

The Reproductive Benefits of Religiosity

Empirical findings of Religion, Reproduction and Female Choice towards a Sociobiology of Religion

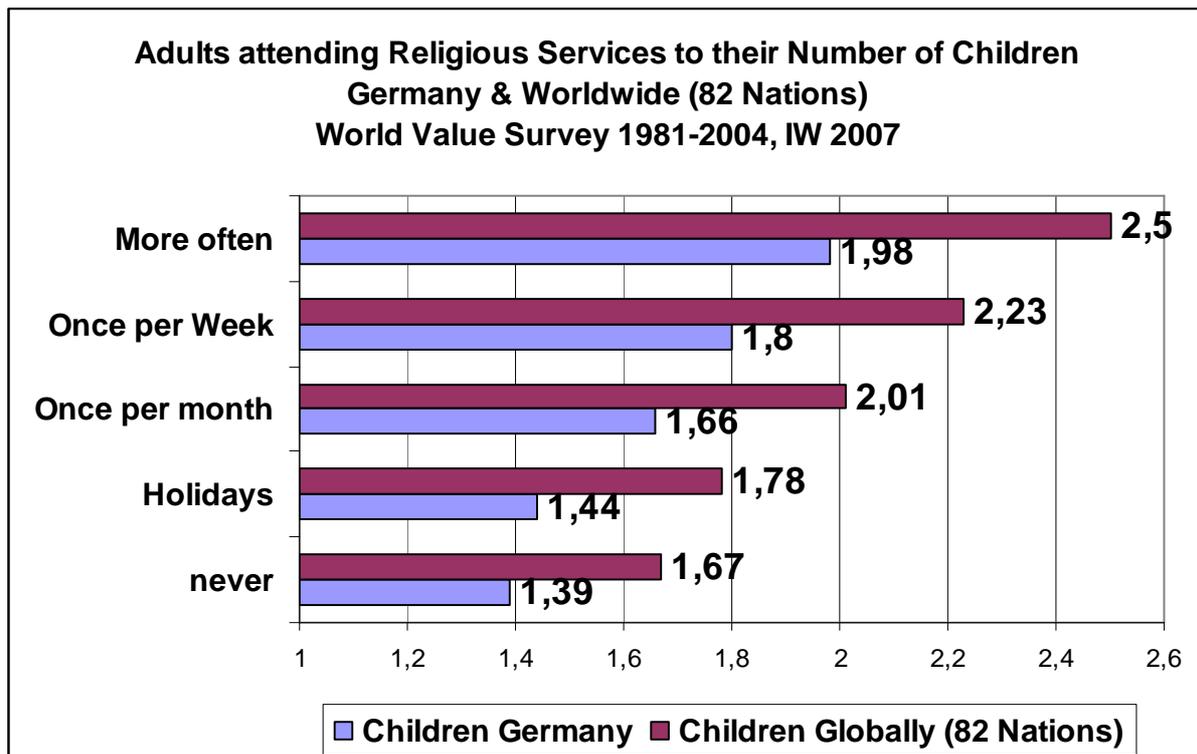
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Data Source: IW 2007, N (Adults) = 267.870 Worldwide / 7.499 Germany

ABSTRACT

Mammalian reproduction strategies have long been successfully modelled by game theory applied to sociobiology. Cost-Benefit-strategies that result in optimal numbers of offspring and Cooperation-Game-Strategies that result in optimal choices of partners spread genetically by retrospective success. But as the brains of early humans expanded, their prefrontal cortices developed, gaining increasing abilities of preplanning survival - and then, reproduction. Thus humans began to play the reproduction games prospectively. As there couldn't be any fixed strategies preprogrammed in their genes meant that these strategies had to be shaped by interacting, individual decisions and cultural evolution. Our ancestors left r- and K-strategies to C (choice, culture and currency)-reproductive strategies empirically observable worldwide. Thus Biology, used to Malthusian concepts which emerge retrospectively among animals and plants, couldn't decipher human demography, whose best models today are built on economics explaining interacting, individual choices. The convergent evolution of religiosity among Homo Sapiens and among Homo Neanderthalensis illustrates that religious abilities evolved as a logical consequence: Religions offer arguments transcending economic rationality, establishing reproductively successful communities and families (i.e. duties to the ancestors or Gods first words to mankind in the Bible "Be fruitful and multiply" (Gen 1, 28)). Genetic dispositions to religiosity are thus favored by direct and indirect reproduction (including organized forms of celibacy) and by sexual selection. Survival strategies (i.e. fostering group cohesion, healthy lifestyle) do exist, but are of secondary importance. The adaptive values of religions are shaped by competitive, cultural evolution, strongly favouring vertical transmission among reproductive families and binding communities (i.e. orthodox Jews, Amish, emerging religious markets in secular countries, revival of creationism) while replacing demographic impasses (i.e. Manichaens, Shakers, secular movements, atomistic individualism). As shown by the Swiss Census 2000 and other, demographic data, the steep rise of diverse religions is the logical consequence of post-agrarian, capitalist economies which turn economic gains of children into consumptive costs. The reproductive relevance of religiosity may seldom have had a weight comparable to today and the cultural reawakening of religiosity may just have begun.

The Sociobiology of Religion

In the founding years of modern sociobiology, Edward O. Wilson wrote that “Religion constitutes the greatest challenge to human sociobiology and its most exciting opportunity to progress as a truly original theoretical discipline” (Wilson 1978, p. 175). Some of my colleagues among the social sciences interpreted this as an attempt of a hostile take-over. But I am convinced that Mr. Wilson justly envisioned a new stage of dialogue and cooperation bridging the “famous gap between the two cultures” (Wilson 1978, p. 10 (Preface)). Today, thanks to your kind invitation I may use the chance to try giving an answer. As an advocate of the scientific study of religion and after several years of research, lectures and seminars on religious demography, I am fully convinced that Mr. Wilson has been right and that we are able to comprehend (not to reduce) religious behaviour and its evolution with established, sociobiological tools. I may try to present evidence that there is a way to open the doors between biology and religious studies with a single key. This key is a modern understanding of human reproduction, which evolved beyond the r- and K-strategies firmly established in biological theory.

Human reproduction: Malthus vs. Smith, Darwinism vs. Wallace

„That’s the question“



To marry or not to marry...
To reproduce or not to reproduce...

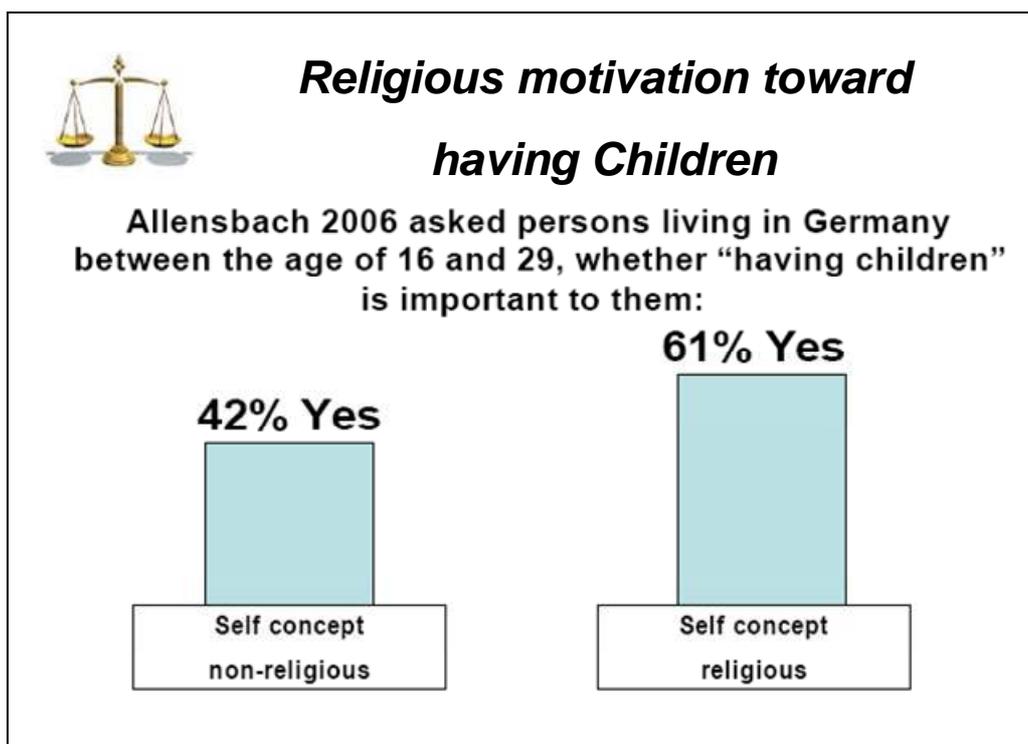
Let me start with a story about a young man, who once took a paper, titled it with “That’s the question” and drew a line on it. Then he assembled some arguments. When married, he noted, he would lose liberties to choose his whereabouts and friends. He would probably never be able to visit America and to learn French and he would have to carry the costs of children. The list of arguments favouring marriage was started with: “Children (if it’s God’s will)”, having a “nice woman” around when enjoying books and music and not being alone when old. His decisive thoughts initiated by a written “My god” he finally concluded: “Marry, Marry, Marry”.

