

SUPPLEMENTARY ONLINE MATERIALS
(SOM)

to the Monograph

THE COOL WATER EFFECT:
The Geo-Climatic Source of Western Exceptionalism

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S1 Overview

This collection of Supplementary Online Materials (SOM) to the book “*The Cool Water Effect: The Geo-Climatic Source of Western Exceptionalism*” authored by us (Christian Welzel, Stefan Kruse, Lennart Brunkert and Steven A. Brieger) is located online at www.coolwatereffect.com.

In a nutshell, the Cool Water (CW)-Theory advocated by our research monograph claims that spaces with a cool and wet climate in coastal proximity are resource-*diffuse* environments in which subsistential opportunities are ubiquitous rather than point-fixed. Resource-diffuse environments favor from the beginning a *decentral* management of water, land and labor. Larger-scale economic and political orders emerging from this decentral setting adopt a *pluto-cratic* character with *contractual* institutional arrangements tailored to an *indiscriminate* provision of the common good. The result are individualistic-egalitarian—in short: ***emancipatory***—developmental outcomes that save ordinary people from material, psychological and legal constraints on their original freedoms. As these emancipatory outcomes—including material prosperity, cultural individualism and liberal democracy—become visible in areas without the CW-Condition, the human desire for freedoms ubiquitously awakens from dormancy, thus starting to dissociate emancipatory dynamics from their initial tie to the CW-Condition. And that is the world in which we are all living today.

This SOM provides plenty of supplementary evidence in support of the already rich demonstrations shown in the CW-book manuscript. The SOM is organized in sixteen sections, referred to as SOM-Sections S1 to S17. Below follows a brief overview of what can be found in these sections.

SOM-Section S1 is this overview. SOM-Sections S2 to S7 fulfill documentation purposes. Specifically, SOM-Section S2 provides a link to the various datasets used in our country-level, province-level, locality-level, individual-level and multi-level analyses. Section S3 displays the SOM-Figures and -Tables referred to in the book manuscript as empirical proofs of our various claims. Section S4 describes our most strongly emphasized outcome variable: the Human Empowerment Index (HEI). Section S5 documents the covariates of the HEI, while Section S6 reports and illustrates the various correlates of the CW-Condition. Section S7 tests the impact of the CW-Condition on the HEI against a host of alternative remote drivers of societal development advocated in the “deep roots” literature.

Sections S8 to S13 subject the CW-Theory to a series of alternative test settings, thus providing complementary confirmations of the CW-Theory’s supposed effects. To be concrete, Section S8 locates the CW-Condition in a tableau of historically ordered developmental influences, ranging from geographic factors, biological characteristics related to disease threats and lactose tolerance, agrarian histories, early state formation, linguistic structures, colonial histories, religious and legal traditions to contemporary emancipatory outcomes. The takeaway of this path analysis is that none of the remote historic drivers of societal development absorbs the emancipatory effect of the CW-Condition, while this effect is largely mediated via the CW-Condition’s positive influence on female reproductive autonomy in nuclear families at pre-industrial times, plus cognitive lifetime investments at the eve of the industrial age.

Section S9 demonstrates that the emancipatory effects of the CW-Condition also surface on other domains of evidence beyond countries, including sub-national provinces of the world's territorially largest countries (S9.1), the Czarist empire's historic ninety-eight *oblasts* (S9.2), migrants from all over the world to Sweden (S9.3) and pre-industrial tribal populations all over the globe (S9.4).

Section S10 replicates the study design of Schulz et al.'s (op. cit., footnote 17) "Western Church" thesis, using the most optimal CW-measure at each level of analysis, which includes the world's countries, Europe's sub-national provinces and pre-industrial local communities from around the globe. The results of this section document that the CW-Condition trumps the effects of Western Church exposure on emancipatory outcomes at the country, province, local and individual level.

Section S11 deviates from Schulz and Henrich et al.'s study design and uses a less optimal CW-measure but one that is perfectly consistent across the country, province and local level. The path analyses demonstrate that the significant and positive CW-effect on *contractual institutional arrangements* (CIAs) is mediated by the CW-Condition's favorable role in giving rise to *nuclear family patterns* and an *emancipatory pro-sociality* with its individualistic-egalitarian (and kinship-loose) patterns of forging social alliances. The charm of these analyses is that they highlight the exact same mediation pattern across all three domains of evidence, in spite of the fact that the strict consistency by which the CW-Condition is measured deviates from the impact-optimized measurement approach used otherwise.

Section S12 relies on an even more simplified measure of the CW-Condition to clarify that the CW-condition's emancipatory effects are neither only due to this condition's equatorial distance component, nor its coastal proximity component, but due to the very *interaction* of the two. This section also shows that the emancipatory CW-effect is not an artifact of designing the CW-measure to Northwestern Europe's geo-climatic singularities.

Section 13 subjects the two most competing narrations of today's world's differentiation in emancipatory progress an ultimate and—as we think—conclusive test. The result is straightforward: In explaining populations' emancipatory progression, the Cool Water theory outperforms the Western Church thesis by a towering magnitude in both nomological terms and on epistemological ground.

Section S14 provides further evidence showing that the freedom-proneness of the world's CW-areas delayed the historic transition to intensive agriculture in comparison to agriculturally suitable areas around the globe without the CW-Condition. Therefore, the developmental advantages inherent in the CW-Condition's natural environment became visible late in the history of civilization, thus unmasking the ancient agrarian empires as dead ends of societal evolution.

As further food for thought, Section S15 reports the critiques raised by the four expert reviews of our initial book proposal and how we took advantage of them in shaping the final manuscript and this SOM.

Section S16 provides selected references to the relevant "deep roots" literature on remote historic drivers of today's world developmental differentiation.

Finally, Section S17 documents extensive command syntaxes to construct the complex variables in the Cool Water study.

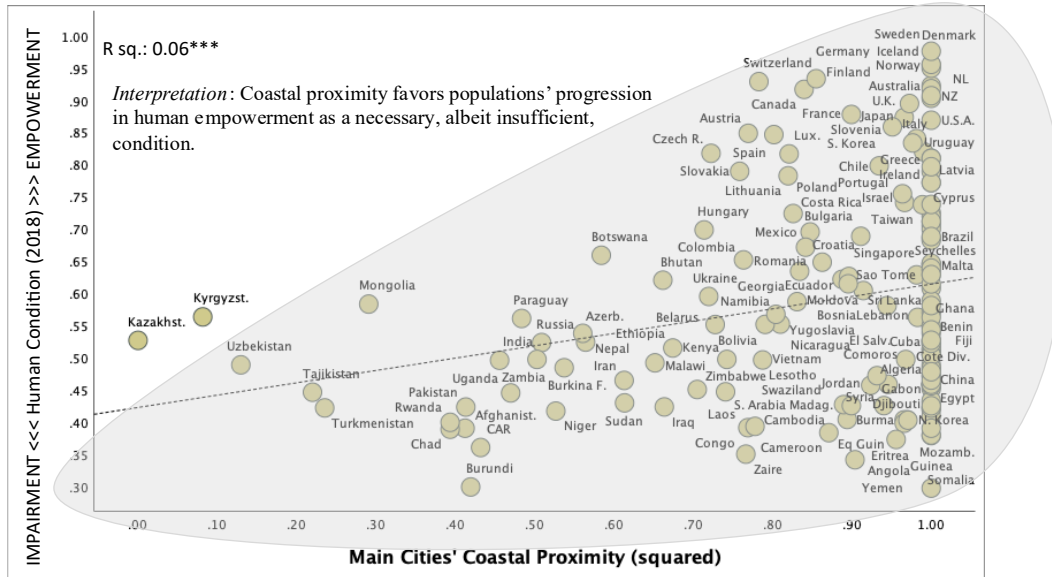
S2 Variables and Data for the CW-Book

Our book and this SOM analyze several thousand variables from a plethora of sources. Our units of observation vary in spatial scope and resolution. They include supra-national population families, the countries of the world, sub-national provinces, pre-industrial local populations, individuals as well as the world's geographic grid cells. For each of these domains of observation, we offer our data for download under the header “data” on this SOM's website at www.coolwatereffect.com. All further details on data sources, scale formats and recodings can be found there. Where appropriate, we use matching and factorization procedures to summarize single variables into more comprehensive conceptual measures, while keeping case coverage at the possible maximum.

