	2.24
School status	Public/ Private	1.28	1.10	1.48

* Multivariate analysis by Poisson model with Generalized Estimating Equations (GEE) methods (which consider intracluster correlation of the studied outcomes)

Factors associated with improvements in the behavior-change stages*				
Factors (variables)	Ratio	RR (Relative Risk)	CI _{95%}	
			Inf.	Sup.
Improved physical activity				
Intervention group (TAKE 10!)	TAKE 10/Agita galera	1.67	1.43	2.11
Teachers Motivational Level	High / Low	1.62	1.43	1.91
School status	Public/ Private	1.16	1.00	1.35
Sedentary activities – I (TV/DVD ≤ 2h/day)				
Intervention group (TAKE 10!)	TAKE 10/Agita galera	1.75	1.57	2.01
Teachers Motivational Level	High / Low	1.86	1.66	2.13
School status	Public/ Private	1.20	1.02	1.43
Sedentary activities – II (Games/Computer ≤ 2h/day)				
Intervention group (TAKE 10!)	TAKE 10/Agita galera	2.08	1.86	2.36
Teachers Motivational Level	High / Low	1.96	1.66	2.45

Clinical significance of the association of intervention program & behavior improvement in post-intervention time 2						
BEHAVIOR	BEHAVIOR IMPROVEMENT					
	INTERVENTION				COMPARISON	
	(TIRE 10!)		(Agita Galera)		ARR	NNT
	n	%	n	%		
Fatty food consumption	580	63.4	195	32.3	0.311	3.21
Fruit & Vegetable consumption	546	59.7	172	28.3	0.314	3.18
Physical activity	459	50.9	135	22.2	0.287	3.48
Sedentary Activities (TV/DVD)	516	57.7	168	28.2	0.295	3.39
Sedentary Activities (Game/Comp)	400	45.4	163	29.5	0.159	6.29

ARR = Absolut Risk Reduction, NNT = Number Needed to Treat

Population Attributive Risk percentage (PAR) of the intervention program on changing unhealthy behaviors	
I. Children improving at least 1 behavior	
• Reduced fatty food consumption	66.4%
• Increased F & V consumption	64.7%
• Increased physical activity	60.1%
• Reduced sedentary TV (screen time)	66.5%
• Reduced sedentary Cp (screen time)	48.9%
II. Children improving all 5 behaviors	
• Improved all five behaviors	99.4%

DISCUSSION - Matching

Table 1 (continued)

	INTERVENTION	COMPARISON	p - value
SCHOOL STATUS			
Private	505 (42.4%)	221 (26.1%)	<0.001*
Public	685 (57.6%)	626 (73.9%) ↑	
"PREPARATION" (behavior stage)			
Fatty food consumption	208 (19.0%)	197 (26.9%) ↑	<0.001*
F&V consumption	274 (25.1%)	212 (28.7%) ↑	
Physical activity	214 (19.9%)	196 (13.2%)	
Sedentary behavior (TV/DVD)	492 (16.9%)	371 (28.2%) ↑	
Sedentary behavior (games/computers)	129 (12.0%)	85 (12.2%)	

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LIMITATIONS

- **Control group:** Absence of a third no-intervention control group
- A third no-intervention control group would be **unethical** since there is already a **similar program** offered by the Brazilian Ministry of Health
- **Main outcomes:** Absence of an **anthropometric and/or behavior primary outcomes**
- Did not measure changes in weight & adiposity distribution, specific food eating frequency, or PA/sedentary direct parameters.
- A **health-centered**, rather than a **weight-centered**, approach directed the study outcomes.*

* Berg F, Buechner J, Parham E. Weight Realities Division of the Society for Nutrition Education. Guidelines for childhood obesity prevention programs: promoting healthy weight in children. J Nutr Educ Behav. 2003; 35 (1): 1-4.

CONCLUSION

TIRE 10! intervention program was highly **effective** in **moving** children closer to **modifying** their eating habits, physical activity and time spent in sedentary behaviors.

It promoted **healthy behavior changes** and has **great potential** for reducing the incidence & prevalence of **excess body weight** in children and its future comorbidities.

THANK YOU!



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