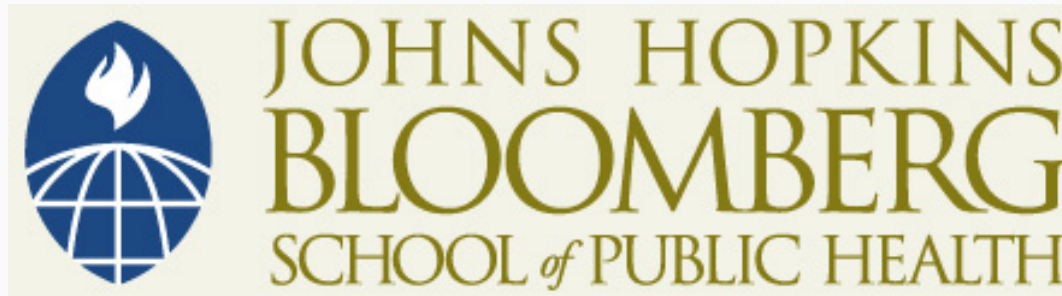


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A Conceptual Framework for Studying Human Fertility

Nan Astone, PhD
Johns Hopkins University

Objectives of the Lecture

- At the end of this lecture and the accompanying readings, students will be able to:
 - Identify and distinguish among the major measures of fertility
 - Distinguish between natural and controlled fertility
 - Describe the proximate determinants framework for the study of human fertility



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Section A

Measures of Fertility

Brief Discussion of Measurement of Fertility

- Crude birth rate
 - Number of births during t/mid-year population in t
- General fertility rate
 - Number of births during t/mid-year population of women aged 15-49
- Age-specific fertility rate
 - Number of births to women aged x during t/mid-year population of women aged x

Crude Birth Rate

(Number of births in the U.S. in 1988/number of people in the U.S. in 1988) *1,000

$$(3,046,162/298,444,215) *1,000 = 10.2$$

General Fertility Rate

(Number of births in the U.S. in 1988/number of woman aged 15-49 in the U.S. in 1988) *1,000

$$(3,046,162/54,022,000) *1,000 = 56.4$$

Age-Specific Fertility Rates (ASFR), U.S. 1988

1 Age	2 Number of births	3 Number of women	4† ASFR
15-19	319,544	7,213,000	44.30
20-24	804,622	7,852,000	102.47
25-29	1,010,748	9,057,000	111.60
30-34	661,414	9,069,000	72.93
35-39	217,754	8,110,000	26.85
40-44	31,068	7,024,000	4.42
45-49	1,012	5,697,000	0.18

†(column 2/column 3) *1,000

Total Fertility Rate (TFR)

- The number of children a woman would have if she experienced a specific set of age-specific fertility rates for her whole lifetime
- Remember, there is no woman who experiences the age-specific rates of the U.S. in 1988
 - That is, a woman 20-24 in 1988 will experience the 1988 20-24 rates, but will experience the 25-29 rates from 1993

Total Fertility Rate, U.S. 1988

1 ASFR	2 Cumulative ASFR
44.30	221.51
102.47	733.87
111.60	1,291.87
72.93	1,656.52
26.85	1,790.77
4.42	1,812.89
0.18	1,813.78
	1.80



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Section B

Natural and Controlled Fertility

Objectives of the Lecture

- At the end of this lecture and the accompanying readings, students will be able to:
 - Identify and distinguish among the major measures of fertility
 - **Distinguish between natural and controlled fertility**
 - Describe the proximate determinants framework for the study of human fertility

“Natural” vs. “Controlled” Fertility

- A useful distinction to make is between “natural” and “controlled” fertility
- Fertility rates VARY across populations or across time within a population
- This is true of populations with natural fertility and populations with controlled fertility
- That is, natural does not mean high, and controlled does not mean low (although natural fertility populations tend to be higher on average than controlled fertility populations)
 - Point of the distinction is that there is ALWAYS variation across populations, and levels are uninformative

