When to wean?

A biological perspective

Culture and breast feeding

- The anthropological literature reports that many children around the world are breastfed for 3 to 5 years or longer, depending on local cultural beliefs.
- In Mali, most children breastfeed for about 2 years.

Culture and breast feeding

- In the United States, many children breastfeed for only a few weeks or months, if they breastfeed at all.
- In the early 1990s, and still in 2018, breastfeeding beyond 1 year of age in the U.S. is considered fairly radical in some circles.

A NATURAL AGE OF WEANING?

- How long human children would breastfeed if they followed a natural or physiological pattern based on our evolutionary history as large-bodied, large-brained, long-lived mammalian primates, rather than being heavily or solely influenced by cultural beliefs about appropriate durations of breastfeeding?

“Natural” birth?

“Natural” birth?

“Natural” birth?

“Natural” birth?

"Natural" birth?

And which model to use?

WEANING ACCORDING TO ADULT FEMALE BODY WEIGHT

- Harvey and Clutton-Brock (1985) derived regression equations for the prediction of the various life history variables as a function of adult female body weight.

WEANING ACCORDING TO ADULT FEMALE BODY WEIGHT

- Their equation for calculation of weaning age is: weaning age in days = 2.71 × adult female body weight in grams

WEANING ACCORDING TO ADULT FEMALE BODY WEIGHT

- For the large-bodied United States population, with an average adult female body weight of 55.35 kg, the regression equation predicts an age at weaning of 3.36 years.

WEANING ACCORDING TO ATTAINMENT OF ONE-THIRD ADULT WEIGHT

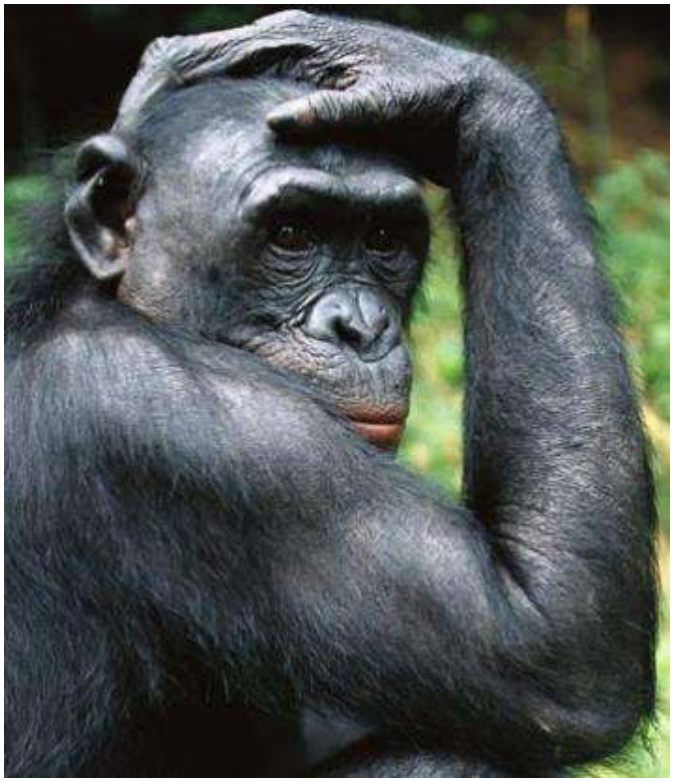
- The exact nature of the link between age at weaning and rate of growth is not known
- According to Charnov and Berrigan (1993), "On average, primates are like other mammals in weaning each offspring when they reach about one-third their adult weight ".

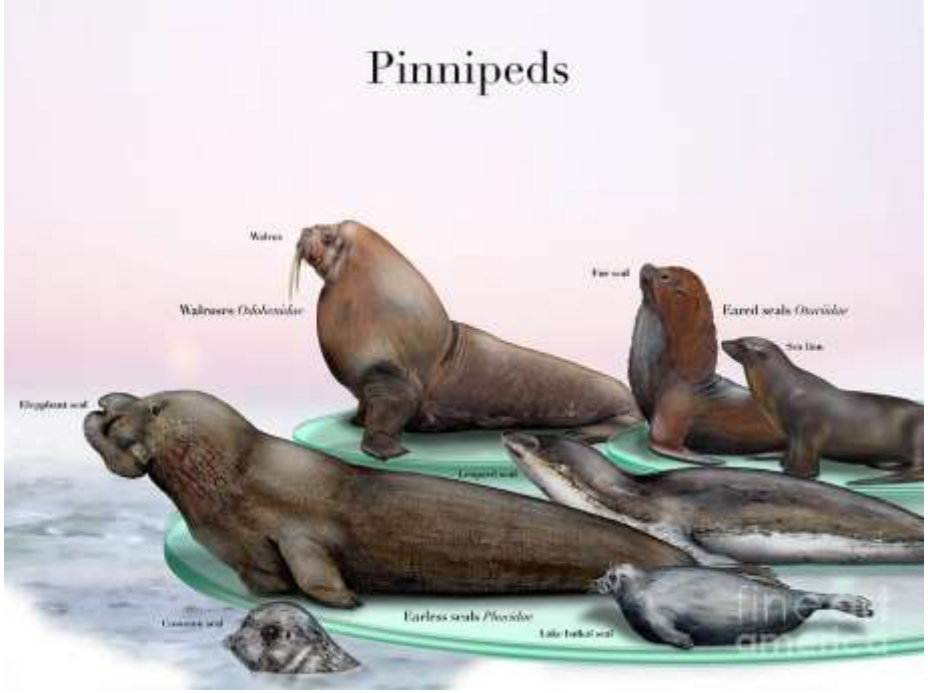
WEANING ACCORDING TO ATTAINMENT OF ONE-THIRD ADULT WEIGHT

- Human children reach one-third their adult weight at approximately 7 years of age for males and 6 years of age for females.