But of course, the young man needed a woman to do that and thus visited his cousin, Emma Wedgwood. They talked, but although the young man was known to have inherited a fortune, Ms. Wedgwood took special interest in his religiosity. Only after being convinced that the young man was a faithful Christian, she agreed to become his wife and to have children with him.

The young man weighing up reproductive arguments in 1838 was named Charles Darwin. I am very grateful that Randal Keynes republished these biographic details recently - one of the great-great-grandsons of Mr. Darwin who wouldn’t have been around if his ancestor had chosen otherwise. (Keynes 2002)

The exciting fact about this biographical record is that we are confronted with a contradiction. On the one side, we know about the theoretical Darwin who assumed that mankind is driven by a Malthusian, reproductive imperative like all other animals. And on the other side, there is a biographical Darwin who remembered his rational, economic calculation considering benefits and costs of marriage and children.

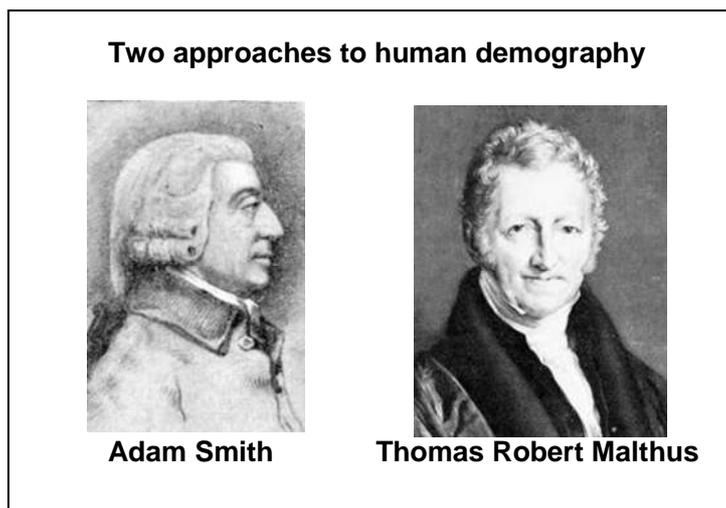
What’s more, the records about the “biographical Darwin” do not link religiosity with any competition for survival, but with reproduction. The young Darwin cites God as he ponders children and as he decides to have a family. Then, his beliefs are tested by Emma Wedgwood as he courts her. There is a close match to the significant correlation among religious practice and the number of children, introduced at the start of this paper. This connection is strengthened, if we take a look at studies comparing family-oriented values among young believers and non-believers.



Data: Allensbach Institute 2006

Classic Darwinism assumes fixed reproductive strategies for humans and animals alike, shaped retrospectively by competitive success. From its very beginning, it has never been able to describe human demography, a fact that Darwin recognized and discussed from the start (e.g. Darwin 1871), but most of his followers ignored. Even as the co-discoverer of evolution, Alfred Russell Wallace, revoked his acceptance of Malthusianism and deemed it (in his exact words) “the greatest delusion of all”, he wasn’t heard. Shortly before his death, Wallace was able to link human fertility with economic, educational and democratic improvement as well as sexual selection and thus to condemn the then-widespread misuse of Darwinism to justify war, social injustice and eugenics (Wallace and Rockell 1912).

Wallace’s basic premises about human demography have been proven far stronger than Darwin’s. Today, as we are used to the fact that wealthy and educated human populations tend to have far less children than their poor contemporaries, we should be ready to recognize human demography as fundamentally differing from animal reproduction.

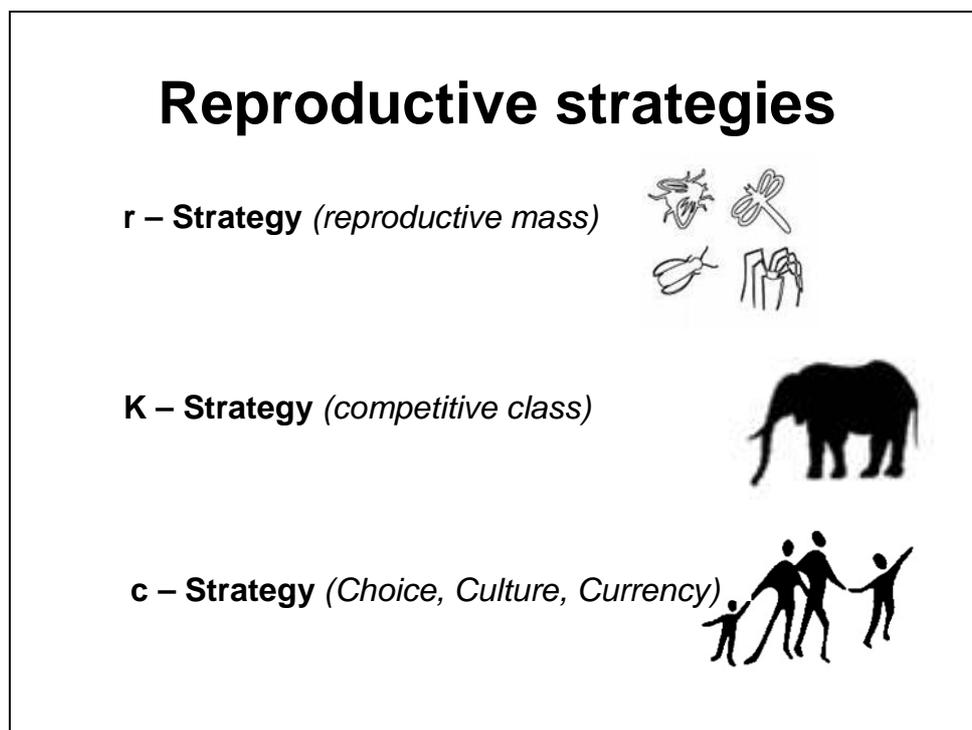


To understand the Malthusian error, we might remember that Malthus borrowed heavily from Adam Smith, whose *Wealth of Nations* (1776) preceded the *Essay on the Principle of Population* (1798). Smith (who himself chose not to have a family) assumed that adults plan their reproduction in advance. He explained the then-perceived doubling of the (Northern) American population in 25 years with the vast economic gains earned by children as the domestic labour market had been severely understaffed. Smith observed that an American widow with several children seldom had a problem remarrying - as the children meant wealth to the new husband as well. (Biologists may want to compare this human calculation with that among Lions as a telling example.) He predicted that decreasing demand for young labourers would therefore lead to decreasing birth rates - an assertion which proved valid.

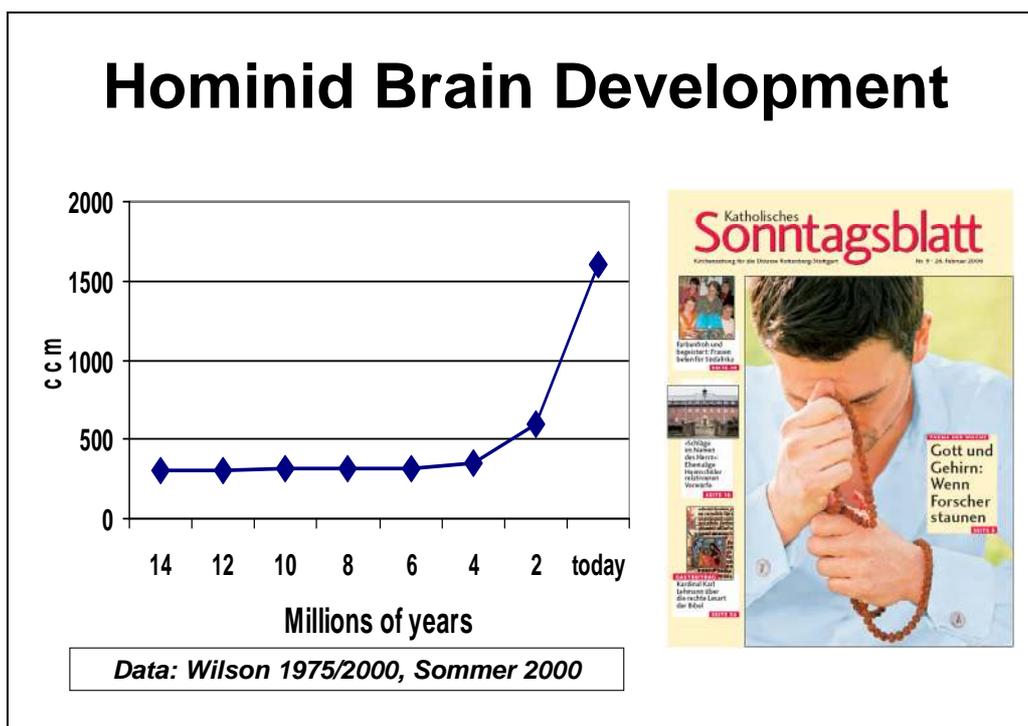
Malthus borrowed and twisted this very example by assuming the doubling rate of increase not as exceptional, but as natural rule. In a sense, he took agrarian population growth as the human standard, explaining the lower birth rates of hunters and gatherers by misery. His thesis has been falsified again and again but still remains prevalent in biologic thought and the major stumbling block that prevents biology to really comprehend human culture and to reach out to the social sciences.