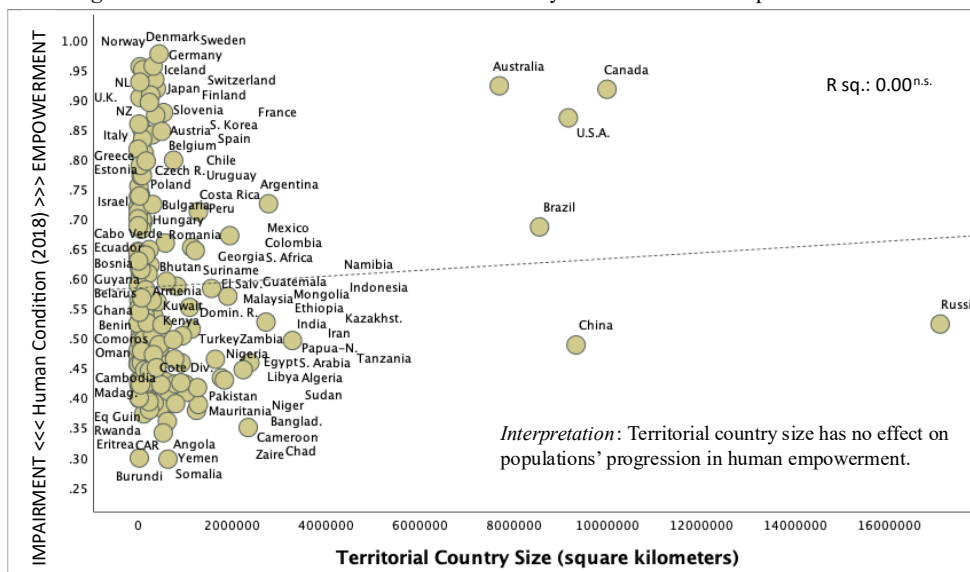
S3 SOM-Figures and -Tables Cited in the CW-Book

The following graphical and tabular materials are all cited in the CW-book with the exact same SOM-numbers as those indicated in this section. For ease of readability, each diagram and table includes a short interpretation brief.

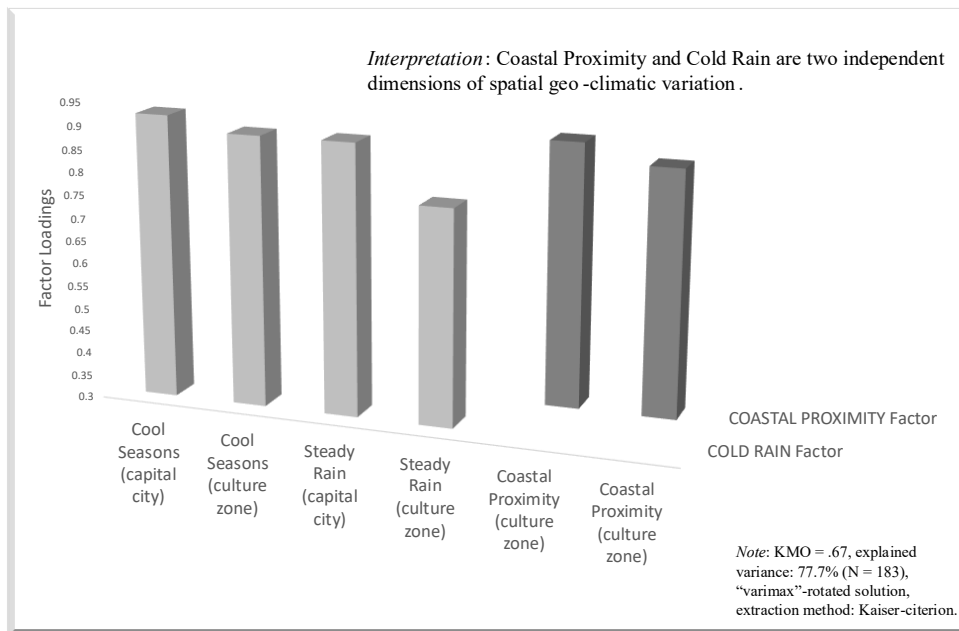
SOM-Figure S3-1. The Relationship between Coastal Proximity and Human Empowerment Today



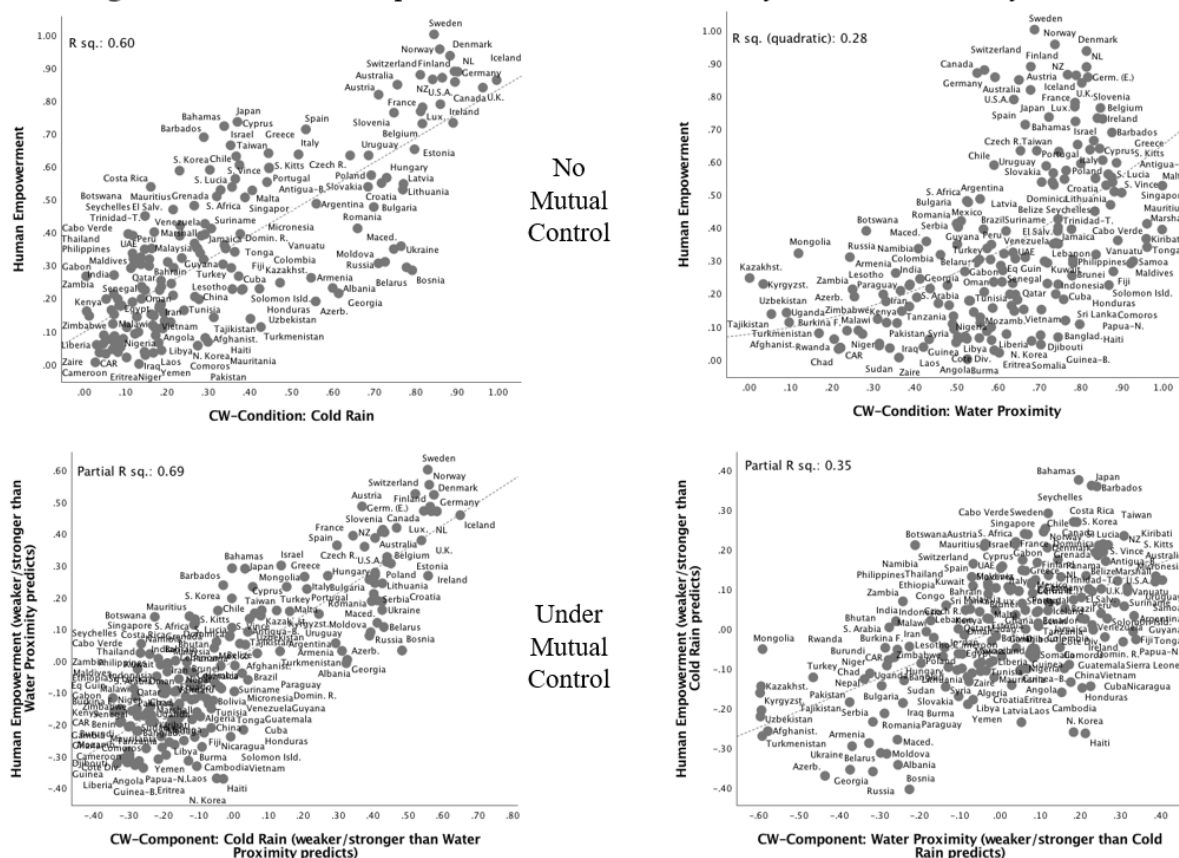
SOM-Figure S3-2. The Irrelevance of Territorial Country Size for Human Empowerment



