Do cooking interventions facilitate behavior change and promote positive family environments? Review of the evidence.

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Changes in Home Food Preparation


- Home Economics college courses mid 1950s
- Women’s lib, Home Econ limitation
- Home Ec cut from schools, FACS for few
- Ready meals in stores
- Obesity rate significantly ↑
- Microwaves in 20% HHs
- Food Network launched
- Extension - health/disease not cooking or recipes
- Cooking intervention systematic reviews coverage
- Fast food industry revenue $6 billion
- Fast food industry revenue $199 billion
- AFH - $1.9 billion
- AFH – $10.5 billion
- AFH – $79.5 billion
- AFH - $287 billion
- AFH - $549 billion

- First frozen foods
- First Swanson TV dinner
- Women spent 113 min cooking/day
- Fast food industry revenue $6 billion
- 3.9 AFH, 1.8 FF meals/wk, cook 5 dinners/wk
- Women spent 66 min cooking/day
- Fast food industry revenue $199 billion
- Learning from family member still #1 source

Swanson CNBC.com
Home and away daily energy intake (1965-2008)

Percentage daily energy intake (middle income) US adults by food source

Factors contributing to increased spending on food AFH

<table>
<thead>
<tr>
<th>Year</th>
<th>Billion Spent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>2</td>
</tr>
<tr>
<td>1960</td>
<td>11</td>
</tr>
<tr>
<td>1980</td>
<td>80</td>
</tr>
<tr>
<td>2000</td>
<td>287</td>
</tr>
<tr>
<td>2014</td>
<td>549</td>
</tr>
</tbody>
</table>

Food Away from Home (FAFH) – diet and health

**Diet**

- **Children/adolescents**
  - 12% calories from fast food (NHANES 2011-2012, Vikraman et al. 2013)
  - Fast food - greater total energy, poorer diet quality, more regular soda consumption (NHANES 2003-2008 Powell et al. 2013)
  - Increased sugary drink intake with greater weekly FAFH (Baseline data Project Move, 541 children, Lopez et al. 2012)

- **Adults**
  - Greater percentage energy from FAFH - greater intake fat and cholesterol intake (NHANES 2005-2014 Todd 2017)
  - Lower FV intake with greater frequency FAFH (telephone survey, King County, WA 2008-2009 Seguin et al. 2016)
  - Fast food/full-service associated with sodium intake, fast food with lower vitamin A, full-service with more fat/lower vitamin D (NHANES 2003-2012 An & Liu 2014)

**Health**

- **Adolescents/adults**
  - Higher % body fat with greater use of fast food, other restaurants, home delivery and takeout (community-based studies 2006-2008 MN, Fulkerson et al. 2011)

- **Adults**
  - BMI higher with greater frequency of FAFH (fast food/sit down) (Health Survey WI 2012-2013, 1418 respondents, Bhutani et al. 2018)
  - More frequent AFH/fast food meals – higher BMI, lower HDL-cholesterol; micronutrients declined with increasing frequency AFH meals (NHANES 2005-2010 Kant et al. 2015)
Time spent cooking, US adults (1965-2008)

Mean time spent cooking, of those cooking (minutes per day)

HH management – time spent preparing food, cleaning, laundry, house maintenance
Screen time – non-occupational TV/computer use during free time
Leisure time physical activity – sports and exercise

## Food consumption and spending

<table>
<thead>
<tr>
<th>Frequency/wk</th>
<th>Hours/day preparing, cooking, cleaning up from meals</th>
<th>p-value&lt;sup&gt;2&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 1 hour</td>
<td>1-2 hours</td>
</tr>
<tr>
<td>Fruit (no juice)</td>
<td>6.1</td>
<td>7.1</td>
</tr>
<tr>
<td>Green salad</td>
<td>2.8</td>
<td>3.2</td>
</tr>
<tr>
<td>Vegetables (no potatoes/salad)</td>
<td>10.6</td>
<td>12.1</td>
</tr>
<tr>
<td>Sugar-sweetened beverages</td>
<td>3.3</td>
<td>3.4</td>
</tr>
<tr>
<td>Sweet snacks</td>
<td>2.9</td>
<td>2.6</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Spending $/person/wk</th>
<th>&lt; 1 hour</th>
<th>1-2 hours</th>
<th>&gt; 2 hours</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating out</td>
<td>22.8</td>
<td>16.4</td>
<td>15.1</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Food at home</td>
<td>43.8</td>
<td>44.6</td>
<td>46.5</td>
<td>0.406</td>
</tr>
</tbody>
</table>

1 Seattle Obesity Study, 2008-2009, 1,319 adults, population-based survey.
2 Means adjusted in GLM with age, sex, race, employment, education, income as covariates.