Scientific testing long passed its judgement. After several failed attempts to explain human reproduction the Malthusian way, scientific demography shifted to sociology and finally returned to economics during the last decades. Today, scientific demography is firmly based on economic models depicting human beings weighing up costs and benefits of parenthood - like Smith assumed and Darwin did.

States are advised to reduce costs and improve benefits and to preach the emotional and transcendent values of children (e.g. Petersen / Theißen 2007). We may name the key to a sociobiological understanding of cultural evolution and the emergence of religiosity *the reproductive C-Strategy*: C meaning individual “C”hoice restricted by socially enforced “C”ulture, which evolves on the basis of economic “C”urrency.



Influenced by classic Darwinism that assumed human reproduction strategies to be fixed, biologists trying to comprehend religiosity usually looked after “survival gains” like health or group cohesion to explain its emergence. Some even deplored cases which obviously influenced reproduction negatively like celibacy or the Shakers. But at the same time, telling cases of reproductive success like orthodox Jews, Mormons or Amish were avoided, although there is not a single, serious theory that could explain their high birth rates and survival as a distinct group for centuries without relating to their faith and communal structures. Religion is only secondarily involved with survival. Its main evolutionary function is reproduction - as nobel laureate Friedrich August von Hayek was the first to assume, astonishingly without any serious resonance for more than two decades (Hayek 1982 / 1991). Religion is the bio-“logical” answer to reproductive choice, which emerged with the expansion of the brains among Homo sapiens and Homo Neanderthalensis.



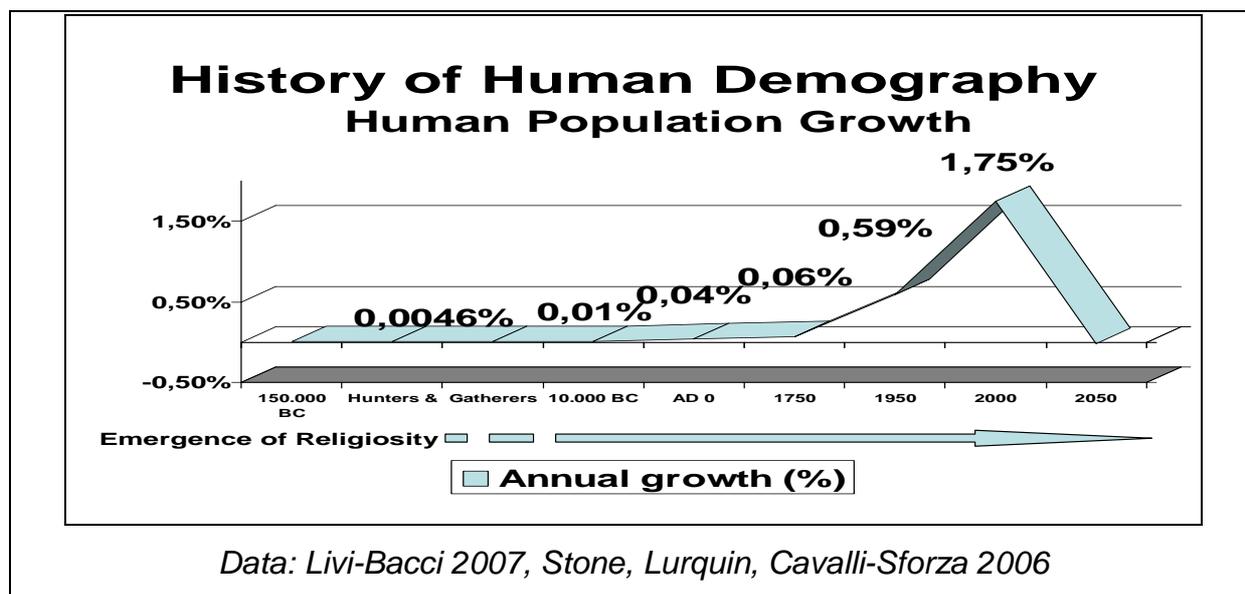
Wilson wrote “that the brain exists because it promotes the survival and multiplication of the genes that direct its assembly. The human mind is a device for survival and reproduction and reason is just one of its various techniques.” (Wilson 1978, p. 4)

It's not primarily the size that matters, as our brain volume is exceeded by whales and elephants by far. It is the prefrontal cortex, which the praying man on the picture is accentuating (like many religious rituals do). As neurobiology discerned, our prefrontal cortices relate to planning actions and delaying impulses, handling and weighing strategic and moral dilemmas, guilt and remorse, acting socially oriented and constructing biographic identities. People who are affected with frontotemporal dementia (Pick's disease) lose social, lingual and emotional skills and happen to change their political and religious worldviews abruptly (cf. Drewermann 2006 / Zimmer 2006).

As the prefrontal cortices and tool-using cultures developed, Homo Sapiens and Homo Neanderthalensis evolved the abilities to plan their behaviour, finally including reproductive options like comprehending the possibility of infanticide, the relation between sexual intercourse and childbirth and the contraceptive effect of breast feeding. And according to evolutionary theory, there couldn't be any genetic provisions to C-reproduction drafted in advance.

Demographic planners were able to improve their survival, but there was (and is) no biogenetic imperative securing their reproduction. About 10% of German women born in 1940 remained childless throughout life. This rate climbed to more than 30% among those born 1960 and yet didn't stop rising (Kaufmann 2005, p. 125). In a recent German survey, 28% of childless aged 25 to 59, amounting to about three million people, explained that they didn't have children because they never felt the urge to have some. Another 52% of childless desiring children and even 30% of parents, adding to more than five million people, said that they were missing a partner ready for a first or subsequent child (Berlin Institute 2007, p. 17-19).

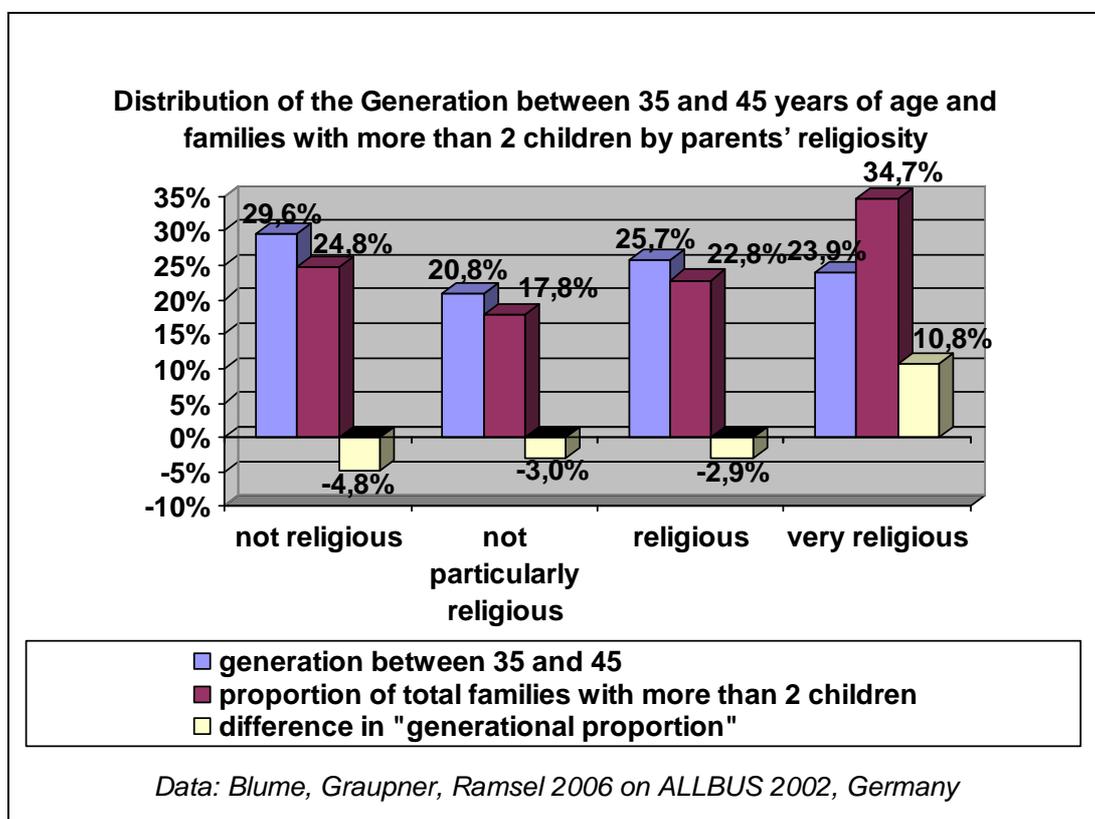
Richard Dawkins, who promoted the so-called "egoistic genes" involuntarily highlighted the topic in his last chapter, where he preached a classic, Gnostic concept not to seek "immortality" in children, but by producing cultural offspring (so-called "memes"), which would be spread by the children of others (Dawkins 1979). His genes, lacking any "ego", obviously didn't veto his new brand of antique creed.