SOM-Figure 3-3. Factor Loadings of the CW's Climate Components



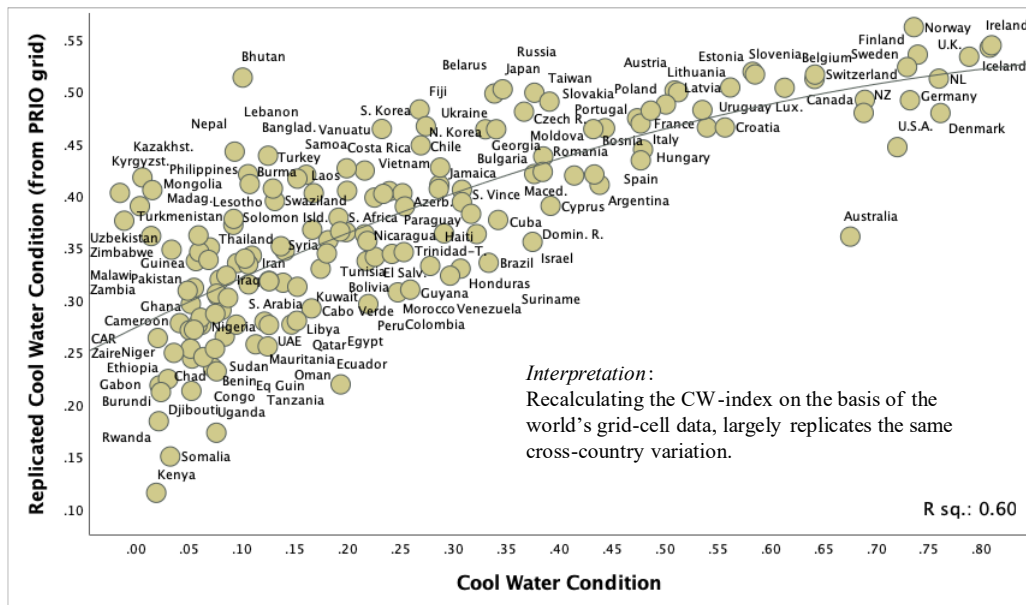
SOM-Figure 3-4. The Developmental Effects of Cold-Steady Rain and Waterway Access



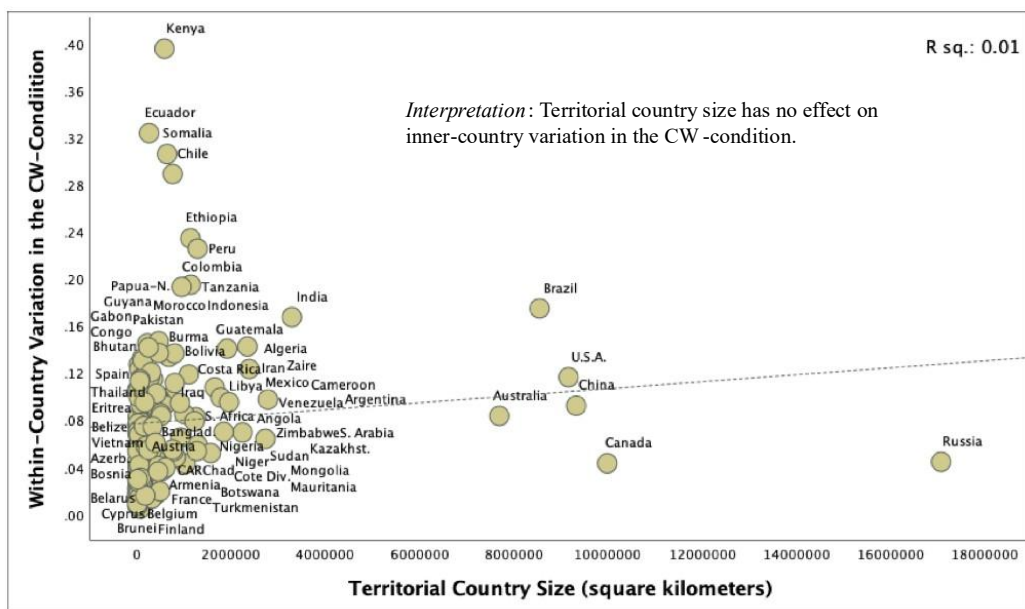
Interpretation:

The separate effects of Cold Rain and Coastal Proximity on populations' progression in human empowerment surface in greater strength under mutual control.

SOM-Figure 3-5. Original and Replicated CW-Scores



SOM-Figure S3-6. The Irrelevance of Territorial Country Size for Within-Country CW-Variation



Interpretation: Lower or higher country means in the CW-Condition are *not* masking more or less inner-country variation around those means

Scatter plot showing the relationship between Regional Means in the CW-condition (from PRIO grids) on the x-axis and Within-regional Variations in the CW-condition (from PRIO grids) on the y-axis. The plot includes a dashed regression line and a label 'R sq. (linear): 0.30'. Data points are labeled with region names: E Africa, India, S America, U.S.A., New Zealand, C Africa, C America, SE Asia, China, SW Europe, N Africa, Australia, S Africa, Oceania, E Asia, Japan, NW Europe, W Africa, Middle East, Caribbean, C Asia, SE Europe, E Europe, Russia, W Europe, N Europe, Canada, and C Europe.

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SOM-Table S3-1. Correlation Matrix of the Three Components of Human Empowerment

	Action Resources	Emancipative Values	Civic Entitlements
Action Resources	1.00 (173)		
Emancipative Values	.72 (103)	1.00 (106)	
Civic Entitlements	.50 (173)	.72 (99)	1.00 (179)

Note: Entries are Pearson correlations with number of observations in parentheses. All correlations are significant at the 1%-level. Variables are measured for 2018. For measurement details, see SOM-Section S4.

Interpretation: Measured across countries, individuals' action resources, their emancipative values and their civic entitlements correlate positively and significantly with each other.

SOM-Table S3-2. Loadings of the Three Components of Human Empowerment on their Unifying Dimension

	Human Empowerment Dimension
Action Resources	.85
Emancipative Values	.85
Civic Entitlements	.93
KMO	.66
Cronbach's Alpha	.79
Variance Explained	77%
Overlapping <i>N</i> (listwise)	103

Note: Measurement explained in SOM-Section S4.

Interpretation: Measured across countries, individuals' action resources, their emancipative values and their civic entitlements correlate so strongly with each other that they reflect a single underlying dimension of cross-country variation, which we label "human empowerment."

SOM-Table S3-3. Amount of Cross-National Variation in the Elements of Human Empowerment due to Countries' Culture Zone Membership

	1960	2018
Action Resources	79%	76%
Emancipative Values	58%	82%
Civic Entitlements	55%	61%
Human Empowerment	63%	73%

Interpretation: Country differences in human empowerment and its three components are explained to a large extent by countries' membership in the world's twelve culture zones (i.e., ancestral population families).

SOM-Table S3-4. Correlations of the Human Empowerment Index (HEI) with Country-level Indicators of Societal Florescence (positive signs) and Societal Misery (negative signs): Lines appear in descending order of the magnitude of r (Pearson correlation)

VARIABLE	r	N	SOURCE (<i>full citations in footnote 1</i>)
Gender Empowerment Measure (late 1990s)	.89	67	United Nations Development Program: www.undp.org
Social Cohesion Index (late 1990s)	.88	127	World Bank, social indicators program: www.worldbank.org
Knowledge Society Index (2008)	.87	136	World Bank, KI and KEI program: www.worldbank.org
Citizens' Knowledge of Democracy (2005-15)	.85	95	World Values Surveys: www.worldvaluessurvey.org
Electoral Integrity Index (2010s)	.84	147	Norris (2014), electoral integrity project: www.electoralintegrityproject.com
Nuclear Families, historic (1800-1850)	.84	146	Dilli (2015)
Good Society Index (2010s)	.83	147	Holmberg & Rothstein (2018), Quality of Government Institute: www.qog-institute.gu.se
Gender Inequality Index (2010s)	-.81	144	United Nations Development Program: www.undp.org
Cross-border Communications (late 1990s)	.81	149	Dreher, Gaston & Martens (2010), KOF indicators program (social globalization): https://kof.ethz.ch
Accident Proneness (late 1990s/early 2000s)	-.80	154	Minkov & Bond (2015)
Authoritarian Values (2000s)	-.80	31	Murray, Schaller & Suedfeld (2013)
LGBT Rights (2010s)	.79	85	Wikipedia: https://en.wikipedia.org/wiki/LGBT_rights_by_country_or_territory
Schooling Years, historic (1900)	.79	75	Murtin (2013)
Cousin Marriage, historic (1900)	-.79	108	Woodley & Bell (2013)
Order and Stability (2010s)	.75	125	World Bank, good government program: www.worldbank.org
Individualist Orientations (early-mid 1990s)	.74	56	Oishi, Diener, Lucas & Suh (1999)
Autonomy Orientations (late 1990s-early 2000s)	.74	48	Schwartz et al. (2006)
Infant Mortality Rate (late 1990s)	-.72	165	World Bank, world development indicator series: www.worldbank.org
Pathogen Prevalence, historic (mid 19th century)	-.71	87	Murray & Schaller (2010)
Elite Quality Index (late 2010s)	.71	31	www.elitequality.org
Peace and Security (2010s)	.69	122	World Bank, good government program: www.worldbank.org

to be continued ...