WEANING ACCORDING TO SPECIFIC MULTIPLICATION OF BIRTH WEIGHT

- Lee et al (1991) studied the link between age at weaning and the attainment of "a critical or threshold body weight attained by offspring among large-bodied mammals: the anthropoid primates, ungulates, and pinnipeds




Pinnipeds
Walrus
Walruses Odobenidae
Fur seal
Eared seals Otariidae
Sea lion
Elephant seal
Leopard seal
Common seal
Earless seals Phocidae
Lake baikal seal


In Honor of Ungulates
the most boring animals on earth
Moose
Bison
Elk
Bighorn Sheep
Mule Deer
Mountain Goat
Pronghorn

WEANING ACCORDING TO SPECIFIC MULTIPLICATION OF BIRTH WEIGHT

- Among these large-bodied mammals, Lee et al found that weaning occurred when offspring had quadrupled their birth weight.

WEANING ACCORDING TO SPECIFIC MULTIPLICATION OF BIRTH WEIGHT

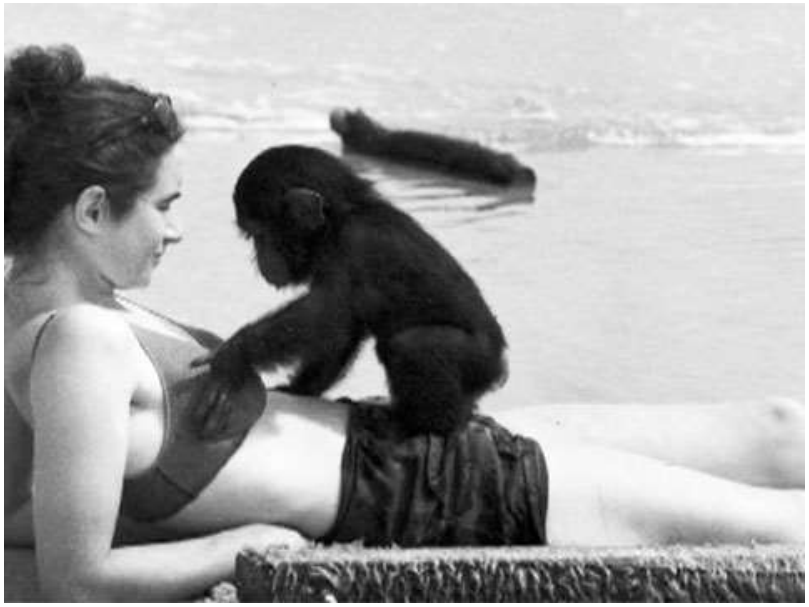
- According to the NCHS standards for U.S. populations the 50th percentile for birth weight for males is 3.27 kg.
- A quadrupling of that birth weight, to 13.08 kg, occurs at around 27 months of age (50th percentile).
- For females, the figures are 3.23 kg at birth, with a quadrupling of birth weight to 12.92 kg at around 30 months.
- Thus, for the U.S., quadrupling of birth weight usually is achieved sometime between 2 and 3 years of age.

WEANING ACCORDING TO GESTATION LENGTH

- Harvey and Clutton-Brock (1985) provide data on life history variables for 135 primate species , including information on both length of gestation and weaning age.

WEANING ACCORDING TO GESTATION LENGTH

- For humankind's closest relatives, chimpanzees and gorillas, the duration of breastfeeding is more than 6 times the length of gestation.



WEANING ACCORDING TO GESTATION LENGTH

- From these comparisons, an estimated natural age at weaning for humans would be 6 times gestation length, 4.5 years, or a little longer .

WEANING ACCORDING TO ERUPTION OF THE FIRST PERMANENT MOLARS

- Holly Smith (1992) has examined the relationship between timing of dental eruption and age at weaning in 21 different primate species.
- Smith finds that in many primates these events occur simultaneously.

WEANING ACCORDING TO ERUPTION OF THE FIRST PERMANENT MOLARS

- In modern humans, the first permanent molars erupt around 5.5 to 6.5 years of age.

WEANING ACCORDING TO AGE AT FIRST BREEDING FOR FEMALES

- Harvey and Clutton-Brock (1985) examined data from 28 species on age at weaning and age at first breeding for females
- The correlation between these 2 variables is quite high, R = 0.89. The regression equation for predicting age at weaning from age at first breeding is: weaning age in days = 1.4493 × age at first breeding in months +1.3450.

WEANING ACCORDING TO AGE AT FIRST BREEDING FOR FEMALES

- What is a natural or normal "age at first breeding" for modern humans?

WEANING ACCORDING TO AGE AT FIRST BREEDING FOR FEMALES

- If we use 20 years as the average age at first breeding for modern humans, the regression equation predicts an average duration of breastfeeding of 6.31 years.
- If we assume that the average age at first breeding is 12 years of age, the regression equation predicts an average duration of breastfeeding of 3.18 years.

