

# Breastfeeding: The Original Slow Food

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# What is a slow food?

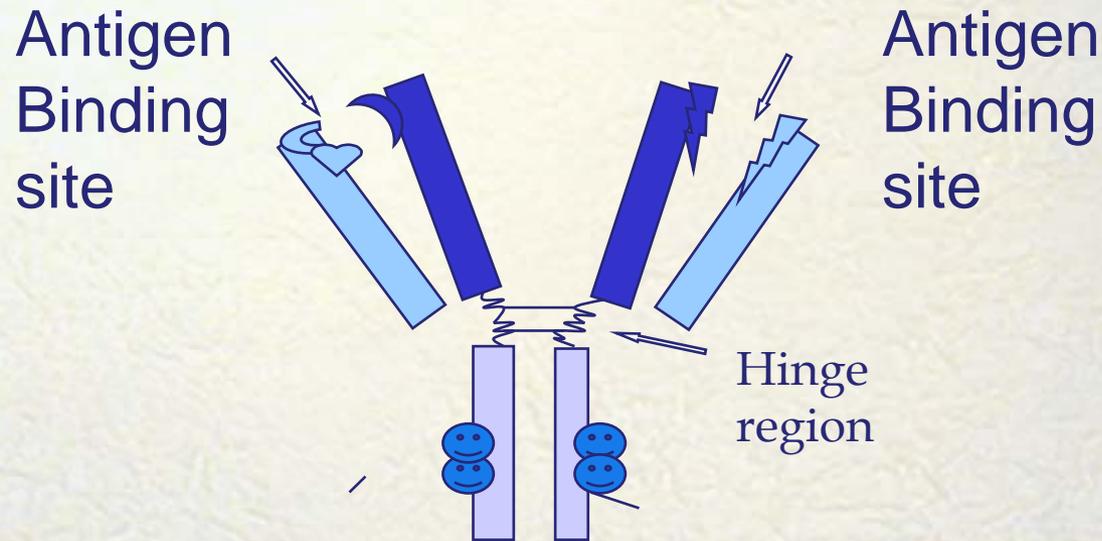
- Not a fast food...
- Characteristic of the region in which it is grown.
- Integrated into and reflective of the local culture.
- Individualized selection and preparation
- Preparation and consumption time reflect / enrich culture

## Is “locally grown” breastmilk any different from other breastmilk?

Yes! Human milk is location-specific.

- Some of the many anti-infective agents in human milk are uniquely designed to combat microorganisms endemic to the region.
- It's value to the infant can be altered and optimized by the behavior of the mother.

# SIgA



- Inactivates viruses and bacteria
- Resists digestion (proteolysis) and protects entire GI tract
- Gradually digested (~ 2 hours)
- 'Pepto-Bismol'

# Specific protection = Localized

- SIgA made to order
  - Entero-mammary pathway
  - Broncho-mammary pathway
- Implications –  
mother/infant proximity

# Infant serum immunoglobulin

## A little background:

- High concentrations of trans-placental immunoglobulin at birth
- These break down quickly
- Low point is 3- 6 months of age
- Not back to birth levels until after 5 years.

# Breastmilk is Location-Specific

It protects against infectious  
agents in the local environment



# Integrated into and reflective of the local culture?

- Human milk reflects the dietary habits and culture of the mother
- Infants prefer foods consumed by mothers during gestation and breastfeeding.
- Breastfeeding is associated with increased fruit and vegetable intake later in childhood.

Cooke et al. Demographic, familial and trait predictors of fruit and vegetable consumption by pre-school children. Public Health Nutrition. Vol 007(002), April 2004, pp 295-302

### **Children who had been exclusively breast-fed**

- ate vegetables more often than those who had been both breast- and bottle-fed,
- who in turn ate them more often than those who were entirely bottle-fed
- ( $P=0.001$ ).

The same effect was observed for fruit consumption ( $P<0.001$ ).

