The Cool Water Effect:

Civilization’s Turn into Human Empowerment[[1]](#footnote-1)

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# 11 Putting the Cool Water Thesis into Perspective

## Recent Scholarship

The idea that climate and geography play a role in development has a long tradition in modern thinking, going all the way back to Montesquieu.[[2]](#endnote-1) Temperature is the climatic feature that received most attention. The majority of authors argues that tropical heat is detrimental, while colder temperatures throughout the seasons are favorable to development.[[3]](#endnote-2) There are a host of reasons for that. Other conditions being equal, coldness decelerates soil depletion, which enhances land fertility, at least as long as we stay within the vegetable zone.[[4]](#endnote-3) Coldness also decreases physical exhaustion from work, which improves labor motivation and productivity.[[5]](#endnote-4) Indeed, as a recent study found out, people are more productive when coldness and rain forces them to stay indoors.[[6]](#endnote-5) By the same token, it is more tempting to spend time outdoors simply to hang out when the weather is nice.

A related issue is seasonality. At the equator, no differences in daylight length and air temperature between winter and summer exist. So as the distance from the equator grows, not only do mean annual air temperatures drop but also the seasonal differences increase. Hernando Zuleta[[7]](#endnote-6) argues that seasonality forces people to plan for the winter in which different crops or no crops at all grow. Thus, people need to think about food storage, or storage more generally speaking, which implants the idea of savings early on in people's mind. As soon as the economy becomes monetized and urban markets come into people's reach, the more strongly pronounced seasonality of cold areashigher latitudes incentivizes savings. Higher savings per capita, in turn, provide better conditions to develop technologies because technologies are capital-intensive.

This needs to be seen in connection with the fact that the CW-condition also incentivizes lower fertilities, which we have already demonstrated. Higher savings and lower fertilities together shift the availability ratio between the three production factors: land, capital and labor. Lower fertilities keep labor in relative short supply. When, under this condition, the labor demands of producers increase because the population's rising purchasing power makes mass production profitable, these producers need to invest into labor-saving technologies. At the same time, higher savings are not only a reason for the population's rising purchasing power but also provide the capital for technological innovation. As Michael Mitterauer's[[8]](#endnote-7) work on agrarian and urban production methods and on water and wind mill technology in Northwestern Europe shows, the dynamic of technological innovation already was in full swing in the 15th and 16th centuries, especially since the Black Death further tilted the ratio of production factors towards the relative scarcity of labor.

In addition to all of this, we suggest another effect of coldness: being forced by cold weather to spend most of the time indoors shapes settlement, household and socializing patterns in such a way that (*a*) kinship bonding concentrates on the nuclear family and (*b*) remains limited to the private sphere. Why do we suggest this? The simple reason is that – very obviously – the CW-condition enforces a stronger separation between the indoor and the outdoor spaces. This in turn means a clearer separation between the private sphere (indoors) and the public sphere (outdoors). Not only is this separation clearer; what is more, people's kinship bonding happens mostly indoors where it concentrates on the nuclear family. This concentration occurs because the need to shield indoor spaces from outdoor weather conditions favors small household arrangements. For smaller spaces are easier to heat and shield than large ones. Accordingly, kinship bonding does not involve the extended family and it does not reach out as much into the public sphere. The public sphere is, thus, mostly shaped by interaction among strangers and consequently turns into a forum of learning to trust strangers.[[9]](#endnote-8)

The water component of the CW-condition adds to the "bad weather" factor because people tend to spend more time indoors when it rains, especially when it is cold rain because precipitation enhances the chill feeling. In general, the water component of the environment inspired a considerably smaller literature than temperature, although the consensus seems to be that abundance of water supply is a favorable factor.[[10]](#endnote-9) John Gallup and Jeffrey Sachs[[11]](#endnote-10), for instance, show that access to permanently navigable waterways is conducive to economic growth, while Manus Midlarsky[[12]](#endnote-11) demonstrates a positive effect of continuous rainfall over the seasons on democracy. The same is true for access to sea-borders.[[13]](#endnote-12) In another aspect--settlement patterns and space separation--water abundance operates in a similar way as cold temperatures: precipitation enforces the shielding of indoor spaces and thus favors a clearer separation of the public from the private sphere.

Surprisingly, the very combination of the two advantageous conditions – cool temperatures and water abundance – has been largely ignored. For this reason, Christian Welzel’s suggestions about the importance of the CW-condition are sole standing here, filling a real gap in the literature.[[14]](#endnote-13)

Nevertheless, recent scholarship has developed a renewed interest in the original causes of persisting differences in societal development. Because human empowerment has turned into the lead theme of societal development since the modern era, the newly emerging development literature is directly relevant to human empowerment. As our review will explain, many suggestions in this new literature are incorporated in the CW-argument. Thus, the CW-argument provides a unifying frame for a number of disparate explanations.

Jared Diamond, to begin with, argues that the number of domesticable plants and animals and a geographic East-West extension facilitated an early adoption of agriculture.[[15]](#endnote-14) Such a head-start resulted in a leading position in other civilizational achievements: an earlier acquisition of food surpluses and, thus, a pioneering position in the development of markets, cities, bureaucracies and states. Indeed, Louis Putterman and his team[[16]](#endnote-15) as well as Ola Olsson and John Paik[[17]](#endnote-16) demonstrate that an early transition to agriculture is still visible in higher per capita incomes today. Likewise, Valerie Bockstette and her co-authors[[18]](#endnote-17) as well as Louis Putterman show that an earlier adoption of agriculture favored an earlier emergence of statehood, which – as Roberto Foa shows – still accounts for some of the differences in societal development today.[[19]](#endnote-18)

However, scholars studying the deep roots of autocracy champion an opposite view as concerns the advantages of an early transition to agriculture and an early acquisition of statehood. Jacob-Gerner Hariri[[20]](#endnote-19), for example, shows that territories with earlier statehood are more likely to be autocratic today. This result resonates with findings by Jeanette Bentzen and her co-authors.[[21]](#endnote-20) They reviewed Karl Wittfogel’s[[22]](#endnote-21) famous thesis that irrigation-managed agriculture breeds autocracy. To test this claim, the authors measure a country’s “irrigation potential”: the agrarian surplus that a territory can or does achieve by large-scale irrigation. Then they demonstrate that irrigation potential significantly predicts degrees of autocratic government until this day. Because irrigation potential correlates positively with early statehood, this finding is in line with Jacob Hariri’s evidence for a link between autocracy and early statehood.

Ola Olsson and John Paik’s[[23]](#endnote-22) study casts further doubts on the advantages of an early adoption of agriculture and statehood. The authors show that the positive relationship between an early transition to agriculture and per capita income today is not only weak; it also only holds in a global cross-national comparison. In a global setting, the relationship is driven by the fact that most countries in sub-Saharan Africa adopted agriculture and statehood late and are still poor today. In stark contrast, if one breaks down the relationship between agrarian pioneership and development by regions and focuses on what Olsson and Paik define as the “Western core” (i.e., Europe, North Africa and the Middle East), the relationship reverts itself and does so quite pronouncedly: inside the Western core, a later instead of an earlier transition to agriculture is linked with higher per capita incomes today.[[24]](#footnote-2)

As is usual for economists, Olsson and Paik explain this pattern institutionally. Early adopters of agriculture erected state capacities rather quickly but froze them in an autocratic frame. Once they reached the “mature stage of pre-industrial civilization,”[[25]](#footnote-3) they were immediately entrapped in the creativity-suffocating tendencies of autocratic institutions. Subsequent adopters of agriculture, by contrast, developed state capacities later but were more likely to wrap them in liberal institutions, which unleash human creativity. Hence, the late developers are ahead today.

Olsson and Paik do not explain why there was an affinity for early adopters toward autocratic institutions and for late adopters towards liberal ones. But if we link their arguments with Jeannette Bentzen et al.'s findings, an answer is at hand: looking at their geographic location, it is obvious that the early adopting areas in the Middle East, the Mediterranean, India and China all were located in hotter and drier climates. By definition, hotter and drier climates have higher irrigation potential. And we have just learnt that irrigation potential favors autocratic institutions. By contrast, the late adopting areas in Northwestern Europe and Japan were located in colder and wetter climates, which means lower irrigation potential and, thus, a higher probability for liberal institutions to evolve.

The way in which these findings combine speaks strongly to the role of the CW-condition as an original cause. For it is clear that the CW-condition determines the irrigation potential: this potential declines linearly with the presence of the CW-condition, especially its water component. Indeed, our data show that irrigation correlates negatively with precipitation.[[26]](#footnote-4)

Damien Murray, Marc Schaller and Peter Suedfeld also explain institutional variation with natural conditions.[[27]](#endnote-23) Building on Randy Thornhill and Corey Fincher’s “disease stress theory of sociality,” the authors maintain that areas in which climatic conditions incur a high infestation with communicable diseases, protective orientations increase a group’s fitness.[[28]](#endnote-24) Group-protective orientations are authoritarian in character because they emphasize discipline and hierarchy as a means to enforce protective rules. In other words, disease prevalence releases selective pressures in favor of authoritarian orientations. Indeed, Murray, Schaller and Suedfeld demonstrate that, in countries with a higher natural disease load, authoritarian personalities are more widespread. Where this is the case, autocratic institutions are more prevalent.

The influence of disease threat, too, speaks to the role of the CW-condition as an original cause: like irrigation potential, disease threat declines linearly with the presence of the CW-condition.[[29]](#endnote-25)

Disease threat is closely linked to colonial patterns. Daren Acemoglu, Simon Johnson and James Robinson argue that only those colonial areas that came under the rule of “inclusive institutions” prospered.[[30]](#endnote-26) Without exception, those areas were also the ones where Europeans settled in large numbers, striving to become independent farmers who work their own land. But this pattern was only observed where a similar climate as in Northwestern Europe would make physical work tolerable for coldness-accustomed “white” settlers. These were also the areas where abundant precipitation allowed for the same type of rain-fed agriculture as in Northwestern Europe.

Other overseas areas, notably those with tropical and sub-tropical climates, were subjected to a quite different type of colonialism. These areas only attracted small numbers of Europeans. They would not come as diligent farmers but as idle rent-seekers to oversee the extraction of produce from plantations and mines. In order to satisfy their rent-seeking ambitions, these colonizers enslaved the indigenous populations and imported masses of slaves from Sub-Saharan Africa after the indigenous populations have been decimated. As Stanley Engerman and Kenneth L. Sokoloff have shown, a “labor-repressive legacy” is a manifest hindrance to the expansion of schooling until this day.[[31]](#endnote-27) This means that repressive labor blocks a society’s cognitive mobilization – a key component of human empowerment.

Confirming the importance of cognitive mobilization, Bo Rothstein and Eric Uslaner show that the rate of schooling in 1870 provides a powerful explanation of low levels of state corruption today.[[32]](#endnote-28) Knowing that low corruption is an indicator of societal florescence in all kinds of respects, including human empowerment, these findings provide a strong case for the long-term importance of universal schooling.

Like irrigation potential and disease threat, the colonial exploitation risk as well speaks to the role of the CW-condition as an original cause: the colonial exploitation risk diminished with the presence of the CW-condition because it was precisely this condition that attracted the less exploitative forms of European farmer colonialism. And as we will see later, the CW-condition made early mass schooling more likely.

Since recently, an increasing number of scholars suggest genetic factors to play a role in development. If one follows the arguments of some authors, one might be tempted to conclude that genetic factors account for a population’s cognitive mobilization—one of the key ingredients of human empowerment. Richard Lynn and Tatu Vanhanen, for instance, claim that the challenges of colder climates require more sophisticated clothing, heating and housing technologies.[[33]](#endnote-29) Accordingly, selective pressures operate more strongly in favor of human intelligence when the climate in which a population reproduces is colder. The authors believe that the strong cross-country correlation between a territory’s average annual temperature and the respective population’s average IQ supports their argument.

Evert van de Vliert, by contrast, argues that climates are more challenging in deviation from the human comfort zone in both directions, towards colder as well as hotter climates.[[34]](#endnote-30) Thus, he measures thermal challenges as the deviation from 22 degrees Celsius in either direction, combining “heat stress” in summer and “cold stress” in winter. Connecting the thermal challenge argument with the argument about selective pressures for human intelligence, one might conclude that thermal challenge in both directions – cold or heat – releases stronger selective pressures for human intelligence. If his conclusion is accurate, then van de Vliert’s combined measure of thermal challenge should be a stronger correlate of average population IQs than just the mean annual temperature, which – according to our data – is not the case however.[[35]](#footnote-5)

Another strand of research suggests that population IQs might increase with a population’s migratory distance from the origin of our species in East Africa.[[36]](#endnote-31) The supposed reason is that people at the migration frontier needed to rely more on their cognitive capacities: they had to be more novelty-seeking as they encountered new environments that required new coping strategies.[[37]](#footnote-6) Hence, selective pressures might have operated more strongly in favor of human intelligence at a greater migratory distance from the human origin. Accordingly, we find a significant positive correlation between a country’s migratory distance from East Africa and its population’s average IQ.[[38]](#footnote-7) Insofar as the IQ differences between different populations are really innate, there would be a genetic basis of cross-country differences in cognitive mobilization. Supposedly confirming this assumption, there are some direct gene-IQ correlations at the country level. For instance, Misho Minkov and Michael Bond[[39]](#endnote-32) identified a gene combination[[40]](#footnote-8) whose prevalence associates with future-oriented life strategies and average population IQs.[[41]](#footnote-9) By contrast, the data gathered by Enrico Spolaore and Romain Wacziarg[[42]](#endnote-33) show a strongly negative correlation between the populations' genetic distance to English Caucasians and population IQs.[[43]](#footnote-10)

In this context, it is worthwhile to remember that we interpreted a population's genetic distance from English Caucasians (which means basically Northwest Europeans) as an indication of colonial exploitation risk: the genetically more distant populations were more likely to fall victim to colonialism. Since it now seems that the genetically distant populations are less smart on average, some might jump to the conclusion that genetically based IQ differences explain colonialism: the smarter populations colonized the not so smart ones.

There are good reasons to reject this conclusion--not because it is inherently racist but because there are manifest doubts about its empirical validity. Specifically, we doubt that the population IQ differences are genetically anchored or in some other form innate. The reason is simple: as soon as we control these correlations for factors indicating a population’s cognitive *training*--such as schooling rates, media usage and exposure to outside influence--they turn entirely insignificant. Hence, IQ differences between different populations describe a population’s cognitive *training*, rather than its innate *potential* to mobilize human cognition. We come back to this fundamental point further below where we also present the evidence (see p. \_).

Although Enrico Spolaore and Romain Wacziarg gathered data on genetic population distances, they interprete them as a proxy for cultural distances in historic trajectories, not differences in such biological qualities as intelligence.[[44]](#endnote-34) More precisely, the authors argue that genetic distances translate into linguistic and other cultural distances that diminish diffusion between countries. Because of that, genetically distant countries tend to be dissimilar in all kinds of subsequent civilizational achievements. Consequently, the emancipatory impulse typical of the West's trajectory meets stronger cultural resistance among country populations that are genetically more distant from Northwestern Europeans.

