Are healthy eaters born or made: the development of young children’s eating behavior

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Nature or Nurture?

Taste sensitivity at birth

- Preference for sweet
- Rejection of bitter
- Neutral for salt
- Preference for sour

Genetic influences on bitter sensitivity

Cumulative Percentage
Number of Bitter Gene Alleles

Mennella et al., Pediatrics, 2005

Food preference 4 - 16 years

Energy density and preference

Cooke, Wardle, British J Nut, 2005
Gibson, Wardle, Appetite, 2003
Food acceptance is a process

Smell/Touch/Play  Spit/Swallow  Swallow

Weeks 1-3  Weeks 5-7  9-10th time

Number of exposures before deciding toddler disliked food

% Reporting

Food Neophobia

Fear of the New

Regulation of energy intake

Variability of meal and daily intake
Eating in the absence of hunger

- Observed in children 3-19 y
- Eating without hunger 1-4:
  - Average = 125 - 300 kcal
  - Range= 0 – 500 kcal

1 Fisher, Birch, Appetite, 1993; 2 Fisher, Birch, AJCN, 2002; 3 Carnell, Wardle, Appetite, 2007; 4 Faith et al., Obesity, 2005

Family Influence → Eating Behavior → Health Outcome

- Food selection
- Social modeling
- Feeding interactions

- Food preference
- Intake regulation

Nutrient adequacy
Overweight

USDA Children’s Nutrition Center
Children’s Eating Laboratory

Observation Rooms
Monitoring Room

Caregivers as providers

Most preferred

1
2
3
4
5
6
7
8
9
10

Least

# of exposures

Most preferred: Served Repeatedly
Unfamiliar

Effects on a disliked vegetable

156 3- to 6-year-old children

- Exposure: A taste each day/2 wk.
- Information: 5-a-day recommendations, tips
- Control: No intervention

Exposure
Information
Control

Liking

Intake

Exposure Information
Control

Wardle et al., Appetite, 2003

Sullivan, Birch, Dev Psych, 1992
A variety of tastes is the spice…

8 days of feeding

Acceptance of green beans

Mennella et al., Phys Behav, 2007

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Portion size and energy density

Fisher, Liu, Birch, Rolls, Obesity, 2007
Caregivers as models

- Eat pancakes with fork, not hands
- Eat pancakes at breakfast, not a dinner
- Eat pancakes with butter & syrup, not catsup
- Eat 1 pancake, not 10 pancakes

Willingness to try new foods

- Novel foods
  - Semolina
  - Yellow, red, or green color
  - Novel spice flavorings
- Three conditions:
  - Adults not eating
  - Adults eating same color
  - Adults eating different color

Social facilitation of how much

- Children eat more in larger groups of children than smaller groups.
- Children eat more with siblings than unfamiliar children.
- Overweight children eat more alone than with unfamiliar children.

References:
1 Lumeng, Hillman, A/JDC, 2007
2 Salvy et al., Appetite, 2007
3 Salvy et al., Phys Behav, 2007
Caregivers as teachers

Division of responsibility

- When
- Where
- What

Whether

How Much

Caregiver Child


Pressure to eat: you can’t leave the table until you finish your vegetables!

| Birch, Martin, Rotter, Child Dev, 1984 |

Clean your plate

External cues
- amount remaining on plate
- time on the clock

| Birch, et al., Learn Motiv, 1987 |

Restrictive feeding

| Fisher, Birch, AJCN, 1999 |

Restriction and eating w/o hunger

- Parents’ reports of higher restriction associated with greater eating in the absence of hunger:
  - For girls, but not boys aged 3-5 y¹ ²
  - Non-Hispanic white girls observed from 5-9 y³⁻⁵
- No association of restriction and eating w/o hunger:
  - Among 52 normal-weight and overweight Belgian children 7-13 y⁶

| Fisher, Birch, Appetite, 1999; ²Fathi et al., Obesity, 2004; ³Birch et al., AJCN, 2000; ⁴Fisher et al., AJCN, 2002; ⁵Birch, Fisher, Davison, AJCN, 2003; ⁶Hovens, Brazil, Beh Avw Rev, 2007 |

What about child weight?

Pressure to Eat

Restrictive feeding

| Fisher, Birch, AJCN, 1999 | N=37; **p<.01, *** p<.001 |
Top 5 tips for nurturing healthy ‘likes’

5. If you build it they will come
   - If at first no success--try, try, try, etc. again
   - Make foods easy to eat

4. Take advantage of hungry stomachs!
   - Limit snacks and drinks 2 hr before meals
   - Veggies as snacks or as a pre-dinner fix
   - One bite rule—at beginning of meal

3. Share meals, foods
   - Retire the short-order cook apron

2. Avoid used car salesmen tactics
   - Free dessert when green stuff is eaten!

Top 5 tips for nurturing moderation

5. Out of sight = out of mind
   - Stock up the pantry with low conflict choices.

4. Provide a model of moderation
   - Abandon ice cream after a filling meal
   - Enjoy ice cream without obsession!

3. Keep an eye to portion size
   - Small stomachs, small containers
   - Start out small, allow 2nds

2. Avoid food traps
   - Pressure to eat, rewards, good food/bad food labels

2 years
- Wipe table, scrub vegetables, wash lettuce, snap green beans, carry ingredients, play with pots/pans

3 years
- Knead dough, pour liquids, mix ingredients, spread soft spreads, place empties in trash

4-6 years
- Peel oranges, set table, mash bananas, measure ingredients, cut with blunt knife, use an egg beater

Glass, McAfee, Soc Sci Med, 2005
Top 5 tips for nurturing moderation

1. Focus on the whole diet and growth
   - Relax on foods, individual meals
   - Let them eat cake (sometimes)
   - Honor hunger and fullness cues

FAQ for feeding children...

- Q: Do I have to eat this?
  A: Yes.

- Q: When it's good for you
  A: I don't know.

- Q: When did I eat enough?
  A: I don't know.

- Q: How many more bites?
  A: Six.

- Q: How about three?
  A: Seven.

- Q: How about six?
  A: On.

To expedite dinner, the shoulders posted an FAQ page.