*i.e. breastfeeding affects taste / preference*

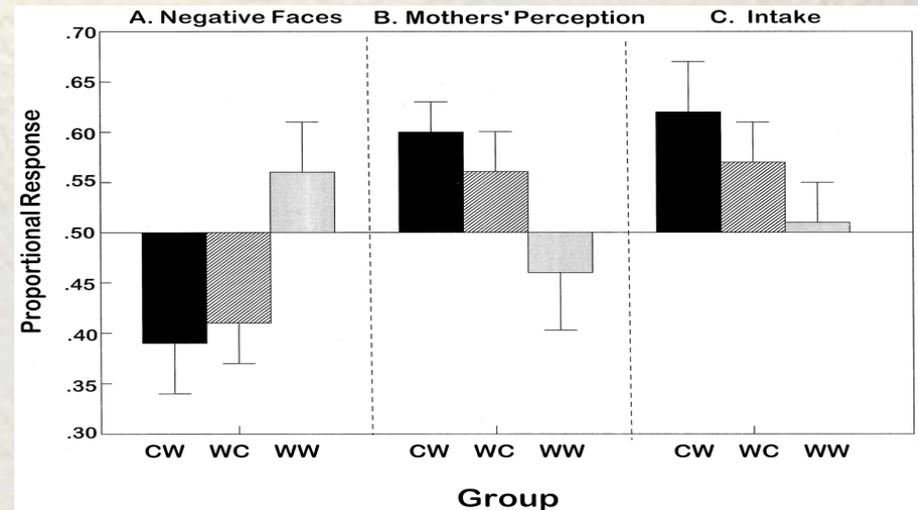
But this seems to depend on  
what the mother eats

Mennella JA . Prenatal and postnatal flavor learning by human infants. Pediatrics. 2001 Jun;107(6):E88.

	Last Trimester of Pregnancy	First Months of Lactation
Group CW	CARROT	WATER
Group WC	WATER	CARROT
Group WW	WATER	WATER

order, cereal prepared with water during 1 test session and cereal prepared with carrot juice during another. Immediately after each session, the mothers rated their infants' enjoyment of the food on a 9-point scale.

Approximately 4 weeks after the mothers began complementing their infants' diet with cereal and before the infants had ever been fed foods or juices containing the flavor of carrots, the infants were videotaped as they fed, in counterbalanced



## Breastfeeding accelerates flavor learning and influences preference

- Flavors of the foods the mother eats are transmitted in breast milk
- = pre-verbal cultural programming during breastfeeding
- This facilitates introduction of weaning foods

Garlic! My favorite

# Mennella – personal communication

- Higher intake of green beans by breastfeeding mothers was associated with higher intake of green beans by their toddlers.
- But – higher intake of green beans by formula feeding mothers was not.
- Conversely, breastfeeding per se was not associated with higher green bean consumption unless the mother ate green beans while breastfeeding.