Another genetic phenomenon calling scholars' attention relates to lactose tolerance. Justin Cook has shown that lactose tolerance is more prevalent among populations in colder climates.[[45]](#endnote-35) One suggested reason for this finding is the vitamin D3 deficit from which populations in cold climates suffer, given their lower sun exposure. Usually, lower vitamin D production weakens bone structures but a dairy diet helps to compensate this deficiency because dairy products are rich in calcium. Lactose tolerance also increases nutritional options, for instance in child feeding, and it adds a whole new set of products to the diet. Because of its link with animal husbandry, lactose tolerance means a higher protein intake through meat consumption. Thus, populations with more widespread lactose tolerance seem to have been taller and healthier already in pre-industrial times.[[46]](#endnote-36) Wider nutritional options and better health would increase the existential autonomy of individuals. Hence, lactose tolerance might be a biological source of individualism. If so, individualism would have a genetic anchor that might make it a chronic predisposition in certain populations.[[47]](#endnote-37) Prima facie, some correlational patterns seem to support this suggestion.[[48]](#footnote-11) We will come back to this point. Henceforth, we interprete the presence of lactose tolerance as an indication of "dietary choice."

If lactose tolerance is indeed a biological anchor for individualism, one would assume that populations with higher lactose tolerance developed their language in ways that reflect their predisposition towards individualism. How a language structures people’s thinking is visible in its grammar—which represents certain cognition patterns. Thus, Matthias Meyer-Schwarzenberger coded languages according to how strongly they pronounce individual agency. One feature of individual agency, for example, is the strictness of the obligation to retain the personal pronoun in a sentence: the prominence of the personal pronoun symbolizes the importance of the actor, which is an inherently agentic feature.[[49]](#endnote-38) Accordingly, we interpret Meyer-Schwarzenberger's language scheme as a measure of "linguistic agency." Given that grammar rules such as this took shape centuries ago, linguistic agency can be interpreted as an early crystallization of a culture’s affinity towards individualism. In a sense, it freezes this predisposition and makes it a chronic feature of a given culture.

If this correct, the long-term presence of linguistic agency should have considerable explanatory power over the adoption of institutional and ideological features that further encode a society’s individualistic orientation. This suggests a path from nutritional to linguistic to institutionalized individualism. In terms of the variable labels used in the subsequent analyses, this represents a causal path from "dietary choice" to "linguistic agency" to "encultured individualism." The latter became manifest, for instance, in certain religious legacies, most notably Protestantism[[50]](#endnote-39), and specific legal traditions, like English customary law.[[51]](#endnote-40)

Another aspect of individualism is "household autonomy"--a factor that involves a whole bunch of things: lower child mortalities, lower female fertilities and a household pattern focusing on consensual and exogamous marriage, the nuclear family and neo-local settlements. Neo-locality means that married couples establish their own household, rather than moving into the household of the husband's parents--which is known as patri-locality.[[52]](#endnote-41) Interestingly, patri-locality is until today pretty much the norm, especially in areas lacking the CW-condition. More generally, patri-locality is part of what Amy Alexander, Ronald Inglehart and Christian Welzel describe as "evolutionary normality" in traditional sex norms: strict heterosexuality, sacrosanct marriage, pre-marital female virginity and high female fertility after marriage, which happens at an early age and is pre-arranged, without the women's consent.[[53]](#endnote-42) All these elements complement each other in establishing male control over female sexuality.[[54]](#endnote-43) Lower female fertility and the other elements of household autonomy represent a deviation from this evolutionary normality in sex norms. As we will see, this deviation has been unique to CW-areas.[[55]](#footnote-12)

Considered under today’s standard, female fertility was high everywhere before the invention of modern contraception. High child mortality, disease vulnerability, famines and other threats dictated relatively high fertility rates in all agrarian societies. High fertility has been incentivized by pressures to increase the population and workforce.[[56]](#endnote-44) Nevertheless, we we will see that climatic differences created significant variation in disease vulnerability and child mortality across regions already at pre-industrial times: areas with a pronounced CW-condition had both lower disease vulnerability and lower child mortality and these differences were naturally given. This allowed for lower fertility to sustain the workforce. Thus, both men and women had the option to marry later already in pre-industrial times, namely in their mid-early twenties instead of their mid-teenage years. This proposition has first been formulated by John Hajnal in 1982 and is known as the “Hajnal-thesis.”[[57]](#endnote-45) Recent re-examinations of the evidence by Mary Hartman and \_ Koiti strongly confirm the Hajnal-thesis for both Northwestern Europe and Japan—the two agrarian areas with the strongest CW-condition before the colonial age.[[58]](#endnote-46)

Against this backdrop, Selin Dilli coded family systems all over the world as they looked like at the time around 1800.[[59]](#endnote-47) With the exception of England and Belgium, this is a time which is located for all areas of the world before the Industrial Revolution. Thus, we deal with pre-industrial family patterns that can be assumed to reach back much farther into agrarian times. Anyways, inspired by Emmanuel Todd's[[60]](#endnote-48) pioneering work, Dilli classifies family systems in terms of marriage rules, household size, inheritance practices and settlement patterns. Along these criteria, Selin Dilli orders family systems in a hierarchy from the most collectivistic to the mosy individualistic type. The collectivistic type includes endogamous and pre-arranged marriage, extended families, no female inheritance, and patri-local sttlement. The most individualistic type features exogamous and consensual marriage, nuclear families, female inheritance as well as neo-locality in settlement patterns. When looking at the global areas to which Selin Dilli attributes the individualistic type, it is clear that this type is a singularity of the CW-areas in Northwestern Europe as well as its overseas former settler colonies, and to some extent also Japan and the Koreas.[[61]](#footnote-13)

Interestingly, Selin Dilli finds that the type of family system prevailing in a country at about 1800-1850 still influences its political regime today. Specifically, family systems at the collectivistic end of her scheme show a significant tendency toward authoritarian rule. By contrast, family systems at the individualistic end exhibit a similarly significant tendency towards democracy. Looking at this evidence, it is not far fetched to assume that other aspects of human empowerment as well are influenced in corresponding fashion by family systems, such that systems towards the individualistic end tend to favor human empowerment in its various manifestations.[[62]](#footnote-14)

Lower fertility and the other features of household autonomy represent a crucial factor in various ways. For one, household autonomy prevents a marriage pattern that is known as the strongest preservative of patriarchy. This pattern has been broadly analyzed by Michael Woodley and Edward Bell and labelled “consanguinity,” which means the preference of distant relatives over non-relatives as marriage partners.[[63]](#endnote-49) This pattern is also known under the terms "endogamy" or simply cousin marriage. It is indicative of (*a*) patriarchy and (*b*) familism as the organizing principles of group formation – which contrasts with contractual consent as the formative principle when household autonomy is strong. Woodley and Bell have shown that consanguinity prevails in areas with high disease vulnerability. This is plausible because consanguine marriage cements in-group closure – a protective measure in disease-vulnerable environments. Woodley and Bell also show that consanguinity correlates negatively with democracy. Since consanguine marriage is linked with disease vulnerability, this finding supports Randy Thornhill and Corey Fincher's evidence that disease vulnerability hinders democracy.[[64]](#endnote-50) Indeed, the in-group closures emanating from consanguinity describe a plausible mechanism why disease vulnerability hinders democracy, as well as other emancipatory achievements linked to human empowerment.

By contrast, household autonomy implies consensual, exogamous marriage: partners from across kinship-lines *agree* to marry out of an intrinsic choice. At the embryonic unit of society – the family household – consensual marriage fundamentally reshapes social relations. It allows for more gender equality, detaches social relations from family ties and makes these relations voluntary and reciprocal.[[65]](#endnote-51) It is plausible to assume that these principles of group formation shape trust patterns, such that out-group trust is significantly higher than in contexts in which consanguinity prevails.[[66]](#footnote-15)

By favoring consensual marriage, household autonomy anchors the *agreement principle* at the grassroots of society. On this basis, power-sharing institutions can grow bottom-up, all the way to the level of national governance. With household autonomy in place, derivative autonomies – such as property disposal, market access and skill acquisition – are more easily in reach. Because of that, people become oriented towards struggling for the guarantee of these autonomies. This delays state formation because autonomy-oriented groups organize resistance against the centralization of regulatory and fiscal capacities when these capacities curtail their autonomies. In the face of such resistance, rulers can build state capacities only in return for something: representation of the taxed population segments in elected assemblies. When this logic kicks in, the driving principle of democracy – “no taxation without representation” – is set in motion. In the beginning, representation was limited to the propertied segments of society. But with the extension of income taxation, military service and school attendance into all layers of the population, representation has been continuously expanded[[67]](#endnote-52), until universal suffrage established modern democracy.[[68]](#footnote-16)

Another feature of household autonomy is that it leaves people more time to improve their skills, education and human capital. This opportunity endowment needs to be seen in the context of humans’ biological programming: our species has an exceptionally long adolescence because a long adolescence maximizes the potential for learning. Given this potential, education is a rewarding investment in the future. With household autonomy, state-driven attempts to expand mass schooling meet a demand-side reservoir of available time at the grassroots of society. This reservoir of time facilitates a life strategy that aims at maximizing the quality of one’s offspring instead of its quantity. As is known from the works of Gary Becker, Steven Barro and Oded Galor[[69]](#endnote-53), the emergence of a “quality-building” strategy (as opposed to the “quantity-breeding” strategy) is vital to the knowledge explosion at the beginning of an industrial take-off. As we will see, the conditions for this transition were better where some degree of household autonomy was already in place at pre-industrial times.

## The Cool Water Condition as the Connecting Source

It is a striking finding that all of the supposed hindrances of development correlate negatively with the CW-condition: irrigation potential, disease vulnerability, "white" settler mortality, the prevalence of consangunity, collectivist family patterns and authoritarian personalities as well as the colonial exploitation risk (i.e., genetic distance to the English) all correlate negatively, and highly significantly so, with the CW-condition.[[70]](#footnote-17) By the same token, all the supposed contributors to development correlate positively, and again very strongly so, with the CW-condition. This is true for a country-territory’s migratory distance from the human origin, the lactose tolerance of the people on this territory, their linguistic agency, encultured individualism, pre-industrial household autonomy, their early achievement of democracy, early levels of mass schooling and early industrialization.[[71]](#footnote-18) Populations featuring strong in the latter characteristics are also the ones in which the human empowerment index reaches the highest scores today.

All of this strongly suggests that the CW-condition is indeed a root cause of human empowerment today. This suggestion is further underlined by the fact that the defining features of the CW-condition – cool temperatures and water abundance – reach farther back in time than the other predictors of development with which the CW-condition correlates. Indeed, the *temporal primacy* of the CW-condition suggests that this condition exerted selective pressures in favor of the more proximate determinants of human empowerment.

## The Timing of the Cool Water Condition’s Impact

A key question is when the advantages of the CW-condition began to germinate. Given that the CW-areas on our planet were laggards in the civilization process for long, this question is all the more critical. To answer it, Figure 41 shows how the CW-condition relates with a country-territory’s per capita income at different points in history, using Angus Maddison’s[[72]](#endnote-54) estimates for thirty-two exemplary territories from around the world. The evidence covers a time span of 1,000 years.

**[Figure 41 about here]**

As is obvious from the upper-left diagram, the relationship between the CW-condition and per capita income is pronouncedly *negative* at our first observation point, in 1000 CE (*R* = -0.51). But five hundred years later, at our second observation point in 1500 CE, there is a clearly positive relationship (*R* = 0.48). Needless to say, the correlations are significant at both points in time. Since then, the relationship turned ever more positive and did so continuously with every century: *R* = 0.60 in 1600, *R* = 0.65 in 1700, *R* = 0.78 in 1800, and *R* = 0.87 in 1900. Still in 2010, an almost equally positive relationship (*R* = 0.78) not only characterizes our initial set of countries (*N* = 32) but all countries in the world for which data are available (*N* = 176).

The negative relationship in 1000 CE reflects the fact that the areas with a strong CW-condition--namely Northwestern Europe, Japan and a few places overseas from Eurasia--lagged behind the civilizational achievements of the Mediterranean, the Middle East, India and China. The CW-areas’ agricultures were less advanced, if there was agriculture at all. Accordingly, urbanization, commercialization and state organization were behind as well. Had we more data, the laggard position of the CW-areas relative to the older civilizations would probably show up in a consistently negative relationship between the CW-condition and per capita income not only in the year 1000 CE but several thousand years back, perhaps all the way to the beginnings of civilization itself.

The turn of the negative relationship into an increasingly positive one, visible in Maddison's data for the first time in 1500 CE, reflects a sequence of steps that brings one CW-area after the next to the forefront of societal development. Reading the diagrams in Figure \_ in their temporal order, the steps of the sequence are well recognizable:

(1) In the first step, the countries of Northwestern Europe—especially the Netherlands and England--start to catch up and then to overtake other country-territories in the world, although Italy, with a moderate CW-condition in its North, remains on top for a while.

(2) In the second step, Northwestern Europe continues its steep progress, reflecting its scientific, commercial and industrial revolutions.

(3) In the third step, Japan begins to catch up, first through the commercial florescence during the Tokugawa period but then more vigorously through the concerted effort of the Meiji Restoration.

(4) In the fourth step, the CW-areas outside of Eurasia—i.e., North America, Australia and New Zealand—join the progress path and climb it quickly after European settlement. As a result, all CW-areas on the globe are advanced today and, for now, remain ahead of other areas.

The appearance of Northwestern Europe’s advantage in 1500 CE coincides with the Great Discoveries, Renaissance-Humanism, the Copernican Revolution, the florescence of pre-industrial capitalism, and the Reformation—all of which are indications of an area in the middle of a massive cognitive mobilization. So what happened between 1000 and 1500 CE to turn a cultural backwater into a paragon of societal dynamism? Scholars[[73]](#endnote-55) argue that starting from a rather primitive level, incremental improvements – such as the invention of the heavy iron plow, the use of draft animals, the spread of three-field rotation, and an excessive use of water power – led agrarian production to levels allowing to sustain expanding urban populations whose members then specialized on manufacture, commerce and trade.[[74]](#footnote-19) A similar process started in Japan in 1600 CE, beginning with the Tokugawa era.[[75]](#endnote-56) Thus, the two agrarian areas with the most pronounced CW-condition in Eurasia – Northwestern Europe and Japan – slowly approached the mature stage of pre-industrial civilization known since long from the older civilizations. This standard consisted of a surplus-oriented agriculture to sustain an elaborate city life, involving the extensive use of such achievements as writing, money, law, science and the fine arts.

But here is the paradox: the mature stage of pre-industrial civilization turned into a perpetual trap for the old civilizations from which none of them managed to escape, not even over the duration of several millenia; by contrast, in the moment the young civilizations reached the mature pre-industrial stage, this stage immediately turned into the jumping board from which they leaped quickly into the industrial age.[[76]](#footnote-20)

We believe that the CW-condition makes all the difference. This condition, we suggest, avoids the Malthusian cycles in which societies get otherwise caught when they reach the mature level of pre-industrial civilization. One source of this difference is that agriculture in the presence of the CW-condition establishes different fertility incentives. As Oded Galor points out, the old civilizations did not experience much progress in ordinary people’s basic living conditions, neither in terms of income nor longevity, because productivity gains were entirely channeled into population growth.[[77]](#endnote-57) A reason of this phenomenon is the high labor-intensity of irrigation-managed agriculture: rice cultivation or that of other irrigated tropical crops, like sugar cane and cotton, requires the deployment of large numbers of laborers per unit of land. To sustain the workforce, high fertility rates are required, which favors early marriages and the reduction of women to the role of reproduction—a tendency further supported by high child mortalities in disease-vulnerable environments. Thus, irrigation-managed agricultures tend to establish fertility practices of the “quantity-breeding” type. As is well understood, when more human lifetime is absorbed by producing children, less time is left to build human capital. Hence, high fertility practices block the "quality building" strategy that needs to spread on a mass-scale to launch an industrial take-off.

