



*Low Fertility at the Turn of the
21st Century*

S. Philip Morgan, Duke University

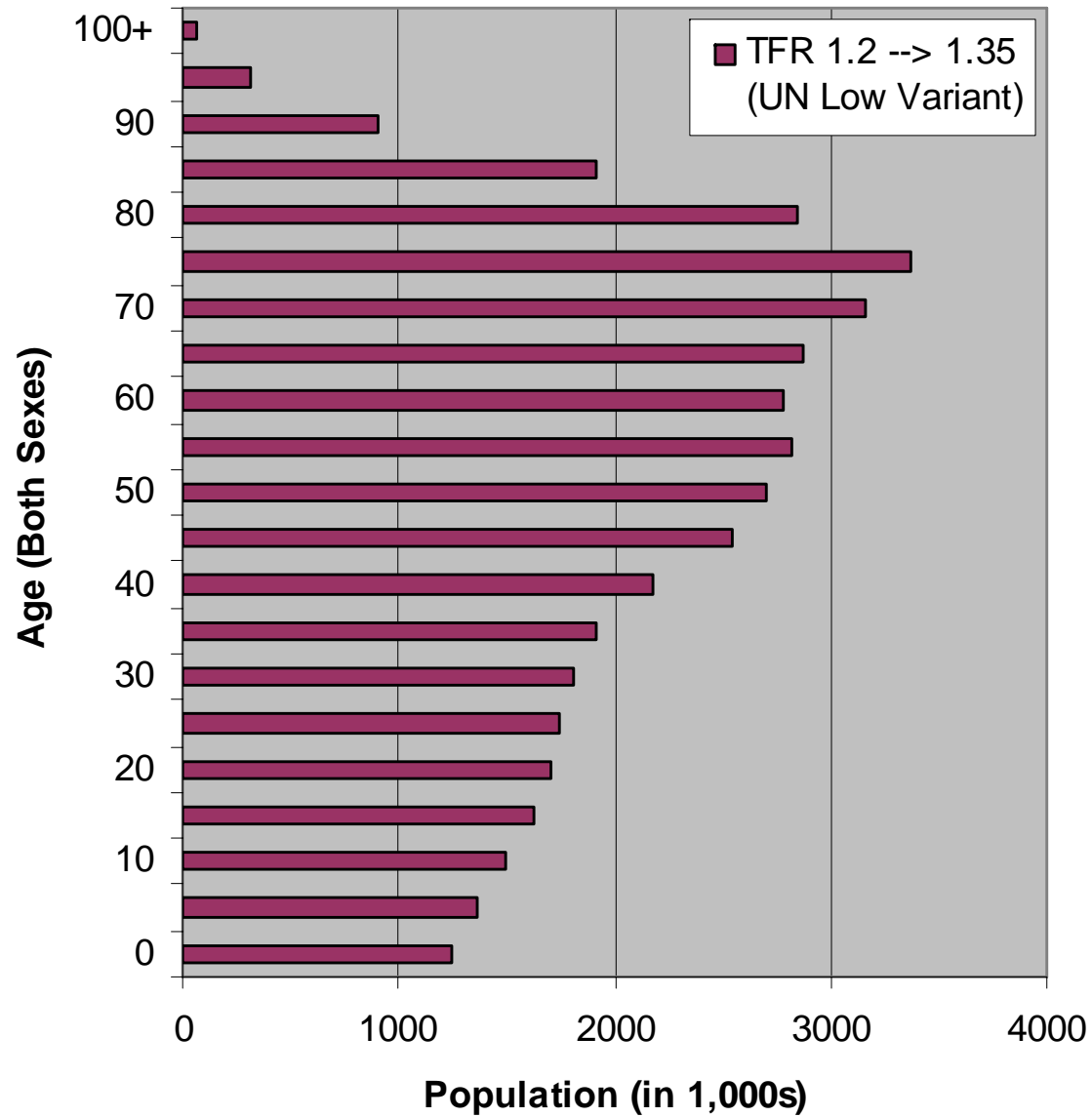
Miles G. Taylor, UNC-Chapel Hill