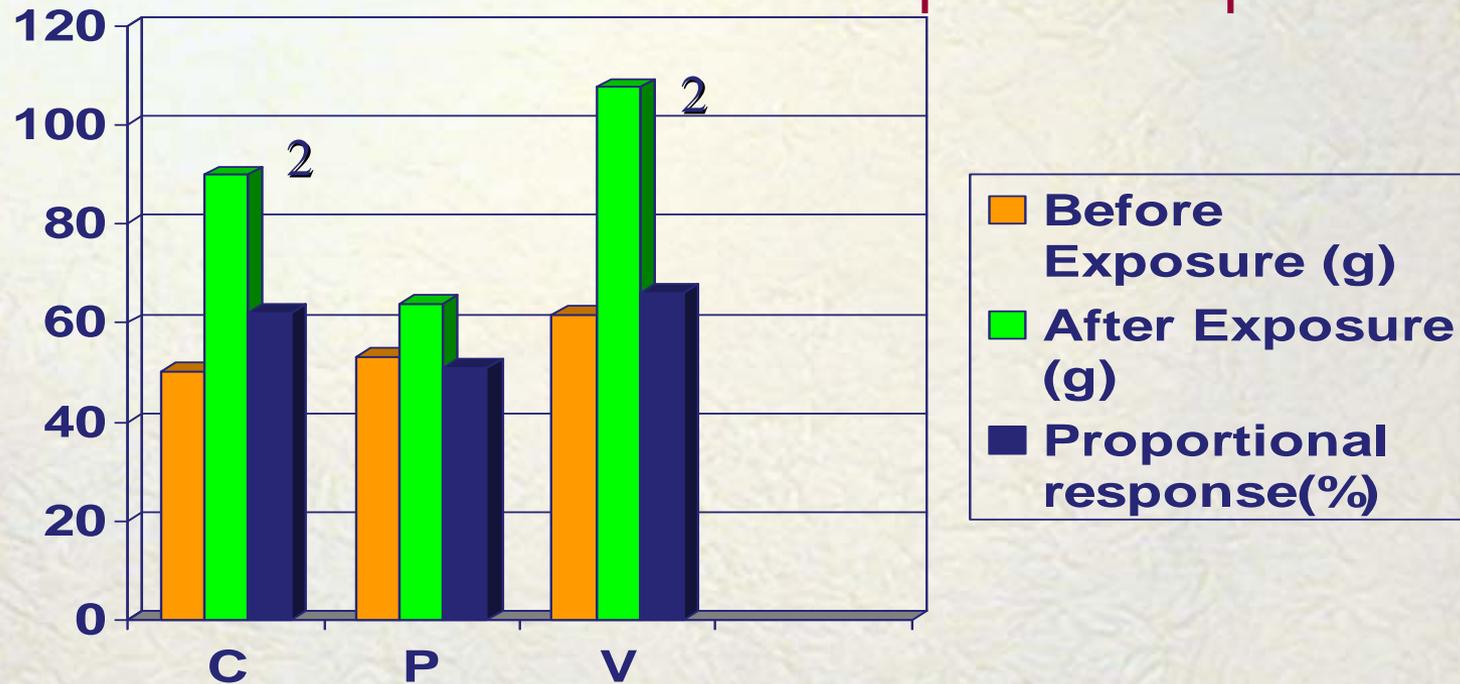
# Fortunately, there are other ways to learn food preferences...

Repeatedly exposing the child to small amounts of the food over a course of 10-15 days



Offering the child a wide variety of similar flavor experiences

# Infants' acceptance of carrots before and after the home-exposure period<sup>1</sup>



C, P, V = Carrot, Potato, Variety groups

<sup>2</sup>Significantly different from before exposure,  $P < 0.05$  (paired  $t$  test with Bonferroni correction). Significant difference among groups,  $P < 0.05$

<sup>1</sup> Carolyn J Gerrish and Julie A Mennella. Flavor variety enhances food acceptance in formula-fed infants. *Am J Clin Nutr* 2001 73: 1080-1085

# Breastfeeding and later Parental Feeding Styles

- Mothers who breast-fed  $\geq$  12 months used lower levels of control in feeding.
- Lower levels of control are associated with higher energy intakes at 18 mo.
- At 18 mo, infants BF  $\geq$  12 mo consumed more energy.
- At 18 mo, children with the highest energy intakes were also taller and leaner.
- *"Our findings suggest that breast-feeding through the first year may have an effect on children's energy intake by shaping mothers' child-feeding practices."*

– Fisher et al - J Am Diet Assoc. 2000 Jun;100(6):641-6.