... continuation *SOM-Table S3-4*:

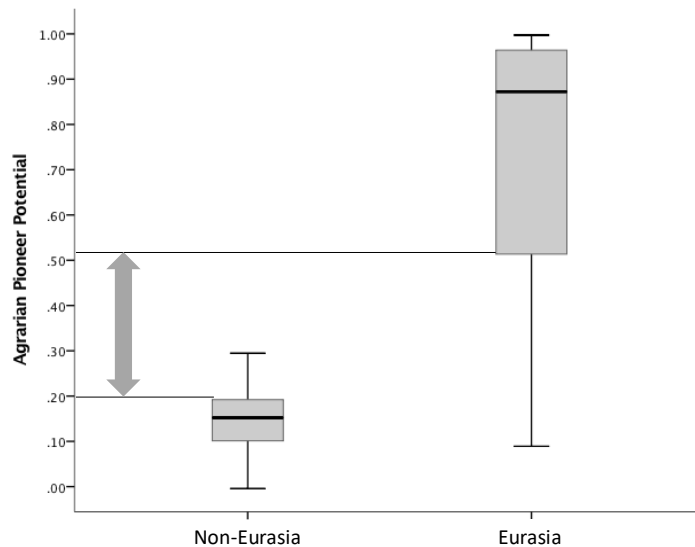
VARIABLE	<i>r</i>	<i>N</i>	SOURCE
Female Wedding Age (late 1990s)	.69	149	World Bank, world development indicator series
Intelligence Quotient (mid-late 1990s)	.69	165	Vanhanen & Lynn (2002), Lynn & Vanhanen (2006)
Future Orientations Index (2012)	.68	45	Preis, Moat, Stanley & Bishop (2013)
Children's Rights Index (2010s)	.66	155	www.kidsrights.org
In-group Favoritism (1990s)	-.64	122	Smith (2015)
Social Inclusion Index (late 1990s)	.63	127	World Bank, social indicators program: www.worldbank.org
Settler Mortality Rate, historic (1800)	-.62	60	Acemoglu, Johnson & Robinson (2001)
Female Fertility, historic (1800)	-.61	161	Gapminder: www.gapminder.org
Digit Ratio (late 1990s-2010s)	-.63	29	Miscellaneous internet sources
Out-group Trust (2005-15)	.60	70	World Values Surveys: www.worldvaluessurvey.org
Lactose Tolerance (2000s)	.58	130	Cook (2014)
Infant Mortality, historic (1800)	-.59	162	Gapminder: www.gapminder.org
Environmental Performance Index (2000s)	.48	40	Yale University, environmental performance program: www.yale.edu
Life Satisfaction (2005-15)	.45	100	World Values Surveys: www.worldvaluessurvey.org

Interpretation: Countries' progression in their populations' human empowerment correlates at great strength and in the expected direction with 35 indicators of (un)desirable developmental outcomes (i.e., consistently negative with indicators of societal illbeing and consistently positive with indicators of societal well-being), including both historic and contemporary outcomes.

Note: Literary sources referenced in footnote 1.¹

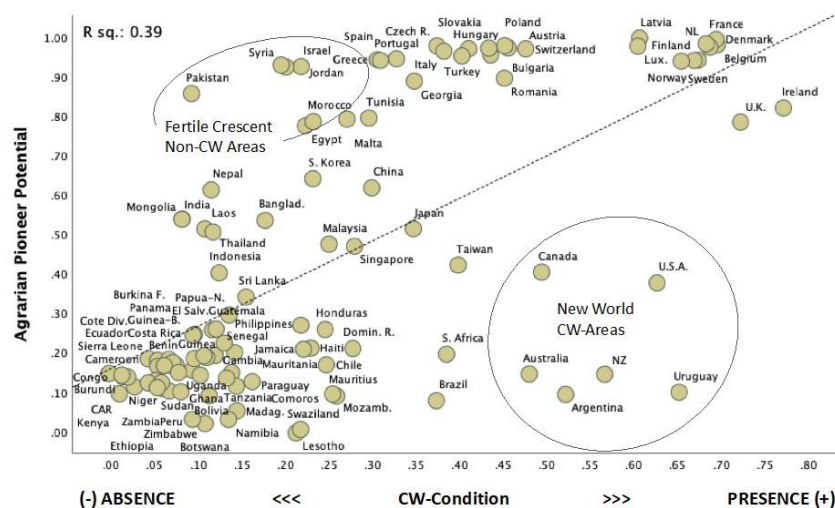
¹ Here follow the full citations to the literary sources referenced in *SOM-Table S3-4* (in the order of their appearance in the table). P. Norris, 2014, *Why Electoral Integrity Matters*, New York: Cambridge University Press.. S. Dilli, 2015, "Family Systems and the Historical Roots of Global Gaps in Democracy," *Economic History of Developing Regions*, 1-53. B. Rothstein and S. Holmberg, 2020, "The Good Society Index," *Quality of Government Institute*, University of Gothenburg. A. Dreher, N. Gaston and W.J.M. Martens, 2010, *Measuring Globalization: Gauging Its Consequences*, New York: Springer. M. Minkov and M.H. Bond, 2015, "Genetic Polymorphisms Predict National Differences in Life History Strategy and Time Orientation," *Personality and Individual Differences* 76, 204-215. D.R. Murray, M. Schaller and P. Suedfeld, 2013, "Pathogens and Prevalence: Further Evidence that Parasite Prevalence Predicts Authoritarianism," *PLOS ONE* 8, 1-8. F. Murtin, 2013, "The Long-Term Determinants of the Demographic Transition, 1870-2000," *Review of Economics and Statistics* 95, 617-631. M. Woodley and E. Bell, 2013, "Consanguinity as a Major Predictor of Levels of Democracy: A Study of 70 Nations," *Journal of Cross-Cultural Psychology* 44, 263-280. S.

SOM- Figure S3-9. The Eurasia/Non-Eurasia Divide over the Agrarian Pioneer Potential



Interpretation: Given the number of domesticable animals and plants and certain geographical features (e.g., East-West extension, landmass size), Eurasian places were much more likely to adopt intensive forms of agriculture early than places outside Eurasia.

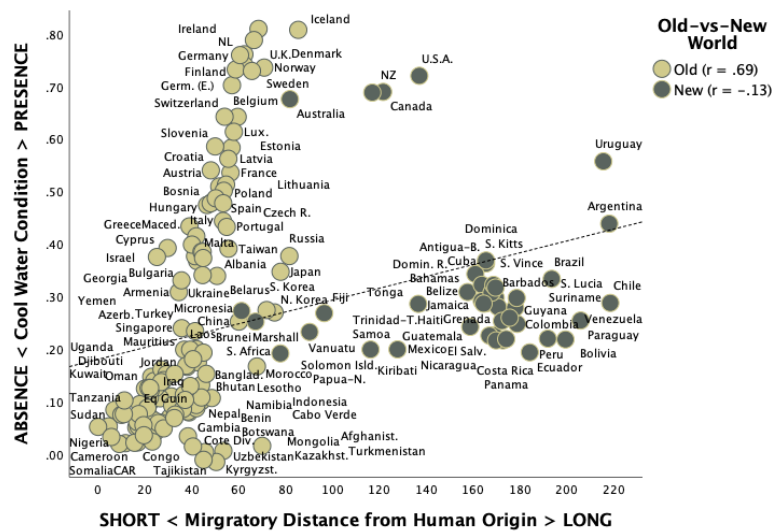
SOM- Figure S3-10. The CW-Condition and the Agrarian Pioneer Potential



Interpretation: Habitats with a stronger CW-condition embody higher agrarian pioneer potential. The two groups of outliers include the New World's CW-areas (because of their location outside the Eurasian landmass) and the Old World's non-CW areas in the Fertile Crescent (because of their high irrigation potential and location at Eurasia's crossroads).