But how could our ancestors prevent their genetic demise? The same way they had evolved thousands of generations before: by survival-oriented cultures based on economic interaction. The sole currency hunters and gatherers may save for times of need and old age is reciprocity: share your food with me now and I will give some when you need it. Fostered by the same planning abilities that would lead to C-reproduction and religion, our ancestors developed bartering and sharing habits exceeding the already impressive abilities of our primate relatives by far.

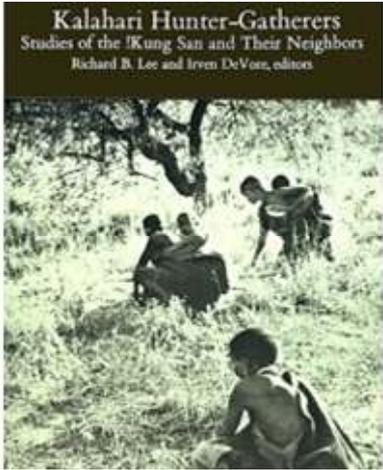
We only have to apply the (iterated) public goods game with the possibilities of punishment and withdrawal to the demographic pool of a band. Any individual that chooses not to contribute to the next generation as the “savings” of the group risks rejection and punishment. And any band structures unable to form, win and keep families inevitably result in disintegration. C-reproduction establishes strong cultural evolution toward rules leading to demographic stability even among selfish agents.

Backed up by several independent surveys of genetic testing, the population from which all modern Homo sapiens emerged has been calculated to about 10.000 persons living (roughly) 150.000 years ago in Africa (Stone, Lurquin, Cavalli-Sforza 2006, p. 176). As historic demography estimates about 6 million humans living at the onset of Neolithic revolution (roughly 140.000 years later), we have a population growth approximating zero, lasting for more than 90% of modern humans existence (cf. Livi-Bacci 2007, p. 25). Even slight reproductive advantages would therefore spread quickly in the gene pool. And that’s exactly what we observe: the first graves are dated to about 120.000 years or five- to six- thousands generations ago, indicating a unique behaviour dynamically evolving to today’s variance and strength.



What's more, as this public goods game is about reproduction, clever defectors fleece themselves out of evolution. As rational free-riders might win "survival games", they largely outjockey their genes in "reproduction games" by reduced numbers of offspring. On the other side, altruists that were (and are) ready to raise more children due to emotional or (later) religious motivations often are fully aware that they are partly exploited economically by others - but they unconsciously spread their genes. In human evolution, C-Reproduction lead to demographic stability while rewarding certain pre-rational emotions and post-rational, that is: religious, calculations!

Demographic reciprocity among Hunters and Gatherers

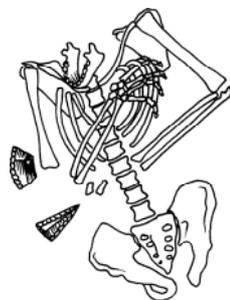
	<p><u>Children known to cause heavy costs</u> (Must be born, fed, carried, raised)</p>
	<p><u>Technologies of avoidance known</u></p> <ul style="list-style-type: none"> ❖ sexual abstinence ❖ contraception (i.e. breast feeding) ❖ child abandonment
	<p><u>Benefits from having Children</u></p> <ul style="list-style-type: none"> ❖ economic / reciprocal (i.e. old age) ❖ social (band acceptance, protection) <ul style="list-style-type: none"> ❖ emotional (filial love) ❖ + <i>religious</i>

As a modern example of hunters and gatherers, the demographic record among the Kung San was reported to be just about 0,5% per year, although there wasn't food shortage. But especially the women were reported to have complex knowledge about sexuality, behavioural, herbal and even technical methods of contraception and the option of infanticide (e.g. after the birth of twins), which was socially and religiously disapproved, but not forbidden. Childlessness was very rare and not accepted. Daughters were married by their parents, who earned the right of services by the groom. But after this parental initiation to reproduction, the women were free to divorce and to choose other partners. Even cases of polygyny were accepted as long as adults contributed to reproduction. The Gods were known to love children and to give them to the humans only reluctantly - so we have direct teachings promoting offspring. Males ready to endure the initiation to the single religious role of Num-

dancers earned the right to wield powers of healing and to circle around the clapping and singing women in the ritual dance. This was one of the very rare opportunities to improving status and to impressing women among the rather egalitarian bands, e.g. awarding prey to the owner of the arrow, not to the hunter.

Finally, among those Kung San bands which began to integrate into agrarian settings as farm hands, culture adapted: sharing receded with the acceptance of money and livestock, the birth rate grew (as children became a source of income) and the egalitarian setting was followed by political and religious specialists, some among the latter even travelling around and performing Num-dances to their increasingly settled fellows in exchange for gifts and favours. Even as we may deplore the danger to the last hunter-and-gatherer cultures, we should be ready to appreciate the high adaptive value of the socioeconomic, cultural und religious skills securing their biological survival. (Lee, DeVore 1999)

Reproductive Function of Funerals



*Neanderthal Grave
(Mt. Carmel, Israel)*

- 1. Signaling commitment**
- 2. The dead survey rules & promises**
- 3. Inter-generational contract**

Among early humans, we find graves of women and men, children and old-aged, of those enjoying relative strength until their demise and others with injuries and diseases that seem to prove that they have received help from other band members for years. Later, parts of the corpses (especially the skulls) were often removed from the grave, carried with the band and buried elsewhere (so-called “secondary

funerals”). And we find ritual gifts, ranging from tokens and trinkets to tools and weapons. It’s hard to imagine myths and rites concerning funerals, handling corpses and the abandonment of valuable property to improve survival. The widespread explanation that these early humans began to foresee their own death and thus developed the psychic need to cope with it, rightly refers to the fact that these humans were able to recognize and shape their biographies. But if their mind settings would only have resulted into costs without benefits, those humans which did not fear death should have spread more successfully. But we observe the opposite: funerals and graves grew in number and complexity and today all human people care for their dead.

Just as they hardly promote survival, predispositions concerning the dead make complete sense if you look at it from C-reproduction. To have emotional and religious motivations toward your relatives and to express and teach them to the other band members enhances direct and indirect reproduction chances, as any person showing them signals its loyal commitment beyond selfishness. We may ask ourselves if we would marry a person or chose a group which just disposed of their former loved-ones without any emotion or care. Most of us wouldn’t, regardless of our respective beliefs, as we would question their loyalty. Having worked with Jewish authorities and relatives to secure and organize the funeral of concentration-camp-victims found at Stuttgart airport at 2005, I was deeply touched to learn that in Jewish tradition, good deeds to the dead are praised most, because they cannot be reciprocated - therefore signalling true altruism and faith.

The surmise that the dead were still present in some way could directly evolve into teachings about them surveying the well-being of close relatives and the band, acting revenge on those that broke promises and rules. To respectfully carry parts of the corpse, like the skull, communicating by rituals and prayers with ancestors that observed everyday life was a way to expand and secure family and band rules. Tales about the dead opening their eyes and taking revenge on the careless living seem to have been deeply embedded into our cultural and then even neuronal settings.

By giving valuables into the grave, these two aspects were added and expanded to still another dimension. Sacrificing, our ancestors expressed their commitment and

belief that the dead still have rights and needs - accepting that they would be in the same situation one day. The reciprocal inter-generational contract was thus expanded beyond life: children raised in love and religious lore were needed to secure that our ancestors wouldn't have to starve in the expected afterlife.