SUMMARY OF THE LIFE HISTORY COMPARISONS

- If humans weaned their offspring according to the primate pattern, without regard to cultural beliefs and customs, most children would be weaned somewhere between 2.5 and 7.0 years of age.

CURRENT EXPERT RECOMMENDATIONS ON DURATION OF BREASTFEEDING

WORLD HEALTH ORGANIZATION

- Since 1979, the WHO has recommended that all children throughout the world be breastfed for a minimum of 2 years of age, with no defined upper limit on duration of breastfeeding

WHO, May 27, 2019

HTTP://WWW.WHO.INT/NUTRITION/TOPICS/EXCLUSIVE_BREASTFEEDING/EN/

WORLD HEALTH ORGANIZATION

- Review of evidence has shown that, on a population basis, exclusive breastfeeding for 6 months is the optimal way of feeding infants.
- Thereafter infants should receive complementary foods with continued breastfeeding up to 2 years of age or beyond.

WORLD HEALTH ORGANIZATION

- "The transition from exclusive breastfeeding to full use of family foods is a very vulnerable period. It is the time when many infants become malnourished"

AMERICAN ACADEMY OF PEDIATRICS

- Since 1997, the AAP has recommended that all children in the United States be breastfed for a minimum of 12 months, with no defined upper limit on duration of breastfeeding.

AAP 2012 (Johnston M et al…)

- The American Academy of Pediatrics reaffirms its recommendation of exclusive breastfeeding for about 6 months, followed by continued breastfeeding as complementary foods are introduced, with continuation of breastfeeding for 1 year or longer "***as mutually desired by mother and infant***".

AMERICAN ACADEMY OF FAMILY PHYSICIANS (2015)

- https://www.aafp.org/afp/2015/0101/p56.html

AMERICAN ACADEMY OF FAMILY PHYSICIANS (2015)

- Most women should breastfeed (or provide human milk to the infant) exclusively for about six months.
- Breastfeeding, combined with complementary foods (e.g., iron-rich foods), should continue until the infant is at least one year of age

AMERICAN ACADEMY OF FAMILY PHYSICIANS (2015)

- However best outcomes can be achieved when breastfeeding continues until the child is two years of age.
- A mother can continue to breastfeed for as long as she and the child want.

AMERICAN COLLEGE OF OBSTETRICIANS AND GYNECOLOGISTS (Feb 2016)

- The American College of Obstetricians and Gynecologists recommends exclusive breastfeeding for the first 6 months of life, with continued breastfeeding as complementary foods are introduced through the infant's first year of life, or longer as mutually desired by the woman and her infant.

Buddhism and Breastfeeding

- Buddhist teachings in the Edo period,(1603-1867)strongly supported the extended feeding until 6 or 7 years of age.
- Usually the biological would breastfeed the infant for the first 2 years, then a wet nurse was hired and would continue breastfeeding till the baby was about 7
- Thus, only relatively wealthy people could afford it

A job interview from the Edo period…

Orthodox Judaism

- The Shulchan Aruch, based on the Talmud, allows breastfeeding until age two in all cases, and up to age 4 (or 5, if the child is sick) as long as the child has not ceased nursing for 72 hours.

Islam

- Islam prescribes breastfeeding and commands children do so until they attain full power and strength, as breastfeeding greatly impacts children's growth and development.
- "The mothers shall give suckling to their children for two whole years." (Al-Baqarah: 233)

Christianity/catholicism


Breastfeeding
in Christian Art

Lucas Cranach the Elder (Germany, 1472-1553)

Giampietrino (Italy 1495-1549)

Hans Memling (Flanders 1430-1494)

El Greco (Greece/Spain 1541-1614)

CATHOLIC STAND

Living the Truth the Church Teaches

Breastfeeding Is Not Immodest

JoAnna Wahlund • June 2, AD2017 • 51 Comments

A friend who works fo apostolate recently shared with me that she was discouraged from breastfeeding her 5-month-old daughter during training sessions. She isn't the first C who has shared this type of story with me, either. I've heard many anecdotes from mothers involved with Catholic ministry who were told they had to co or couldn't nurse at all (i.e., the nursing baby wasn't welcome to attend a specific function that his/her mother was required to attend).

When the issue was pressed, most of these mothers were told that these policies were due to concerns about modesty — they were worried that the sight mother would encourage impure thoughts in others; most notably, in young men. There are many, many problems with type of policy and the reasoning sake of brevity, I'll point out four specific issues.

Restricting Breastfeeding Is Probably Illegal

Forty-nine states, the District of Columbia and the Virgin Islands have laws that specifically allow women to breastfeed in *any* public or private location exception is Idaho. A Catholic church, ministry, apostolate, etc. that sets policies restricting breastfeeding mothers from feeding their babies, or requirir while doing so, may very well be running afoul of the law. (Worldwide, Australia, Canada, Germany, the Philippines, Taiwan, and the United Kingdom – have laws protecting nursing mothers, too.)

Google

catholicism and breastfeeding

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Breastfeeding Is Not Immodest - Catholic Stand : Catholic Stand

www.catholicstand.com/breastfeeding-not-immodest/ ▾

Jun 2, 2017 - A friend who works for a **Catholic** apostolate recently shared with me that she was discouraged from **breastfeeding** her 5-month-old daughter ...