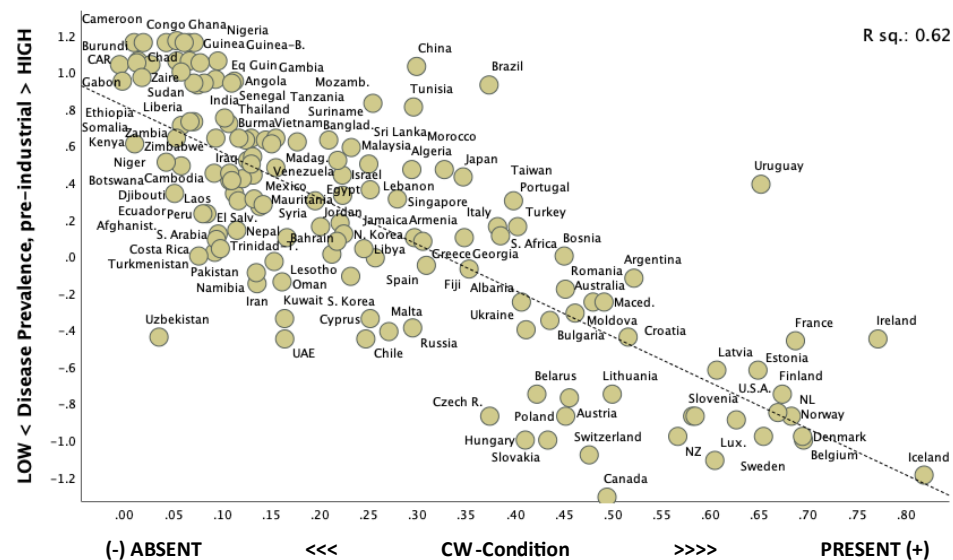
Oishi, E.F. Diener, R.E. Lucas and E.M. & Suh, 1999, "Cross-cultural Variations in Predictors of Life Satisfaction: Perspectives from Needs and Values," *Personality and Social Psychology Bulletin* 25, 980–990. S.H. Schwartz, 2006, "A Theory of Cultural Value Orientations," *Comparative Sociology* 5, 137–182. D.R. Murray and M. Schaller, 2010, "Historic Prevalence of Infectious Diseases with 230 Geopolitical Regions," *Journal of Cross-Cultural Psychology* 41, 99–108. T. Vanhanen and R. Lynn, 2002, *IQ and the Wealth of Nations*, Westport: Praeger. R. Lynn and T. Vanhanen, 2006, *IQ and Global Inequality*, Augusta: Washington Summit Publishers. T. Preis, S.H. Moat, H.E. Stanley and S.R. Bishop, 2012, "Quantifying the Advantage of Looking Forward," *Scientific Reports* 2, 1–2. P.B. Smith, 2015, "To Lend Helping Hands: In-group Favoritism, Uncertainty Avoidance and the National Frequency of Pro-social Behaviors," *Journal of Cross-Cultural Psychology* 46, 759–771. D. Acemoglu, R. Johnson and W. Robinson, 2001, "The Colonial Origins of Economic Development," *American Economic Review* 91, 1369–1401. C.J. Cook, 2014, "The Role of Lactase Persistence in Precolonial Development," *Journal of Economic Growth* 19, 369–406.

SOM-Figure S3-11. Migratory Distance and the CW-Condition in the Old and New World



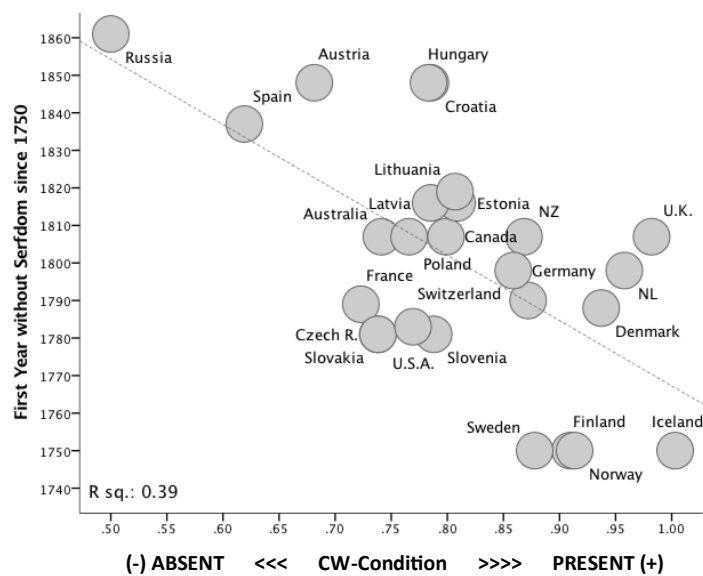
Interpretation: In both the Old and the New world, places with a stronger CW-Condition exist in larger migratory distance from the origin of the human species in East Africa. Hence, CW-areas have been settled later by our ancestors.

SOM-Figure S3-12. The CW-Condition and Disease Load



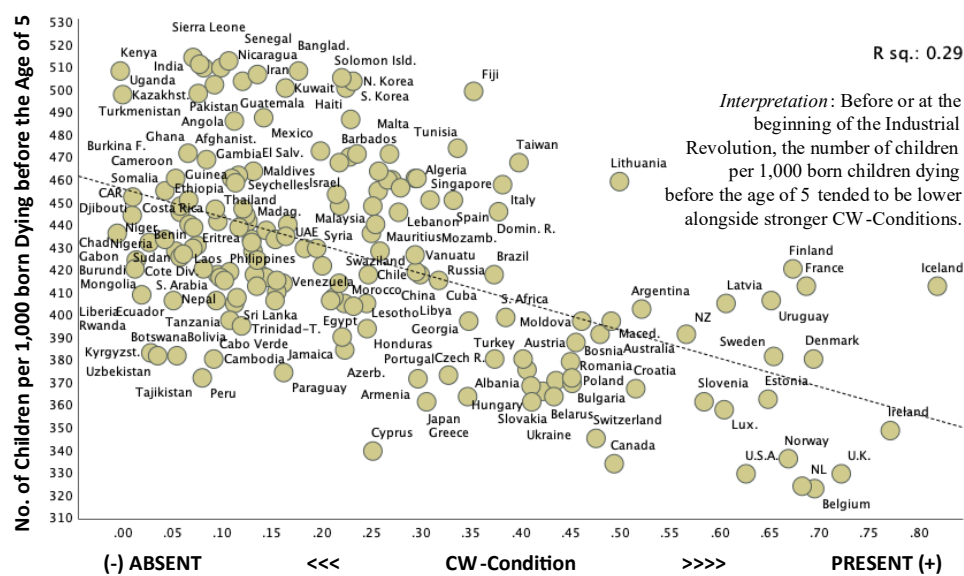
Interpretation: Places with a stronger CW-Condition naturally harbor a lower disease load/pathogene prevalence

SOM-Figure S3-13. The CW-Condition and the Absence/Abolition of Serfdom



Interpretation: Serfdom has been abolished earlier or never existed in European areas with a stronger CW-Condition.