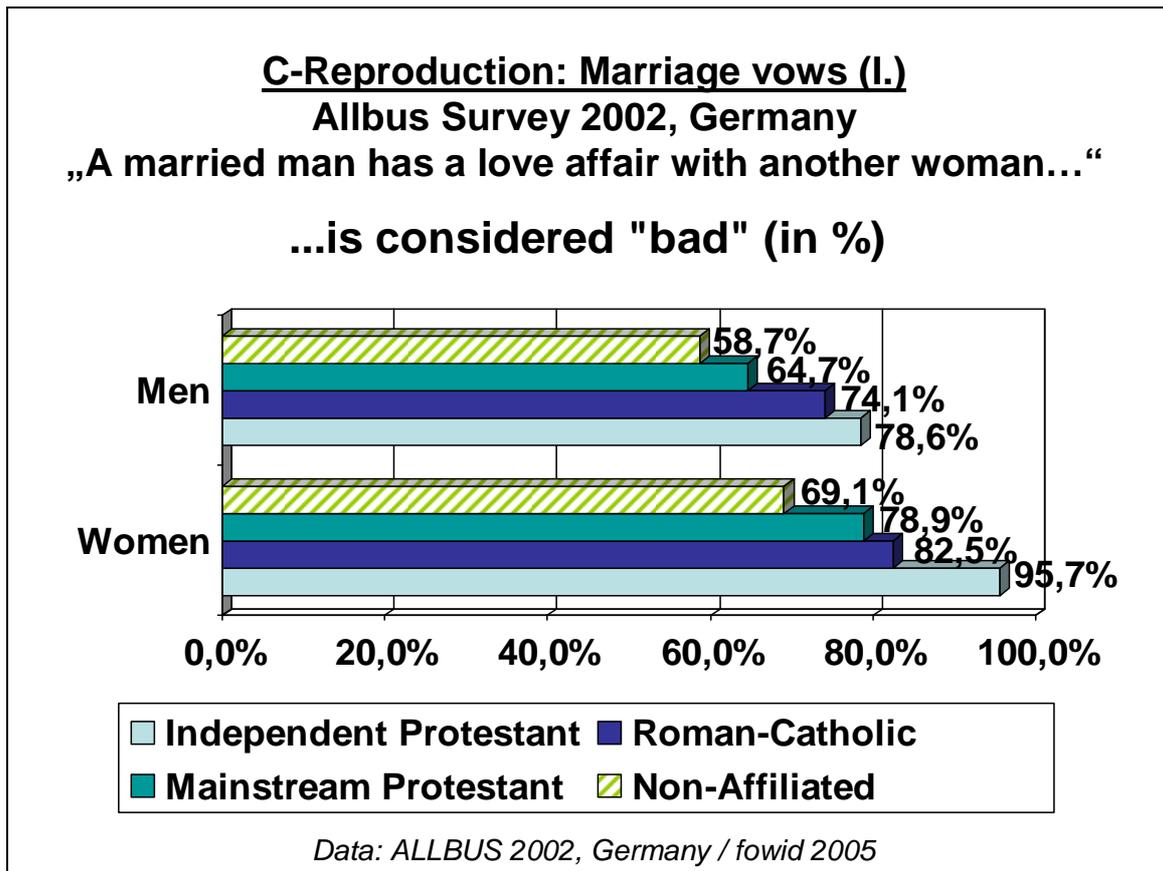
For illustration of transcendent resources, let's take the personal level into consideration. As mammalian reproduction is a reproductive effort with heavy costs and risks especially to the mothers, biologists are used to comprehend animal reproductive strategies by investment games leading to Evolutionary Stable Strategies.

But as soon as agents plan their pairing and reproduction strategies in advance, the setting changes to the prisoner's game with uneven stakes. Therefore, only agents who evolved C-Reproduction need and promptly develop a cultural variance of marriage vows given before a witnessing public as a means to secure the loyal investment of both parents and their respective groups (cf. McCain 2003). Especially for women, wrong choices could be crucial, as Johann Wolfgang von Goethe described in his famous "Faust".

And what question did Gretchen pose to Faust in order to assess his loyalty? She asked about his religion - inviting disaster to her family, her child and finally herself as she accepted Faust's blend of pantheism and agnosticism. It is Goethe's devil Mephistopheles, who clearly sees and fears the correlation of religiosity to marital loyalty. He scoffs, annoyed by Gretchen's inquiry into his chosen victim's beliefs:

I've heard, most fully, how she drew thee.
 The Doctor has been catechised, 'tis plain;
 Great good, I hope, the thing will do thee.
 The girls have much desire to ascertain
 If one is prim and good, as ancient rules compel:
 If there he's led, they think, he'll follow them as well. (Chap. XVI)

We might remember the topics Emma Wedgwood wanted to discuss before she agreed to marry Charles Darwin. And let us include that among almost all cultures, marriage vows are accompanied by religious rites, often calling the transcendent agents as decisive witnesses.



Studies point out that there are different attitudes toward marriage vows among men and women and among secular and religious people. As would be expected in the prisoner's game with uneven stakes, women tend to condemn male unfaithfulness in stricter terms than do men. But as any men may swear his personal loyalty and love as Faust did (and as the prisoner's dilemma predicts), women would also be well advised to favour bands where vow-breakers risk social punishment.

And if there are bands around whose marriage vows are blessed and witnessed by all-knowing, transcendent beings like the living dead or gods punishing unfaithfulness, the "social control" is further expanded and deepened. Therefore, women's higher average preferences of religion and their sexual selection towards faithful men might be observable in empiric data about familial behaviour. And it is, as for example shown by differentiating all religious denominations not predominated by immigration in the Swiss Census 2000.

Marriage vows and Sexual Selection				
Swiss Census 2000 Denominational category	% of members female	% pairs married	% pairs living with children	% single parents
Yehova's Witnesses	57,4% (1)	99,3% (1)	53,3% (4)	5,2% (6)
Protest.-Methodists	56,4% (2)	97,1% (5)	49,8% (8)	3,0% (1)
Smaller Christian	54,9% (3)	93,9% (6)	51,2% (6)	6,8% (7)
Pentecostal	54,6% (4)	98,5% (3)	63,8% (2)	5,1% (5)
Independent Protestant	54,6% (5)	97,8% (4)	59,4% (3)	4,2% (4)
New Apostolic Church	54,1% (6)	91,1% (8)	44,6% (9)	5,9% (10)
Christian-Catholic	53,9% (7)	89,4% (10)	41,7% (11)	5,6% (9)
Evangelicals	53,5% (8)	98,9% (2)	65,6% (1)	5,9% (10)
Protestant-Reform. (M)	52,7% (9)	88,2% (11)	44,0% (10)	5,4% (7)
Roman-Catholic (M)	51,6% (10)	89,8% (9)	51,4% (5)	5,5% (8)
Judaism	51,0% (11)	93,9% (7)	51,0% (7)	6,3% (11)
<i>Swiss Average</i>	51,0%	89,0%	48,5%	5,8%
Non-affiliated	45,9% (12)	81,5% (12)	40,0% (12)	7,8% (12)
r / Spearman Rank C.		0,696	0,622	0,378

Categories marked by an (M) have more than one Million adherents.

Swiss women not only predominate among all major denominations. They significantly prefer those communities where living together means to marry, where pairs tend to have children together and where parents hesitate to divorce. In contrast, the non-affiliated form the single category dominated by men, featuring the lowest percentage of married couples, the lowest percentage of pairs having children and (although characterized by the lowest rate of birth) having the highest percentage of parents, mostly mothers, raising children alone.

Therefore, we shouldn't be too surprised to find women attracted to successful religious movements, which did not and do not exactly promote gender mainstreaming. Some men might perceive religion as a stage to earn status. But lacking any secular institutions securing their personal well-being and that of prospective children, women were on the lookout for husbands incorporated into bands that stood to their family-oriented promises. We might be fascinated by the Kung San-Num dancer role only accessible to men. But we shouldn't overlook the fact that the women perceive the performance, singing and clapping the tune.

And as they faced the bulk of C-reproductive selection pressure, women are not the booty, as they were pictured by classic Darwinism, but active agents seeking out and constructing successful bands.

We may now compare the birth rates (completed fertility rates = CFR) of any religious denominations differentiated by the Swiss Statistic Office with more than 10.000 adherents. And in order to check two possible alternative explanations, we will test as well if the birth rates in religious communities are determined by education or income levels of its members.

Swiss Census 2000 Denominational category	(CFR) Births per woman	% academic education	% higher occupational class
Hinduism*	2,79 (1)	17,0% (12)	7,4% (14)
Islam*	2,44 (2)	11,4% (15)	6,1% (15)
Jewish	2,06 (3)	42,7% (1)	42,4% (1)
Other (smaller) Protestant	2,04 (4)	20,1% (5)	19,2% (6)
New Pietism / Evangelical	2,02 (5)	19,2% (6)	17,9% (8)
Pentecostal	1,96 (6)	17,1% (11)	15,7% (10)
Other (smaller) Christian	1,82 (7)	39,1% (2)	31,8% (2)
Didn't answer	1,74 (8)	19,1% (7)	5,3% (16)
Christian-Orthodox*	1,62 (9)	18,0% (10)	9,8% (13)
<i>Swiss Average</i>	1,43	19,2%	19,6%
Buddhist*	1,42 (10)	20,3% (4)	13,4% (11)
Roman-Catholic (M)	1,41 (11)	16,8% (13)	18,5% (7)
New apostolic	1,39 (12)	13,9% (14)	17,6% (9)
Protestant-Reformed (M)	1,35 (13)	18,9% (8)	22,2% (4)
Yehova's Witnesses	1,24 (14)	6,8% (16)	11,2% (12)
Christian-Catholic	1,21 (15)	18,4% (9)	22,2% (5)
Non-affiliated	1,11 (16)	30,6% (3)	26,7% (3)
r / Spearman Rank Correl.		0,054	-0,269
Data Source - BFS 2004	p. 43	p. 117	p. 115

Categories marked by an * are dominated by adherents born outside of Switzerland.

Categories marked by an (M) have more than one Million adherents.