Natural Fertility

- The type of fertility pattern that emerges when people do not change the behaviors that underlie fertility as a result of how many children they have
- Examples:
 - Post-partum abstinence
 - Breastfeeding
 - Taboos about grandmothers having children

Controlled Fertility

- The type of fertility pattern that emerges when people do change the behaviors that underlie fertility as a result of how many children they have
- Examples:
 - Have a goal of how many children they want
 - Decide that they have enough children
 - “Replace” children who die

Graphing ASFRs: Natural vs. Controlled Fertility

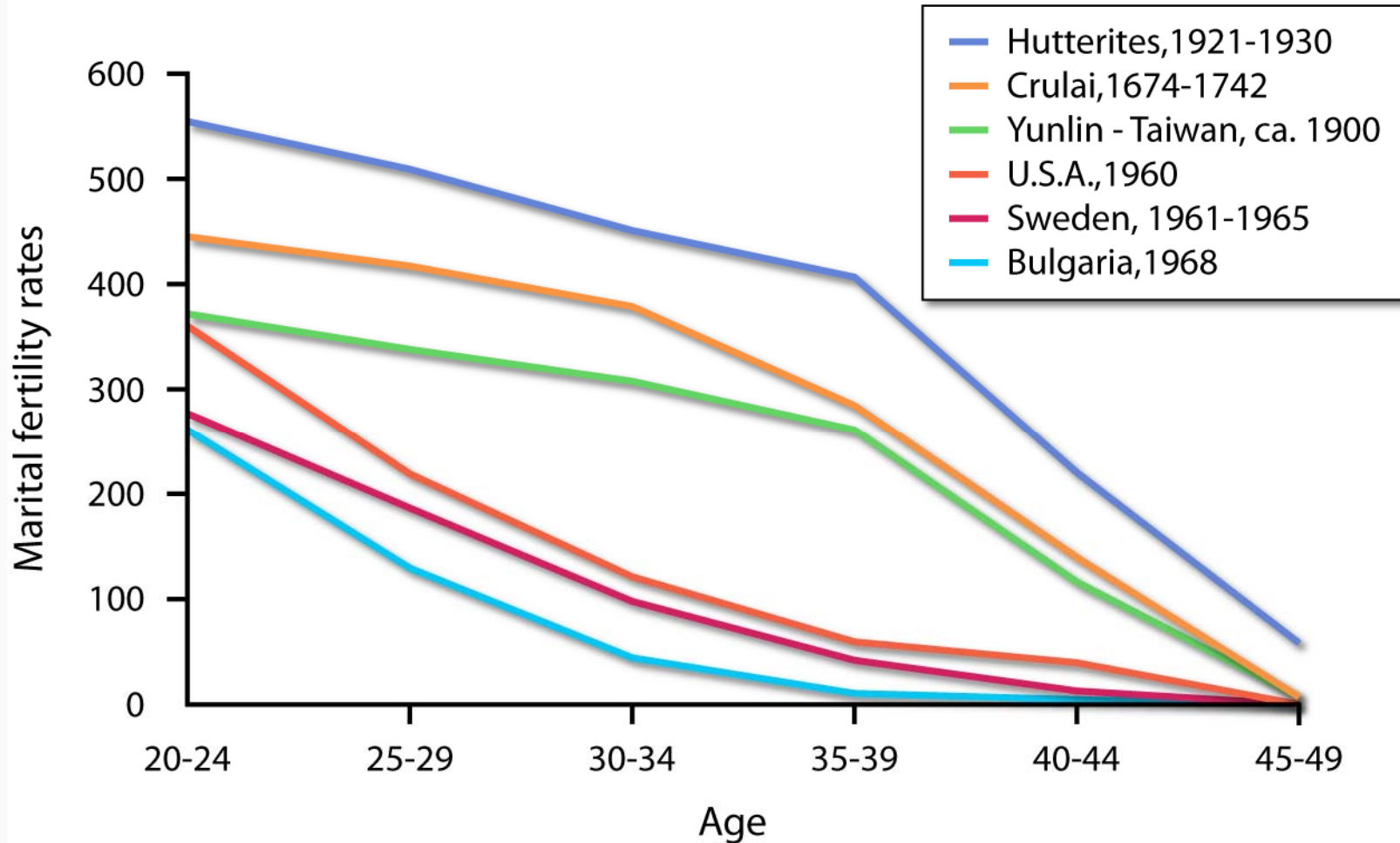
- Differences in the shape of the graph when you plot fertility rates by age (ASFRs)
 - Under natural fertility, the ASFRs decline as a result of declining fecundity alone: convex shape
 - Under controlled fertility, the ASFRs at older ages are lower than they would be otherwise: concave shape