# Breastfeeding reflects and influences the child's culture

Influences food preferences

Affects ease of introduction of solids

May shape the nature of parental-child feeding interactions

## Is a Human Milk meal individualized for the recipient?

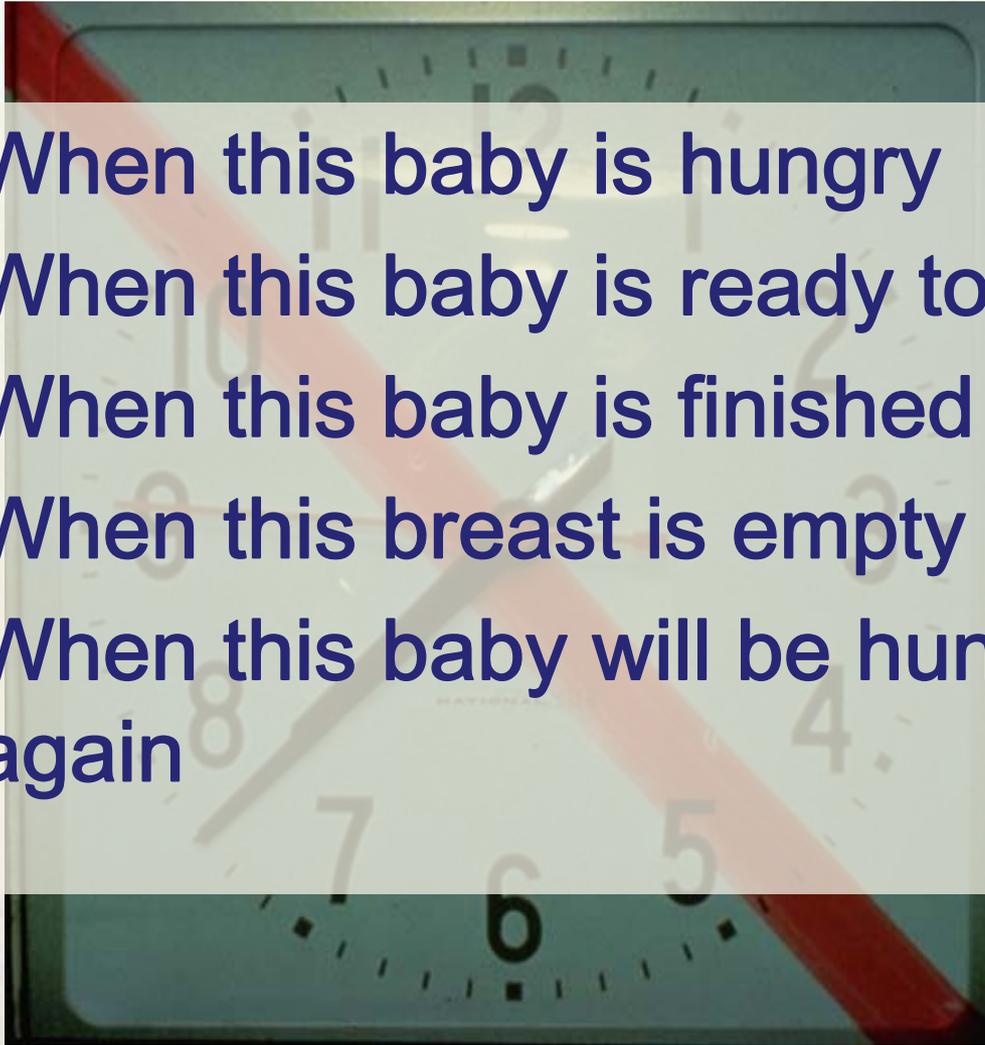
- Nutrient composition varies with development – particularly for the premature infant, but also for the term infant.
- Infants themselves can influence the types of protective compounds in the milk.

# Human milk differs from one "meal" to the next

- Infants control the volume consumed, and, to some extent, the fat content of the milk.
- ONLY IF the infant determines
  - When to start
  - When to stop
- Time – as a concept – undermines breastfeeding success!

# What the Clock Doesn't Know

- When this baby is hungry
- When this baby is ready to eat
- When this baby is finished
- When this breast is empty
- When this baby will be hungry again



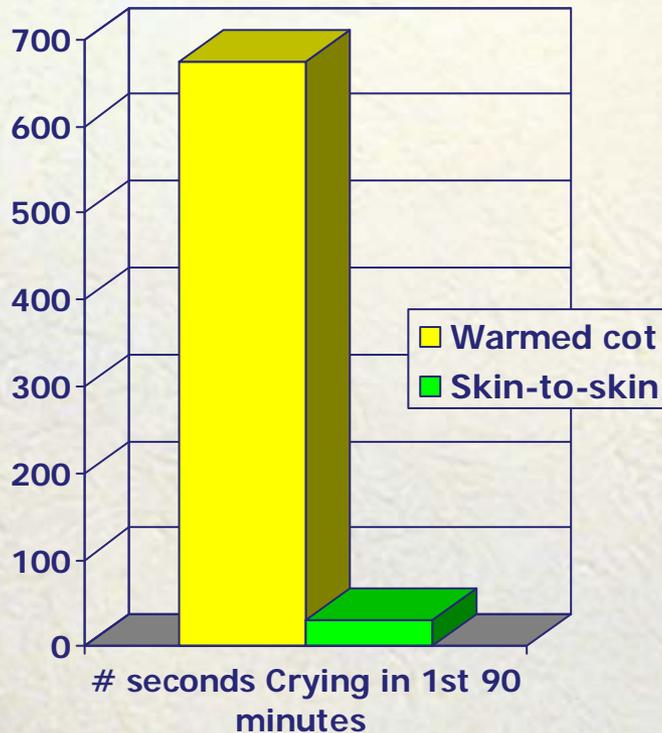
Fast Food?  
Breastfeeding isn't even a  
"timed" food.