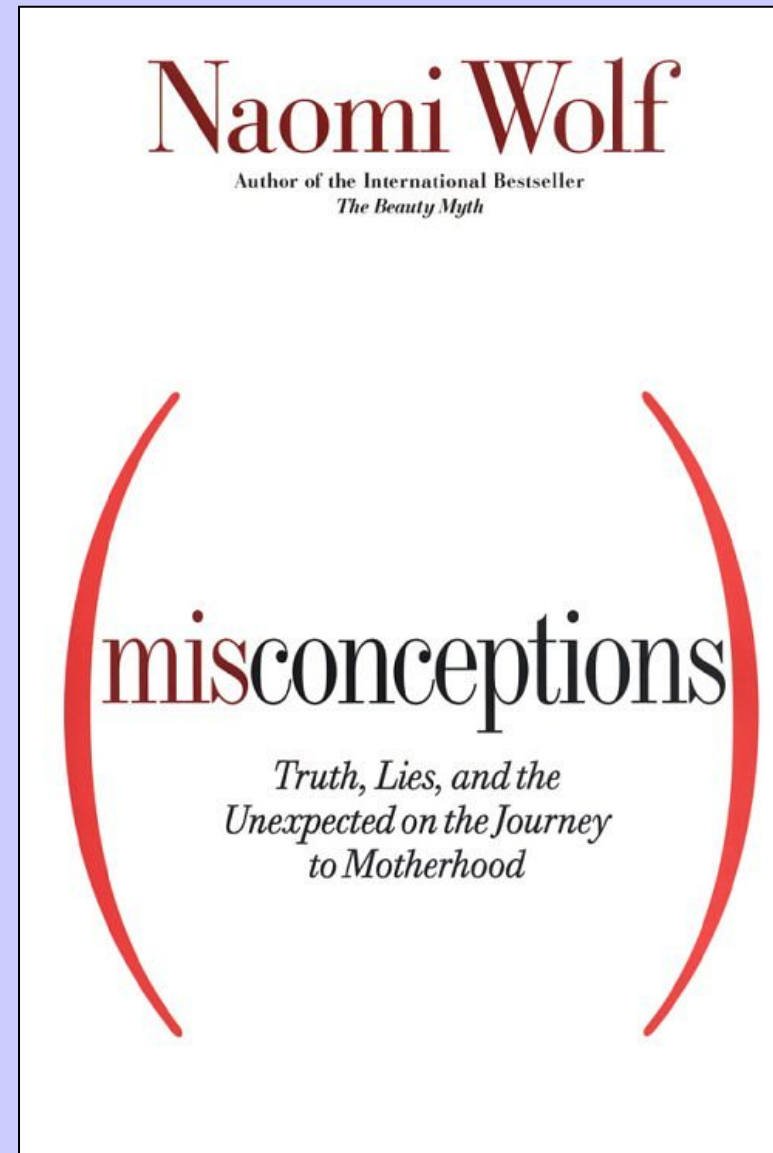
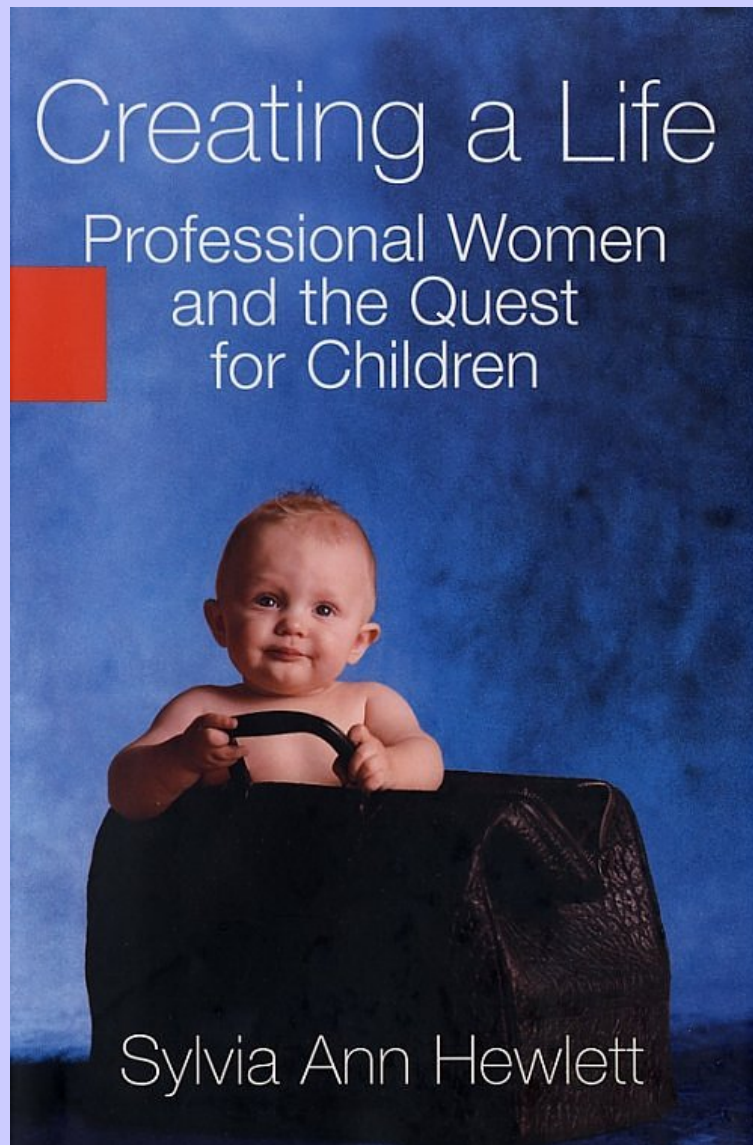
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Countries with TFR < 2.1

