Interventions to improve the quality of the grocery shopping

Carmen Piernas
Health Behaviours
University of Oxford
• Dietary habits, healthy or unhealthy, start in the grocery store. Once food is at home it’s likely it will be eaten

• Governments around the world are encouraging the food industry to take action to support healthier choices

• Lack of current evidence on effective strategies for intervention within grocery stores, or at the individual level to encourage healthier choices
Experimental Online Shopping Studies

Building evidence base for testing in real scenarios
Experimental Online Supermarket

Fresh Food  Bakery  Food Cupboard  Frozen Food  Drinks

Sweet Biscuits (229 products)

- Jacobs Lemon Puff 200G  £1.53
- Border Biscuits Crumbles 150G  £1.00
- Fox's Whipped Cream Sinful Strawberry 200G  £1.49
- Oreo Vanilla Snack Pack 176G
- Fox's Jam Sandwich Creams 150G
- Tesco Digestive Biscuits 500G
- Tesco Mint Chocolate Fingers 8Pk

My Trolley
Trolley Total  £7.10

Checkout

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Product</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Remove</td>
<td>Tesco Value Beef Frying Steak 300G</td>
<td>£1.65</td>
</tr>
<tr>
<td>1</td>
<td>Tesco Baker's Soft 6 Tasty White Finger Rolls</td>
<td>£0.60</td>
</tr>
<tr>
<td>1 Remove</td>
<td>Mccain Hash Browns 700G</td>
<td>£1.40</td>
</tr>
<tr>
<td>1 Remove</td>
<td>Granny Smith Apple Pack Min Count 6</td>
<td>£1.80</td>
</tr>
<tr>
<td>1 Remove</td>
<td>Hoads Farm Free Range Eggs Large Box Of 6</td>
<td>£1.65</td>
</tr>
</tbody>
</table>
Environmental vs. Individual Interventions

Aim

To test the effectiveness of:

a) food swaps with less saturated fat

b) prominent positioning of lower saturated fat foods in the list

Outcome: saturated fat content of the shopping basket

Prominent positioning and food swaps are effective interventions to reduce the saturated fat content of the shopping basket in an experimental online supermarket: a randomized controlled trial. Koutoukidis D; Jebb SA; Ordóñez-Mena JM; Noreik M; Tsiountsioura M; Kennedy S; Payne-Riches S; Aveyard P; Piernas C. International Journal of Behavioral Nutrition and Physical Activity (online June 27, 2019). Trial registration: ISRCTN13729526
Factorial 2x2 randomised controlled trial

- Prominent position
- Both
- Swaps
- Prominent position
- Neither (control)
- +
- -
- +
- -

Swaps

Prominent position

Neither (control)
Shopping list

- Milk for everyday use
- Butter or margarine for everyday use
- Cheese for use in a sandwich or light meal
- Ready-to-eat savoury entree item
- Ready-to-eat individual chilled desserts
- Meat/fish/vegetarian alternative to cook for 4 people
- Dessert for a meal for 4 people
- Something to eat with a hot drink
- A sweet snack item to eat now
- A savoury snack item to eat now
Baseline characteristics

- Age mean (SD): 38 (12) years old
- % Male
- % BMI ≥ 30 kg/m²
- % White background
- % Shopped online for groceries
Two-way analysis of variance for participants that bought $\geq 5$ items
% energy from saturated fat – Subgroup analysis

**Basket Cost**
- Combined
- Altering order
- Swaps
- Control

**Sex**
- M: Male
- F: Female

**Age**
- < M: < Median
- > M: > Median

**Ethnic group**
- Non-White
- White

**BMI**
- >30
- <30

**Education**
- Higher
- Lower

**Income**
- Higher
- Low/middle

![Graphs showing subgroup analysis](image-url)
Conclusions

• Interventions to change food purchasing are promising to reduce saturated fat

• An intervention to alter the environment (e.g. prominent position) was more effective than an individual-level intervention (e.g. swaps) requiring conscious decision-making

• Next step: test these strategies in real supermarkets and investigate longer-term effects on food purchasing
Testing Different vs. Similar Swaps

Aim

To test the effectiveness of:

a) Offering out of category but substantially reduced salt alternatives
b) Offering within-category alternatives with minimally less salt

Outcome: salt content (g/100g) of the shopping basket

**HYPOTHESIS:** Offering alternatives with a larger reduction in salt will result in a larger reduction in total salt content of the shopping basket.