By contrast, rain-fed agriculture in CW-areas has a lower demand for human labor per unit of land, especially when the production centers on grains such as rye, wheat and barley, with pastures held for draft animals.[[78]](#endnote-58) This incentivizes fertility practices of the “quality building” type. These practices limit the size of the workforce while increasing its skill. If, in this situation, rising urban centers increase the labor demands of producers, cheap mass labor is in short supply.[[79]](#footnote-21) To meet their labor demands, producers then must invest in technology. To do this, they need to allocate resources to experimentation and research. They also must hire creative minds with knowledge. As this becomes obvious, a market for ideas emerges, which further increases people’s incentives to have fewer but better skilled children. Low fertility practices further increase the state’s incentives to promote universal schooling, as a tool to unlock a population’s intellectual potential for economic productivity. All these tendencies flow together in a broad process of cognitive mobilization, which eventually allows societies to escape the Malthusian trap.

The advantages of the CW-features are conditional: they require the emergence of the mature level of pre-industrial civilization at which the old civilizations remained stuck ever since they got there. This maturation happened late in history, and so the advantages of the CW-condition too germinated rather late. But once they did, they did so with increasing power as the sequence in Figure \_ illustrates beyond reasonable doubt.

The following set of analysis attempts to find out which variables are the most powerful filters over which the CW-condition’s developmental effect has operated in history. To do so, we first propose a scheme of sequentially ordered layers in history and place the variables discussed so far into these layers. Then we use this scheme for an empirical path analysis that tries to carve out among manifold possibilities the most influential path leading from ecological start conditions to human empowerment today.

# 12 Charting the Map from Cool Water to Human Empowerment

## Methodological Considerations

This section describes measures of the variables introduced so far. It also describes the structure of a path analysis that places these variables relative to each other in a supposed causal order. This is done in such a way that variables with a farther reach backward in time are placed prior to variables representing more recent characteristics. We always and only place a layer of variables prior to another one when it is beyond reasonable doubt which was there first and which thereafter. Thus, subsequent layers are chosen in such a way that a great temporal distance separates them. Such a clear temporal separation assures that we avoid confusing causes and effects. Thus, our findings stay clear of any endogeneity problems. This is fortunate because, in the absence of endogeneity problems, we do not need to engage in technically complicated solutions, such as panel regressions with instrumental variables.

We apply an explorative approach: a later situated variable is always regressed on all previously situated variables. We use this explorative approach on purpose. The reason is that it is impossible to know before-hand exactly which preceding condition in a set of potentially important factors will show the strongest influence on which subsequent outcome. In order to reduce the random noise that would obscure the clarity of an existing pattern when many insignificant effects are kept in a model, we use a “stepwise” elimination procedure. Among all possible influences, this procedure selects only those retaining significance in competition with others. Sometimes, this procedure is criticized as being a-theoretical. But all our variables are created and selected based on strong theories. We just do not know, and there is no way to know this beforehand, which of these theories has more empirical support. Hence, we try it out and apply an evolutionary selection that sorts out all those effects with competitive significance.

Before we show the results of this sorting out analysis, Figure 42 first shows a purely conceptual diagram without any arrows. The diagram simply places the studied variables in their temporal sequence, ordered from more backward-reaching to more recent, from the top to the bottom. Figure 42 also highlights in orange those six of our 17 input variables that are located on the path sequence from which we will see that it leads all the way through to human empowerment today. The eleven grey marked variables, by contrast, represent deadends that do not end up in human empowerment, as we will see.

**[Figure 42 about here]**

Next, Figure 43 shows the same diagram again but now with all significant influences that we could establish empirically. Thus, Figure 43 is the result of a host of multiple regressions, each conducted with stepwise elimination, such that a variable located at a certain layer of time is always regressed simultaneously on all previously layered variables. This makes it possible to find a maximum of 130 significant influences from previous to subsequent layers of time.

**[Figure 43 about here]**

Of the 130 possible influences, only 31 influences prove significant throughout our multiple series of temporally ordered regressions. This sounds like a great reduction but as Figure 43 shows, even this reduced number of significant influences provides a complex picture. Representing this complexity is for once a helpful exercise because it reminds us to avoid over-simplistic explanations of history. To demonstrate the CW-condition's outstanding importance as the original source of human empowerment, Figure 43 highlights in orange the 26 of the 31 pathways originating in the CW-condition. The five pathways that do not relate back to the CW-condition are shown in grey. Noticing the overwhelming majority of orange arrows in Figure 43 already reveals something very significant: all of our twenty variables – except the agrarian potential, irrigation yield and population density around 1500 CE – are in one way or the other related to the CW-condition.

In spite of our appreciation of the real world’s complexity, we wish to sort out the less from the more relevant influences. Thus, Figure 44 blinds out all pathways that lead into a deadend. In other words, Figure 44 only shows those eleven of the 31 significant pathways that follow through all the way to our ultimate outcome variable, which is human empowerment in the 2000s. Now, we get a clearer sense of the "masterpath" spanning the entire sequence between our original source, the CW-condition, and our final outcome, human empowerment. Between origin and outcome, there are only four stations in a sequence order reaching from lactose tolerance to linguistic agency to female autonomy and encultured individualism to human capital.

**[Figure 44 about here]**

In further reducing the complexity, Figure 45 only shows the strongest influence on each station on the masterpath. Doing so, clears up the masterpath even more, isolating a sequence in which the connection between the CW-condition and human empowerment is mediated by just two stations: female autonomy and human capital.

**[Figure 45 about here]**

A shortcoming of our analyses consists in the fact that the multitude of separate regressions does not test all the significant influences in a single model. Accordingly, we do not obtain an overall fit of all these influences. To resolve this shortcoming, we tested in a single path model how well the 31 significant influences in Figure 43 fit the data of our entire set of twenty variables. Likewise, we tested in another integrated path model how well the eleven throughgoing influences in Figure 44 fit the data of the nine involved variables. In both cases, the goodness of fit statistics testify to an exceptional model quality. Accordingly, our path models neither overlook significant paths nor do they specify insignificant paths. We can conclude from this finding that our path models are valid, at least as concerns the data at hand. Figure 46 shows these results.

**[Figure 46 about here]**

## Layers and Stations

### Ecological Conditions

We now explain the logic of the temporal layering in Figures 42 to 46. Clearly, the most original conditions that predate any civilizational achievement are geography-based ecological features, which accordingly form our first layer. Economic historians from David Landes to Eric Jones, anthropologists from Carol and Melvin Ember to Jared Diamond as well as sociologists from Gerhard Lenski to Michael Mann recognize that ecological conditions constitute the starting configuration for any societal development.[[80]](#endnote-59) Ecological conditions define the opportunity endowments that a society can learn to use by the means of human intelligence. They determine what food is available, what crops can be grown and which animals can be domesticated, what raw materials are available for production, what trade routes exist and what people need to do to survive under given weather conditions. We focus on two types of ecological conditions that received attention recently: the country-territories' "agrarian potential" as well as their "CW-condition."

The history of civilization, so far, is characterized by three evolutionary leaps: the first leap marks the transition from foreaging into agrarian societies, the so called Neolithic Revolution. The second leap signifies the transition from agrarian into industrial societies, the so called Industrial Revolution. The third leap typifies the transition from the industrial into the information age, what we call the Information Revolution. Among our two ecological conditions, we hypothesize that the agrarian potential was decisive for the "first" evolutionary leap into the agrarian era. By contrast, the CW-condition was decisive for the "second" evolutionary leap into the industrial era. Interestingly, as we will see, where present the CW-condition slowed down the adoption of agriculture but catalyzed the leap into industrialization once agriculture was in place. Finally, as we will also see, globalization diminishes the determining power of ecological conditions in the information age, including that of the CW-condition.

The Cool Water Condition. The CW-condition belongs into this layer because it touches upon climatic features that are a direct outcome of geography: latitude and coastal proximity largely determine where it is colder and rainier – two of the CW-condition’s defining characteristics. To capture the CW-condition, we use the measure discussed in detail in Chapter 11.

Agrarian Potential. Inspired by the ideas of Jared Diamond[[81]](#endnote-60), Ola Olsson and John Paik[[82]](#endnote-61) created an index combining the number of domesticable plants and animals that were originally present on a country-territory. They also measured the territory's East-West extension. Why the number of domesticable plants and animals defines a country-territory's agrarian potential is self-evident. The East-West extension is important as a diffusion facilitator: agrarian innovations diffuse more easily over an East-West than a North-South axis because climate zones differ mostly over geographical latitude and hardly over longitude.

### The Agrarian Threshold

Agrarian Pioneers. The next layer in the causal sequence is separated from the first by a boundary that one might characterize as the “environments – populations” threshold. The first layer merely addresses environmental conditions. These are entirely exogenous to human achievements. The next layer then addresses early adaptations to the environments by human populations. These adaptations are driven by selective pressures from the environments and occur in ways that make these adaptations durable, so the benefits of these adaptations are inherited over the generations. These adaptations represent the first stages at shaping a lasting legacy. A first major step into this direction is the adoption of agriculture. Thus, we use Louis Putterman et al.'s data, labelled “agrarian pioneers,” which measures the number of years since the adoption of agriculture in a country-territory.[[83]](#endnote-62)

Lactose Tolerance. The adoption of agriculture demarcates the biggest leap in societal development, apart from the Industrial Revolution. Agriculture fundamentally transformed nutritional options and this required genetic adaptations. Specifically, lactose tolerance became an advantageous trait once animal husbandry was adopted. When animal husbandry was practiced, lactose tolerance offered novel nutritional options in the form of dairy products. This advantage is even bigger under the CW-condition because, where this condition is prevalent, dairy products provide a welcome compensation for vitamin D deficiencies caused by low sun exposure. Also, under the CW-condition one finds the most fertile pastures to feed the animal with the highest milk production: the cow. We take the lactose tolerance data from Catherine Ingram and Justin Cook, as collected by Andrey Sherback.[[84]](#endnote-63) Since lactose tolerance is an adjustment to animal husbandry, we place this variable at the same layer as "agrarian pioneers."[[85]](#footnote-22)

The CW-condition embodies water autonomy while lactose tolerance contributes to nutritional autonomy. Together, the CW-condition and lactose tolerance provide an ecological-biological basis for ordinary people's existential autonomy as such. In so doing, these conditions build the material basis of an individualistic culture. This is a lasting basis because the CW-condition derives from persistent environmental conditions and because lactose tolerance establishes a hereditary genetic trait. Accordingly, the CW-condition and lactose tolerance are plausible original sources of human cultures' different emancipatory tendencies.

Irrigation Yield. The third variable in the early agrarian layer addresses the yield that a country-territory can obtain from large-scale irrigation management. To capture this feature, we use the data collected by Jeannette Bentzen and her co-authors.[[86]](#endnote-64) The assumption is that the irrigation yield favors despotic structures. If anything, this tendency should be detrimental to human empowerment.

### The Colonial Threshold (around 1500 and before)

The next layer leads us to early civilizational achievements after the transition to agriculture. An early manifestation of culture that greatly enhances its heredity is the formation of written language[[87]](#endnote-65), something that only occurs after the adoption of agriculture.[[88]](#endnote-66) Once the basic grammar structure of a language has taken shape, this structure preserves certain cognition patterns and inherits them from one generation to the next.[[89]](#endnote-67) Inspired by Emiko and Yoshihisa Kashima's research[[90]](#endnote-68), we assume that, if the CW-condition and lactose tolerance indeed provide an ecological-biological basis of subsequent emancipatory tendencies, one of the first cultural crystallizations of these tendencies should be visible in “linguistic agency.”

Linguistic Agency. We define linguistic agency as grammar features emphasizing the actor as the central agent in a happening. We consider linguistic agency in this sense as an inherently emancipatory feature because an emphasis on agency is part of what defines emancipation.[[91]](#endnote-69)

In some languages, especially those of the Germanic family, such as English, German and the Scandinavian languages, the grammatical emphasis on agency goes so far that even in happenings that actually do not have an agent, the sentence uses a neutral pronoun and does as if this is the actor.[[92]](#endnote-70) A good example is the expression "it rains": raining has no actor but the pronoun "it" fulfills the function of a subject committing the act of raining. In most other languages outside the Germanic family, passive terms without a subject are used to express happenings without a real actor.

Another manifestation of linguistic agency is an emphasis on active instead of passive voice. In Swedish, for instance, to tell someone your name you say "jag heter \_" (*I call myself* \_), which is active, whereas in Russian you say "[меня́](http://dict.leo.org/rude/index_de.html#/search=%D0%BC%D0%B5%D0%BD%D1%8F%CC%81&searchLoc=0&resultOrder=basic&multiwordShowSingle=on) [зову́т](http://dict.leo.org/rude/index_de.html#/search=%D0%B7%D0%BE%D0%B2%D1%83%CC%81%D1%82&searchLoc=0&resultOrder=basic&multiwordShowSingle=on)" (*one calls me* \_), which is passive.[[93]](#endnote-71)

Yet another manifestation of linguistic agency is a language's insistence on retaining the personal pronoun in an expression of activity. There are many languages allowing to drop the personal pronoun completely in a sentence.[[94]](#endnote-72) In Romanic languages, like Spanish, the pronoun can be dropped but the actor remains recognizable at the conjugated ending of the verb. In Germanic languages, by contrast, the personal pronoun cannot be dropped under any circumstances.

To capture linguistic agency, we use a language index produced by Matthias Meyer-Schwarzenberger.[[95]](#endnote-73) The index orders the grammar structures of a given country's main language on matters of subject centrality, emphasis on active voice, insistence on personal pronoun usage and some other individualistic, emancipatory features. The index yields a nine-point scale from the least to the most emancipatory features. We standardize the scores into a range from minimum 0 to maximum 1.0, with increasing fractions indicating a stronger presence of emancipatory features. We label the resulting index "grammatical individualism."

Figure 47 shows that grammatical individualism, which according to Meyer-Schwarzenberger began to crystallize around 1500 CE, associates significantly and positively with human empowerment today: there is a visible tendency for countries in which people speak languages with a more pronounced grammatical individualism to achieve more advanced levels of human empowerment. A few outliers from this tendency are, however, obvious: some East Asian countries, such as Japan, Taiwan and South Korea, speak languages with little grammatical individualism but neverhteless achieve relatively advanced levels of human empowerment. By contrast, some sub-Saharan African countries, like Burkina Faso, or Caribbean countries, like Cuba, speak languages with a relatively strong grammatical individualism but nevertheless lag behind in human empowerment.