2000

**Figure 1. Projected Population by Age:
Italy 2050**





WILL MALTHUS BE RIGHT?

BY NILES ELDRIDGE

His forecast was ahead of its time, but nature may still put a lid on humanity

MALTHUS WAS RIGHT. SO READ A CAR BUMPER sticker on a busy New Jersey highway the other day, and it got me thinking about the Rev. Thomas Malthus, the English political economist who gave the "dismal science" its nickname. His "Essay on the Principle of Population," published in 1798, predicted a gloomy future for humanity: our population would grow until it reached the limits of our food supply, ensuring that poverty and famine would persistently rear their ugly faces to the world.

The most casual cruise on the Internet shows how much debate Malthus still stirs today. Basically, the Pollyannas of this world say that Malthus was wrong; the population has continued to grow, economies remain robust—and famines in Biafra and Ethiopia are more aberrations than signs of the future. Cassandra's reply that Malthus was right, but techno fixes have postponed the day of reckoning. There are now 6 billion people on Earth. The Pollyannas say the more the merrier, the Cassandra's say that is already twice as many as can be supported in middle-class comfort, and the world is running out of arable land and fresh water. Despite a recent slowdown in the growth rate, the U.N. Population Division expects the world population to reach 9.5 billion by the year 2100.

What's missing from the debate is an understanding of the changing relationship between humanity and nature. For it is how humans fit into the natural world that will settle whether Malthus was right or wrong. He was wrong in 1798. But if he had been writing 10,000 years earlier, before agriculture, he would have been right. And were his book being published today, on the brink of the third millennium, he would be more right than wrong. Let me explain.

Malthus cared about only one species: ours. And, ecologically speaking, ours is an unusual species. With the invention of agri-

culture 10,000 years ago, we became the first species in the 3.7 billion-year history of life not to be living as small populations off the natural fat of the land. Taking food production into our own hands, we stepped outside the local ecosystem. All but a few cultivated plants became weeds, and all but a few domesticated herds, pets and game animals became pests and vermin.

In short, we declared open war on the very local ecosystems that had until then been our home. As preagricultural hunter-gatherers, we humans held niches in ecosystems, and those niches, resource-limited as they always were, had indeed kept our numbers down. Estimates vary, but a figure of roughly 6 million people on Earth at the beginning of agriculture is reasonable. By 1798 the population reached 800 million. Agriculture altered how we related to the natural world and, in liberating us from the confines of the local ecosystem, removed the Malthusian lid in one fell swoop.