**BUT...**

- Are alternatives with a large reduction in salt, possibly out-of-category, acceptable? Reduced utility?

- If these products are out-of-category, do people disengage due to ‘brain drain’?
INTERVENTION

Randomised to either LS or MLS intervention

Swaps offered at point of choice – when items added to basket

Swaps chosen at random within the OLS from all available alternatives

**LOWER SALT (LS)**
- swaps offered which were 5-20% less salt
- Same category

**MUCH LOWER SALT (MLS)**
- swaps offered which were more than 20% less salt
- Same AND different category
## SWAP EXAMPLE IN MLS GROUP

Would you like to try a product with less salt?

<table>
<thead>
<tr>
<th>You chose:</th>
<th>This product has 8% less salt</th>
<th>This product has 22% less salt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lake District Mature Cheddar 400G</td>
<td>£2.66</td>
<td></td>
</tr>
<tr>
<td>Seriously Vintage 350G</td>
<td>£4.49</td>
<td>President Emmental 250G</td>
</tr>
<tr>
<td></td>
<td></td>
<td>£2.69</td>
</tr>
</tbody>
</table>

- **Out of category:** continental cheese
- **Within category:** cheddar

Options:
- **Keep This**
- **Choose This**
- **Show Me Another**
- **Cancel**
Change in total basket salt content

Absolute salt (g) reduction:

LS  -2.9g (CI -3.4, -2.4)
MLS - 8.0g (CI -8.8, -7.2)  \(\rightarrow\) Between group difference -5g (-6, -4) \(P<0.001\)
Swap acceptance was the same in both groups but swaps in the MLS group were ‘larger’

<table>
<thead>
<tr>
<th></th>
<th>LS Mean (SD) (N=476)</th>
<th>MLS Mean (SD) (n=471)</th>
<th>Difference MLS compared to LS (adj*) (95% C.I)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of swaps offered</td>
<td>8.4 (3.46)</td>
<td>15.74 (11.08)</td>
<td>7.20 (6.15, 8.27)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Number of swaps accepted</td>
<td>2.69 (2.36)</td>
<td>4.39 (3.50)</td>
<td>1.72 (1.34, 2.10)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Proportion of swaps accepted</td>
<td>0.34 (0.28)</td>
<td>0.33 (0.26)</td>
<td>-0.00 (-0.04, 0.03)</td>
<td>0.785</td>
</tr>
<tr>
<td>Salt difference per swap (g/100g)</td>
<td>-0.21 (0.10)</td>
<td>-0.46 (0.35)</td>
<td>-0.25 (-0.29, -0.21)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

In the MLS group 68% of accepted swaps were for MLS products
EXPLORATORY ANALYSIS

- Participants who **rated health as an important** consideration accepted **13% more swaps** (p<0.001); reduced salt by an extra -0.03g/100g (95% C.I. -0.05,-0.02 p<0.001)

- Participants who **had previously been advised to reduce salt** accepted **6% more swaps** (95% C.I. 10%, 17% p<0.001);

- **70%** of all participants found the **intervention acceptable** - only 7% didn’t.

- Acceptability of the intervention was associated with greater reduction in salt; -0.04 g/100g with each increasing category of acceptance (95% C.I. -0.05, -0.03 p<0.001).
Conclusions

- Swaps offering a large reduction in salt (e.g. out of category) were acceptable AND achieved a greater reduction in total salt content.

- People health awareness and previous advice to reduce salt influenced acceptance of swaps.

- External validity unknown but engagement was high – people engage in a realistic way but does this cross over to real life purchasing... Intentions versus behaviour?
Summary

• Supermarkets can be more **proactive** encouraging healthier options

• Preliminary **evidence base** that can be tested in real supermarkets
  • Most effective strategies will be hard to be adopted

• **Low cost & scalability** of interventions, cost-effective and likely **beneficial** for the entire population
Thanks

carmen.piernas-sanchez@phc.ox.ac.uk