**[Figure 47 about here]**

The index of grammatical individualism is available for only 119 of the roughly 200 countries in the world. For this reason, we use a complementary source of insight: a nine-fold categorization of language families, for which we consulted the World Atlas of Languages.[[96]](#endnote-74) We code this categorization in ascending order of the given language family's emancipatory tendency. To measure this tendency, we use as a yardstick John Gerring and his co-author's "democracy stock" index[[97]](#endnote-75), which adds up a country's annual democracy ratings[[98]](#footnote-23) over a time span of a hundred years, from 1900 to 2000.[[99]](#footnote-24)

We are convinced that democracy is a valid proxy of emancipatory tendencies because the core of democracy consists in the fact that it gives each individual citizen an equal vote and voice: this is precisely the combination of individualistic and egalitarian features that Christian Welzel defines as human emancipation.[[100]](#endnote-76) We also believe that a long-term measure of democracy is more valid to depict a linguistically encoded tendency towards emancipatory outcomes because, if such a tendency indeed exists, it is a continuous force that should surface most visibly over a long time span. To measure democratic traditions before 1900 is impossible because democracy did not exist before this time; at least it did not if we define democracy by universal female and male suffrage.

Support for the assumption that democratic traditions indeed represent an emancipatory tendency is provided by the fact that democratic traditions correlate strongly with both Gert Hofstede's index of individualism[[101]](#footnote-25) and Christian Welzel's emancipative values index,[[102]](#footnote-26) which measures an emphasis in people's orientations on freedom of choice and equality of opportunities.

Given these premises, we create nine linguistically defined country-groups based on the language family of the countries' main languages. In ascending order, these linguistic country-groups show the following scores on the continuum of democratic traditions, which reaches from a minimum of 0 to a maximum of 1 (standard deviations in parentheses): East Slavic languages 0.18 (0.06), Semitic languages 0.25 (0.14), West Slavic languages 0.29 (0.16), African languages 0.39 (0.09), East Asian languages 0.33 (0.20), South Asian languages 0.46 (0.19), Pacific island languages 0.55 (0.09), Romanic languages 0.56 (0.20), and Germanic languages 0.91 (0.12).[[103]](#footnote-27)

It is noteworthy that the standard deviations within the country-groups are by a sizeable factor smaller than the group means. This already indicates that countries in the same language group are relatively homogenous as concerns their democratic traditions. Accordingly, fully 62 percent of the entire cross-national variation in democratic traditions is captured by the countries' language families.[[104]](#footnote-28) The boxplot in Figure 48 shows how distinctively the language families cluster on different democratic traditions.

**[Figure 48 about here]**

Now, when countries show different democratic traditions in close correspondence with their linguistic heritage, this can be an indication that this heritage in and by itself engenders emancipatory tendencies – like a grammatical mind-programming that orients people towards long-term emancipatory outcomes, such as democracy. Of course, such a correspondence is not yet a definitive proof that different emancipatory tendencies are inherent in languages *themselves*. The simple reason is that languages might only be confounders of all kinds of other factors that truly engender such tendencies. Nevertheless, if a decently strong correspondence between the countries' linguistic heritages and democratic traditions indeed exists, the assumption that emancipatory tendencies are inherent to languages would at least be a plausible possibility. How inherent to languages themselves the emanciptory tendencies truly are will become obvious when we examine the linguistic heritages' democratic traditions under control of possible confounders.

Until we have identified such confounders, we consider all cross-country variation in democratic traditions that corresponds to language families as inherent to these language families. Of course, this is a probational consideration, pending on whether the correspondence holds under proper controls. With this probational assumption, we give linguistic heritages a maximum chance to turn out as the major source of emancipatory cultural tendencies. In other words, we enhance the chances of a possible influence that is a contender of our own theory of emancipation to its maximum.

In testing this chance, we assign each country the mean score in democratic traditions of the linguistic country-group to which it belongs.[[105]](#footnote-29) This way, we measure the countries' incorporation of democratic traditions, but only *in as much* as these incorporations are attributable to language families. To be sure, any given country's own democratic tradition can deviate from the mean score of its linguistic country-group, and at times does so quite largely. But precisely this deviation cannot be attributed to the respective country's linguistic heritage for the very reason that it is a *deviation* from it. Hence, we cannot take the countries' own democratic tradition to measure the linguistic anchor of this tradition, for not all of the variation in democratic traditions is tied to this anchor. Only the part captured by the linguistic group means is, which we already know accounts for 62 percent of the entire variation in democratic traditions.

Our index of "language-encoded emancipation" measures an earlier occuring feature, namely language families, against the yardstick of a later occuring feature, which is democracy. Against this backdrop, some researchers might criticize our placement of this index in the pre-colonial layer of time because democracy appeared *after* this time. In fact, this is indeed a noteworthy point. Nevertheless, it does not invalidate our measurement approach, we believe. What we intend to measure is language differences from the viewpoint of their inherent emancipatory potential, in as far as such a potential actually exists. And we think we have provided convincing reasons why democratic traditions are a first-rate manifestation of an emancipatory potential. Now, the realization of a potential inevitably actualizes later than the time that the potential itself is in place. Accordingly, when no direct measure of the potential is available, it is perfectly logical to infer its previous existence backward from its subsequent actualization. In the same vein, it is perfectly sensible to measure the languages' emancipatory potentials by their later manifestations in democratic traditions, and nevertheless placing the potentials at an earlier layer of time--for they were already there; only their actualization occured later.[[106]](#footnote-30) This should not be too difficult to understand: present evidence often provides a window into the past, just as watching the stars tells you about the universe's configuration several lightyears back in time.

Confirming this logic, "language-encoded emancipation" shows an astounding 75 percent overlap with Matthias Meyer-Schwarzenberger's index of grammatical individualism, across the 119 countries for which both measures are available. Given that Meyer-Schwarzenberger himself dates his measurements back to about 1500 CE or earlier, our temporal placement of language-encoded emancipation in the pre-industrial layer of time does not seem to be off the mark. Hence, it is justified to combine the emancipatory ordering of language families and grammatical individualism into a joint index of linguistic agency.[[107]](#footnote-31) Doing so, we obtain measures of linguistic agency for 188 countries.[[108]](#footnote-32)

As the scattergram in Figure 49 shows, countries scoring high in linguistic agency show a significant and pronounced tendency to also score high in human empowerment today. The evidence looks very similar as for the 119 countries with Meyer-Schwarzenberger's measure of grammatical individualism, already shown in Figure 47.

**[Figure 49 about here]**

Population Density. Another feature resulting from agriculture is population density. Agrarian societies are able to feed many more people per unit of land than is the case with foreaging societies.[[109]](#endnote-77) This advantage in numbers allowed agrarian societies to push back hunter-gatherers wherever agriculture was feasible. On truly advanced levels of pre-industrial agriculture, societies are able to yield so much food surplus that a considerable proportion of the population does not need to work in food production. This allows for occupational specialization and the concentration of non-agrarian professions in urban centers, which generates higher population density. Hence, population density is a valid measure of societal progress since the invention of agriculture and before the Industrial Revolution.

As Oded Galor argues, population density might be the only measure of societial progress in pre-industrial times because no civilization was able to generate high per capita incomes and long life expectancies for the broad mass of the population before industrialization.[[110]](#endnote-78) Before this incision, gains in food production were channeled into population growth, not income growth. Moreover, some scholars consider pre-colonial population densities as an important factor in the history of colonialism because densely populated territories were supposedly less likely to be colonized by Europeans.[[111]](#endnote-79) To test the influence of pre-colonial population densities in the historic sequence leading towards human empowerment today, we look at population densities at about 1500 CE. Data are taken from Kees Klein Goldewijk and his co-authors.[[112]](#endnote-80)

Pre-colonial Statehood. Yet another consequence of pre-industrial agrarian progress is state formation. When food surpluses become large enough to feed a non-agrarian population of urban dwellers – such as manufacturers, artisans and merchants – specialization on policing order, administering justice, military defense and tax collection becomes possible. Especially in agrarian settings that originate in large-scale, riverine irrigation management – as it was the case in Mesopotamia, Egypt, India and China – these public functions emerged rather quickly and formed the backbones of early statehood.[[113]](#endnote-81)

Until this day, many scholars consider the emergence of state order as the quintessential achievement of civilization, if not its core definition.[[114]](#endnote-82) As Valerie Bockstette and her co-authors argue[[115]](#endnote-83), countries with a legacy of statehood reaching far back into pre-industrial times have accumulated and inherited stocks of organizational knowhow that allow them to outperform countries with a shorter legacy of statehood until this day.

Roberto Foa's analysis of statehood traditions among sub-national regions in India provides convincing support for this argument.[[116]](#endnote-84) Some scholars also believe that long-lasting pre-colonial state traditions reduced the likelihood for a country to fall victim to European colonialism. To test the influence of pre-colonial statehood in the historic sequence leading towards human empowerment today, we use data on "state antiquity" collected by Valerie Bockstette and her team.[[117]](#endnote-85) As with population density, we look at pre-colonial statehood at about the time of 1500 CE, measuring a country's cumulative years of statehood from 0 to 1500. In Figures 42 to 46, we label this variable "pre-colonial statehood."

Linguistic agency creates an anchor that makes an emancipatory predisposition hereditary in a given population. There is also evidence that linguistic agency contributes to cognitive autonomy, that is, the ability to think independently. Suggestive evidence to this end can be seen in the fact that universal schooling has been introduced earlier among populations speaking languages with linguistic agency. In addition, these populations perform better in intelligence tests and other indications of cognitive performance today.[[118]](#footnote-33) Furthermore, bi-lingual people who fluently speak two languages with largely different linguistic agency come up with more creative solutions to cognitive tasks when the task is phrased in the language with stronger grammatical agency.[[119]](#endnote-86) Of course, this evidence does not prove a causal connection between linguistic agency and cognitive autonomy but it makes at least the possibility plausible. Be it as it is, there is reasonable evidence suggesting that linguistic agency represents a grammatical encoding of an emancipatory cognition. The strong correlation between linguistic agency and emancipative norms across the worlds' countries belongs to this evidence.[[120]](#footnote-34)

Equipped with this heritage, a population’s subsequently evolving ideologies are likely to give explicit expression to an emancipatory worldview and to preserve these expressions in the form of lasting beliefs and rules. Thus, linguistic anchors represents population characteristics that are still implicit; with the formulation of doctrines and laws, the implicit tendencies crystallize into explicit institutions. Crossing this threshold leads us into a field of legacies that is now a matter of intentional social engineering.

Lasting institutions evolve when a population’s environmentally, biologically and linguistically shaped predispositions crystallize – crystallizing in a heritable organizational form. This means to encode predispositions in explicit beliefs and rules, transmitted over the generations through the socialization process.

Now, among the institutional configurations that emerged at different points in history, those present at the dawn of colonialism, that is at around 1500 CE, are of outstanding importance. The reason is that this era marks a true singularity in the history of civilizations. Indeed, never before in human history had a single civilization challenged all others at once. And never had a single civilization aspired for dominance over the entire globe. Yet, this is exactly what happened with the rise of the West in the early colonial era. The institutional arrangements that the territories of different civilizations had available by then are of critical importance. These arrangements determined how well the respective populations were prepared to cope with the Western challenge. Consequently, we measure linguistic agency, population density and pre-colonial statehood at about the time when the pre-colonial age reaches its end.

### The Industrial Threshold (ca. 1500-1800)

The next temporal layer addresses legacy factors that began surfacing with the onset of the colonial age. These legacy factors were taking effect in the forefront of the Industrial Revolution, supposedly preparing this incision. The key legacy of this type in our eyes relates to differences in fertility behavior and their role in shaping marriage, family, household and settlement patterns – the stuff shaping the grassroot structures of every society. From this point of view, our most favored influence relates to the nuclear family configuration.

The Nuclear Family Configuration. At the original stage of human societies--foreaging--fertility rates are modest because the mobility of hunter-gatherers sets a clear limit to the number of children that can be fed at once. Fertility certainly varied to some extent in response to seasonally fluctuating food supplies. But fertilities above replacement level could not be sustained for long. Consequently, population growth in foraging society is slow, population density low and organized groups are small.[[121]](#endnote-87)

The situation changes dramatically with the transition to agriculture. Food surpluses and the ability to store them for times of shortage now allow for higher fertility. In addition, high fertility becomes a decisive advantage because, in the competition between neighboring agrarian populations, those reproducing faster outcompete slower growing populations by the sheer power of numbers. Thus, competition between agrarian populations for land favored high fertilities. These pressures were so strong that they offset humans’ natural preference for a fertility rate at or slightly above replacement level.[[122]](#endnote-88)

Consequently, most agrarian societies evolved religious doctrines that fervently propagate high fertility. Togther with high fertility, most religious doctrines advocate derivative reproductive norms, which include strict heterosexuality, sanctity of marriage and female virginity before an early marriage. These traditional sex norms had dramatic consequences for gender relations: if the gendered division of labor in foreaging societies already was somehow uneven, high fertilities in agrarian societies now greatly reinforced the initial inequality, by fixating the role of women to maximize reproduction over their *entire* fertile lifespan.[[123]](#endnote-89) Hence, the sex patterns that become the "evolutionary norm" in agrarian societies are all about cementing male control over female sexuality.[[124]](#endnote-90) Supported by religion and other doctrinal systems, such as Confucianism, patriarchy became the most strongly encultured, most common and most enduring form of inter-human discrimination, condeming half of our species to perpetuated inferiority.[[125]](#endnote-91)

Against this evolutionary norm in agrarian societies, Northwestern Europe's grassroots social fabric appears as distinct already at pre-industrial times. Although fertility rates were high in all agrarian societies by nowadays standards, Nortwestern Europe's CW-areas nevertheless showed suspiciously lower fertilities.[[126]](#endnote-92) As it seems, Northwestern Europe's lower fertility was the result of a deliberately chosen fertility restraint in the face of a natural opportunity endowment that made lower fertility first a feasible and then also preferred choice in this agrarian setting.