People also search for

is it legal to breastfeed in church | can you breastfeed in church

woman breastfeeding in church | how should a catholic woman dress

lds breastfeeding

Less Catholicism means better health care, including for newborns

https://www.irishtimes.com/.../less-catholicism-means-better-health-care-including-for-... ▾

Apr 17, 2017 - Women living in countries where **Catholicism** has dominated are less likely to initiate **breastfeeding**.

More Catholics Means Less Breastfeeding in Developed Countries ...

https://www.medpagetoday.com/pediatrics/generalpediatrics/61881 ▾

Dec 6, 2016 - The higher the portion of **Catholics** in a country, the lower the rates of **breastfeeding**, an ecological study found. The **breastfeeding** rate was ...

HOW ABOUT YOU?

BREAST FEEDING PEARLS

Francis B Mimouni, MD

BREAST FEEDING PEARLS

- FORMULA INTAKE AD LIBITUM DURING THE FIRST TWO DAYS OF LIFE
- INFANT ACCEPTANCE OF POSTEXERCISE BREAST MILK

BREAST FEEDING - PEARLS

- MATERNAL DIET - EFFECTS ON FLAVOR AND THE INFANT'S BEHAVIOR

FORMULA INTAKE AD LIBITUM DURING THE FIRST TWO DAYS OF LIFE

SHAUL DOLLBERG, MD
SIGALIT LAHAV, RN
FRANCIS B. MIMOUNI, MD, FACN

BACKGROUND (I)

- IN THE FIRST DAYS OF LIFE, BREAST-FED INFANTS CONSUME MINIMAL AMOUNTS OF MILK, AS LITTLE AS 13 ML/KG/D ON DAY ONE AND 40 ML/KG/D ON DAY 2 OF LIFE
- BREAST MILK PRODUCTION ADJUSTS ITSELF TO THE INFANT'S REQUIREMENTS

BACKGROUND (II)

- WHETHER LOW COLOSTRUM OR MILK OUTPUT OF THE FIRST 2 DAYS OF LIFE IS PRIMARILY DUE TO A RELATIVE LACK OF READINESS TO LACTATE, OR IS SECONDARY TO LOW CONSUMPTION BY THE INFANT IS UNKNOWN

AIM

- To compare the spontaneous formula intake of unrestricted formula-fed infants to that of breast-fed infants over the first 48 hours of life.

HYPOTHESIS

- 1) Spontaneous formula intake of unrestricted infants is much higher than that of breast-fed infants.
- 2) Spontaneous formula intake correlates positively with gestational age or birthweight.

PATIENTS

- 43 infants. By maternal choice, 15 infants were exclusively breast-fed and 28 were formula-fed ad libitum every 4 hrs.
- All infants were healthy, singleton, term, *AGA*, born after uncomplicated pregnancy, labor, and delivery, and had an Apgar score > 7 at 1 and at 5 min.

METHODS

- Breast-fed and formula-fed infants were fed ad libitum every 4 hrs.
- Breast-fed infants were weighed before and 1 hour after initiation of feeding and intake was calculated from the difference between the measurements, and corrected individually for his/her normal postnatal decrease in body weight.
- Bottles offered to formula-fed infants contained 60 cc and the remainder was carefully measured.

RESULTS (I)

- Breast feeding on day1 was 9.6±10.3 (mean ±SD) vs. 18.5 ±9.6 cc/kg/d in formula-fed infants (p=0.011);
- On day 2 it was 13.0±11.3 vs. 42.2±14.2 cc/kg/d (p<0.001).
- Breast fed infants lost significantly more weight on day 2 (p=0.015).

RESULTS (II)

- In multiple regression, when the dependent variable was the second day intake, the significant independent variables were group (higher intake in the formula-fed group), weight loss (the higher the weight loss, the lower the intake), and first day intake (the higher the first day intake, the higher the second day intake).

CONCLUSIONS (I)

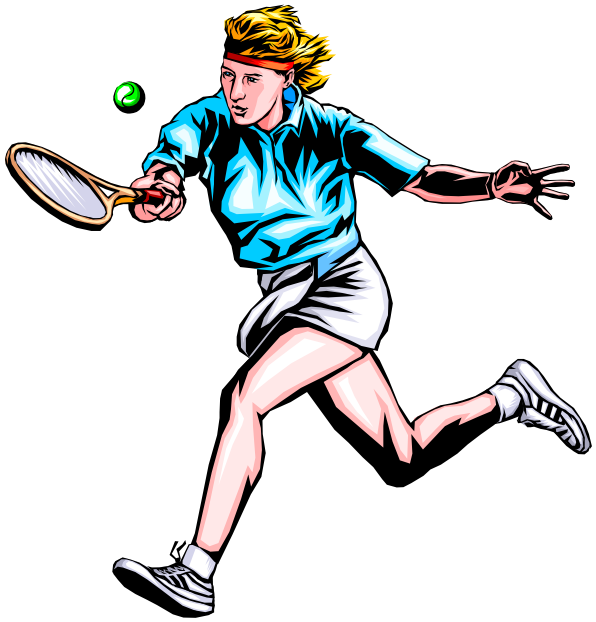
- Newborn infants offered ad-libitum every 4 hours formula consume much larger amounts than breast-fed infants fed according to the same schedule.
- In addition, weight loss is more marked in breast-fed infants on day 2 of life.

CONCLUSIONS (II)

- There can be no suspicion that the formula-fed group was substrate-limited. Thus lower intake in the first days of life must be interpreted as due to self-limitation by the infant.
- This self limitation could possibly due to lower appetite and/or thirst, decreased sucking and swallowing competency, or decreased alertness level, and may be aggravated by iatrogenic factors such as opiate analgesics.