## Normal Breastfeeding influences neurologic activity of infants

- Normal breastfeeding requires skin-to-skin contact.
- Skin-to-skin contact alters behavior of infants.
- in the early postpartum period it
  - Reduces agitation
  - Reduces crying (immediate and prolonged)

**Christensson et al Separation distress call in the human neonate in the absence of maternal body contact. Acta Paediatr. 1995. 84(5):468-73**



Random assignment to skin-to-skin or warmed cot

Separated babies cried in short pulses, separated by silent periods, with a median crying time oscillating between 7 and 42 s/5 min throughout the observation.

In babies in close body contact with mother, crying was virtually absent.

# Transfer to mom's chest eliminated early crying



Seconds of crying in 5 minute period

30 infants placed in warmed cot for 45 minutes after birth.

1/2 moved to mother's chest

1/2 left in cots

Breastfed Babies are Calmer

Skin to Skin

Bioactive Peptides



How does breastfeeding  
affect mothers?



# Oxytocin and the Brain

- Oxytocin is released simultaneously in two directions:
  - to the blood stream
  - within the brain
- Neural binding promotes affiliative behaviors

# Oxytocin and the brain

- Two types of receptors in (vole) brain (activated by estrogen, progesterone, testosterone, others)
  - binding promotes reproductive behavior
  - binding promotes parental behavior
- “Love Hormone”

# Inhibitors of oxytocin release

- fear
- pain/ discomfort
- stress
- nerve damage

# Triggers for Oxytocin Release

- Birth and subsequent expulsion of placenta
- Breastfeeding
- Stroking by a TRUSTED individual
- Soft music
- Food
- Age- higher levels in older men