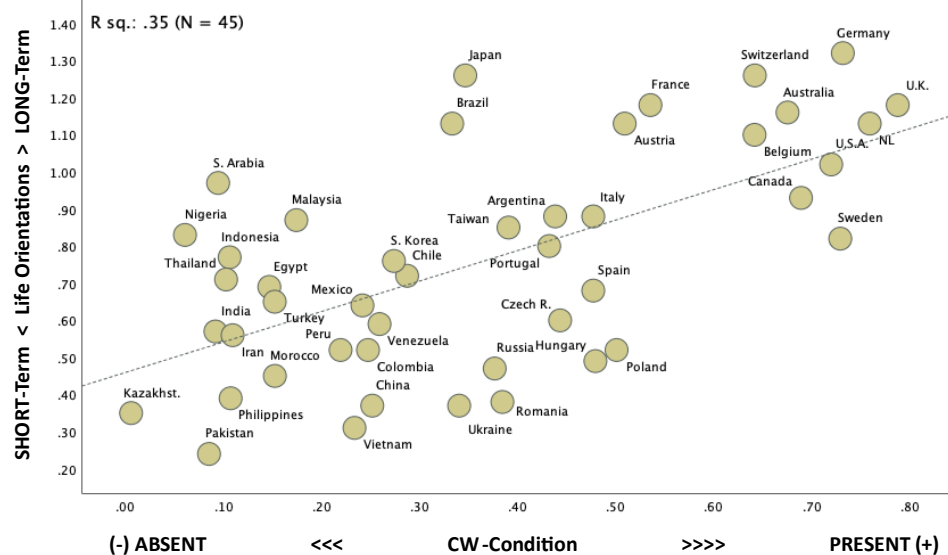
SOM-Figure S3-14. The CW-Condition and Infant Mortality in about 1800 CE



Interpretation: Before or at the beginning of the Industrial Revolution, the number of children per 1,000 born children dying before the age of 5 tended to be lower alongside stronger CW-Conditions.

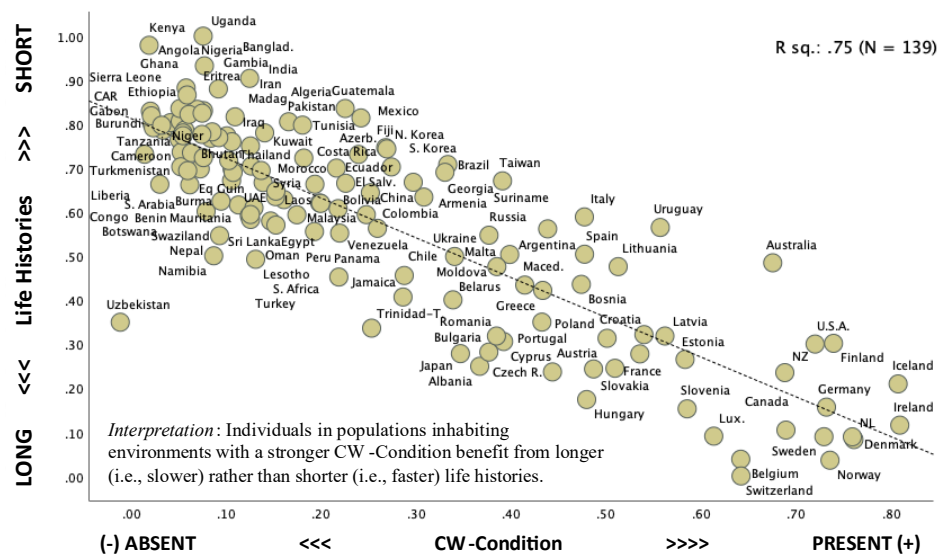
[illegible]

SOM-Figure S3-16. The CW-Condition and Short-vs-Long Life Orientations in 2012



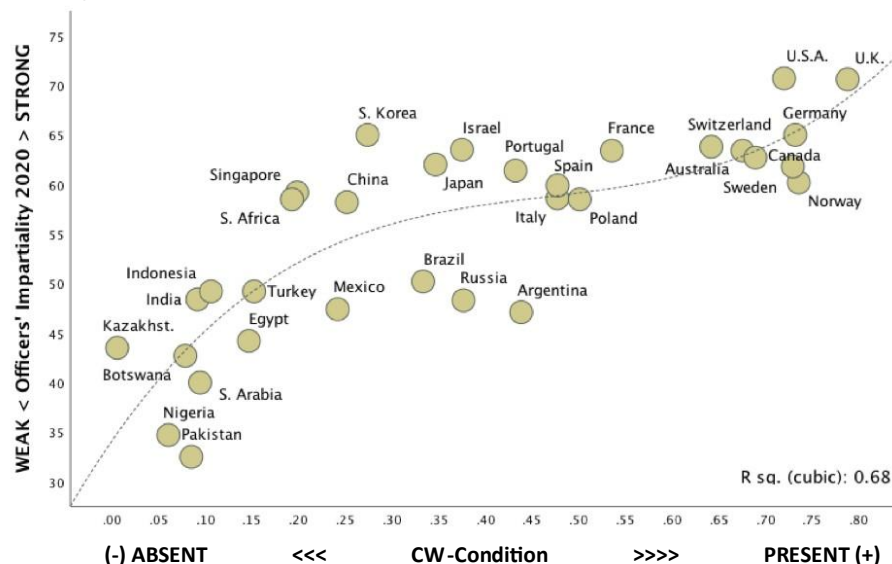
19

SOM-Figure S3-17. The CW-Condition and Short-vs-Long Life Histories in about 1800 CE

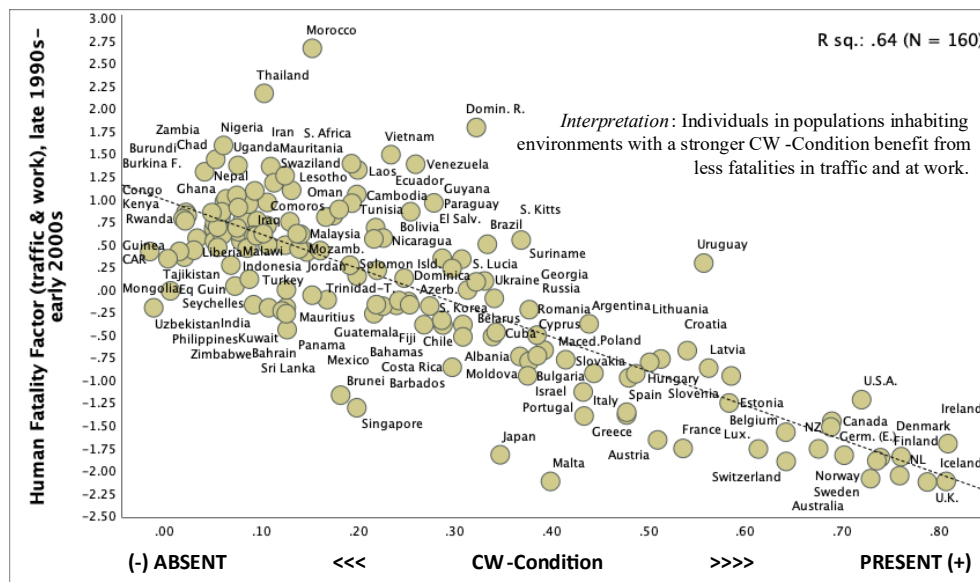


Note: Life Histories measured as the first principal component of disease load, child mortality and female fertility, normalized to a 0-to-1 scale range, with higher diseases, mortalities and fertilities growing towards 1 (i.e., fast/short life histories) and lower diseases, mortalities and fertilities shrinking towards 0 (i.e., slow/long life histories).