INFANT ACCEPTANCE OF POSTEXERCISE BREAST MILK PEDIATRICS, 1992

- LACTATING WOMEN REPORT DIFFICULTY NURSING THEIR INFANTS FOLLOWING EXERCISE
- INCREASE IN LACTIC ACID CONCENTRATION IN BREAST MILK FOLLOWING MAXIMAL EXERCISE
- LACTIC ACID PRODUCES A SOUR TEST

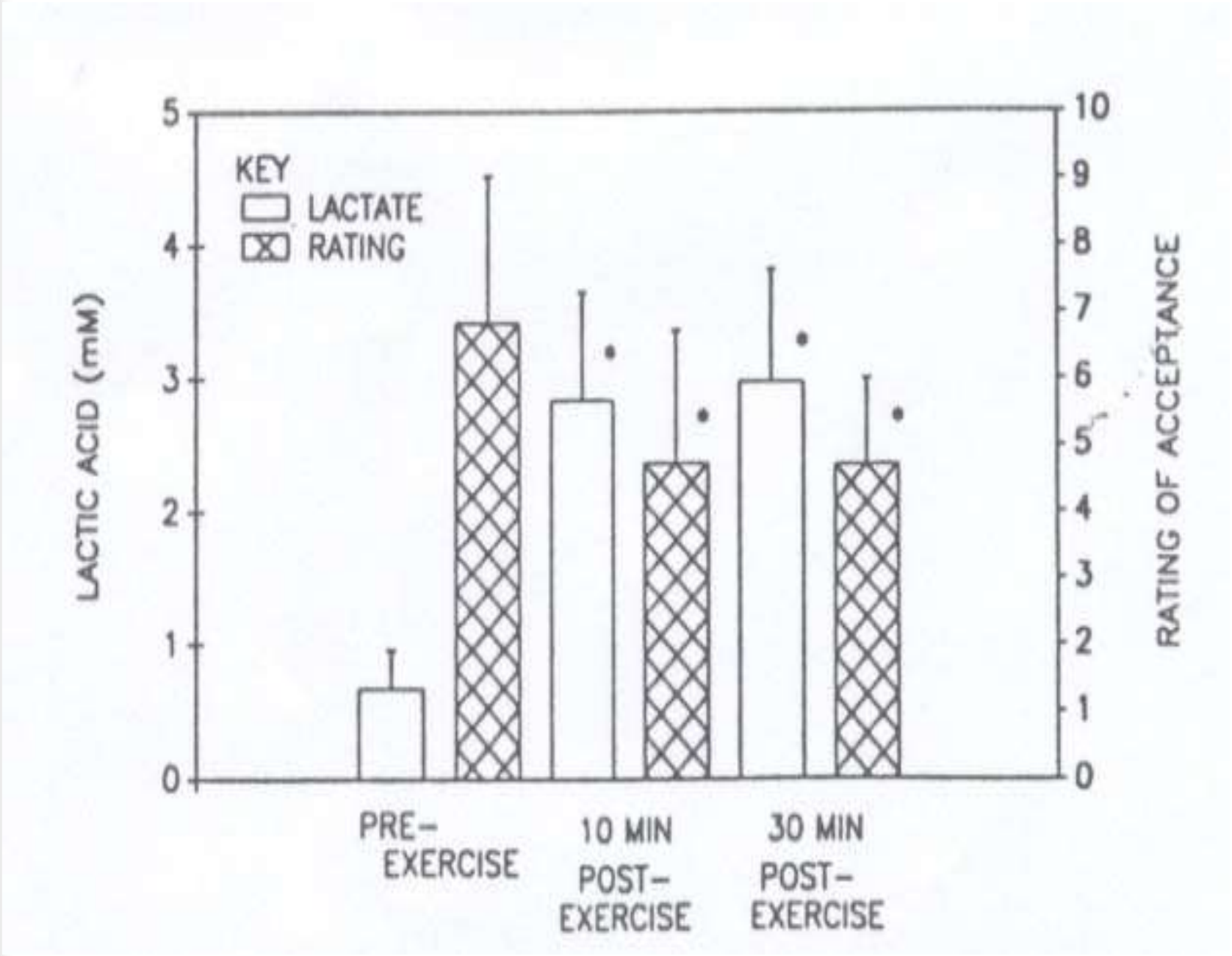


METHODS

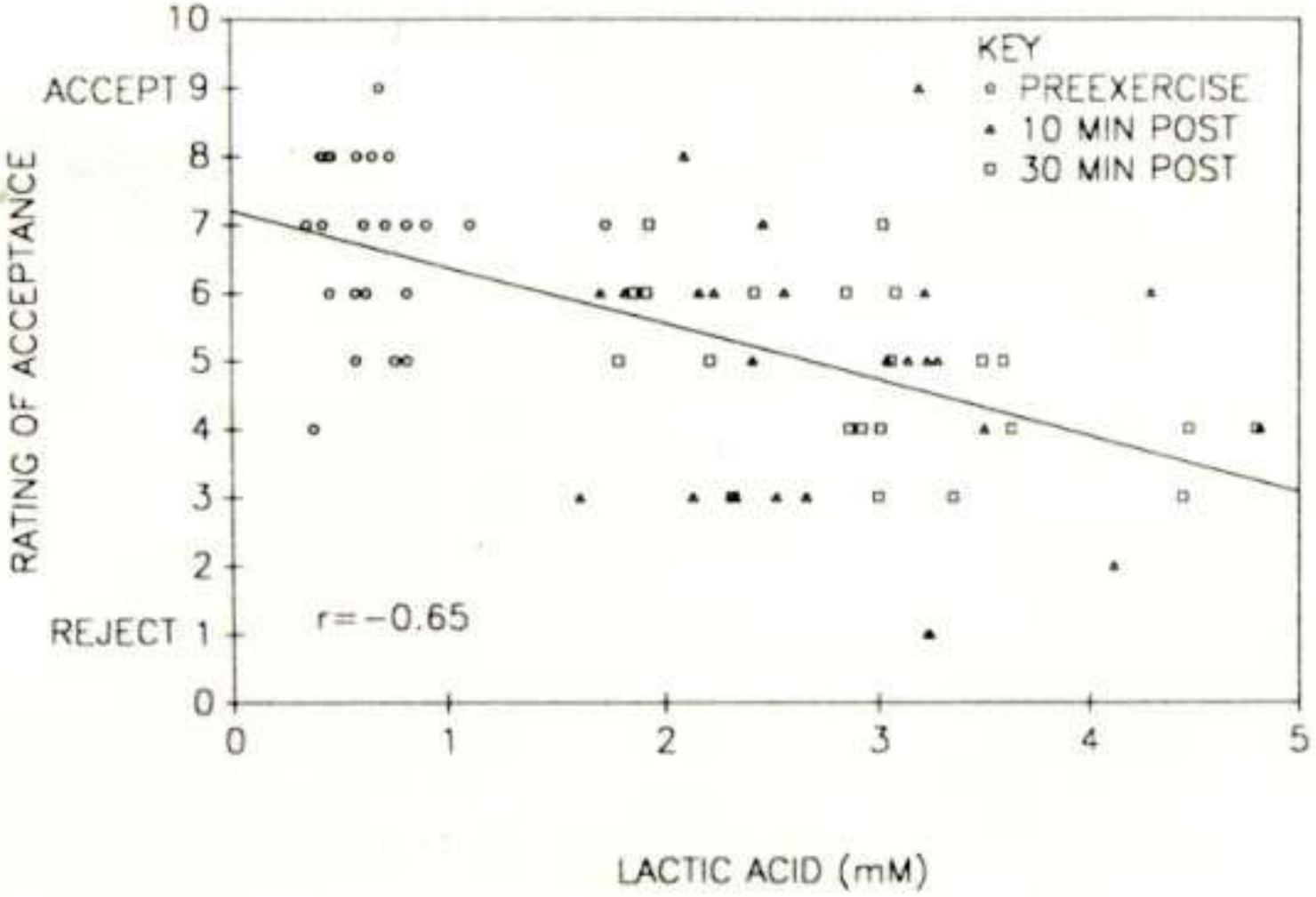
- 26 HEALTHY LACTATING WOMEN (treadmill, 2.5-3.5 mph, at angle allowing maximal voluntary effort)
- PREEXERCISE AND POSTEXERCISE BREAST MILK WAS ANALYZED FOR LACTIC ACID
- THE MOTHER RATED THE INFANT'S ACCEPTANCE OF THE MILK
  - 1 CRY
  - 3 REJECT
  - 5 INDIFFERENT
  - 7 ACCEPT
  - 9 LAUGH
- RANDOMIZED, DOUBLE-BLINDED EVALUATION

CONCENTRATIONS OF LACTIC ACID IN BREAST MILK BEFORE AND AFTER MAXIMAL EXERCISE