A key issue here is pathogene load and the resulting natural child mortality. In areas with a pronounced CW-condition, most notably Northwestern Europe, the pathogene load is *naturally* lower.[[127]](#footnote-35) Indeed, none of the communicable diseases known from tropical and sub-tropical areas – such as yellow feaver, dengue fever, malaria, leprosis, bilharziosis and so on – is present in CW-regions. And there are no communicable diseases known specifically to the CW-regions. Furthermore, water itself is much less infectious in colder than in warmer regions.[[128]](#endnote-93) Anyways, the CW-areas' lower pathogene load *naturally* induces lower child mortalities. Of course, child mortalities were high under nowadays' standards everywhere in the pre-industrial world. But significant differences nevertheless existed. Data collected from multiple sources by Gapminder for the time around 1800 CE indicate that in the CW-areas of Northwestern Europe, Japan, North America, Australia and New Zealand 32 to 36 percent of all infants would not survive until the age of five.[[129]](#endnote-94) For most of Africa, the Middle East, India, South and East Asia as well as Latin America, the respective proportions were between 42 and 51 percent. For all country-territories, except England and Belgium, the time around 1800 CE is located before the Industrial Revolution. For this reason, regional differences in child mortality around 1800 CE cannot be explained by differences in industrial wealth. Instead, these differences derive partly at least from differences in natural environments related to the CW-condition.[[130]](#footnote-36)

A naturally lower child mortality is an opportunity endowment. This becomes obvious when one recognizes that, compared to other species, humans have an exceptionally long period of adolescence. The temporal length of the adolescent period is a direct reflection of our species' capacity for cultural evolution: this long stretch of time is needed for growing-up individuals to learn all the skills they need to know in order for themselves to function in society and for the society to continue operating and evolving. Against the backdrop of humans' long adolescent period and the learning potential inherent in it, maximizing the number of child births incurs a high opportunity cost. When pressured to maximize child births, parents sacrifice time that they otherwise would invest into further developing their talents and skills. Maximizing the number of children also incurs an opportunity cost on children themselves: the attention every child receives to develop its potential shrinks with the number of siblings. Thus, when more time is invested into producing and raising children than is necessary for the continuation of one’s lineage, this is a waste of learning potential in a double sense, for it limits the room of self-development for both parents and children. As a result, the entire society's developmental potential suffers.[[131]](#endnote-95)

No doubt, evolution has endowed humans with a desire to reproduce. But naturally this desire does not focus on the number of children but on how much we can teach them to continue and further enrich our ancestors' legacies. This is a question of using humans’ exceptionally long adolescence for what it has evolved for: learning. If given the opportunity, humans’ natural preference is a fertility rate at or slightly above replacement level.[[132]](#endnote-96)

In light of these propositions, it is not surprising that country-territories with a pronounced CW-condition had lower fertilities already in pre-industrial times, as we have seen in Figure 10. These are the earliest fertility data with a broad country coverage, which Gapminder[[133]](#endnote-97) has collected from a multitude of sources. The data refer to about 1800 CE, which is for all countries – except England and Belgium – a time before the Industrial Revolution. It is, thus, reasonable to assume that the fertility differences present at this time reach farther back into the agrarian era. At any rate, country-territories with the most pronounced CW-condition had on average three to four births per woman. By contrast, country-territories with the least pronounced CW-condition had on average eight to ten births per woman.[[134]](#footnote-37) Already at times before modern contraception has been available, lower fertilities are achieved by longer breastfeeding and later marriage ages.[[135]](#endnote-98) As concerns female marriage ages, data from 1800 are available for only seventeen countries. It is nevertheless noteworthy that the differences in female marriage ages across these seventeen country-territories are substantial, reaching from a low of 13 years in India and Bangladesh to a high of 27 years in The Netherlands and Denmark. As Figure 11 illustrated, these differences correlate at an outstanding strength[[136]](#footnote-38) with the country-territories' CW-condition. Despite the small number of country-territories covered by this correlation, these country-territories represent most of the world's major civilizations, including Middle Eastern, Indian, Chinese, Russian, Japanese and Western civilization. This coverage of the world's major civilizations underlines the historical significance of this correlation. In addition, the distribution in Figure 11 documents powerfully Northwestern Europe's demographic singularity before the Industrial Revolution.[[137]](#footnote-39)

Lower fertilities correlate very closely with lower pathogene loads, lower child mortalities and closeness to the nuclear family in Selin Dilli's[[138]](#endnote-99) classification of household systems. In fact, all these variables correlate significantly with each other and actually represent a single dimension of cross-country variation.[[139]](#footnote-40) Along this single dimension, we find high pre-industrial pathogene loads, high child mortalities, high female fertilities and the extended family with early, pre-arranged and endogamous marriages as well as patrilocal houeholds at the vicious end, juxtaposed to low pre-industrial pathogene loads, low child mortalities, low female fertilities and the nuclear family with late, consensual and exogamous marriages as well as neolocal houeholds at the virtuous end.[[140]](#footnote-41) Thinking about what this single dimension covers in substantive terms, we suggest that when these four components come together at the virtuous end, what we get is household autonomy in family planning, or reproductive choice to put it short. Indeed, lower child mortalities and lower pathogene loads provide an opportunity for family planning, while lower fertilities and the nuclear household indicate the actualization of this opportunity. Together, then, our summary measure of reproductive choice represents the combination of *potential* and *actualized* autonomy in family planning.[[141]](#footnote-42) At the same time, this is a measure of gender equality in the household, for very obvious reasons: if anything, reproductive norms affect the status of women. Reproductive choice in this sense indicates a major deviation from "evolutionary normality" in the sex norms of agrarian societies. For reasons of brevity, in Figures 42 to 46 we label this variable the "nuclear family" because this type of family constitutes the orgnizational core of reproductive choice. It needs to be emphasized, however, that nuclear family in this sense represents a continuous variable, indicating degrees of approximation to the conditions describing the nuclear family configuration in all of its four virtuous components.

So far, we suggested a series of derivative autonomies, starting from water autonomy inherent in the CW-condition to nutritional autonomy provided by lactose tolerance to cognitive autonomy rooted in linguistic agency. To this sequence, we now add household autonomy, which is attached to the nuclear family configuration. As a whole, this set of partial autonomies establishes existential autonomy writ large, as depicted in Figure 50.

**[Figure 50 about here]**

We are somewhat uncertain about how far back in time we should place the nuclear family in our causal chain. The earliest data for the majority of countries date from 1800. For all countries, except England, this means a time *before* the Industrial Revolution. This is important to note because it clarifies that the country differences we see with respect to the nuclear family cannot have been caused by the medical breakthroughs of the industrial age. Instead, they precede these breakthroughs. However, pre-industrial conditions characterize a time span reaching back much farther than the year 1800. The question is how far. On the one hand, one could argue that pathogene load and child mortality are direct outcomes of the CW-condition. This premise suggests to place the nuclear family as far back in time as the beginning of agriculture. But one component of the nuclear family is inverse female fertility and this is a behavioral issue that might have been influenced by later factors. Specifically, decisions to restrain fertility, we believe, were more strongly encouraged when emerging urban markets enhanced the opportunity cost of raising many children.

The reason is simple: when markets and cities come in reach of ordinary people, these people gain a whole new host of options of how to make a living and how to spend their time. Clearly, this creates an incentive to redirect time from raising many children to develop marketable skills, which favors postponed child birth and later marriage. For all these reasons, we believe that differences in family structures measured the first time in 1800 came into being at the time when pre-industrial urban capitalism started to flourish. Historic data from Nathan Nunn and Nancy Qian[[142]](#endnote-100) show that urbanization picked up speed and that cities began to play a more prominent role in agrarian societies with a pronounced CW-condition in the early colonial period, starting at about 1500 CE. We are aware that this is a debatable decision but defensible in our eyes based on the reasons just given.

Next to the nuclear family configuration, our reading of the literature suggests to also place into the early colonial layer (*1*) the extent to which countries have encoded emancipatory tendencies in pre-industrial religious doctrines and legal systems, (*2*) the country-territories' different risks of falling victim to European colonial exploitation and (*3*) the country-territories' different levels of pre-industrial material wealth per capita. So let us discuss this set of variables.

Western Legacies. Scholars from Douglas North to Jack Goldsmith to Niall Ferguson reason that the West's pioneering role in the Industrial Revolution results from institutionally encoded ideological legacies that embody an emancipatory seed.[[143]](#endnote-101) The germination of this emancipatory seed was programed towards individualistic-egalitarian outcomes through which human initiative is unlocked on a mass level. Many scholars also agree that the institutionalization of the Western emancipatory legacy is most clearly visible in Protestant religious doctrines[[144]](#endnote-102) and Anglo-Saxon customary law[[145]](#endnote-103) traditions.[[146]](#footnote-43)

These ideas resonate well with our own reasoning. We reasoned that country-territories with a pronounced CW-condition evolved under environmental incentives favoring an implicit orientation towards emancipatory outcomes. Consequently, these country-territories and their populations supposedly developed dietary and linguistic anchors that inherit an emancipatory pre-disposition. It would be logical, then, if these implicit predispositions at one point institutionalize in more explicit forms, finding concrete expression in doctrines and laws.

In shaping doctrines, religion acted as a main force in history.[[147]](#endnote-104) This seems to be true especially with respect to emancipatory tendencies or their very opposite: patriarchy. Indeed, as we just mentioned, scholars argue since the times of Max Weber[[148]](#endnote-105) that Protestantism sticks out as the religion with the most pronounced emancipatory tendency.[[149]](#endnote-106) Protestantism emerged through the Reformation, which coincided with the early colonial period and the florescence of pre-industrial capitalism. Not coincidentally, pre-industrial capitalism and the Reformation succeeded mostly in those regions of Europe where the CW-condition already provided water autonomy and contributed to nutritional as well as cognitive autonomy. This link suggests that the emancipatory tendency of Protestantism resonated with an already existing predisposition to this end and was selected for this reason once this option was on the table.

In other words, Protestantism encoded in religous doctrine an emancipatory pre-disposition that has already been there. Against the claims of Max Weber and his many followers, then, Protestantism was *not* the deep cause of the West's emancipatory impulse but rather a subsequent manifestation of it, or a sort of ideological re-enforcement.

In contrast to Protestantism, scholars like Samuel Huntington and Timur Kuran place Orthodox Christianity and Islam at the opposite end of emancipation, attributing these religions a particularly patriarchal outlook.[[150]](#endnote-107) As Huntington points out, this outlook became typical of the "Eastern" religions because they were allied in their history with despotic empires: the Byzantine and Russian empires in the case of Orthodox Christianity, and the Caliphates and Sultanates in the case of Islam. Catholicism has also been embedded in an inherently patriarchal institution, the Roman Church, but the separation of the church from the state has pushed back its patriarchal influence in Catholic countries. From this point of view, one would place Catholicism in between Protestantism, on the one hand, and Orthodox Christianity and Islam, on the other hand, when it comes to the issue of emancipation versus patriarchy.

At this point, we leave it an open question whether the patriarchal versus emancipatory tendencies of different religions are inherent in their ideological doctrines or their organizational structures. Most plausibly, these tendencies are inherent to both doctrines and organizations, which usually complement each other in mutually re-enforcing ways. For instance, the Protestant doctrine that each person can herself engage directly with God had a strongly individualizing and egalitarian impetus. In terms of organization, this impetus was reflected in the layperson assemblies especially in Presbyterian church communities, which are quite democratic.[[151]](#endnote-108)

It is indeed true that the major world religions vary by degree in their position on a continuum from patriarchal to emancipative tendencies. At least, this is obvious when we accept, again, democratic traditions as a proxy for such tendencies, using the same measure introduced above (see p. \_).

We operate with nine religiously defined country-groups. Of course, many country-territories have been influenced by different religions in their history but, in most cases, it is possible to identify the religion with the strongest formative power in a country-territory's history. For instance, The Netherlands are divided into a Catholic and a Protestant part but the history of this country has been shaped by the Protestant Reformation. Likewise, during the Mughal era most of India has been ruled by a Muslim dynasty but the social fabric of India's caste system is intimately linked with Hinduism. In cases such as these, we attribute a country-terrritory to the religion that shaped its history most powerfully. Thus, The Netherlands are attributed to Protestantism and India to Hinduism.

Comparing our country-groups' mean scores on democratic traditions, it turns out that the religion-based variation in democratic traditions is highly significant and accounts for almost 50 percent of the entire cross-national variance in democratic traditions.[[152]](#footnote-44) In ascending order, the boxplot in Figure 51 reveals the religious country-groups' mean scores on democratic traditions (standard deviations in parentheses): Buddhism[[153]](#footnote-45) 0.25 (0.10), Islam[[154]](#footnote-46) 0.27 (0.15), Orthodox Christianity 0.29 (0.20), Confucianism[[155]](#footnote-47) 0.39 (0.27), Animism[[156]](#footnote-48) 0.42 (0.12), Catholicism 0.52 (0.22), Hinduism[[157]](#footnote-49) 0.72 (0.04), Protestantism 0.81 (0.27), Judaism[[158]](#footnote-50) 0.82.[[159]](#footnote-51) It is noteworthy that, for most of the religious country-groups, the standard deviations are by a considerable factor smaller than the mean scores.[[160]](#footnote-52) This shows that the countries with the same religeous heritage are relatively similar as concerns their democratic traditions, which further underlines the significance of religion as a force shaping patriarchal versus emancipatory tendencies.

**[Figure 51 about here]**

The world's major religions concentrate in specific geographic areas: Buddhism dominates in South and Southeast Asia; Islam is most prevalent in North Africa, the Middle East and South Asia; Orthodox Christianity centers on Eastern and Southeastern Europe; Confucianism has its stronghold in East Asia; Animism prevails in Sub-Saharan Africa and Pacifica; Catholicism originates in Southern and Central Europe and spread over Ireland, Latin America and the Philippines; Protestantism has been important in Northern, Central and Western Europe as well as North America, Australia and New Zealand.

Since geogrpahic space has been a confounding factor of ethnic compositions, language families and empires, the religions' ties to geographic space also link them to certain ethnicities, languages and empires. Among these linkages, the one to empires has been of particular importance because empires had the power to further institutionalize religions. Specifically, in terms of imperial anchors, Islam is related to the Arab and Persian Caliphates and the Ottoman Sultanate; Orthodox Christianity to the Byzantine and Russian empires; Confucianism to the Chinese empires; Catholicism to the late Roman empire and the Spanish and Portuguese colonial empires; and Protestantism to Reformist Europe and the British settler colonies overseas. Only Hinduism, Buddhism and Animism are not linked to particular empires.

As for Animism, which is the least institutionalized religeous legacy, the respective territories were mostly at the tribal stage when they came in contact with Europeans. This made them easy victims of colonizers from areas with more advanced levels of organization and technology. In this sense, the Animist tradition as well is linked to the history of empires: the fact that this tradition is indicative of the absence of historic empires made it particularly vulnerable to colonial imperialism.

Now, when countries show different democratic traditions in close correspondence with their religeous legacies, this can be an indication that these legacies in and by themselves engender patriarchal versus emancipatory tendencies. Of course, such a correspondence is not yet a definitive proof that different emancipatory tendencies are inherent to religions because religions might only be confounders of all kinds of other factors that truly engender emancipatory tendencies. Nevertheless, if a decently strong correspondence between the countries' religeous legacies and democratic traditions indeed exists, the assumption that patriarchal versus emancipatory tendencies are inherent to religions themselves would at least be a plausible possibility. How credible this assumption truly is will become obvious when we control the religeous legacies' emancipatory tendencies for possible confounders.

To examine this issue, we create a variable called "religion-encoded emancipation." This variable assigns each country the mean score in democratic traditions of the religeous country-group to which it belongs.[[161]](#footnote-53) Religion-encoded emancipation in this sense measures the countries' placements on the continuum of democratic traditions, *in as much* as these placements are attributable to the countries' religeous legacies. As was already the case with language-encoded emancipation, any given country's own democratic tradition can deviate from the mean score of its religeous country-group. But precisely this deviation cannot be attributed to the religeous legacy for the very reason that it is a deviation from it. Hence, we cannot take the countries' own democratic tradition to measure religion-encoded emancipation because not all of the variation in democratic traditions is attributable to religeous legacies. Only the part captured by the religeous legacies' group means is.