So, when he wrote 200 years ago, Malthus was wrong. He did not see that nations are not like ecosystems, that people could expand into new regions and, with the burgeoning technology of the Industrial Revolution, become vastly more efficient at producing food and wasting raw materials from Earth.

But something else is going on, and I think Malthus may have sensed it coming. As long ago as 1679, Antoni van Leeuwenhoek (the Dutch inventor of the microscope) speculated that the limit to the human population would be on the order of 13 billion—remarkably close to many current estimates. For our position in the natural world is once again undergoing a sea change. We are not the first nor are we the only species to spread around the globe, but we are the first



ecosystems—ecosystems we have allowed to decay as we have chosen (quite successfully!) to live outside them.

We have converted woodlands and prairies to farmland virtually all over the globe. Our cities, suburbs and malls have paved over natural communities and pollution and overfishing are rapidly destroying our rivers, lakes and oceans. As these ecosystems go down, we are losing perhaps 30,000 species of animals and plants a year, out of perhaps 10 million total species, even though we still deeply rely on at least 40,000 species for food, shelter, clothing and fuel. We rely on natural products to replenish genetic diversity in our crops and to produce new medicines. We rely on pristine ecosystems to replenish oxygen, regulate water cycles, control erosion, cycle essential nutrients and restock critical fisheries. We still need these things to sustain life—our life. The irony is that our rampant success in living outside the world's ecosystems has put them all, and thus ourselves, in jeopardy.

The tide is running back toward Malthus. We are emerging from a 10,000-year vacation from nature still not fully realizing that our own survival hinges on reducing the damage we do to Earth's natural systems. We may not drive ourselves to the complete oblivion of biological extinction, but I fear that the Malthusian specters of famine, warfare and disease will rise in the comparatively short run (the next few centuries), coupled with an accelerating loss of human cultural diversity and, ultimately, quality of life.

Unless, we can, I think, find the inner will to wake up to our current situation, to see the grimmer outlook around the corner and to choose to do something about it. We can stabilize our numbers and temper our patterns of consumption. We can work to stem the tide of ecosystem destruction and species loss. We can, in short, see ourselves for what we have become: the first global economic entity, a fascinating state arrived at through no end of cleverness but a state that is ultimately limited by the health and productivity of the natural system in which we live. We can, if we choose to do so, prove Malthus' direst prognostications wrong.

to do so as an integrated economic entity. Other species maintain tenuous genetic connections, but no direct ecological connections, among their far-flung members. We, in contrast, are exchanging more than \$1 trillion of goods and services among ourselves globally every day.

This means that in an economic—if not a political—sense, we have become a single, enormous population. The system in which we are living, extracting our energy and other supplies, is global: the totality of Earth's atmosphere, its waters, its soils and crust, and all its living things. This is the sum total of all the world's local

Niles Eldredge is a paleontologist at the American Museum of Natural History. His book *The Triumph of Evolution* is due out early next year.

OUT OF CONTROL

World population (in billions)

A.D. 1000 1500 1900 1999 2150
Source: UN Population Division

10

8

6

4

2

low fertility features to be explained

- Its spread across regions
- Variation in low fertility across societies
- The persistence of low fertility once it arrives..