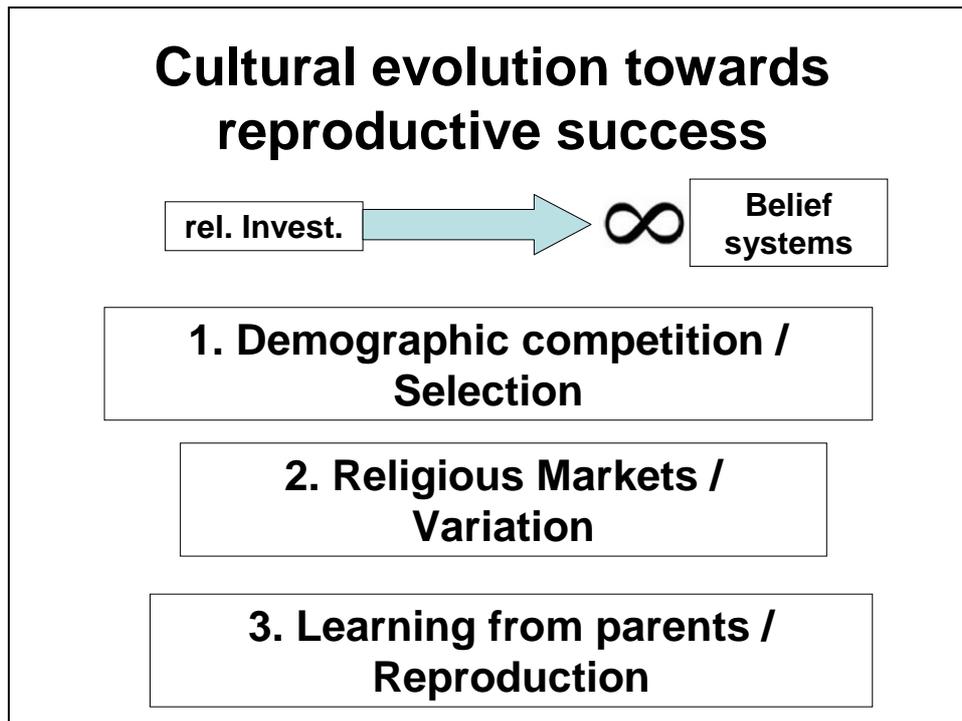
The result is highly significant: Women among **all** denominational categories give birth to far more children than the Non-affiliated. And this remains true even for those (Jewish and Christian) communities who combine nearly double as much births with *higher percentages of academics and higher income classes* as their non-affiliated contemporaries.

Tested with the Spearman Rank Correlation Coefficient, there remains *no* rank conjecture relating to the percentage of academics, as the Jews and some protestant minorities have begun to win and hold educated strata. Based on German data, we had already surmised that the general decline in birth rates relating to improved educational levels can be stopped and even be reversed by strict, religious observance (Blume et al. 2006), most often in smaller bands, that is: communities.

There is a slight negative rank correlation relating birth rates and career positions. Even as they have climbed the same educational classes like their secular contemporaries, religious parents seemed to sacrifice occupational options for the sake of children. That this doesn't indicate relying only to strict traditionalism is highlighted in the fact that very traditional and centralised communities like Yehova's Witnesses and the New Apostolic Church performed low, whereas the young and thriving protestant minorities featured record rates of mothers working part-time (BFS 2004, p. 46). Traditions incorporate reproduction strategies which have been successful in the past, but successful religions evolve and test new adaptations, including family models and developments in gender relations.¹

But how do religions know? The scientific answer is, of course, evolution - that is: variance, competitive selection, reproduction.

¹ The Swiss were the only European people spared by any war for 160 years and getting wealthy and secure devoted to high quality products and international banking. I owe special gratitude especially to the Statistic Office as they opened the treasure troves of their censuses for scientific work, conducted every decade including a non-discriminating question relating to denomination. Having measured reproductive differences on samples of some thousand peoples (e.g. Blume, Graupner, Ramsel 2006), the amount of 6.972.244 individuals or 95.67% of the Swiss population naming their denomination sent my remaining doubts fleeing and made possible the scientific inclusion of smaller minorities like the Jews or new Protestant denominations.



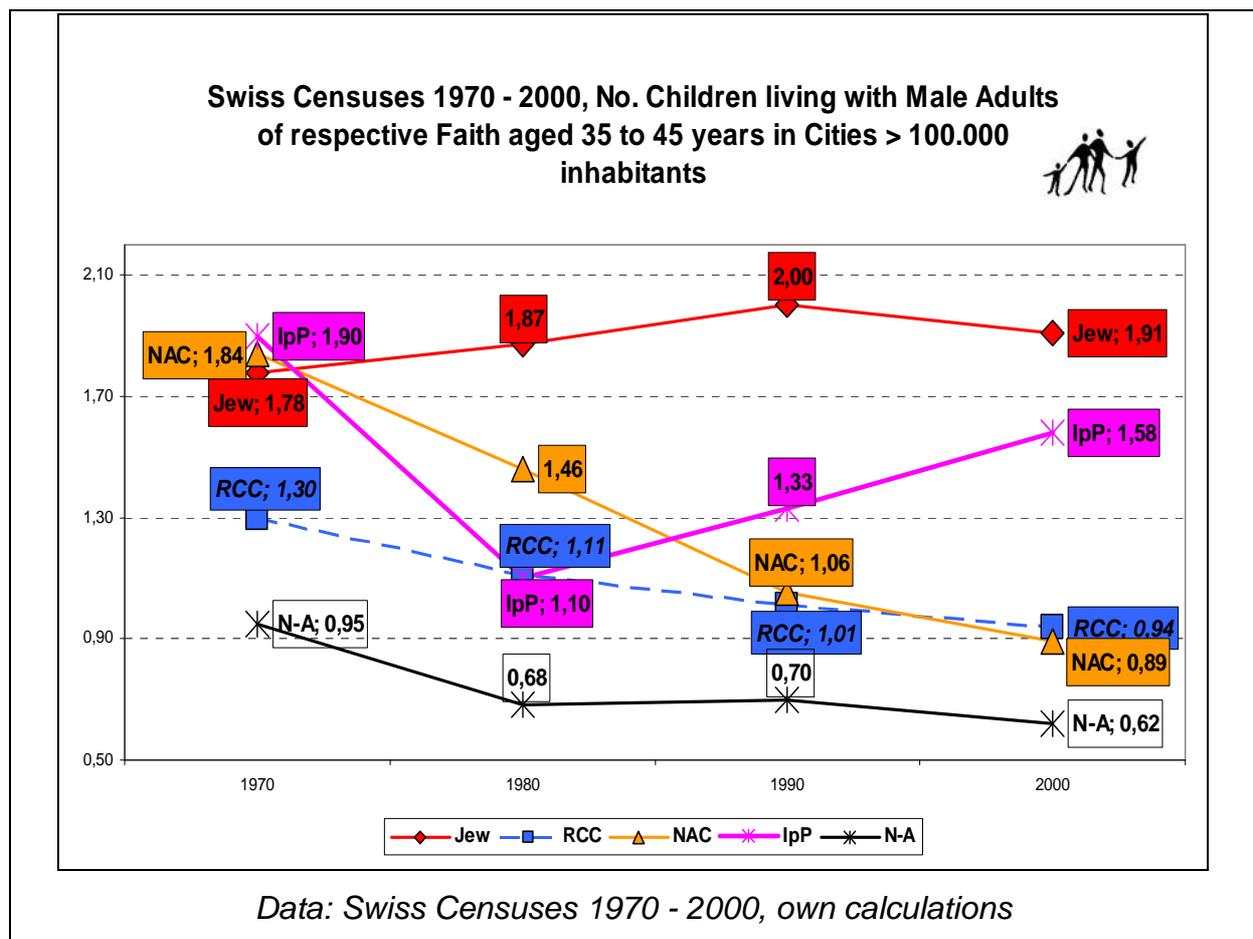
We may observe the way religious biological success is formed. Let us start with the assumption that there are numerous possibilities of believing, some of them harming reproductive performance, some remaining neutral and a few fostering it. How could the successful needles have been found in the haystack?

To begin with, we have demographic competition itself, which Wilson quoted as “cultural Darwinism [...] in the evolution of advanced religions” (Wilson 1978, p. 175). Von Hayek spoke about “natural selection of religions” based on “reproductive advantage” (Hayek 1982, p. 95-98). Like with a genetic mutation offering a slight chance of improving reproductive success and then spreading, we could surmise that any useful cultural tool found by pure chance would spread by the very advantage it brings.