Compared to religion, legal systems constitute an even more formal means to institutionalize a patriarchal versus emancipatory tendency. Scholars argue since long that law systems are a first-rate crystallizer of culture and, accordingly, differ significantly between countries.[[162]](#endnote-109) Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, for instance, claim that the English customary law establishes a stronger protection of personal property and individual freedom than the Roman law, which in turn is more emancipatory in these terms than most of the non-Western law traditions.[[163]](#endnote-110) For our purposes, we modify the typology of legal traditions developed by Rafael La Porta and his co-authors. The reason is that we are interested in measuring "law-encoded emancipation," for which we use – once more – democratic traditions as the yardstick. In pretty much the same way as we did with religeously defined country-groups, we create seven country groups based on their type of law tradition and then measure their position on our continuum of democratic traditions. Finally, we assign each country the mean score in democratic traditions of its legal country-group, which measures democratic traditions in as much as they have an anchor in different legal traditions. Next to religion-encoded emancipation, we thus obtain law-encoded emancipation.

Even more than religeous legacies, legal heritages have been shaped by empires. Thus, we distinguish seven different legal heritages. As Figure 52 shows, they are positioned as follows on the continuum of democratic traditions (standard deviation in parentheses): Byzantine law 0.18 (0.06), Islamic law 0.32 (0.19), Confucian law 0.40 (0.28), Colonial law 0.44 (0.13), Roman law 0.53 (0.26), 0.93 Germanic law (0.07), Anglo-Saxon law 0.98 (0.04).[[164]](#footnote-54) It is once more noteworthy that the standard deviations per legal country-group are by a considerable margin smaller than the group means. This indicates that the legal country-groups are relatively homogenous as concerns democratic traditions. Accordingly, the means of the legal country-groups cover 54 percent of the entire cross-national variation in democratic traditions.[[165]](#footnote-55)

**[Figure 52 about here]**

Not surprisingly, religeously and legally encoded emancipation overlap very strongly.[[166]](#footnote-56) Accordingly, it makes sense to summarize the two encodings into a single variable that measures the different countries' inherited emancipatory tendency – in as much as it is encoded in both religeous heritage and law tradition.[[167]](#footnote-57) Arguably, the institutionalization of an emancipatory cultural tendency is a most distinctive feature of the West, which is also obvious from the fact that Anglo-Saxon law in terms of legal heritages and Protestantism in terms of religious legacies rank highest on our encoding measure. It is, hence, justified to label this measure "Western legacy."

Colonialization Risk. A country's colonialization risk indicates its likelihood to fall victim of exploitative forms of European plantation and mining colonialism. Daren Acemolgu, Simon John and his co-authors argue that the “white settler mortality” determined this risk: where this mortality was high, large-scale settlement of European farmers who work land by themselves would not occur.[[168]](#endnote-111) Instead, a thin layer of plantation and mine managers would take control and establish slavery and other forms of forced labor. Usually, this was the case in hot tropical areas where Europeans would find physical work insufferable. To measure the colonial exploitation risk, we initially experimented with the data on “white settler mortality” collected by Acemoglu and his co-authors. However, Enrico Spolaore and Romain Wacziarg's[[169]](#endnote-112) measure of residential populations' genetic distance to Northwestern Europeans[[170]](#footnote-58) in 1500 CE covers more cases and shows better results in predicting emancipatory outcomes than does the "white" settler mortality. Hence, we use the country-populations' genetic distance to Northwestern Europeans in 1500 CE as a proxy for their historic risk to fall victim to colonization. We label this variable "colonialization risk." It should be obvious that Northwest Europeans were less scrupulous in exploiting indigenous populations that were genetically more distant because then it was easier to categorize these people as naturally inferior to Europeans.

Pre-industrial Wealth. The "reversal of fortunes" thesis propagated by Daren Acemoglu and his co-authors claims that the Industrial Revolution inverted the global income distribution of pre-industrial times: areas, like the Middle East and China, that were richer in pre-industrial times than was Northwestern Europe fell behind Northwestern Europe after the Industrial Revolution. If this is true, the countries' per capita income at pre-industrial times should be a negative predictor of industrial income and, accordingly, of later emancipatory outcomes, including human empowerment today. To take this possibility into account, we use data on per capita income in 1800 CE collected by Gapminder from multiple sources.[[171]](#endnote-113) Let us emphasize again that 1800 CE is the first year that provides income data for most countries in the world. And for all countries, except England and Belgium, this is indeed a time before industrialization.

### The Industrial Age (ca. 1900)

The next temporal layer after the colonial age is the industrial age. Because of limited data availability, we are restricted to data from around 1900 when the Industrial Revolution was in full swing in Europe and its settler colonies and in its incipient phase in Japan.

Human Capital Formation. A recent study by Bo Rothstein and Eric Uslaner[[172]](#endnote-114) shows convincingly that impartial government today traces back all the way to the late 19th century when states whose rulers were committed to modernize their countries promoted universal schooling. Possibly, this path dependency also applies to other developmental outcomes, including human empowerment. Indeed, we believe that this is a very plausible expectation because it touches directly on cognitive mobilization – one of the three components of human empowerment. We measure a country-territory’s advancement in universal schooling in the late 19th century based on data collected by Fabrice Murtin[[173]](#endnote-115), taking advantage of Rothstein and Uslaner’s scheme of attributing these data to contemporary countries. The data are from 1900. [TBD]

Nascent Democracy. As concerns democracy, the period around 1900 is indeed the time in which we see emerge the first fully fledged democracies with universal male and female suffrage (in 1893 New Zealand is the first such democracy). Thus, here we see the vanguards of modern mass democracy. To measure a pioneering role in democratization around 1900, we use the newly released and widely acclaimed data from the "varieties of democracy" (V-Dem) project in Gothenburg, Sweden.[[174]](#endnote-116) For the year 1900, we use the V-Dem index with the strongest predictive power on human empowerment today, which the data providers call liberal democracy. In our path diagram, we label the respective index "nascent democracy."

Global Power Position. In light of the path dependencies of the colonial era, many scholars argue that the countries' developmental achievements today largely reflect their position in the world system at the apex of imperial colonialism before WWI.[[175]](#endnote-117) Thus, the time around 1900 is again our focus. To take into account the countries' position in the world system around 1900, we use a seven-point ordinal scale, indicating the countries' global power status in ascending order. The weakest position is present when a contemporary country has been a colony of a European power, other than Britain. The next weakest position is a colony of Britain. We distinguish non-British and British colonies here because a large literature argues that Britain was a less exploitative colonial power than were other European nations.[[176]](#endnote-118) The next weakest position is given when a contemporary country has not been occupied in 1900 by a bigger land empire, such as the Ottoman, Russian or Austro-Hungarian empires. After this follow countries that only have been formally independent in 1900 while being effectively controlled by some colonial power. Examples cover much of Latin America where most all of today's countries have been independent since the early 19th century but nevertheless have been controlled in various ways by the US. Other examples include Thailand, Iran or China, none of which ever has been a formal colony but nevertheless have been controlled by one or more of the colonial powers. The next rung up on the ladder of power is reached when a contemporary country already existed as a truly independent nation in 1900. On top of this, we place contemporary countries that were the center of bigger land empires in 1900. Examples are Austria, Turkey or Russia. Finally, at the peak of the ladder, we find contemporary countries that were the centers of overseas empires, in other words colonial powers, like Britain, France, the Netherlands and Portugal.[[177]](#footnote-59)

Interestingly, this classification of the world order in around 1900 explains 52 percent of the entire cross-national variation in human empowerment today.[[178]](#footnote-60) Hence, this variable is a plausible contender of the CW-condition's supposed emancipatory effect.

Rational Bureaucracy. From Max Weber to Talcott Parsons to Francis Fukuyama[[179]](#endnote-119), influential thinkers argue that features labelled inter-changeably as "rule of law," "benevolent government," "enlightened absolutism," "effective order," "output impartiality" or "rational bureaucracy" are the true source of the countries' long-term achievements. If this is true, it should also apply to emancipatory outcomes, in which case differences in human empowerment today would be explained by "rational bureaucracy" in 1900. To measure this aspect of society, we use the "rule of law" indicator in 1900 from the V-Dem project.[[180]](#endnote-120)

Industrial Wealth. The time around 1900 is significant in other aspects related to development. After an initial phase of mass pauperism, we see that differential progress in industrialization starts to become visible in really big gaps in per capita incomes between countries. Economic historians such as Angus Maddison, Eric Jones and David Landes claim industrial development is strongly path-dependent. Consequently, leaders of industrialization in around 1900 should still be more developed than other countries today. If this is an accurate voew, then the leaders of industrialization in 1900 should also be advanced in human empowerment today. To test this possibility, we measure industrial development by the countries’ per capita Gross Domestic Product (logged) in 1900. We take these data from the Gapminder project, which has collected them from multiple sources.[[181]](#endnote-121)

### The Information Age

Human Empowerment. At the last temporal layer in our scheme, the information age of today, we measure human empowerment, using the three-component index introduced earlier, which uses knowledge streams as an indicator of mass-level *cognitive* empowerment, emancipative norms as an indicator of mass-level *motivational* empowerment, and effective democracy as an indicator of mass-level *institutional* empowerment. Again, our final outcome variable summarizes these three partial empowerment into a *single* index of human empowerment writ large. As we have seen with plenty of evidence in chapter \_ (pp. \_), our index of human empowerment is an encompassing catch-all measure of almost anything that can be used to measure a country's general life quality.