Regional trends in TFR

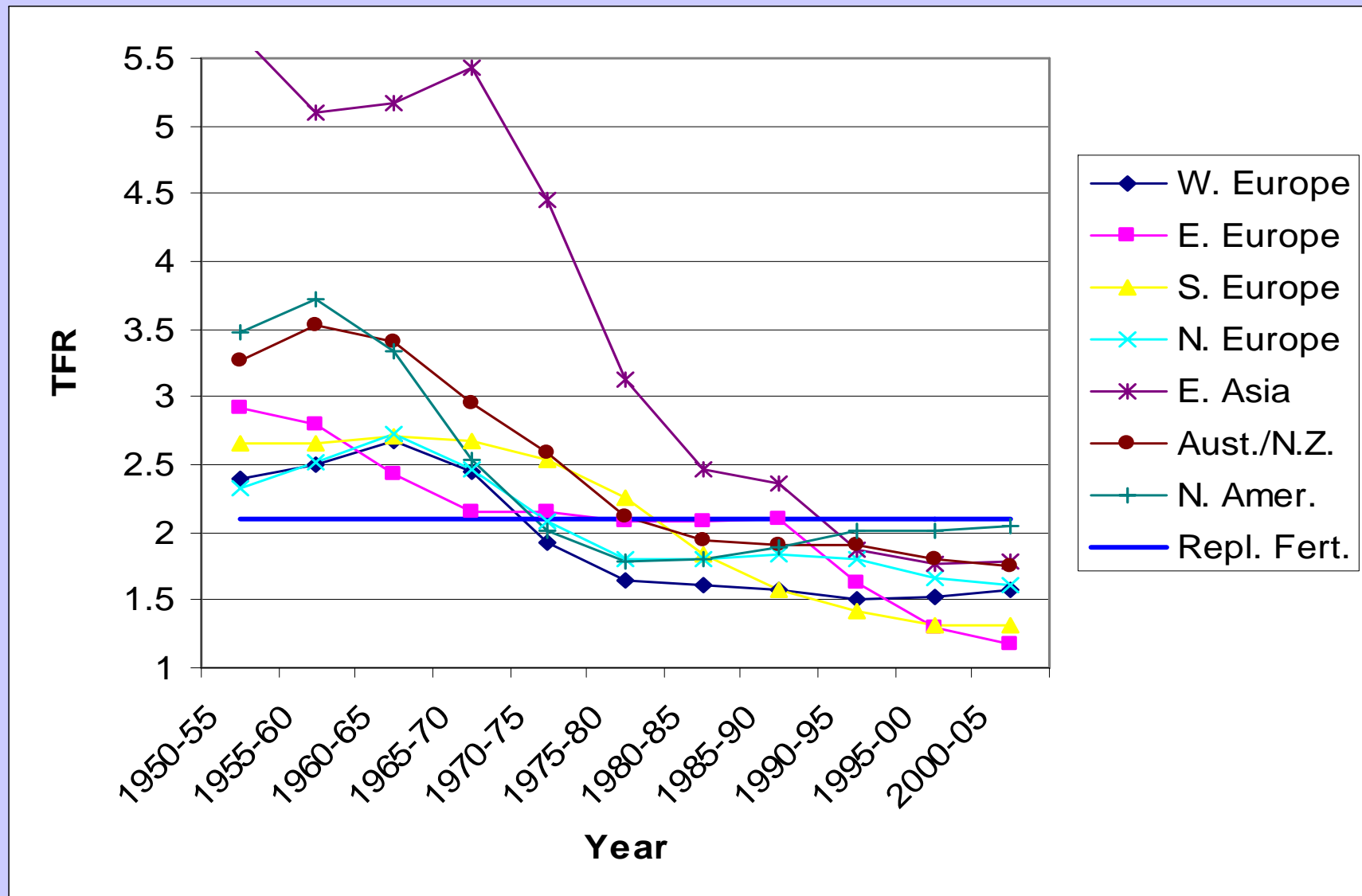


Table 1. TFRs for selected countries

Country	TFR 2000-2005 ^a	Implied growth rate ^c	Implied yrs. to halve*	Period TFR < 2.1 ^a	Yrs. TRF<2.1**
<i>Europe</i>					
Germany	1.32	-1.5%	46	1970-1975	30
France	1.87	-0.4%	196	1975-1980	25
<i>Russian Federation</i>					
	1.33	-1.6%	43	1965-1970	35
Spain	1.27	-1.6%	42	1980-1985	20
Italy	1.28	-1.6%	42	1975-1908	25
Greece	1.25	-1.7%	41	1980-1985	20
Sweden	1.64	-0.8%	88	1970-1975	30
<i>Asia</i>					
China	1.70	-0.9%	75	1990-1995	10
Japan	1.33	-1.5%	46	1955-1960	45
<i>Australia/New Zealand</i>					
Australia	1.75	-0.6	119	1975-1980	25
<i>North America</i>					
U.S.	2.04	-0.1%	1025	1970-1975	25
U.S.: White non-Hisp.	1.84 ^b	-0.4	196	N/A	N/A

II. Decomposition, Proximate Determinants and What We Know About Low Fertility

- 1) Timing and quantum
- 2) The transition to parenthood
- 3) Proximate determinants of low fertility?