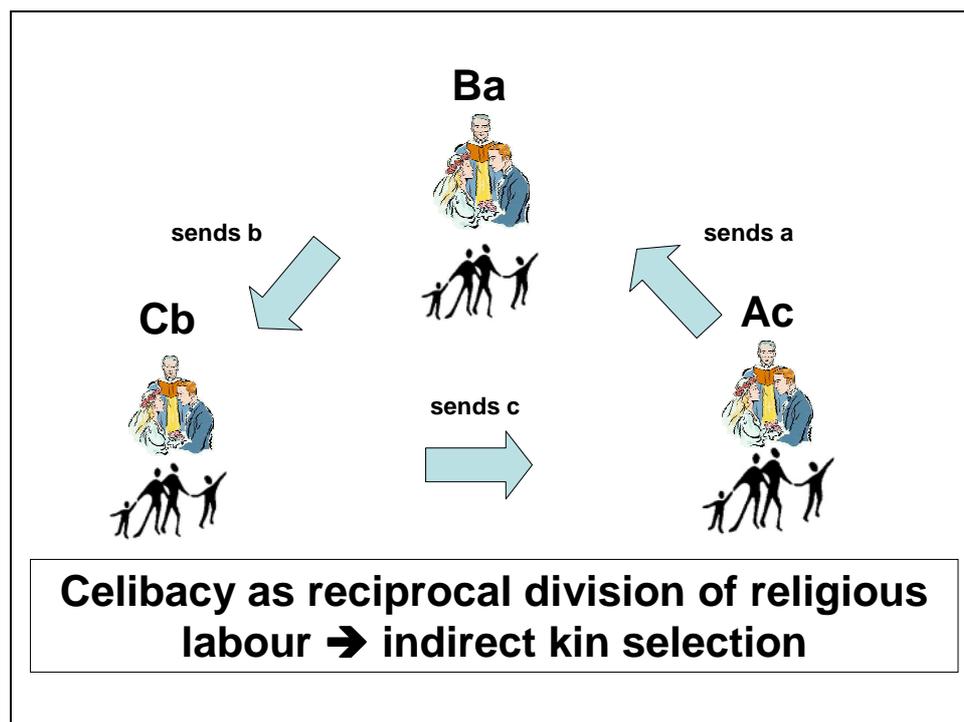
The recorded history of religion supports that claim: there were religious communities like some early Christian splinter groups, the main branch of the Manicheans or the Shakers disapproving or even forbidding reproduction. But even if they had some missionary success for a time, they were inevitably surpassed by competitors *combining* missionary and reproductive activity.

Jews and Christians survived repeated campaigns of violence and persecution, whereas the Manicheans couldn't really reassemble after having lost favour with the respective governments. The Amish were driven from their homelands and became nearly extinct several times, but although they parted into different branches and stopped missionary activity, they flourish to this day due to large families. In contrast, the US-founded Shakers never had to cope with state persecution, but stumbled upon lack of appeal to potential converts as their ranks grew old and as the government forbade the adoption of children to religious communities.

What's more, divergent streams of tradition competed *within* religious movements, influencing their teachings. Buddhism and Christianity have been recast in some aspects, as family-oriented streams championed their interpretations. We already saw how different various religious communities performed. Taking into account the Swiss censuses ranging back to 1970 we may observe the competition "at work".



To maximize comparability, four subsequent generations of males aged 35 to 45 years living in a shared environment (Cities with more than 100.000 inhabitants) were examined. As the Swiss birth rate declined in general, the Jewish communities (red) not only held their high performance, but even managed to improve it. In contrast, the New Apostolic Church (NAC, orange) lost their grip on big city life, resulting in a linear decline of the number of Children, as did the Roman Catholic Church (RCC, blue). As these church congregations grow older, they have difficulties winning or just keeping young people. Some of the protestant independent churches (IpP, pink) were heavily affected by the turmoils of the 60s and early 70s, but quickly recovered. Now they form and win young parents with family-oriented attractions, gaining missionary zeal in the process. In contrast, the Non-Affiliated seem to be fixed on the reproductive bottom. Here we find the explanation why seculars silently slipped into a defensive posture regarding youth cultures.



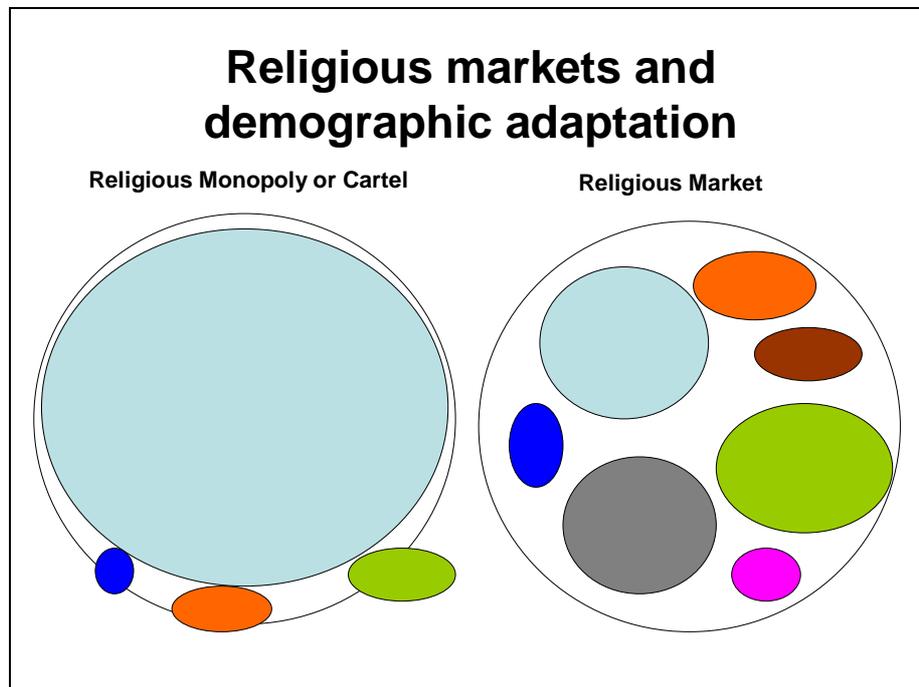
Let us consider a religious institution that directly seems to contradict reproductive success: celibacy. If religions urge some of their most dedicated followers to forfeit reproduction and to leave their families, it is widely assumed that at least these individuals are reproductively exploited. And as the example of the Shakers shows, sometimes celibate rules failed, contributing to communal declines.

But culturally evolved the right way, celibacy may function as an advanced division of religious labour, even benefiting those families and communities that contribute celibate individuals. As we have seen, religious rites and roles preaching family values, blessing and witnessing marriage vows, caring for the sick and poor, educating children, reconciling disputes, condemning rule transgressions and winning converts may enhance the reproductive success of a community. But especially among growing, agrarian populations economically structured along expanding family property and obligations, any religious teacher belonging to a certain clan might face deep reservations, as Jesus, rejected by the people knowing his family, observed: "A prophet is not without honour, save in his own country, and in his own house. - And he did not many mighty works there because of their unbelief." (Matthew 13, 57-58)

In this situation, celibate institutions might evolve as they imply individuals breaking their family obligations for religious reasons (often perceived as a scandal at first, e.g. Buddha, Jesus, Francis of Assisi and Ramakrishna etc.), therefore symbolizing trustworthy faith. The diagram shows that even among three communities, each could benefit reproductively by swapping celibate teachers to perform indirect kin selection, as any of these religious functionaries could perform far better among strangers than entwined into family obligations at home. In a biological sense we might comprehend the assertion of Jesus: "And every one that has forsaken houses, or brethren, or sisters, or father, or mother, or wife, or children, or lands, for my name's sake, shall receive an hundredfold." (Matthew 19, 29)

But as successful as celibate institutions could symbolize trustworthy faith in agrarian settings, where children contribute to parental income and old age provision, they regularly lose reputation in post-agrarian, capitalist societies, where forfeiting children is not any more a signal of altruism, but of economic rationality. More and more, clergy would be expected to be role models by having families - as was the case throughout rabbinic Judaism (suffering bans on accepting converts while at the same time hardly pressed by violence and missionaries), in protestant Christianity (e.g. former monk Martin Luther marrying former nun Katharina von Bora), but also among several branches of Buddhism (e.g. former monk Shinran marrying former nun Eshinni) and Hinduism.

This directly leads to the second improvement enhancing religious-demographic performance: the Religious Market.