SOM-Figure S3-18. The CW-Condition and Office Holders' Common Good Commitment in 2020



SOM-Figure S3-19. The CW-Condition and Human Fatalities in Traffic and at Work (late 1990s to early 2000s)



SOM-Figure S3-20. The CW-Condition and Coercive-vs-Contractual State Institutions in 1789

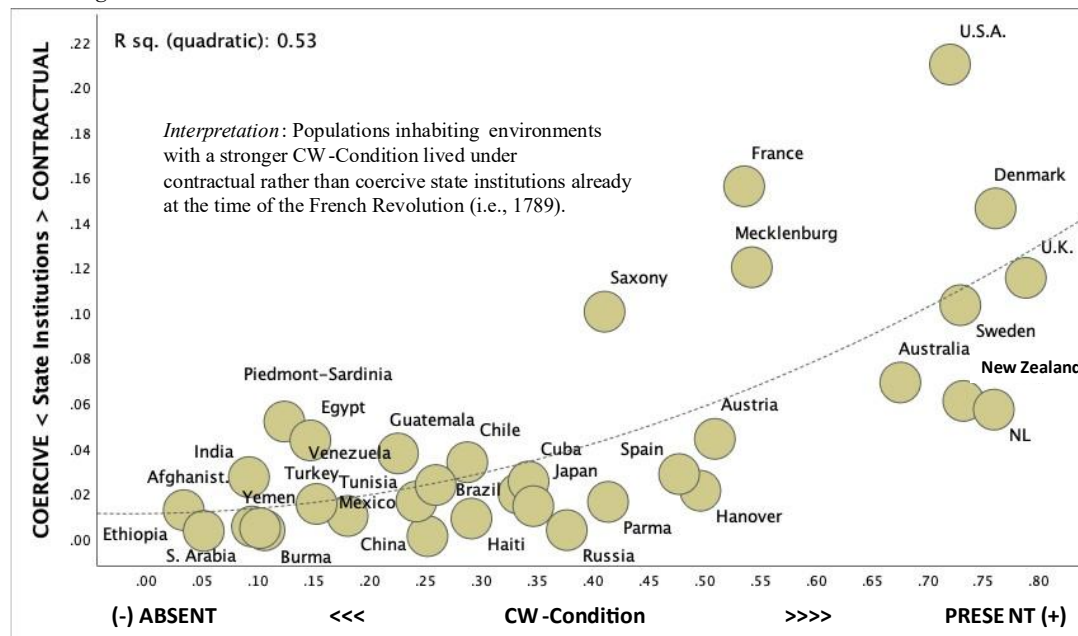


Figure 1: Scatter plot showing the relationship between CW-Condition and Average Female Marriage Age in 1800.

The Y-axis represents the **Average Female Marriage Age in 1800**, ranging from 13 to 27. The X-axis represents the **CW-Condition**, ranging from 0.00 to 0.80. The plot includes a solid regression line and a dashed line representing the **Western/Non-Western Gap**.

Interpretation: Populations among the Old World's major civilizations favored older female marriage ages already at pre-industrial times (e.g., around 1800 CE) alongside stronger CW-Conditions.

Legend: (-) ABSENT, <<< CW-Condition, >>>> PRESENT (+)

Approximate Data Points:

Country	CW-Condition (X)	Average Female Marriage Age (Y)
India	0.08	13.2
Banglad.	0.18	12.8
Pakistan	0.12	15.8
Sri Lanka	0.15	16.8
Egypt	0.22	17.8
Russia	0.30	17.5
China	0.32	19.2
Japan	0.35	21.2
Finland	0.62	23.2
U.S.A.	0.68	23.8
NL	0.68	24.8
France	0.70	24.2
Belgium	0.72	25.2
U.K.	0.75	23.8
Norway	0.68	26.8
Denmark	0.70	26.8

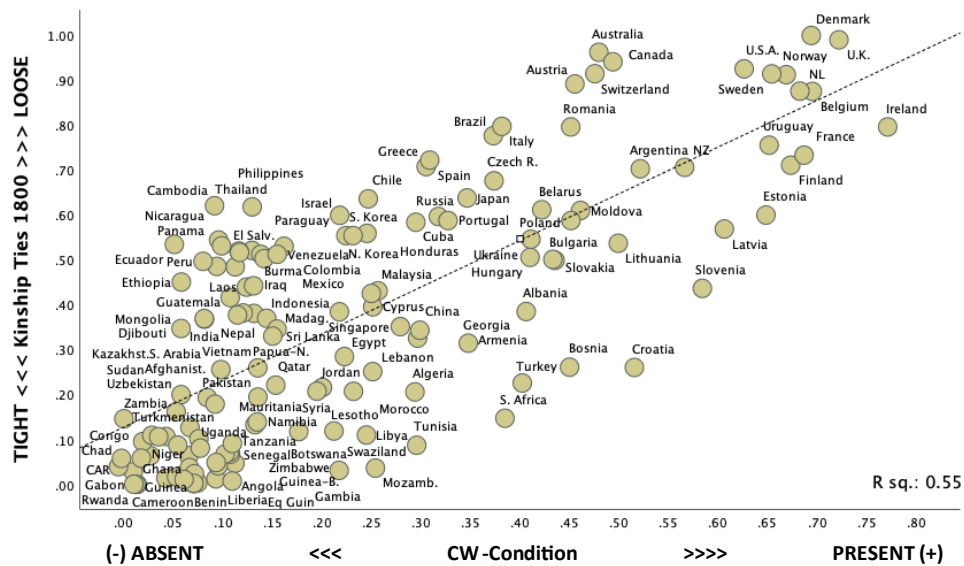
R²: 0.89

Figure 1 consists of two scatter plots. The left plot shows the relationship between Cool Water Condition (X-axis, ranging from 0.00 to 1.00) and Percent Married Women at Age of 15-19, 2010 (Y-axis, ranging from 0 to 75). The data points are labeled with country names, and a dashed regression line is shown. The correlation coefficient is $R, \text{Linear} = 0.424$.

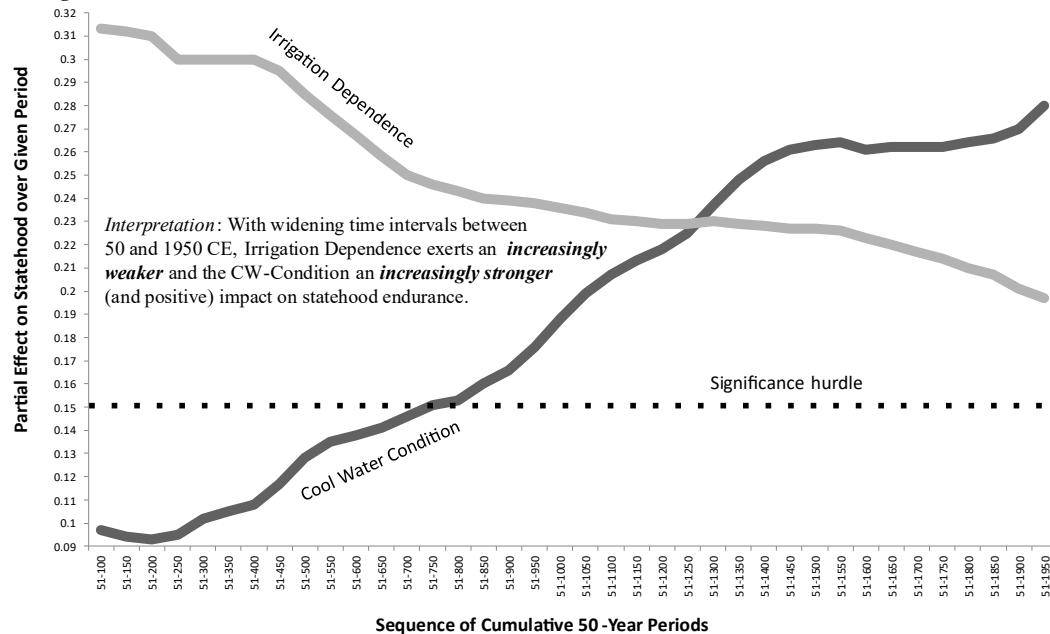
The right plot shows the relationship between Cool Water Condition (X-axis, ranging from 0.00 to 1.00) and Female Tertiary Enrolment 2010 (Y-axis, ranging from 0 to 120). The data points are labeled with country names, and a dashed regression line is shown. The correlation coefficient is $R \text{ sq.: } 0.60$.