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$$TFR = Ft \times (IP) \times (Fu \times Fg) \times (Fi \times Fc) .$$

$$TFR / Ft = (IP) \times (Fu \times Fg) \times (Fi \times Fc) .$$

II. Decomposition, Proximate Determinants and What We Know About Low Fertility

1. Fertility postponement lowers current period measures of fertility
2. Fertility timing has consequences for the number of children women will bear
3. Women's (men's and couple's) fertility histories unfold in tandem and in interaction with human capital formation, mental and physical health trajectories, and other key aspects of their life course

II. Decomposition, Proximate Determinants and What We Know About Low Fertility

4. Parents incur high direct and indirect costs in having and rearing children in contemporary contexts.
5. Dominant norms and cultural schemas legitimate active birth control
6. Low parity births remain strongly normative and fulfill women's/couples' desire to be parents and have a family.

*II. Decomposition, Proximate Determinants and
What We Know About Low Fertility*

7. High parity births are increasingly rare and non-normative

Not all families have 1.8 children.



Everything seems to be getting smaller. Even the American family. According to the U.S. Bureau of Census the average family now has less than two children. This shrinking family size has contributed to many manufacturers downsizing the family sedan.

But Honda doesn't look at the American family as a vanishing breed. In fact, over the

years we've actually made our Civic 4-Door family Sedan bigger. Inside and out.

We've added more headroom, front and back; more shoulder room; more hiproom. And as we've made more room for people, we've made more room for their belongings.

To make sure everyone rides in comfort, we've increased the wheelbase by more

than five inches. We also have equipped this front-wheel-drive Civic with torsion bar front suspension, child-proof rear door locks, front and rear stabilizer bars, an adjustable steering column. And more. Plus, there are child safety-seat anchors to provide secure installation of approved car seats for children under 4 years or weighing less than 40 lbs.

If you have big plans for your family and need a car with a small price, plan on a Civic 4-Door Sedan. As your family grows so will your appreciation of this Honda.

HONDA

The Civic 4-Door Sedan

Fundamental Causes of Low Fertility and Its Variations

- The conceptual range of theories
- Scope (Global, Interactive, Idiosyncratic)
- Content
 - Economic change
 - Ideological change
 - Institutional change
 - Technological change
 - Multiple domains

**Table 2: Typology of Low Fertility Theories /Schemas
with Illustrative Examples**

				SCOPE		
				Global	Interactive	Idyosyncratic
CONTENT	Economic change	Davis 1937 Caldwell & Schindlmar 2003		Caldwell 2001		Sobotka et.al. 2003 Kreyenfeld 2003 Witte & Wagner 1995
	Ideological change	Lesthaeghe & van de Kaa 1986 Thornton 2005				
	Technological change	Potts 1997		Galor and Weil 1996,2000		Goldin and Katz 2000
	Institutional			Esping-Andersen 1999 McDonald 2000 Rindfuss et.al. 2003		Morgan 2003
	Synthetic	Goode 1963 Bumpass 1990 Mason 1997				Ginsborg 2003 Atoh 2001 Prachuabmoh and Mithranon 2003

Where Do We Go From Here ?

- Decomposition and proximate determinants
- An integrative theory linking distal causes to more proximate determinants

Explaining Family Change and Diversity

S. Philip Morgan, Duke; Tom DiPrete,
Columbia

Suzanne Bianchi, Seth Sanders, U. Md.

Judy Seltzer, Joe Hotz, Duncan Thomas,
UCLA

<http://www.soc.duke.edu/~efc/>

JMF, 2005, 67:908-25.

Explaining Parenthood Change and Variation

S. Philip Morgan,
Christine Bachrach,
Jennifer Johnson-Hanks,
Hans-Peter Kohler

Culture, Structure, Events

- Sewell, W. H. (1992). "A Theory of Structure: Duality, Agency, and Transformation." American Journal of Sociology **98**(1): 1-29.
- Sewell, W. H. (2005). Logics of History. Chicago, University of Chicago Press.

END

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