Transition towards vegetarian meals in school canteens in France: what does a conjoint assessment of nutritional and environmental impact, and acceptability by children and their parents tell us?

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School canteens in France

• A paying service proposed to parents by public institutions, with a wide array of directives in order to address
  • Nutritional composition
  • Environmental impact
Vegetarian meals in school canteens

• Vegetarian meals: a new legal constraint
  • Egalim directive, 2019: experimental
  • Climat & Résilience directive, 2021: mandatory

• In addition to other regulatory measures towards a more sustainable offer:
  • ≥ 50% of the offer (in €) should be constituted of food products with quality indicators (e.g., PGI)
  • Among which ≥ 20% organic
Questions related to vegetarian meals

• Environmental impact
• Adequacy to children’s nutritional needs
• Acceptability by children
• Acceptability by parents

• => A case study in Dijon, France
School catering in Dijon

- 1 central kitchen (cold link)
- 8,000 meals/day
- 49 staff members

- Satellite restaurants: 39 preschools, 38 primary schools
- Children help themselves (*except Covid*)
- ~750 staff members (service and animation)

- Social cost* applied to families (*indexed on parental income*)
- Average cost to families: 3.36 € per meal

*Source: www.dijoncestcapitale.fr
Source: www.dijon,fr
Source: www.bienpublic.com
VG and non VG meals

Nutritional quality
Mean adequacy ratio (%)

Environmental impact
GHGEs (kgCO²eq)

2019 Dijon school canteens 249 menus

Vegetarian school meals are of good nutritional quality
Vegetarian school meals are of low environmental impact

See also
For all menus:
19 of 23 nutrients are in satisfactory amounts (≥33%).

For non-vegetarian menus:
Insufficient (<33%) coverage of nutritional requirements for calcium, ALA, vit C, and D.

For vegetarian menus:
Coverage of nutritional requirements is insufficient (<33%) in potassium, zinc, and DHA.
Measuring children’s liking of meals

April – May 2021

38 feedback devices
All primary schools
Inside the canteen buildings
Staff information and training

June 2021

Validity studies
Reliability
3 questionnaires
External validity
1 questionnaire

September 2021 – June 2023

“How much did you like the meal today?”
Everyday right after lunch
All children in primary schools (~4000/day)
Main dish only

Dahmani, Franzon, Valcke, Grenier, Feyen, Nicklaus, Marty, in prep
Comparison liking of VG – non VG dishes

Mixed model (proc mixed, SAS): liking = protein dish type + side dish type + school restaurant (random)

### Fixed effects fixes (Type III)

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<thead>
<tr>
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<th>F</th>
<th>Pr &gt; F</th>
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<tr>
<td>Protein dish</td>
<td>0.16</td>
<td>0.687</td>
</tr>
<tr>
<td>Side dish</td>
<td>169.3</td>
<td>&lt; 0.001</td>
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### Protein dish:
- Non-VG (n=91)
- VG (n=33)

### Side dish:
- Starch (n=46)
- Fries (n=10)
- Pulses (n=4)
- Vegetables (n=64)

Les moyennes avec des lettres différentes sont différentes au seuil α = 5%

**Children like vegetarian dishes as much as non-vegetarian dishes**

Data Sept 21 – June 22
Comparison liking of VG – non VG dishes

Mixed model (proc mixed, SAS) : liking = protein dish type + side dish type + school restaurant (random)

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<tr>
<th>Fixed effects fixes (Type III)</th>
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<tr>
<td>Protein dish</td>
<td>19.6</td>
<td>&lt; 0.001</td>
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<tr>
<td>Side dish</td>
<td>181.7</td>
<td>&lt; 0.001</td>
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Protein dish:
- Beef (n=15)
- Pork, poultry (n=32)
- Fish (n=23)
- Eggs and/or cheese (n=16)
- Vegetal (n=7)

Side dish:
- Starch (n=46)
- Fries (n=10)
- Pulses (n=4)
- Vegetables (n=64)

Data Sept 21 – June 22

Les moyennes avec des lettres différentes sont différentes au seuil α = 5%

Children like especially vegetarian dishes with eggs&cheese
What do parents want?

• Project to offer a 2\textsuperscript{nd} optional VG meal > January 2023
• Estimation of parental willingness to opt for
  • This 2\textsuperscript{nd} optional VG meal
  • An optional VG meal everyday
• On line survey sent to all parents Sept-Nov 22

• 50\% of parents would opt for a 2\textsuperscript{nd} VG meal per week
• 28\% of parents would opt for a VG option every day
Conclusions

• VG meals are of equivalent nutritional quality, and emit much less CO2 eq. than non vegetarians meals
• Children enjoy as much VG meals as non vegetarians meals
  • They like meals with eggs&cheese dishes slightly more than vegetal meals
• Half of parents would opt for a 2\textsuperscript{nd} vegetarian meal / week, and 28\% for a vegetarian option everyday
• Barrer to implementation:
  • Attitudes of some staff members
  • Willingness to go beyond the national directives by politician decision-makers
  • « Vegetarism » became a political topic
  • Hard to bring the debate back to rationality
Perspectives

The feedback devices:
A tool for steering the food transition

- Daily analysis of the appreciation of new recipes
- Data transmitted to the cooks

**Perspective:**
*Study the correlation between food liking and food waste data*

Taste and food education:
A lever for the food transition

- The pleasure of eating is built through food experiences
- Three dimensions that can be mobilized during interventions: sensory, cognitive, interpersonal

**Perspective:**
*Evaluate the impact of a taste and nutrition education program on children’s liking of canteen dishes*
Thank you for your attention

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