1. This book is part of the GGL-Project®, which stands for the Gender Governance Link: see www.ggl-project.org. The GGL-Project® is co-directed by Amy C. Alexander (Gothenburg University), Stephan Klasen (University of Goettingen) and Christian Welzel (Leuphana University) and conducted by a team of young researchers, including Jana Lenze, Manual Silva Santos and Maria Ravlik, plus a number of student assistants. The GGL-Project® sustains a publically accessible databank, collecting over time and across countries the most indicative measures of gender equality and impartial government. Various working papers and other materials of the GGL-Project® are also available on the website cited above. [↑](#footnote-ref-1)
2. Cite Montesquieu's ideas about the influence of climate ... Add work by Gordon Childe ... [↑](#endnote-ref-1)
3. Gallup & Sachs 2000 [↑](#endnote-ref-2)
4. Masters & Wiebe 2000 [↑](#endnote-ref-3)
5. Graff Zivin & Neidell 2010 [↑](#endnote-ref-4)
6. Cite study indicating that on "bad" weather days, productivity goes up ... [↑](#endnote-ref-5)
7. Cite Hernando Zuleta's work on seasonality (Journal of Economic Development 2012) ... [↑](#endnote-ref-6)
8. Cite Mitterauer's work on wtaer power and mill technology ... [↑](#endnote-ref-7)
9. Find and cite work evidencing different settlement and private/public separation patterns under the CW-condition ... Easterly & Levine 2003; Deschenes & Greenstone 2007 [↑](#endnote-ref-8)
10. Cite Solomon 2011 for a good summary of all the advantages ... [↑](#endnote-ref-9)
11. Cite Gallupp and Sachs 2011 for navigable waterways ... [↑](#endnote-ref-10)
12. Cite work by Midlarski 1997 ... rain and democracy [↑](#endnote-ref-11)
13. Cite Midlarski/Midlarski 1999 for sea borders and democracy ... [↑](#endnote-ref-12)
14. Cite Welzel 2013: 338-344 [↑](#endnote-ref-13)
15. Diamond (1997) [↑](#endnote-ref-14)
16. Putterman et al. (2002) [↑](#endnote-ref-15)
17. Olsson and \_ Hibbs (2005) [↑](#endnote-ref-16)
18. Bockstette et al. \_ [↑](#endnote-ref-17)
19. Foa 2014 [↑](#endnote-ref-18)
20. Hariri 2013 [↑](#endnote-ref-19)
21. Bentzen, Kaarsen and Wingender 2012 ... [↑](#endnote-ref-20)
22. Wittfogle 1957 ... [↑](#endnote-ref-21)
23. Olsson and \_ Paik (2013) [↑](#endnote-ref-22)
24. These authors follow Ian Morris’s division of East and West, which is wildly implausible, putting the two regions with the biggest cultural rift in today’s world--Western Europe and the Arab world--into the same category. [↑](#footnote-ref-2)
25. We use the term “mature stage of pre-industrial civilization” here and throughout this book to characterize the highest level of civilizational achievement before industrialization. The mature stage is characterized by the development of agrarian productivity to a level that surpasses mere subsistence. This means producing food surpluses large enough to feed sizeable urban populations. The mature stage of pre-industrial civilization regularly involved elaborate commercial networks, money, writing, fine arts, laws and bureaucratic organization. [↑](#footnote-ref-3)
26. The correlation amounts to a Pearson's R of -0.36 (N = 153; P = 0.000). [↑](#footnote-ref-4)
27. Murray, Schaller and Suedfeld (2014) ... [↑](#endnote-ref-23)
28. Thornhill and Fincher (2014) ... [↑](#endnote-ref-24)
29. R = 0.80 (N = 179; P = 0.00, two-tailed) ... [↑](#endnote-ref-25)
30. Acemoglu, Johnson and Robinsoon 2001 ... [↑](#endnote-ref-26)
31. Engerman and Sokoloff 1997 ... [↑](#endnote-ref-27)
32. Rothstein and Uslaner (2013) ... [↑](#endnote-ref-28)
33. Lynn and Vanhanen (2009) ... [↑](#endnote-ref-29)
34. Van de Vliert (2009) ... [↑](#endnote-ref-30)
35. Supplementary analyses with our data in the appendix show that heat stress in summer correlates negatively with average population IQ (and with the human empowerment index for that matter). In sharp contrast, “cold stress” in winter correlates positively with both. Hence, the two stress factors pull into opposite directions, for which reason their summary in an overall measure of “thermal challenge” might dilute more than it reveals. For a more detailed discussion of the role of IQ differences in societal development, see p. \_. [↑](#footnote-ref-5)
36. Chen et al. 1999; Matthews & Butler 2011 ... [↑](#endnote-ref-31)
37. Evidence for this argument is supposedly provided by differential demographic frequencies of a version of the DRD4 receptor gene that seems to account for novelty seeking. The respective gene is more frequent among populations in larger migratory distance from the human origin. However, so far this evidence is based on a total of only 35 ethnic groups worldwide. Also, a meta-analysis by Munafo, Yalcin, Willis-Owen and Flint (2008) found no significant link between DRD4 and novelty seeking. [↑](#footnote-ref-6)
38. The correlation amounts to a Pearson's R of 0.50 (N = 156; P ‹ 0.001, two-tailed). [↑](#footnote-ref-7)
39. Cite Minkov and Bond 2014 study on the geneic basis of longterm life-orientations ... [↑](#endnote-ref-32)
40. The combination includes a polymorphism of the androgen receptor gene AR, the dopamine receptor gene DRD4, and the 5-HTTLPR VNTR polymorphism of the serotonin transporter gene. [↑](#footnote-ref-8)
41. The correlation amounts to a Pearson's R of 0.76 (N = 56; P ‹ 0.001, two-tailed). Given the small number of countries covered by this evidence, caution is due before accepting this as valid evidence for a true genetic effect on intelligence. This is not to deny that individual differences in intelligence incorporate a genetic component. But it is an entirely different thing to relate average population differences in intelligence to genes. Caution in this respect is all the more due when there is no supporting individual-level evidence, showing that individuals with a certain gene are more intelligent than those without it. The DRD4 evidence cited in footnote 13 is inflicted by exactly this problem. [↑](#footnote-ref-9)
42. Cite Spolaore and Wacziarg for genetic distance data ... [↑](#endnote-ref-33)
43. The correlation amounts to a Pearson's R of -0.67 (N = 144; P ‹ 0.001, two-tailed). Large as this correlation appears, caution against a genetic interpretation of intelligence is due here as well: one of the most striking findings in ethnic intelligence studies is the high performance of East Asians. This evidence contradicts the idea that average population intelligence drops with a population's genetic distance from English Caucasians because, for instance, Han Chinese are genetically very distant but on average score higher in IQ-tests. [↑](#footnote-ref-10)
44. Cite work on genetic distances by Spolaore and Wacziarg ... [↑](#endnote-ref-34)
45. Cook 2011; 2012 ... [↑](#endnote-ref-35)
46. Cite work on Europeans' early tallness ... [↑](#endnote-ref-36)
47. Cite Sherback forthcoming ... [↑](#endnote-ref-37)
48. A country-population’s average lactose tolerance correlates at R = 0.59 (N = 48; P ‹ 0.001) with collectivism-vs-individualism. [↑](#footnote-ref-11)
49. Meyer-Schwarzenberger 2014; Licht, Goldschmidt & Schwartz 2012 ... [↑](#endnote-ref-38)
50. Lal 1998 ... individualism in Protestantism [↑](#endnote-ref-39)
51. Kuran 2012 on Islamic law ... [↑](#endnote-ref-40)
52. Cite Alexander, Ravlik and Welzel 2016 ... [↑](#endnote-ref-41)
53. Alexander, Inglehart and Welzel 2015 ... [↑](#endnote-ref-42)
54. Cite Hudson et al. Sex and World Peace ... [↑](#endnote-ref-43)
55. Indeed, our indicator of household autonomy in about 1800 (explained in detail further below, at p. \_), correlates with the CW-condition at R = 0.85 (N = 179; P = 0.000, two-tailed). [↑](#footnote-ref-12)
56. Boserup 1970; Nolan & Lenski 1999; Blumberg 2010 [↑](#endnote-ref-44)
57. Hajnal 1982; Lasslett \_ [↑](#endnote-ref-45)
58. Hartman 2004; Koiti 2009 [↑](#endnote-ref-46)
59. Dilli 2015 [↑](#endnote-ref-47)
60. Todd 1985 The Explanation of Ideology ... [↑](#endnote-ref-48)
61. An analysis of variance shows that 76 percent of the entire cross-national variation in family types is due to differences in the CW-condition (N = 149; P = 0.000). [↑](#footnote-ref-13)
62. The countries' different family types in 1800 explain 67 percent of the entire cross-national variance in human empowerment today (N = 149; P = 0.000). [↑](#footnote-ref-14)
63. \_ Woodley and \_ Bell 2013 [↑](#endnote-ref-49)
64. Thornhill and Fincher's et al.’s 2009 [↑](#endnote-ref-50)
65. Banfield 1958; Hartman 2004 [↑](#endnote-ref-51)
66. Using Woodley and Bell’s (2012) indicator of consanguine marriage, we find that the prevalence of this pattern in a country correlates at R = -0.41 (N = 45; P ‹ 0.001) with a population's mean score in generalized trust, using Welzel's (2013: \_) measure from the World Values Surveys. This means that consanguine marriage increases and its inverse—consensual marriage—decreases the gap between in-group and out-group trust. Further supporting this evidence, our encompassing indicator of household autonomy in 1800 correlates at R = 0.55 (N = 70; P = 0.000, two-tailed) with a population's generalized trust today. [↑](#footnote-ref-15)
67. Moore 2004; Brautigam 2008 [↑](#endnote-ref-52)
68. This historically relationship holds until this day: states whose revenues primarily and heavily depend on general income taxation, tend to have representative democracy. Vice versa, states that deviate from the otherwise robust relationship between prosperity and democracy in that they are rich but not democratic have access to sources of revenue other than income taxation. Examples are oil in the Gulf monarchies and foreign direct investment and harbor tariffs in Singapore (Conrad & DeMerrit 2013). [↑](#footnote-ref-16)
69. Becker (1981), Becker and Barro (1988) as well as Galor (2012) ... [↑](#endnote-ref-53)
70. A country-territory’s CW-condition correlates with our data for the earliness of the adoption of agriculture in that territory at R = 0.27 (N = 152; P ‹ 0.005). But after controlling a country-territory’s agrarian potential, the relationship turns strongly negative: Rpartial = -0.57 (N = 152; P ‹ 0.001). The comments on Figure 9 in the findings section explain this evidence. In a nutshell, it shows that among areas with similar agrarian potential, the CW-condition delays the adoption of agriculture. A country-territory’s CW-condition also correlates negatively with our data for disease vulnerability (R = -0.81; N = 161; P ‹ 0.001), colonial exploitation risk (R = -0.81; N = 114; P ‹ 0.001), the prevalence of authoritarian personalities (R = -0.70; N = 30; P ‹ 0.001), consanguine marriages (R = -0.70; N = 70; P ‹ 0.001) and irrigation potential (R = -0.40; N = 157; P ‹ 0.001). For a documentation of our data and their sources, see the data description section and the appendix. [↑](#footnote-ref-17)
71. A country-territory’s CW-condition correlates with our data for this territory’s migratory distance from the human origin at R = 0.33 (N = 157; P ‹ 0.001). But this moderately positive correlation turns strongly positive once we control for the diversion of the human migration path in the Americas (where the path led southward and, thus, towards a less pronounced CW-condition). Controlling for this fact, the correlation between the CW-condition and migratory distance is Rpartial = 0.66. The comments on Figure \_ at p. \_ explain the evidence in more detail. A country-territory’s CW-condition also correlates positively with our data for lactose tolerance (R = 0.61; N = 131; P ‹ 0.001), linguistic agency (R = 0.49; N = 184; P ‹ 0.001), encultured individualism (R = 0.49; N = 184; P ‹ 0.001), early democracy in 1900 (R = 0.76; N = 95; P ‹ 0.001), household autonomy (R = 0.85; N = 179; P ‹ 0.001), universal schooling in 1900 (R = 0.85; N = 76; P ‹ 0.001), early industrialization (R = 0.61; N = 70; P ‹ 0.001) and consensual marriage, the inverse of consanguinity (R = 0.73; N = 71; P ‹ 0.001). For a documentation of our data and their sources, see the data description section in the Online Appendix OA at www.\_\_\_.org. [↑](#footnote-ref-18)
72. Maddison (2007) [↑](#endnote-ref-54)
73. Jones 1987; Landes 1998; Mitterauer 2009 [↑](#endnote-ref-55)
74. The Black Death in the middle of the 14th century was a demographic disaster that killed half of the population and more in some areas of Europe. Some scholars, however, suggest that the labor shortages caused by this event contributed to rising per capita incomes. At any rate, by 1500 the demographic setback was largely overcome and population was back to previous levels in many areas (Byrne 2004; Mitterauer 2010). [↑](#footnote-ref-19)
75. For Japan's Tokugawa era florescence, see Ponting \_, Powelson \_, Landes \_ [↑](#endnote-ref-56)
76. The word "quickly" is to be understood relatively: it took England about 150 years to finalize the first phase of the Industrial Revolution. Other countries, like Germany or Japan, needed less time. At any rate, on the time scale of history, these are short periods. [↑](#footnote-ref-20)
77. Galor (2011) [↑](#endnote-ref-57)
78. Cite Mitterauer and Jones for lower labour demands under grain agri than rice or shugar cane ... [↑](#endnote-ref-58)
79. The Black Death in the middle of the 14th century reinforced this effect. [↑](#footnote-ref-21)
80. Cite work by David Landes, Eric Jones, Carol and Melvin Ember, Gerhard Lenski and Patrick Nolan as well as Michael Mann attributing to ecological conditions the role of starting configurations of development ... [↑](#endnote-ref-59)
81. Diamond 1997 [↑](#endnote-ref-60)
82. Olson and Paik 2013 [↑](#endnote-ref-61)
83. Cite Louis Putterman et al. as the source for the Neolithic Revolution data ... [↑](#endnote-ref-62)
84. Ingram (2009); Cook (2010; 2011); Sherback (forthcoming). [↑](#endnote-ref-63)
85. We experimented with alternative indications of genetic population differences, with no promising results. Section 4.2 is more explicit about this. [↑](#footnote-ref-22)
86. Bentzen, Kaarsen and Wingender 2012 ... [↑](#endnote-ref-64)
87. Cite Steven Pinker, 1994, The Language Instinct ... [↑](#endnote-ref-65)
88. Cite David Lightfood (1999) The Development of Language ... [↑](#endnote-ref-66)
89. Cite Noam Chomsky, 1968, Language and Mind ...; Licht, Goldschmidt and Schwartz (2007) Culture Rules ... [↑](#endnote-ref-67)
90. Cite Kashima and Kashima 1998, 2003 ... [↑](#endnote-ref-68)
91. Cite work by Christian Welzel on the definition of individualism ... [↑](#endnote-ref-69)
92. Cite work by Martin Haspelmath 1998; 2013 ... [↑](#endnote-ref-70)
93. Cite work by Matthew Dryer 2013 ... [↑](#endnote-ref-71)
94. Cite Kashima and Kashima 1998, 2003 ... [↑](#endnote-ref-72)
95. Meyer-Schwarzenberger (2014) ... [↑](#endnote-ref-73)
96. Cite source for World Atlas of Languages ... [↑](#endnote-ref-74)
97. Cite Gerring et al. (2005) for democracy stock ... [↑](#endnote-ref-75)
98. Gerring et al. summarize the annual democracy ratings from the Polity project (see: www.polity.\_\_\_). Countries obtain a higher democracy in a given year (a) when there are more constraints on executive power, (b) when public office is more contested in elections and (c) when the electorate is more inclusive and citizens have more rights to participate. To countries that were not independent in a given year of the past but are independent today, Gerring et al. assign for that year the democracy rating of the bigger territorial unit to which a country belonged at that time. For instance, all Soviet successor states obtain the Soviet Union's democracy rating for each year they were part of the Soviet Union. [↑](#footnote-ref-23)
99. As we do with all continuous measures, we standardize the scoring on the "democracy stock" index into a scale range from minimum 0 for an entirely absent democratic tradition to 1.0 for its fullest presence. [↑](#footnote-ref-24)
100. Cite some of Dahl's definition of democracy ... cite Christian Welzel's definition of human emancipation ... [↑](#endnote-ref-76)
101. R = 0.71; N = 56; P = 0.00, two-tailed. [↑](#footnote-ref-25)
102. R = 0.69; N= 101; P = 0.00, two-tailed. [↑](#footnote-ref-26)
103. The country coverage of the different language families looks as follows: East Slavic languages 18 countries, Semitic languages 26 countries, West Slavic languages 10 countries, African languages 40 countries, East Asian languages 11 countries, South Asian languages 15 countries, Pacific island languages 9 countries, Romanic languages 42 countries, and Germanic languages 17 countries. To inspect which country we assigned to which language family, go to the Online Appendix (OA, p. \_) at www.\_\_\_.org. [↑](#footnote-ref-27)
104. When we summarize the five different measures of (electoral, participatory, liberal, deliberative and egalitarian) democracy provided by the V-Dem project into a single measure for the year 1900 (which is justified given the strong uni-dimensionality of these measures), our distinction of language families accounts even for 68% of the entire cross-national variance in 1900 democracy (N = 96; P = 0.00). [↑](#footnote-ref-28)
105. Technically speaking, this is the same as assigning each country the score in democratic traditions predicted by the mean of its linguistic country-group. [↑](#footnote-ref-29)
106. Whenever it is possible to establish a potential-manifestation logic, it is also possible to use manifestation data to infer potential data. [TBD] Think a bout phenotype - genotype ... [↑](#footnote-ref-30)
107. To do so, we use a two-step matching procedure. In the first step, we standardize the two ordinal scales into so called z-scores and assign every country the arithmetic mean of the two z-scores. This procedure is limited to those 119 countries for which both z-scores are available. In the second step, we focus on the 68 countries for which only one z-score is available and use this available z-score as a predictor in linear regression to estimate the combined z-score. Thus, for those countries for which the combined z-score is not available, its predicted value is used instead. Given that the predictive power of one z-score over the average of both is fully 85 percent, this is a defensible procedure to maximize country coverage. Nevertheless, we recognize that the combined z-score incorporates twice as much information when it is calculated as the average of the two constituent scores than when it is predicted from just one constituent score. Accordingly, we devised a weighting scheme that assigns countries a weight of 1.0 when both constituent scores are available and a weight of 0.5 when only one is available. Then we re-examined all of our evidence using this scheme in weighted least squares regressions to see if our results hold under this condition. This was always the case. For convenience reasons, the countries' final z-scores are standardized to range from minimum 0 for the least linguistic agency to maximum 1.0 for the most linguistic agency, with fractions of 1.0 indicating intermediate positions. [↑](#footnote-ref-31)