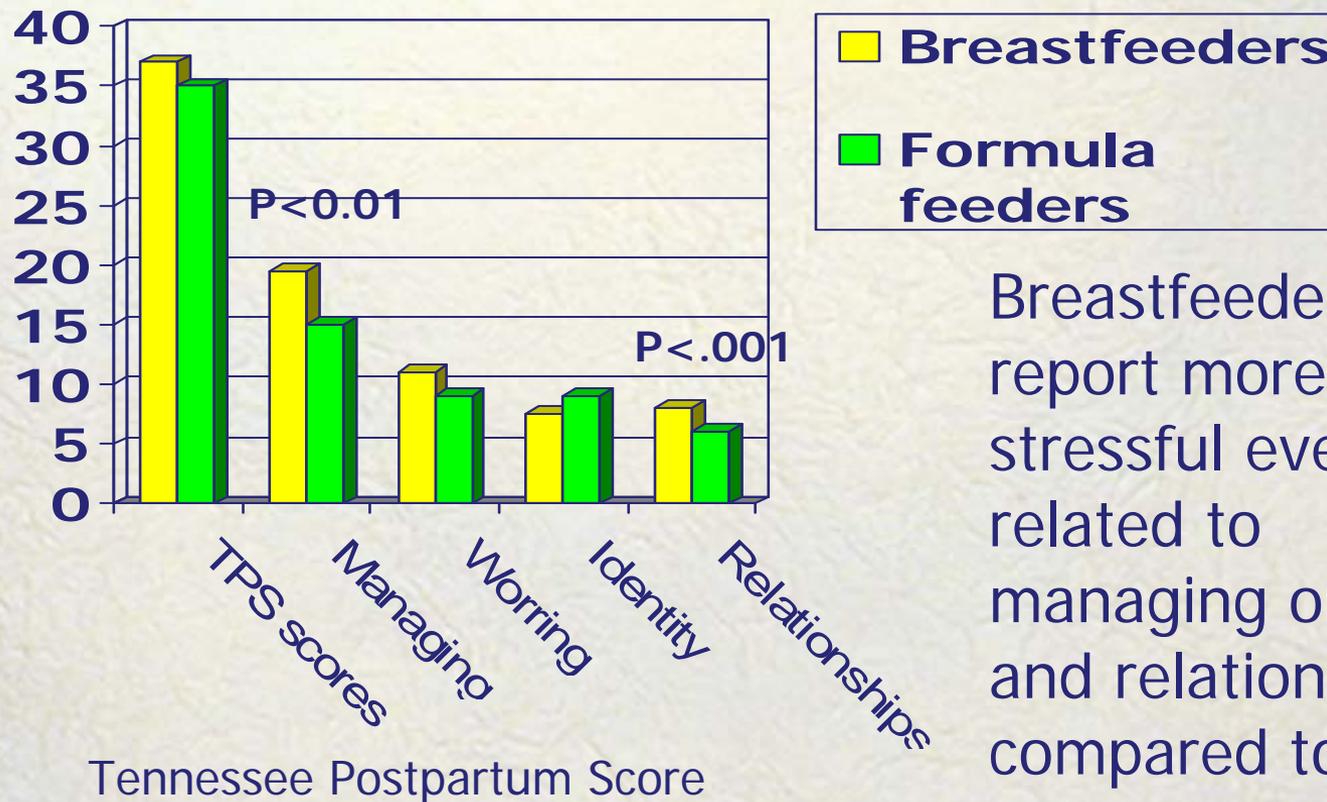
# Physiologic Effects of Oxytocin

- Nipple erection / Milk ejection
- Reduced blood pressure, / Increased blood flow to skin
- Increased digestive hormones (CCK, gastrin, somatostatin)
- Increased glucagon, insulin & circulating glucose
- Hyperphagia / satiety