	Mean,mMol/L	SD
Pre-exercise	0.67	0.28
postexercise		
10 min	2.84*	0.81
30 min	2.97*	0.84


KEY
LACTATE
RATING
LACTIC ACID (mM)
RATING OF ACCEPTANCE
0
1
2
3
4
5
0
1
2
3
4
5
6
7
8
9
10
PRE–
EXERCISE
10 MIN
POST–
EXERCISE
30 MIN
POST–
EXERCISE

RELATIONSHIP BETWEEN LACTIC ACID CONCENTRATION AND THE MATERNAL RATING OF THE INFANT'S ACCEPTANCE



CONCLUSIONS

MOTHERS SHOULD CONSIDER NURSING

OR COLLECTING MILK FOR LATER

FEEDINGS BEFORE EXERCISING

THE TRANSFER OF ALCOHOL TO HUMAN MILK EFFECTS ON FLAVOR AND THE INFANT'S THE NEW ENGLAND JOURNAL OF MEDICINE, 1991

- TRADITIONALLY, ALCOHOL HAS BEEN RECOMMENDED TO NURSING MOTHERS
- THE INFANT INGESTS ONLY A SMALL FRACTION OF WHAT HAS BEEN CONSUMED BY ITS MOTHER
- WHAT IS THE EFFECT ON THE INFANT ?