108. Our final index of linguistic agency accounts for 75% of the entire cross-national variance in democratic traditions (N = 178; P = 0.00). When we summarize the five different measures of (electoral, participatory, liberal, deliberative and egalitarian) democracy provided by the V-Dem project into a single measure for the year 1900 (which is justified given the strong uni-dimensionality of these measures), the index of linguistic agency accounts even for 86% of the entire cross-national variance in 1900 democracy (N = 96; P = 0.00). [↑](#footnote-ref-32)
109. Cite Nolan and Lenski as well as Diamond for the number advantage of agrarian over foreaging societies ... [↑](#endnote-ref-77)
110. Galor 2012 on population density as the measure of progress in the pre-industrial period ... [↑](#endnote-ref-78)
111. Cite work arguing that population densities prevented colonization by Europeans ... [↑](#endnote-ref-79)
112. We thank these authors for sharing their data with us. - Klein Goldewijk, K. , A. Beusen, M. de Vos and G. van Drecht (2011). The HYDE 3.1 spatially explicit database of human induced land use change over the past 12,000 years, Global Ecology and Biogeography20(1): 73-86. [DOI: 10.1111/j.1466-8238.2010.00587.x](http://onlinelibrary.wiley.com/doi/10.1111/j.1466-8238.2010.00587.x/abstract" \t "_blank)  
     - Klein Goldewijk, K. , A. Beusen, and P. Janssen (2010). Long term dynamic modeling of global population and built-up area in a spatially explicit way, HYDE 3 .1. The Holocene20(4):565-573. [DOI: 10.1177/0959683609356587](http://dx.doi.org/10.1177/0959683609356587" \t "_blank) [↑](#endnote-ref-80)
113. Cite works of Wittvogel, Midlarski, Bentzen et al. and Gerner-Hariri for the link between irrigation and statehood ... [↑](#endnote-ref-81)
114. Cite works of Elman Service, Scott Flannery, Robert Carneiro, Giovanni Poggi, Francis Fukuyama and Samuel Finer for statehood as the essence of civiclization ... [↑](#endnote-ref-82)
115. Cite Bockstette et al. for the role of state antiquity in development ... [↑](#endnote-ref-83)
116. Cite Foa on Indian state traditions ... [↑](#endnote-ref-84)
117. Cite Bockstette et al. as data source for state antiquity ... [↑](#endnote-ref-85)
118. Provide evidence for a relationship between linguistic agency and cognitive capacity ... [↑](#footnote-ref-33)
119. Cite works reporting evidence that bilingual people are more creative when challenged in their laguage with stronger agency ... [↑](#endnote-ref-86)
120. N = 101; R = 0.75; P = 0.00. [↑](#footnote-ref-34)
121. Cite Nolan & Lenski 2005 and Blumberg for fertility levels in foreaging societies ... [↑](#endnote-ref-87)
122. Cite work on the fertility incentives in early agrarian societies ... [↑](#endnote-ref-88)
123. Cite work by Boserup, Blumberg, Mansbridge on women's reduction on reproduction in agrarian societies ... [↑](#endnote-ref-89)
124. Cite Hudson et al. Sex and World Peace for evolutionary normality in sex norms ... [↑](#endnote-ref-90)
125. Cite Boserup, Blumberg on the historic persistence of patriarchy ... [↑](#endnote-ref-91)
126. Cite Welzel 2013; 2014 for fertility differences among agrarian societies ... [↑](#endnote-ref-92)
127. The countries' CW-condition correlates at R = -0.80 (N = 179; P = 0.00, two-tailed) with the pre-industrial pathogene load in the given country-territory, due to historic pathogene data collected by Damian Murray and Mark Schaller (2012). Under mutual control, the water component of the CW-condition correlates at Rpartial = -0.57 and the coolness component at Rpartial = -0.72 with the country-territories' pre-industrial pathogene load. Both partial correlations are highly significant and together explain 61 percent of the entire cross-national variation in pre-industrial pathogene loads. [↑](#footnote-ref-35)
128. Cite works on the infectiousness of water depending on its temperature ... [↑](#endnote-ref-93)
129. Cite Gapminder for child mortality data in 1800 ... [↑](#endnote-ref-94)
130. Indeed, when predicting cross-country differences in child mortalities in 1800, using the country populations' per capita income in 1800 (logged), lactose tolerance and the CW-condition as predictors, we explain a highly significant 36 percent of the variation (N = 124). Amog the three predictors, only the CW-condition is significant, showing a pronouncedly negative effect on child mortality (Rpartial = -0.39; P = 0.00, two-tailed). [↑](#footnote-ref-36)
131. Cite Becker & Barro (1988), Galor on the time trade-offs when deciding to give birth or to learn ... [↑](#endnote-ref-95)
132. Cite Becker & Barro (1988), Rogers (1994), Ntoimo (2014) and other work on humans natural fertility preference when it comes to the desired number of children ... [↑](#endnote-ref-96)
133. Cite Gapminer and its sources for the fertility data around 1800 ... [↑](#endnote-ref-97)
134. The countries' CW-condition correlates at R = -0.52 (N = 172; P = 0.00, two-tailed) with the country-populations' average female fertilities in 1800. Under mutual control, the water component of the CW-condition correlates at Rpartial = -0.40 and the coolness component at Rpartial = -0.36 with the country-populations' fertilities. Both partial correlations are highly significant and together explain 24 percent of the entire cross-national variation in pre-industrial fertilities. [↑](#footnote-ref-37)
135. Cite Bongarts & Watkins (1996) for contraception before the IR ... [↑](#endnote-ref-98)
136. R = 0.90 (N = 17; P = 0.00, two-tailed). [↑](#footnote-ref-38)
137. Furthermore, the correlation between the CW-condition and female marriage ages reaches even into more recent times: until today, the CW-condition correlates with average female marriage ages at R = 0.65 (N = 156; P = 0.00, two-tailed). [↑](#footnote-ref-39)
138. Cite again Dilli (2015) ... [↑](#endnote-ref-99)
139. Factor loadings are 0.87 for the closeness to the nuclear household type, 0.82 for the lowness of the pathogene load, 0.74 for the lowness of child mortality and 0.68 for the lowness of the female fertility in a given country-population in about 1800. The Kaiser-Meyer-Olkin measure for the factor analysis is 0.73, indicating a factor solution of high statistical quality. The variance that the extracted factor explains over all of its four constituent variables is 61 percent. The Cronbach's alpha for the four constituent variables is 0.73, indicating a high degree of reliability for the summary measure as concerns its summary function. [↑](#footnote-ref-40)
140. In evolutionary psychology, the same juxtaposition is described as "fast" versus "slow" life histories, with fast life histories corresponding with conditions at the vicious end and slow life histories with those at the virtuous end (see Woodley 2013). [↑](#footnote-ref-41)
141. To summarize the four constituent variables into a single index, we apply a multi-step matching procedure. In the first step, we z-standardize each variable, such that they all have a mean of 0 and standard deviation of 1.0. Then we calculate for each country-territory a weighted average across the four constituent variables, using their factor score coefficients as weights. The formula is: RC = 0.36 \* NHz + 0.34 \* IPz + 0.30 \* IMz + 0.28 \* IFz, where RC denotes reproductive choice, NHz nuclear households (z-standardized), IPz inverse pathogene load (z-standardized), IMz inverse mortality of children (z-standardized) and IFz inverse fertility of women (z-standardized). Using the factor weights as multipliers in calculating the four-variable average means that each variable contributes to the summary index in proportion to its shared variance with the others. Now, if we exclude the variable with the smallest country coverage, which is nuclear households, and regress the 4-variable based reproductive choice scores on the other three variables, we obtain predicted scores of reproductive choice for an additional 23 countries that lack a score on the 4-variable basis. Since the predictive quality of this regression is at 94 percent, we add the 23 predicted scores to the 149 observed ones, thus extending the country coverage to 172. If we further exclude the variable with the next smallest country coverage, which is inverse fertility, and regress the existing reproductive choice scores on the remaining two variables, we obtain predicted scores of reproductive choice for an additional 2 countries. Since the predictive quality of this regression is at 81 percent, we add the two predicted scores to the 172 already existing ones, thus extending the country coverage to 174. Finally, if we exclude all variables, except the one with the largest country coverage, which is the inverse pathogene load, and regress the existing reproductive choice scores on this remaining variable, we obtain predicted scores of reproductive choice for an additional 5 countries. Since the predictive quality of this regression is at 70 percent, we add the 5 predicted scores to the 174 already existing ones, thus extending the country coverage to 179. Since the reliability of the reproductive choice scores decreases with the exclusion of variables, we device a weighting scheme that takes this into account by down-weighting countries in proportion to their variable coverage: the 149 countries for which the reproductive choice scores derive from 4 variables obtain a weight of 1; the 23 countries for which the reproductive choice scores derive from 3 variables obtain a weight of 0.75; the 2 countries for which the reproductive choice scores derive from 2 variables obtain a weight of 0.50; finally, the 5 countries for which the reproductive choice scores derive from just 1 variable obtain a weight of 0.25. We applied these weights to test the robustness of our findings using weighted least squares regression. This test revealed no substantial difference in results. [↑](#footnote-ref-42)
142. Cite work by Nunn and Qian on the potatoe and urbanization in Europe ... [↑](#endnote-ref-100)
143. Cite work by Douglas North, Jack Goldsmith and Nial Ferguson on the institutionalization of the Western emancipatory legacy ... [↑](#endnote-ref-101)
144. Cite works of Max Weber and Depak Lal on the role of Calvinism/Protestantism ... [↑](#endnote-ref-102)
145. Cite work by Douglas North and Rafael LaPorta et al. on the positive role of Anglo-Saxon customary law ... [↑](#endnote-ref-103)
146. The idea goes back to Max Weber who specifically addressed the initiative-unleashing role of the Calvinist doctrine of pre-destination. The notion that God's already made choice of whether you will go to heaven or hell in after-life will be visible in your this-worldly achievements, supposedly generated a strong achievement motivation on a mass-level. Other scholars, like Depak Lal, refer to the individualism and egalitarianism inherent in Protestantism more generally. For instance, the Protestant idea that every single person can directly and independently relate to God, without the need to repent and being dispensed by the authority of a priest, had a strongly individualistic and egalitarian impulse. To allow every individual to build her or his own relationship to God, Martin Luther translated the Bible from Latin into German, which created an incentive for ordinary people to become literate. This is visible from the fact that the spread of Johan Gutenberg's printing press (invented ca. 1440) accelerated after Luther's Bible translation, which he finalized in 1534 (the New Testament was translated already in 1522). [↑](#footnote-ref-43)
147. Cite work by Nolan and Lenski as well as by Ember and Ember on the central role of religion [↑](#endnote-ref-104)
148. Cite Max Weber 1904 on The Spirit of Capitalism ... [↑](#endnote-ref-105)
149. Cite Depak Lal and Dumont on individualism and Protestantism ... [↑](#endnote-ref-106)
150. Cite Huntington (1996) Clash of Civilizations and Kuran (2012) for work on Islamic law traditions ... [↑](#endnote-ref-107)
151. Cite work on religeous doctrines and institutional structures ... [↑](#endnote-ref-108)
152. N = 184 (P = 0.00, two-tailed). [↑](#footnote-ref-44)
153. We find no significant difference between Buddhist countries depending on whether they mostly belong to Hinnayana or Mahayana Buddhism. [↑](#footnote-ref-45)
154. We find no significant difference between Muslim countries depending on whether they mostly belong to Sunni or Shia Islam. [↑](#footnote-ref-46)
155. We are aware of the fact that Confucianism is strictly speaking not a religion but a philosophy. In shaping moral codes and ethical norms, Confucianism is however a functional equivalent of religion. [↑](#footnote-ref-47)
156. Animism denotes belief systems that project a soul into objects of nature, like trees, mountains or rivers. Animism is very common among tribal societies at the pre-state stage of development. Because most of sub-Saharan Africa and Pacifica was at that stage of development before colonization, we classify countries in these areas as belonging to the religious tradition of Animism. [↑](#footnote-ref-48)
157. Only India and Sri Lanka are categorized as mostly Hindu majority countries. [↑](#footnote-ref-49)
158. Israel is treated as the only Jewish majority country. [↑](#footnote-ref-50)
159. Contradicting widespread stereotypes, Pippa Norris and Ronald Inglehart point out in Rising Tide that Buddhism performs worse on matters of gender equality and sexual liberation than Islam. We find the same with democratic traditions. [↑](#footnote-ref-51)
160. Our coverage of 188 countries includes 10 Buddhist, 41 Islamic, 12 Christian Orthodox, 5 Confucian, 50 animist, 48 Catholic, 2 Hindu, 19 Protestant countries, and 1 Jewish country, which of course is Israel. To inspect which country belongs into which group, see the Online Appendix (OA, p. \_) at www.\_\_\_.org. [↑](#footnote-ref-52)
161. Technically speaking, this is the same as assigning each country the score in democratic traditions predicted by the mean of its religeous country-group. [↑](#footnote-ref-53)
162. Cite work by La Porta, Lopez-de-Silanes and Shleifer et al. (2007) on the significance of law traditions ... [↑](#endnote-ref-109)
163. Cite work by Finer on law traditions ... [↑](#endnote-ref-110)
164. Our coverage of 188 countries includes 18 Byzantine law tradition countries (which were core parts of the Byzantine and Russian empires), 40 Islamic law tradition countries (which were core parts of the Arab/Persian Caliphates or the Ottoman Sultanate), 11 Confucian law tradition countries (which were parts of the Chinese empires), 84 colonial law tradition countries (in Sub-Saharan Africa, Latin America and Oceania), 21 Roman law tradition countries (in Southern and Central Europe), 8 Germanic law tradition countries (in Central and Northern Europe), and 6 Anglo-Saxon law tradition countries (Australia, Canada, New Zealand, Ireland, UK, US). To inspect which country belongs into which group, see the Online Appendix (OA, p. \_) at www.\_\_\_.org. We do not assign former plantation and mining colonies to the law tradition of their former colonial power because we believe that it makes a big difference if a given law tradition has been implanted through colonial exploitation. Thus, we created an own category of "colonial law" to indicate foreignly imposed law traditions. As our data show, this conceptual decision is empirically justified as the colonial category looks distinct on matters of democratic traditions (as well as other indications of emancipatory tendencies). [↑](#footnote-ref-54)
165. N = 179; P = 0.00, two-tailed. [↑](#footnote-ref-55)
166. R = 0.94; N = 188; P = 0.00, two-tailed. [↑](#footnote-ref-56)
167. Technically speaking, we calculate for each country its arithmetic mean of religeously and legally encoded emancipation. This Western legacy index captures 68% of the entire cross-national variance in democratic traditions, which compares to 46% for its religeous legacy component and 55% for its legal tradition component (N = 178; P = 0.00). The summary of the two components, thus, brings a noteworthy increase in explanatory power. When we summarize the five different measures of (electoral, participatory, liberal, deliberative and egalitarian) democracy provided by the V-Dem project into a single measure for the year 1900 (which is justified given the strong uni-dimensionality of these measures), our Western legacy index captures even 78% of the entire cross-national variance in 1900 democracy (N = 96; P = 0.00), which in this case compares to 68% for its religeous legacy component and 69% for its legal tradition component. [↑](#footnote-ref-57)
168. Cite Acemoglu, Johnson and Robinson for the "white settler mortality" ... [↑](#endnote-ref-111)
169. Cite Spolaore and Wacziarg for genetic distance data in 1500 CE ... [↑](#endnote-ref-112)
170. To be precise, Spolaore and Wacziarg measure genetic distance from the English but this is literally the same as saying genetic distance from Northwestern Europeans. [↑](#footnote-ref-58)
171. Cite Gapminder as the source for income/pc data collected from multiple sources for 1800 CE ... [↑](#endnote-ref-113)
172. Cite article and book by Rothstein and Uslaner ... [↑](#endnote-ref-114)
173. Cite Farbrice Murtin for historic education data ... [↑](#endnote-ref-115)
174. Cite Lindberg, Coppedge et al. for the V-Dem project and data ... [↑](#endnote-ref-116)
175. Cite Immanuel Wallerstein "world system theory," works in the context of "dependencia theory" and other works claiming that position in the world system at the apex of colonial imperialism explains development today ... [↑](#endnote-ref-117)
176. Cite work of Lipset and others who have argued that British colonialism was less harmful to democracy and other developmental outcomes ... [↑](#endnote-ref-118)
177. Spain, by then, has lost almost all of its former colonial possessions and is, hence, not classified as a colonial power in around 1900. [↑](#footnote-ref-59)
178. N = 184; P = 0.00, two-tailed. Interestingly, however, the highest level of human empowerment today (mean: 0.84; sd: 0.11) is present among the 12 countries falling into the category of "truly independent nations 1900" and not among the 8 "colonial powers 1900" (mean: 0.79; sd: 0.08). Thus, colonial exploitation a undered years ago does not explain human empowerment today. [↑](#footnote-ref-60)
179. Cite works by Max Weber, Talcott Parsons, Poggi, Michael Mann, Samule Finer and Francis Fukuyama as well as North, Wallis and Weingast on state order and rational bureacracy ... [↑](#endnote-ref-119)
180. Cite V-Dem project for the "rule of law" measure ... [↑](#endnote-ref-120)
181. Cite Gapminder and its multiple sources for 1900 per capita GDP data ... [↑](#endnote-ref-121)