# Behavioral effects of oxytocin

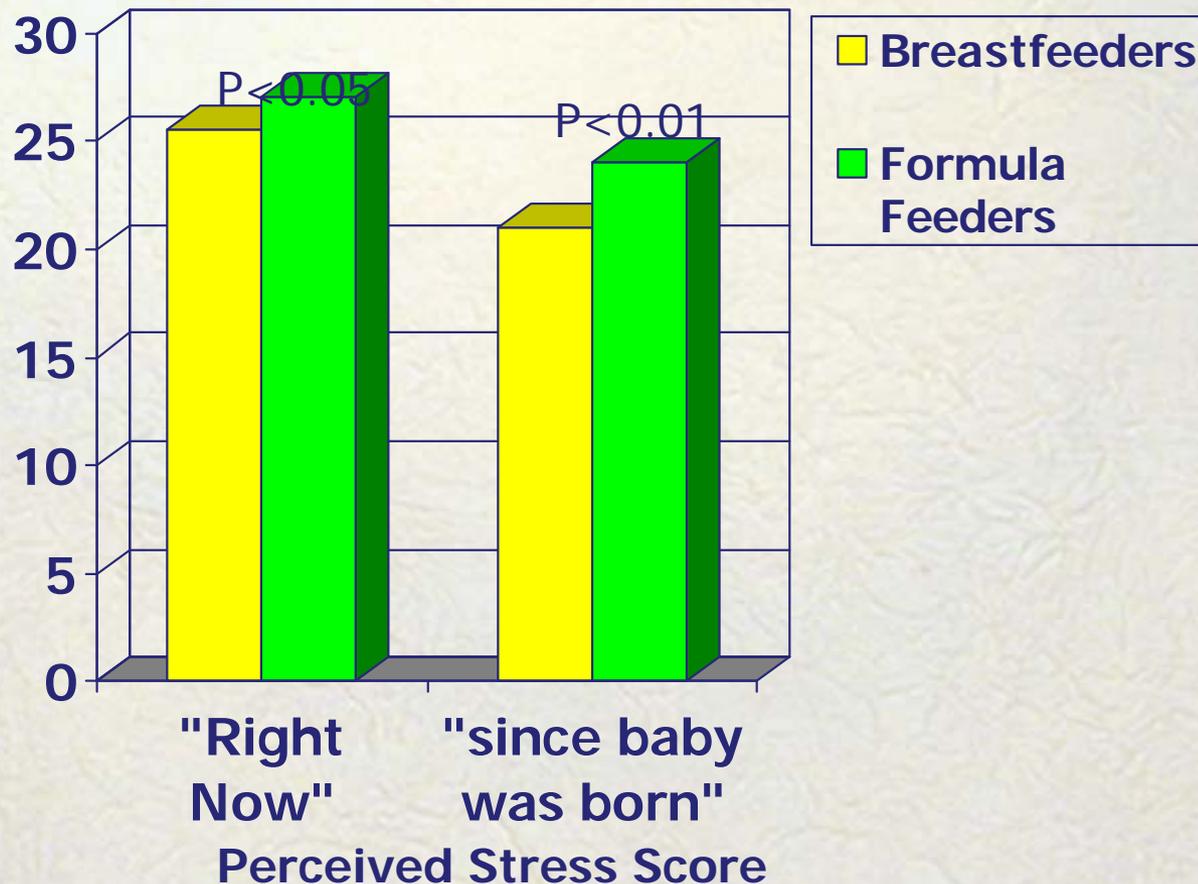
- Increased attachment behaviors in mammals
  - parenting behaviors / pair bonding
- Decreased stress response/ increased pain threshold / decreased avoidance
- Accommodation (mimicking behaviors) / trust
- Calmed behavioral state /increased intensity of observation and focus