METHODS

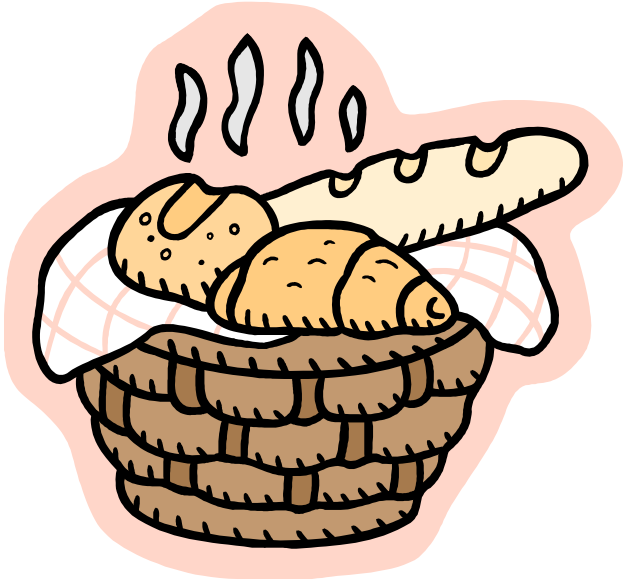
- 12 LACTATING WOMEN
- ORANGE JUICE WITH OR WITHOUT ETHANOL
- MILK SAMPLES WERE OBTAINED BEFORE AND AFTER THE INGESTION OF THE BEVERAGE
- EVALUATION OF THE MILK (ETHANOL CONTENT, ODOR)
- EVALUATION OF THE INFANT (WEIGHT, VIDEOTAPE)

EFFECT OF MATERNAL ALCOHOL CONSUMPTION ON THE FEEDING BEHAVIOR OF NURSING INFANT

	Orange juice	alcohol
Total amount of milk consumed (ml)	156.4±8.2	120.4±9.5†
Total time attached to nipple (min)	28.6±7.7	28.2±7.3
No. of feedings	2.5±0.2	2.2±0.2
Mean no. of sucks per feeding	307.1±56.4	352.3±64.8
Minute 1	58.4±5.9	67±6.5 †
Minute 2	56.2±6.5	61.2±5.4
Minute 3	49.8±5.8	58±4.9
> minute 4	142.7±38.2	166.1±48

MATERNAL DIET ALTERS THE SENSORY QUALITIES OF HUMAN MILK AND THE NURSLING'S BEHAVIOR PEDIATRICS, 1991

- DOES MATERNAL DIET AFFECT THE TASTE, ODOR, AND CONSEQUENTLY FLAVOR OF BREAST MILK ?
- WHAT ARE THE EFFECTS OF MATERNAL DIETARY CHOICES FOR THE NURSLING ?



METHODS

- 8 LACTATING WOMEN
- MILK SAMPLES WERE OBTAINED BEFORE AND AFTER EATING EITHER PLACEBO CAPSULES OR CAPSULES CONTAINING GARLIC
- SENSORY EVALUATION OF MILK (SENSORY PANEL)
- EVALUATION OF THE NURSLING'S BEHAVIOR (VIDEOTAPE, WEIGHT)

TABLE. Effect of Garlic Ingestion by the Mother on the Behavior of the Infant During Nursing

Behavior of Nursling	Type of Capsules Ingested by Mother	
	Placebo	Garlic
Time attached to the nipple, min		
Prior to or within 1.5 h after ingestion	15.0 ± 2.8	14.0 ± 3.4
1.5–3 h after ingestion	12.4 ± 2.6	18.8 ± 3.6*
Total 4-h testing period	27.4 ± 5.2	32.8 ± 6.6*
Amount of breast milk consumed, mL		
Prior to or within 1.5 h after ingestion	101.2 ± 13.1	111.3 ± 15.7
1.5–3 h after ingestion	69.0 ± 5.4	92.8 ± 17.3
Total 4-h testing period	170.2 ± 13.7	204.1 ± 31.1
No. of feeds		
Prior to or within 1.5 h after ingestion	1.9 ± 0.3	1.5 ± 0.3
1.5–3 h after ingestion	1.6 ± 0.3	1.6 ± 0.2
Total 4-h testing period	3.5 ± 0.5	3.1 ± 0.4

* $P < .05$.

DISCUSSION

- THE DIET OF A LACTATING WOMAN ALTERS THE SENSORY QUALITIES OF HER MILK
- THE BREAST-FED INFANT MAY BE RECEIVING SENSORY INFORMATION ABOUT THE MOTHER'S DIETARY CHOICES
- ALCOHOL CONSUMPTION BY LACTATING WOMEN ALSO REDUCED MILK INTAKE BY THEIR INFANTS:
  - THE CHANGE IN THE FLAVOR ?
  - A DIRECT EFFECT OF ALCOHOL ?
  - A DECREASE IN MILK PRODUCTION ?
- GARLIC CONSUMPTION BY THE MOTHERS ALTERED THEIR INFANT'S SUCKLING BEHAVIORS

Prenatal and Postnatal Flavor Learning by Human Infants

Julie A. Mennella, PEDIATRICS
Vol. 107 No. 6 June 2001, p. e88

Background

- Flavors from the mother's diet during pregnancy are transmitted to amniotic fluid and swallowed by the fetus.
- Some of these same flavors will later be experienced by infants in breast milk, a liquid that, like amniotic fluid, comprises flavors that directly reflect the foods, spices, and beverages eaten by the mother.

HYPOTHESIS

- Experience with a flavor in amniotic fluid or breast milk modifies the infants' acceptance and enjoyment of similarly flavored foods at weaning.

METHODS (I)

- Pregnant women who planned on breastfeeding their infants were randomly assigned to 1 of 3 groups.
- The women consumed either 300 mL of carrot juice or water for 4 days per week for 3 consecutive weeks during the last trimester of pregnancy and then again during the first 2 months of lactation.