When a Population Uses Parity-Specific Behavior

- Can tell whether or not a population is using parity-specific behavior by shape, not level
 - Graph shows three natural and three controlled fertility populations, all of which have different fertility levels

Three Natural, Three Controlled Fertility Populations

Age Specific Marital Fertility Rates (Births per 1,000 Married Women)



Adapted by CTLT from Knodel, John. 1997. "Family Limitation and the Fertility Transition: Evidence from the Age Patterns of Fertility in Europe and Asia." *Population Studies* 31(2):219-249



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Section C

The Proximate Determinants Framework

Objectives of the Lecture

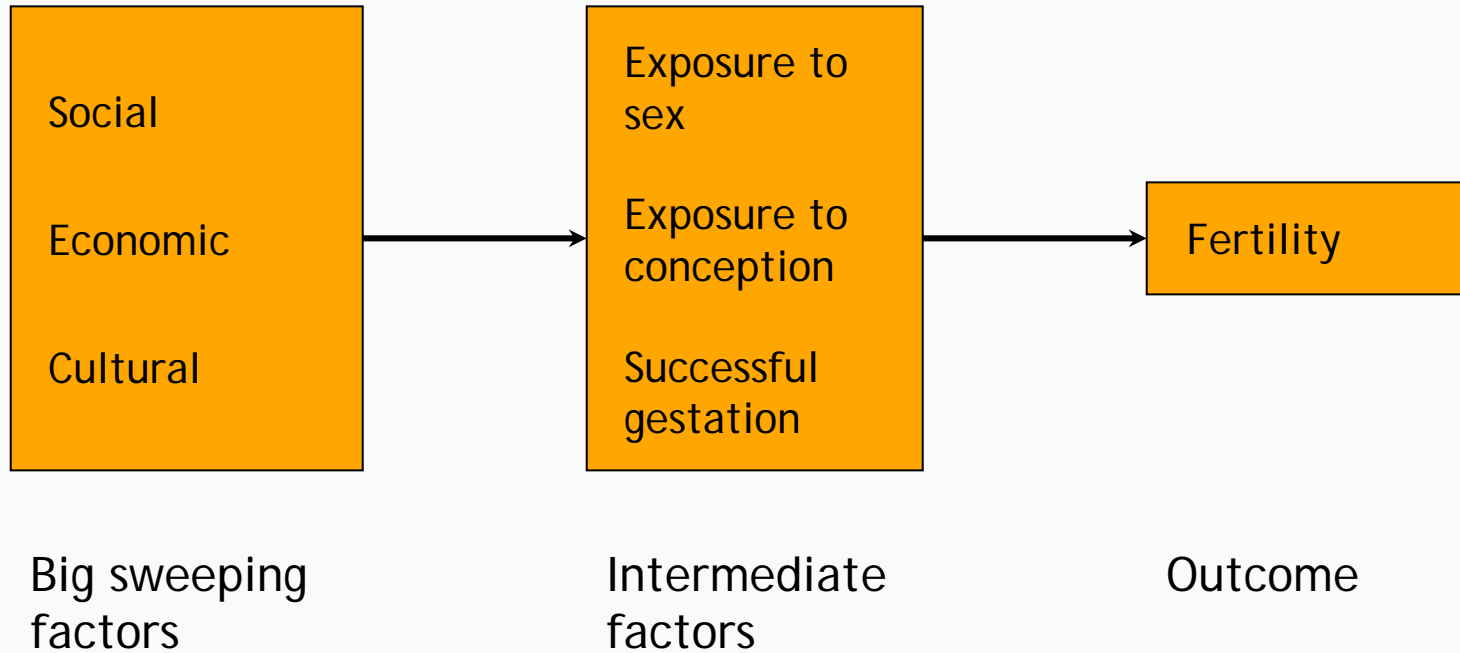
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Research on Variation in Fertility Levels