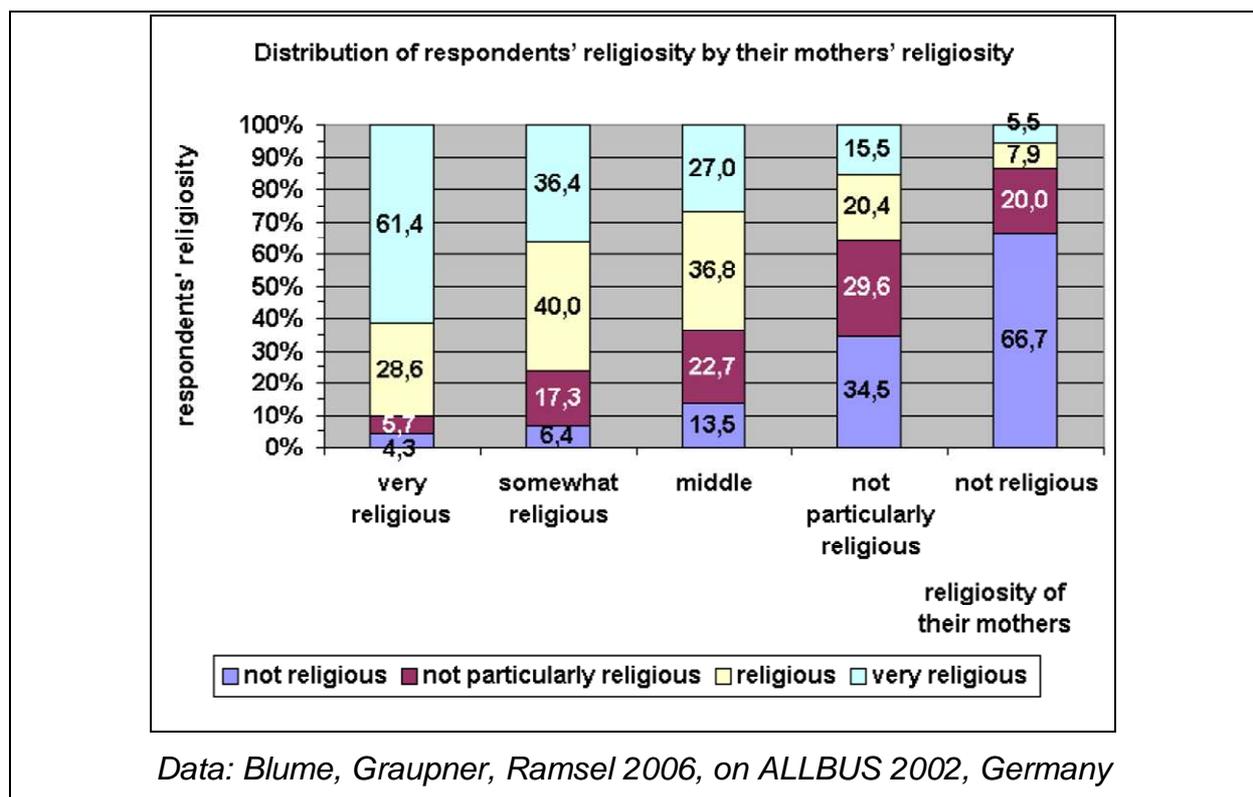
Religious monopolies and cartels tend to suppress religious diversity and thus cultural evolution. Thus, societies like Italy, Greece, Poland, Spain, Germany and (beginning) Iran take a long time of post-agrarian birth rate decline, as their state-privileged churches suppress modern family models (cf. France, which overcame his demographic demise by weakening its then-monopolist church). In contrast, in religious markets like in the United States or growing parts of India and Europe, the individuals don't have to accept a single version of lore. They have to be convinced, motivating religious institutions to seek out and absorb benchmark solutions from competitors, which are often "rediscovered" as old traditions. Thus, strategies and tools proven to be successful have a high chance to be discovered and adapted into different settings. It's not only the rosary that evolved in India, was later adapted to Islam and then taken up by Christians as did many mystic teachings and practices.²

² Other, non-familial examples: Augustine's theology was influenced by the Manichaeism he had championed for years. Thomas of Aquinas owed much to the works of the Greek classics which were translated and interpreted by Muslims, Jews and Christians having established a fruitful time of coexistence in Spain. Anti-biologist pamphlets by American evangelicals are eagerly copied by Muslim fundamentalists fighting western education, whereas Muslim reformers take European Christian-Democrats as a role model to bridge religious and democratic thought and activity etc.

Religious markets will also tend to be far more dynamic than religious monopolies in the field of demography, as new family models will be brought to the fore by religious minorities, who form and win a growing number of families.

To name a few examples of familial discoveries, later adopted by other faiths:

- enforcing of marriage vows in Jewish, Christian and Muslim faiths, including the strong condemnation of infanticide in contrast to former Roman, Greek and Arabic habits
- discovering of marriage as a holy sacrament in Catholic teaching of the 12th century, as children lost their agrarian income value to growing city populations
- discovering of a distinct “childhood” and the value of education by Protestant minorities in the 17th century, in direct contrast to centuries of “oikos”-family models, which traditionally included child’s and mother’s labour
- accepting and even welcoming working Moms among recent protestant minorities and even some state-privileged churches (like the Swedish)



Thus we have reached the last of the three main methods sorting out those religious teachings that confer evolutionary success to its adherents. This last method seems to be so common to everyday life that it is frequently underestimated: learning from the parents. A huge amount of surveys shows that parents exercise the most pervasive influence on the religious attitudes of their children by far.

We shouldn't be surprised that human evolution rewarded vertical transmission of religious imprinting, because it confers a clear advantage: if you learn from your parents, you are sure to learn from people who chose to have children and who usually have a real interest that you may continue the generation chain. Cultural evolution leaning on the vertical transmission in families therefore tends to favour demographic success and seems to have been strengthened in human evolution. In fact, religious roles functioning alongside the families usually adopt familial terms like father, mother, sister or brother.

A telling, actual example of the power of vertical transmission is creationism. After the Scopes Trial in 1925 and the subsequent establishment of evolutionary theory in state schools, there was a broad conviction that the defeat of anti-evolutionist fundamentalism was a matter of time. But to the great surprise of most, creationism and Intelligent Design today enjoy a worldwide resurgence. The reason is simple: naturalists may have far more scientific arguments - but believers have far more children.

And as devoted parents who chose to take high personal costs, religious adults are highly motivated to protect their offspring from secular teachings and to insist in private schools, home-schooling and institutions constructing creationist worldviews. Liberal democracies may never accomplish what even most empires didn't manage: to suppress reproductively successful, vertical transmission of culture by state power.

There is an interesting paradox in here: the creationist parents unconsciously defend the reproductive success of their children and communities against evolutionist teachings, whereas some naturalists try to defeat our evolved ability of religiosity. To me, it seems rather odd to try to defeat nature with naturalistic arguments.



The last aspects we might discuss from an evolutionary perspective are the two peaks which cultural evolution climbed. I fully agree with Pascal Boyer's assumption that we perceive transcendent beings through our evolved neuronal systems (cf. Boyer 2002). As human children are fascinated by objects breaking intuitive rules like for example artifacts coming to life or animals speaking, we are enthralled by communicating dead, spirits inhabiting mountains and springs, demons, angels and gods transcending matter, species, time and space. Whereas the shared lore about ancestors might have sufficed to establish reproductive rules among early hunter and gatherer bands, we could assume that alongside accelerating population density, abstracter concepts able to integrate bigger groups and strangers would gain importance. Thus, humans would begin to pray to animal spirits, legendary heroes and higher gods, subsequently banning and in some instances even binding their own dead from interference - which is exactly what prehistoric findings suggest. Amidst thriving cities with multitudes of peoples, gods and opportunities, the concept of a single and jealous, all-knowing and all-powerful deity enforcing strict rules out of his love to life seems to me a logical outcome of demographic competition.

The first words the God of the Bible speaks to mankind (resulting in the first of all 613 commandments in Jewish tradition) are: "Be fruitful and multiply" (Genesis 1, 28). This commandment is re-enacted two times toward Noah's family (Gen 9, 1 and 7). The first human words are attributed to Adam accepting his wife, interestingly followed by the observance that in paradise, men left their families to join their wives (that is: matrilocality, sexual selection by women) and there were fewer sexual regulations (no shame, no clothing) (Gen 1, 23-25).

By accepting new fruit, mankind is expelled into an agrarian setting followed by hard rules experienced as punishment. The men are condemned to hard work on the soil and women to many, painful births as well as the subjugation to patriarchy (Gen 3).

The first recorded praise to God is attributed to Eve, thanking God (not her husband!) for the birth of the first child (Gen 4, 1, again Gen 4, 25). The first wish, quest and blessing of Sara and Abraham are not to have to adopt a slave as old-age provision, but to have offspring “as numerous as the stars” (Gen 15, 2-6).

The first personal death penalties enacted by God did not punish murder (Cain is only banned), but Er’s and Onan’s breaking of marriage vows. Even Judah is publicly humiliated as he tries to skirt the vow given to his Canaanite daughter-in-law Tamar (Gen 38).

And the founding story of Israel’s religious identity starts with the story of a Pharaoh explicitly fearful about the demographic performance of these early monotheists, but unable to suppress it (Exodus). Maybe we don’t discover a close connection of religiosity and demography any more as we rediscover it.

Looking to the other peak of religious and philosophical tradition, we are fully capable of reducing our worldview to impersonal rules, rejecting transcendent beings including our self-perception as souls with a free will as mere illusions. We find this approach in early philosophies, in religions like Buddhism and Jainism and in modern naturalism based on evolutionary theory. But the reproductive results are not the same, because, as Boyer rightly observed, we may take orders from persons, but we manipulate things.

Monist philosophies, Buddhism and Jainism therefore tend to teach their adherents to free themselves from the given, suffering-inducing principles of the Universe or at least to transcend them, as most ultradarwinian naturalists including Richard Dawkins, Daniel Dennett and others do. I know of not a single community believing in strictly non-personal principles and managing to confer inter-generational, reproductive success like theist communities did for centuries and still do today.

As at the beginning of our millennium for the first time in human history most of us lived in cities and as children lose their income values while needing higher education investments at the same time, the birth rates are plummeting globally and the resurgence of religion seems to me just to have started.

God has not been inscribed into our genes as an artefact of the distant past, but the belief in God is dynamically evolving into our genetic and cultural pools as a part of our recent history, presence and future. Accepting evolutionary logic and the rich observations about convergent evolution of religion among Sapiens and Neanderthals on our small planet, I may end this lecture and start our discussion with a prognosis to astrobiology: If we should ever meet developed species able to space-travel and thus more than able to ponder and plan their reproduction, we should be ready for inter-religious dialogue among evolutionary theists: about a single, personal and purposeful Creator and about biology and theology unveiling complementary parts of the same, universal message of life and its ends.

Thank you very much for your invitation & time!

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