# Groer 2005

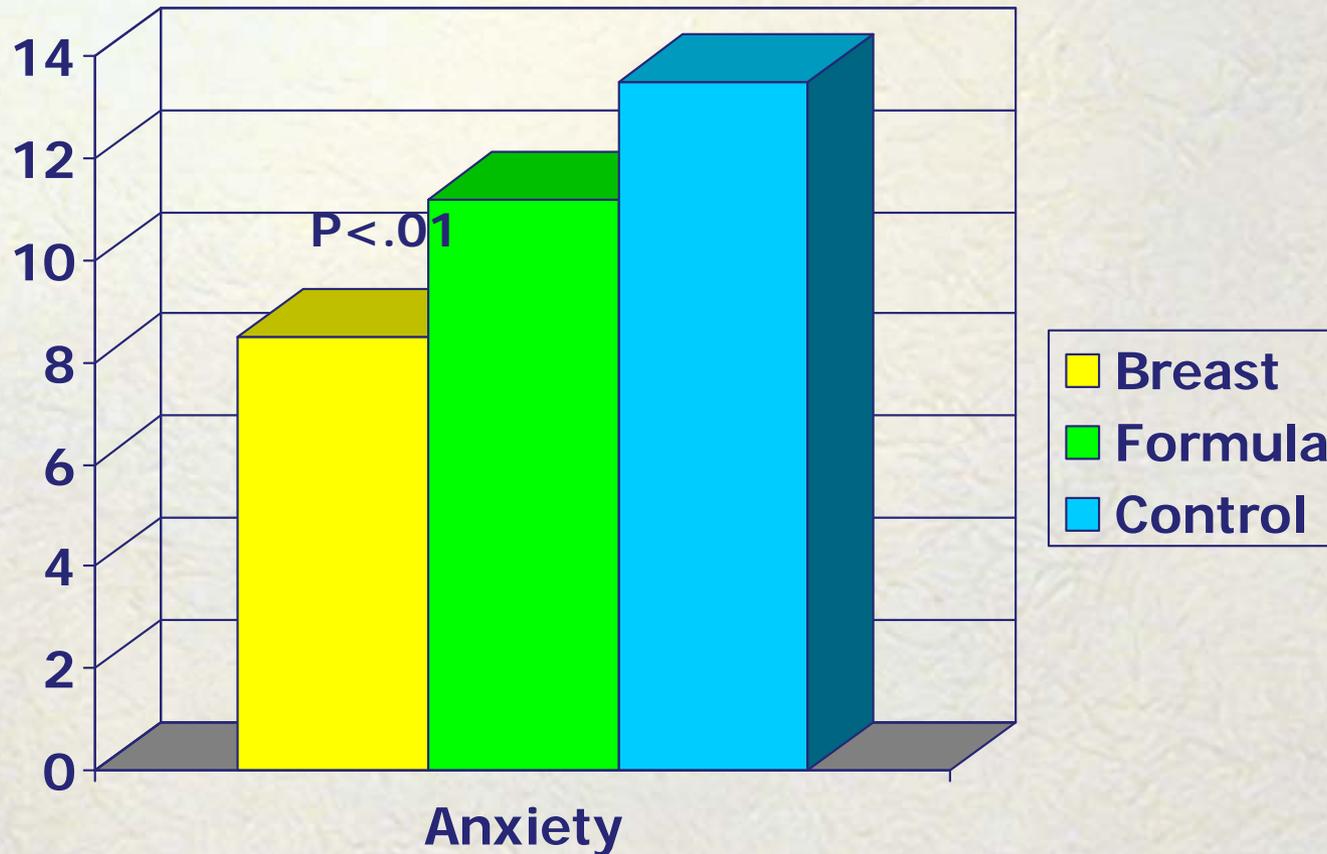


Breastfeeders report more stressful events related to managing one's life and relationships compared to formula feeders

Groer, M. Differences Between Exclusive Breastfeeders, Formula-Feeders, and Controls: A Study of Stress, Mood, and Endocrine Variables. Biol Res Nurs 2005. 7:106-117



# Anxiety\* and Feed Type



\* Profile of Mood States instrument - Groer 2005

**Mezzacappa et al. Breast-feeding is associated with reduced perceived stress and negative mood in mothers. Health Psychology. 2002. 21(2), 187-191**

- Perceived stress in the past month was compared between 28 breast-feeding and 27 bottle-feeding mothers. Breast-feeding mothers reported less perceived stress, after controlling for demographic confounds.
- Mood ratings were assessed in 24 mothers both before and then after 1 breast-feeding and 1 bottle-feeding session. Breast-feeding was associated with a decrease in negative mood, and bottle-feeding was associated with a decrease in positive mood from pre- to post feeding.
- **Results suggest that breast-feeding buffers negative mood.** These effects appeared to be attributable to the effects of breast-feeding itself and not solely to individual-differences.

# Breastfeeding affects mothers behavior

Calms them

Lowers perceived stress levels

Increases energy consumption and  
appetite

May buffer negative mood

Associated with reduced  
depressive symptoms



Does culture affect  
breastfeeding?



# Characteristics of a culture influence breastfeeding

- If the women are depressed, breastfeeding durations are shorter
- When women move from other countries to the U.S., breastfeeding rates decline.
  - Hospital routines interfere with initiation
  - Perceived preference of “elite” culture
  - Traditional cultural practices associated with breastfeeding are not accommodated (social space, special foods, support practices)

Pippens et al. Association of Breastfeeding with Maternal Depressive Symptoms. Journal of Women's Health. 2006. 15(6):754-61,

- Persistent depressive symptoms (2 or more including at least one before delivery) → increased weaning before 1 mo.

# Taveras. Pediatrics 2003;112-108

Characteristic	DC at 2 wk	DC at 12 wk
Maternal Depression score	.39	.01
BF support from dad	.002	.58
BF problems	.001	.03
Encouraged by HCP	NA	.015
Return to work / school	NA	<.0001

## How is Breastfeeding affected by our culture?

- A culture with income disparities -> more mothers working out of necessity rather than choice.
- → low BF rates
- Solution: pump at work and feed expressed milk

# Breastfeeding / Feeding Breast Milk

Are these equivalent?

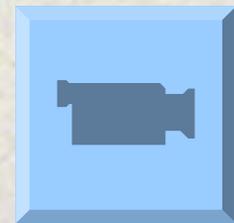
If not, how do they differ and what  
might that mean for mothers, infants,  
and our culture?



# Conceptualization of breast and breastfeeding in different cultures

- What is a breast?
  - Sexual object?
  - Marketing tool?
  - Infants' source of nurture and comfort?

- <http://www.youtube.com/watch?v=9VTZilwnd6k>
- oppai go ippai video



# Breastfeeding is

- A communication system
  - Interpersonal
  - Cultural
  - Biological
- A framework for current and future immunologic protection and health
- A nutrient source
- Reflective of and dependent on the larger culture within which it occurs.

# Breastfeeding is the original Slow Food

*It reflects location, diet and culture.*

*And*

*It shapes the people  
we will become*