• Observational/qualitative studies (n = 38)
  – Individual level outcomes
    • Lower BMI, health improvements
    • Dietary benefits – indices, nutrient intake, healthier food groups, patterns
    • Family environment
      – Home cooking allowed exploration of food cultures
      – Perceptions of gender roles and cultural belonging influenced by cooking patterns
      – Home food preparation - connections with others, increased adolescent independence
Observational/qualitative studies (n = 38) – home cooking more likely:
- Female, confident, passed skills on to children
- Perceptions of skills – motivation to cook
- Roles of wife, girlfriend, mother – perceived responsibility to provide meals
- Interest in learning to cook, personal goals, nutrition, food costs
- Time (employment, children’s activities – barriers)
- Married, having dependents
- Immigrants and Asian-Americans
Inpatient and community-based cooking interventions (n = 11)

- Socialization – group participation, belonging, sharing common interests
- Self-esteem – concentration, coordination, confidence, accomplishment
- Quality of life – psychological well-being; mediated by healthy food choices
- Affect – less anxiety/agitation, positive affect mediated by healthy food choices, intuitive eating habits
Barriers to home cooking and healthy eating

**Barriers to home cooking**

- Eating away from home provided quality family time, less picky eating and perceived costs
- Early school lunch/after-school sports
  - Children not hungry or home at the typical dinner hour
  - Parents did not want to cook after 8pm
- Preparing/eating a meal at home took more time than driving/eating out
- Overestimated cost of home-prepared compared to take-out and frozen meals.

**Barriers to healthy eating**

- Adults (US/UK) lack of cooking skills/food preparation knowledge
- College students
  - Non-familiarity with cooking, lack of time, dislike grocery shopping, kitchen cleanup
- Men lack skills/confidence, constrained by time/expense
- Mothers (low income/overweight)
  - Reported picky children/food requests, stressful daily events interfered with cooking
- EU adults lack cooking skills, prefer to eat out, limited cooking facilities

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Robson et al. Appetite 2016;96:147-153
Behavior Change Techniques (BCTs) Applied to Cooking Interventions

59 cooking and food skills interventions
- 2 reviews
- 1980-2016

40-item CALO-RE taxonomy
- BCTs
- Coding

Most frequently occurring BCTs
- Across and within
- Theoretical underpinnings

1980-2011 - 25 Research Article
Impact of Cooking and Home Food Preparation Interventions Among Adults: Outcomes and Implications for Future Programs
Marla Reicks, PhD, RD1; Amanda C. Trocholtz, MPH, RD1; Jamie S. Stang, PhD, MPH, RD2; Melissa N. Laska, PhD, RD2

2011-2016 - 34 Systematic Review
Impact of Cooking and Home Food Preparation Interventions Among Adults: A Systematic Review (2011–2016)
Marla Reicks, PhD, RD1; Megan Kocher, MLIS3; Julie Reeder, PhD; MPH; CHES3

A refined taxonomy of behaviour change techniques to help people change their physical activity and healthy eating behaviours: The CALO-RE taxonomy
Susan Miche1, Stefanie Ashford1, Fatiko P. Sniehotta1, Stephan U. Dombrowski1, Alex Bishop2 and David P. French2

Figure. Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow diagram of the process to identify and screen included studies.
Intervention locations

- US (31)
- UK (6)
- Australia (5)
- Canada (4)
- Scandinavia (3)
- Italy (2)
- China, India, Indonesia, South America, Netherlands, Ireland (1 each)
Participants (n = 21 – 7,422, mean 359)

Target populations
- Low-income/vulnerable – 16
- Groups with health needs – 20
- General adult population (including students) – 14
- Specific cultural groups (e.g., Aboriginal adults) – 6
- Families – 3

Sex and Age
- Mixed female and male – 40
- Female only – 14
- Male only – 5
- Skewed toward middle-aged/older adults
Intervention Design

• 24 of 59 – practical cooking sessions to develop cooking skills
• 35 of 59 – wider food skills issues (nutrition knowledge, accessing healthy ingredients, budgeting)
Intervention duration (of 57)

- 8-10 sessions: 10 sessions
- 2-4 sessions: 13 sessions
- 5-7 sessions: 17 sessions
- 1 session: 6 sessions
Assessment (2011 – 2016)

• Dietary outcomes – FFQ, food records/recalls, single/multiple questions
  – 7 tested/validated, 6 provided references for use, 10 provided no info on testing

• Psychosocial outcomes – confidence, knowledge
  – 5 measured confidence (3 tested/validated), 8 measured knowledge (2 tested/validated)

• Health outcomes – body weight, BP, biochemical markers, specific scores
  – 4 used scores (all tested/validated)
Standardized definitions of behavior change techniques allows for:

- Identifies which techniques contribute to effectiveness (evidence synthesis)
- Accurate description of interventions
- Reliable linking of BCTs to mechanisms of action
Behavior change techniques

1. Provide information on consequences of behavior in general (relationship between the behavior and likely consequences usually based on epidemiological data)

   Versus

2. Provide information on consequences of behavior to the individual (benefits and costs of action/inaction tailored to relevant group based on individual’s characteristics)

21. Provide instruction on how to perform the behavior (telling the person how to perform verbally or in written form)

   Versus

22. Model/demonstrate the behavior (showing the person how to perform through physical or visual demonstrations of performance)

20. Provide information on where and when to perform the behavior (telling the person where and when they might be able to perform the behavior, verbal or written)

26. Prompt practice (prompt the person to rehearse and repeat the behavior once or more than once)

BCTs identified across interventions

- General information on consequences of behavior: 49
- Info consequences of behavior for individual: 24
- Barriers/problem solving: 17
- Info where/when to perform behavior: 24
- Instructions on how to perform the behavior: 45
- Demonstrate behavior: 31
- Prompt practice/practical cooking: 39
- Plan social support: 15

Frequency of BCT
Outcomes

55 of 59 reported positive outcomes after the intervention or short term (3 months)

14 of 59 reported positive outcomes longer term (> 3 months)

1. Health outcomes (e.g., reduced cholesterol)
2. Dietary outcomes (e.g., improved intakes)
3. Psychosocial outcomes (e.g., improved nutrition knowledge)

Short-term change (55)
- Health - 18
- Dietary - 26
- Psychosocial – 40

Long-term change (14)
- Health – 4
- Dietary – 10
- Psychosocial - 8
- Practice – 10/14
- Info how to perform 10/14
- General info - 9/14
- Info when/where - 4/14
### Comparison between most commonly used and those used to produce long term behavioral change

<table>
<thead>
<tr>
<th>Behavioral Change Technique</th>
<th>Number of interventions (of all 59) where BCT used</th>
<th>Number of interventions reporting long-term change (of 14) where BCT used</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Give general information</td>
<td>98</td>
<td>64</td>
</tr>
<tr>
<td>2 – Give information specific to the individual</td>
<td>41</td>
<td>21</td>
</tr>
<tr>
<td>20 – Where and when to carry out the behavior</td>
<td>0</td>
<td>28</td>
</tr>
<tr>
<td>21 – How to carry out the behavior</td>
<td>76</td>
<td>71</td>
</tr>
<tr>
<td>22 – Demonstrate the behavior</td>
<td>66</td>
<td>0</td>
</tr>
<tr>
<td>26 – Prompt practice/practical cooking</td>
<td>44</td>
<td>71</td>
</tr>
</tbody>
</table>
Theoretical Underpinnings

- Theory explicitly cited in 14 of 59 interventions, no report of how theory informed which BCTs were used or linked theory to content/outcomes
- Demonstrate behavior (12 of 14)
- Prompt practice (7 of 14)
- All 14 indicated primary outcomes were met
- 3 of 14 reported long-term positive outcomes

No pattern between using theory and positive long-term outcomes and use of specific BCTs.
Commentary on studies included

1980-2011
- 25 studies
- 3 assessed BMI
- Small number with clinical outcomes

2011-2016
- 34 studies
- 12 assessed BMI
- About half assessed clinical outcomes

→ About half in both reviews used measurement instruments tested for reliability and/or validity
→ Lack of control group in nonclinical settings, no power calculation
→ Most participants - convenience samples
  • Female, often lower income, middle-aged or older
→ Wide variety of intervention lengths, co-interventions
Family environment variables

Intervention studies
→ Food purchasing
→ Food security
→ Affordability of home-cooked meals
→ Changes in the food environment
→ Cooking attitudes and enjoyment

Barriers identified
→ Family food norms/preferences and resistance to change
→ Financial constraints (creatively partner with community service organizations)
Future directions – behavior change & positive family environments

• Standardized cooking and food skills intervention design template
• Replication and adoption of effective BCTs in future interventions to maximize efficacy
• Outcomes
  – Cooking skills and food skills (meal planning, food acquisition, organization)
  – Increase home food preparation frequency, decrease FAFH frequency
  – Self-efficacy for cooking skills and food skills
• Considerations
  – Time/financial constraints
  – Mealtime context – routines
  – Family cooking programs
Thank you!
References

Caraher M. 5th June 2012.
http://arrow.dit.ie/dgs/2012/june5/6/.
Fulkerson JA. Physiol Behav.
https://doi.org/10.1016/j.physbeh.2018.04.005