METHODS (II)

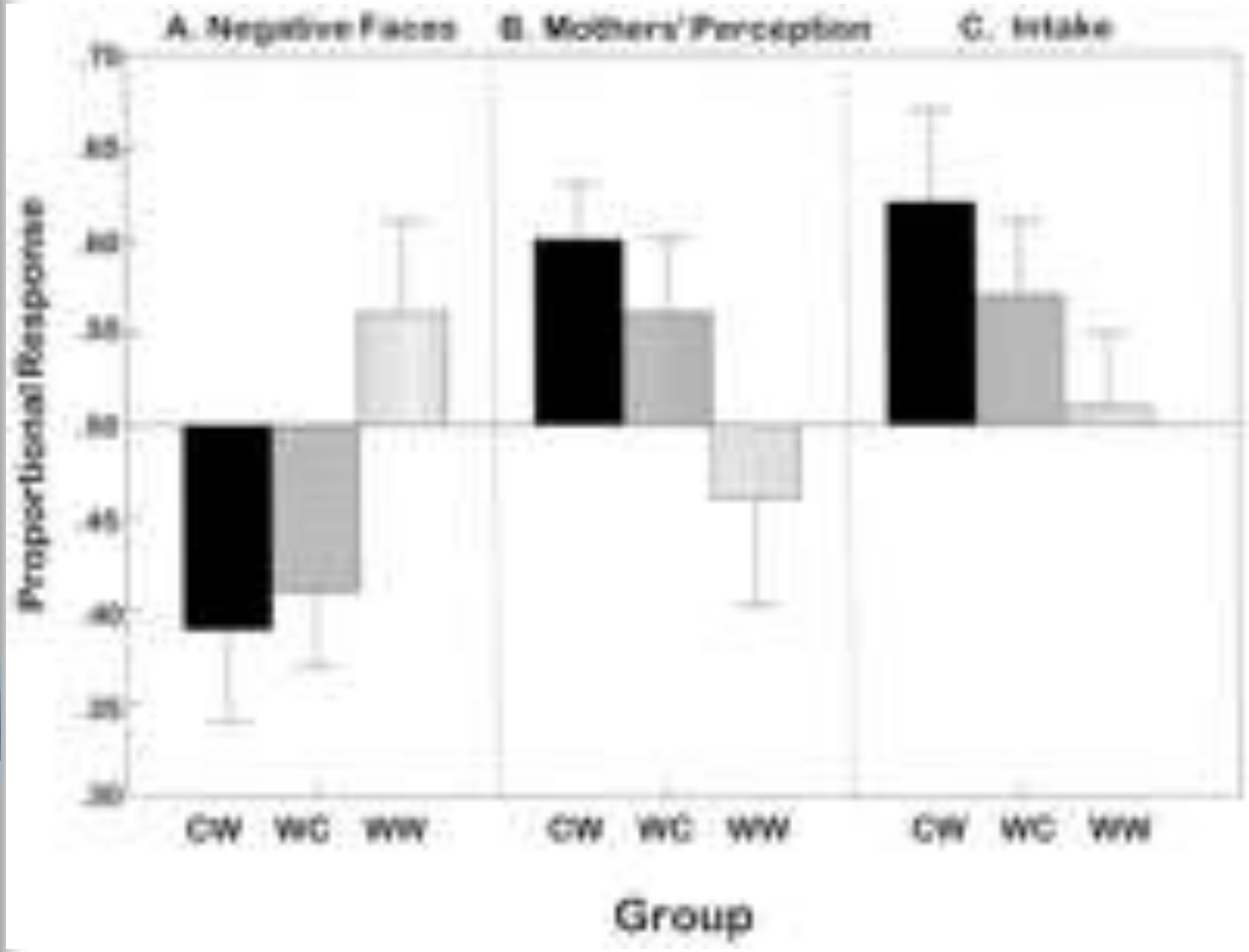
- Mothers in group 1 drank carrot juice during pregnancy and water during lactation
- Mothers in group 2 drank water during pregnancy and carrot juice during lactation
- Mothers in group 3 drank water during both pregnancy and lactation.

METHODS (II)

- 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 order, cereal prepared with water during 1 test session and cereal prepared with carrot juice during another.

METHODS (III)

- Immediately after each session, the mothers rated their infants' enjoyment of the food on a 9-point scale.
- Trained raters, who were unaware of the experimental conditions, scored the videotaped records of the first 2 minutes of each feed in real time.


A. Negative Faces
B. Mothers' Perception
C. Intake
Proportional Response
70
65
60
55
50
45
40
35
30
CW
WC
WW
CW
WC
WW
CW
WC
WW
Group

RESULTS (I)

- The results demonstrated that the infants who had exposure to the flavor of carrots in either amniotic fluid or breast milk behaved differently in response to that flavor in a food base than did non-exposed control infants.
- Infants exposed to carrots prenatally were perceived by their mothers as enjoying the carrot-flavored cereal more compared with the plain cereal.

CONCLUSION

- Prenatal and early postnatal exposure to a flavor enhanced the infants' enjoyment of that flavor in solid foods during weaning.
- These very early flavor experiences may provide the foundation for cultural and ethnic differences in cuisine.


The French Rejection 26
God of Cricket 40
TIME
ARE YOU
MOM
ENOUGH?
Why attachment parenting drives some mothers to extremes—and how Dr. Bill Sears became their guru
BY KATE PICKERT