- Interest in explaining why populations have different levels of fertility has driven a lot of research
- In particular, scholars and policy makers have been interested in why fertility declines
- We will take up their suggestions and conclusions in the next lecture
- They were very focused on things like economic development, religion, women's work

- 1950s
- The “intermediate variables” approach
- First formal statement that the broad and sweeping social phenomena that people were attempting to link to fertility change could not affect fertility directly
- For example, many have linked economic development with low fertility
 - When the GNP changes, women don't magically become less able to conceive by osmosis

Factors and Outcome



Factors Affecting Exposure to Sex

- Formation and dissolution of sexual unions
 - Age at entry into sexual union
 - Permanent celibacy
 - Time spent between or after unions
- Exposure to coitus within unions
 - Voluntary abstinence
 - Involuntary abstinence
 - Coital frequency

Factors Affecting Exposure to Conception

- Involuntary infecundity
- Use of contraception
- Voluntary infecundity (sterilization)

Factors Affecting Gestation

- Involuntary fetal mortality (miscarriage)
- Voluntary fetal mortality (abortion and infanticide)

Social and Economic Institutions

- Davis and Blake argued that pre-industrial populations evolved social and economic institutions to produce sufficient fertility to overcome high mortality
- This does not always mean social and economic institutions that promote the highest possible fertility
 - Polygyny and post-partum abstinence (insured that children were not closely spaced, probably lowered infant mortality)
 - European marriage patterns (insured that children were born to the most prosperous people)

- How did John Bongaarts improve on Davis and Blake's model?
 - Davis and Blake missed breastfeeding entirely
 - Bongaarts attempted to quantify the intermediate variables, which he re-named proximate determinants, by proposing specific measures and using them (the measures) to predict the TFR, using real data
 - ▶ Flaws in the data and the project should not take away from the importance of the attempt

Bongaarts's Proximate Determinants Model

- A. Exposure to intercourse
 - 1. Proportions of women married by age
- B. Exposure to conception
 - 2. Contraceptive use and effectiveness
 - 3. Duration of post-partum infecundability
 - 4. Frequency of intercourse
 - 5. Permanent sterility
- C. Successful gestation and parturition
 - 6. Spontaneous intrauterine mortality
 - 7. Induced intrauterine mortality

Bongaarts's Criteria

- Bongaarts's criteria for evaluating the importance of the proximate determinants
 - Sensitivity
 - ▶ How big an impact does the factor have?
 - Variability
 - ▶ How much variability does the factor explain

Results

- Proportion married and contraception score high on both sensitivity and variability
- Post-partum infecundability and abortion score moderately on sensitivity and very high on variability
- Other three (intrauterine mortality, sterility, and coital frequency) are, at best, moderate on one

Results

- Bongaarts focused on proportion married, contraception, post-partum infecundability, and abortion
- Developed a mathematical model where one calculates the TFR by multiplying maximum fertility (15.3) by indices of these four factors that range in value from 0 to 1

Questions

- Did fertility scholarship need Bongaarts?
- Do we really need Bongaarts?