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Problem statement

European School Fruit Scheme in North Rhine-Westphalia (Germany) – Does it work?

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Introduction

Theoretical background

- · Nutrition behavior is a complex construct with multiple interdependencies (e.g. Glanz and Bishop 2010).
- · Personal, behavioral and environmental factors influence children's dietary behavior (e.g. Bandura 1998; see F1).
- · Interventions with a multi-component approach are most promosing to positively affect nutritional behavior (Van Cauwenberghe et al. 2009).

F&V intervention in schools

Fruit and Vegetable (F&V) consumption

• can lower the risks of chronic diseases (e.g. Buijsse et al. 2009).

- are seen as an effective instrument for improving F&V intake by children (e.g. Howerton et al. 2007).
- have been introduced in the EU in 2008 (European School Fruit Scheme (SFS)).

• falls considerably below the minimum intake of 5 servings F&V per day (WHO 2003).

• amounts to less than 2 servings per day for 70% of children in Germany (Mensink et al. 2007).

• started in 355 elementary & special-need schools in North Rhine-Westphalia (NRW; Germany) in 2010.

Research objectives & Study design F2: Study design **Research objectives Basic population:** 1 Analyse the acceptance of the SFS in NRW. 355 participating elementary & special-need 2 Examine the scheme's impact on children's total F&V intake schools in NRW frequency. ➡ 3 Identify potential influencing factors. Study population: - 8 participating elementary schools - 2 elementary schools not taking part Study design & Study population (control schools) • Multi-component study with a pretest and after 1 year of intervention-Selection criteria: start design including intervention and control group (see F2). - social deprivation (low/high) Children and teachers were interviewed. - nutrition education involvement (low/high) • n=499 children, 2010: 2nd & 3rd graders; 2011: 3rd & 4th graders. ➡ • Teachers at follow up (2011). follow up baseline (2010) (2011)

Questionnaires

Methodology & Data

Children:

1st part: 24h food recall filled in as a whole class exercise, developed within the scope of "Grab 5 Project" in the UK (Edmunds and Ziebland 2002) and adjusted for this study (see F3).

2nd part: guestions concerning knowledge, attitudes and beliefs.

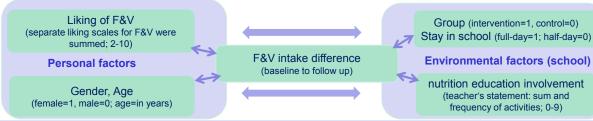
Teachers:

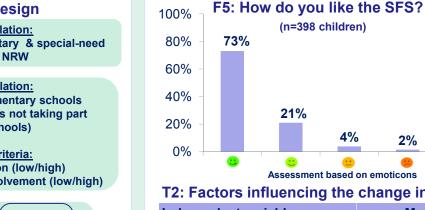
Questions about organization, assessment of the program and accompanying nutrition education measures.

Analysis

- F&V intake frequency per day was counted, based on the 24h food recall (follow up included SFS F&V).
- Potatoes, F&V juices and most of the combination foods were excluded.
- Wilcoxon rank-sum test was conducted to identify the difference in F&V consumption between baseline and follow up.
- Ja 🖾 Nein 🗆 • To detect and control for potential influencing factors of the intervention three mixed linear regression models were estimated (see F4).

F4: Structure of variables in the linear mixed regression models





F3: 24h recall, first page

Fin Tag in deinem Peh

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van Schwarg Bod mit Käse

Und Tomater

Hast Du zum Frühstück etwa Ja 🖾 Nein 🗆

n? Orangen

Hast Du gestern vor der Schule Fern gesehen oder Computer gespielt?

| T2: Factors influencing the change in F&V intake between baseline and follow up (Mixed linear regression models) | | | | |
|--|---|--|--|--|
| Independent variables | Model I overall Coeff. (Stand. Err.) | Model II lower baseline intake Coeff. (Stand. Err.) | Model III higher baseline intake Coeff. (Stand. Err.) | |
| Constant | -1,22 (1,03) | -2,40 (0,94) ** | -0,77 (1,92) | |
| Group | 0,91 (0,21) *** | 1,12 (0,20) *** | 0,45 (0,32) | |
| Age | 0,09 (0,10) | 0,13 (0,09) | 0,03 (0,18) | |
| Gender female | 0,13 (0,15) | 0,31 (0,14) ** | 0,40 (0,28) | |
| Stay in school (half-day/full-day) | 0,21 (0,17) | -0,09 (0,15) | 0,46 (0,31) | |
| Nutrition education | 0,0003 (0,0002) | 0,0002 (0,0002) | 0,0005 (0,0003) | |
| Liking of F&V (at baseline) | 0,003 (0,05) | 0,15 (0,04) *** | -0,09 (0,10) | |
| Wald Chi ² (6); (Prob>chi ²) | 24,54; (0,0004) | 58,29 (0,0000) | 9,98 (0,1255) | |

Results

Group

Control

Intervention

- I. overall (n=

- I. overall(n=1

- II. lower

- III. highe

- II. lower

- III. highe

- The SFS in NRW is highly accepted by the children (see F5).
- In general children show a very low F&V consumption frequency well below the recommendation at baseline (see T1). Intervention group:
 - significant positive effect in total F&V consumption frequency per day.
 - however, significant increase only for children with a low F&V intake frequency at baseline (see T1 & T2).
- Gender (girls) and liking of F&V are positively associated with a higher increase (see T2).

Conclusions

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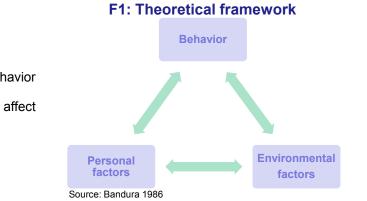
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- There are few studies that measure young children's F&V consumption through self-reporting.
- Using a validated questionnaire, an intervention effect (change in F&V in frequency) could be detected.
- · Although multi-component intervention studies are known to advance int success, nutrition education on class level shows no significant impact.
- \rightarrow Possibly there is a general estimation problem resulting from the sma unbalanced number of individuals on class level.



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| T1: F&V consum | ption frequency | / – baseline and | follow up |
|----------------|-----------------|------------------|-----------|
| | | | |

| | Baseline | Follow up | |
|---|----------|-----------|--|
| 390) | 1,26 | 2,02 *** | |
| · baseline intake (0-1x) (n=257) | 0,44 | 1,77 *** | |
| er baseline intake (>1x) (n=133) | 2,85 | 2,50 ** | |
| 1 09) | 1,31 | 1,18 | |
| · baseline intake (0-1x) (n=70) | 0,50 | 0,71 | |
| er baseline intake (>1x) (n=39) | 2,77 | 2,03 ** | |

Data presented in unadj. means; Wilcoxon runk-sum test ; Significance: ***p ≤ 0,01; **p ≤ 0,05

Data nested in classes (34); Significance: *** $p \le 0,01$; ** $p \le 0,05$

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