22

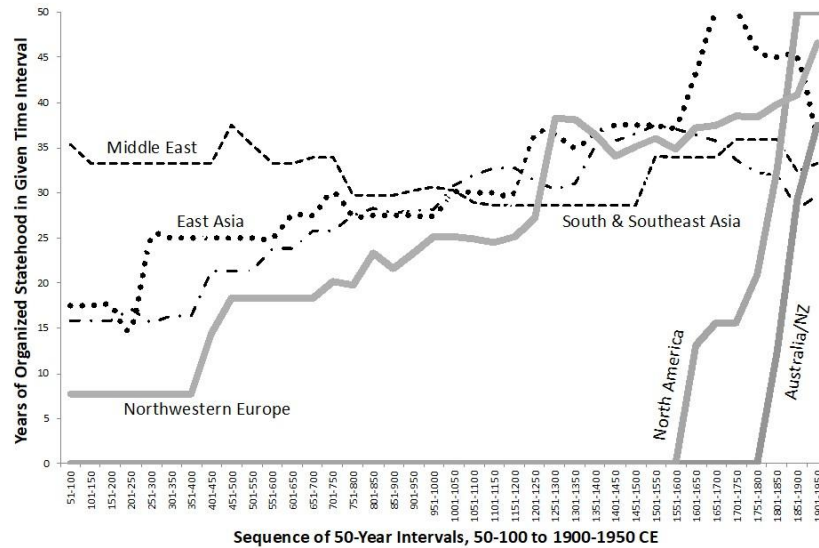
SOM-Figure S3-23. The CW-Condition and Tight-vs-Loose Kinship Ties in 1800 CE



SOM-Figure S3-24. The CW-Condition and Statehood Evolution

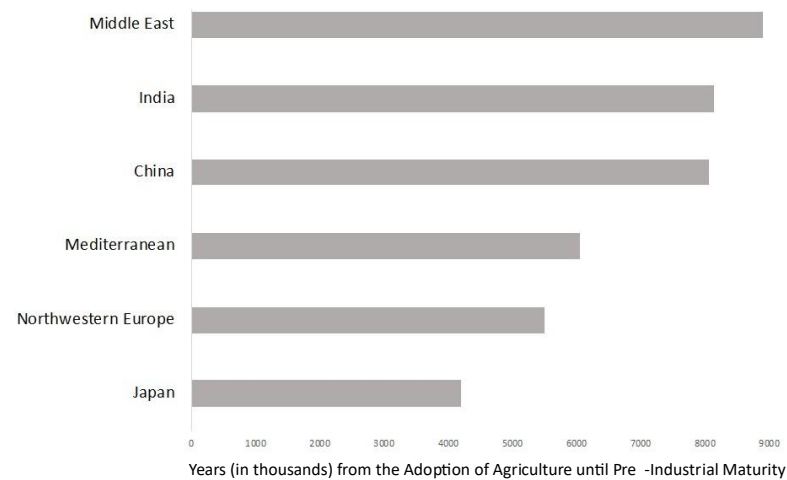


SOM-Figure S3-25. The CW-Condition and Statehood Development in Core Areas of Selected Civilizations



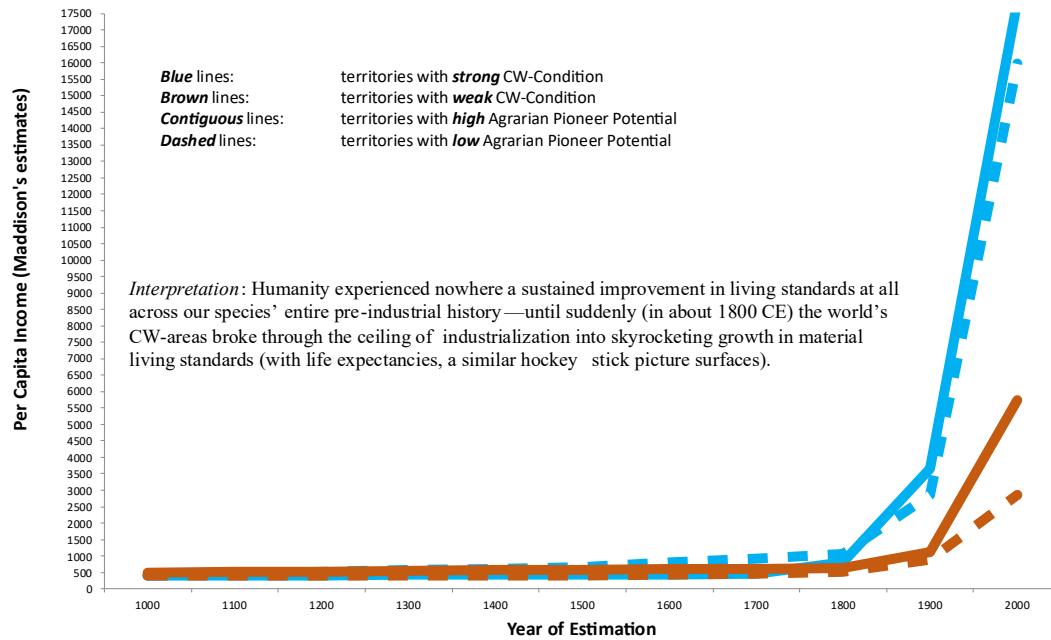
Interpretation: Compared to Middle Eastern and Asian civilizations, the CW-areas of Northwestern Europe and its settler colonies overseas have been laggards in statehood formation until 1300 CE (NW-Europe) and 1800 CE (settler colonies).

SOM-Figure S3-26. Time Span in Years from the Adoption of Agriculture to the Mature Stage of Pre-Industrial Development

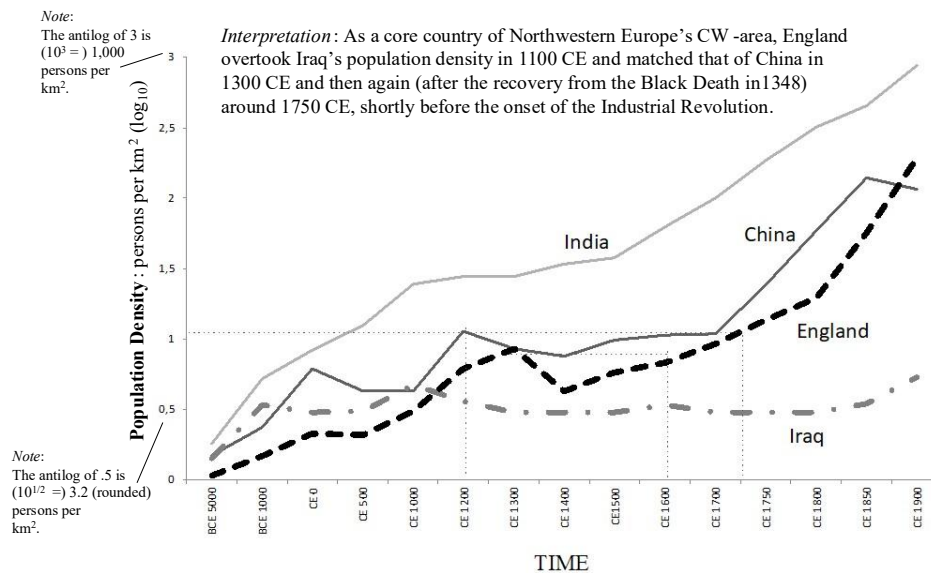


Interpretation: Although the Old World's CW-areas in Northwestern Europe and Japan adopted intensive forms of agriculture several thousand years later than Eurasia's pristine civilizations in the Middle East, the Eastern Mediterranean, India and China, the CW-areas needed 2,500 to 3,000 years less time since then to reach the mature pre-industrial stage of development.

SOM-Figure S3-27. The Hockey Stick of Income Development in Human History



SOM-Figure S3-28. The Evolution of Population Densities in Core Countries of the Old World's Major Civilizations



Partial Correlation with Population Density (r_{partial})

TIME

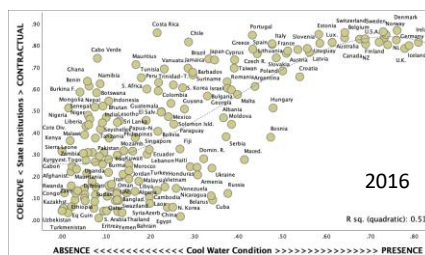
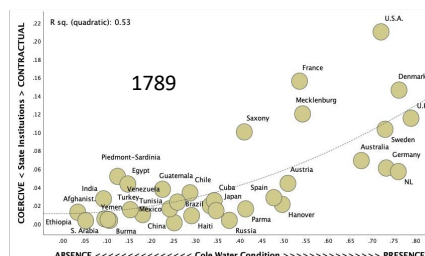
Significance Hurdle

Cool Water Condition

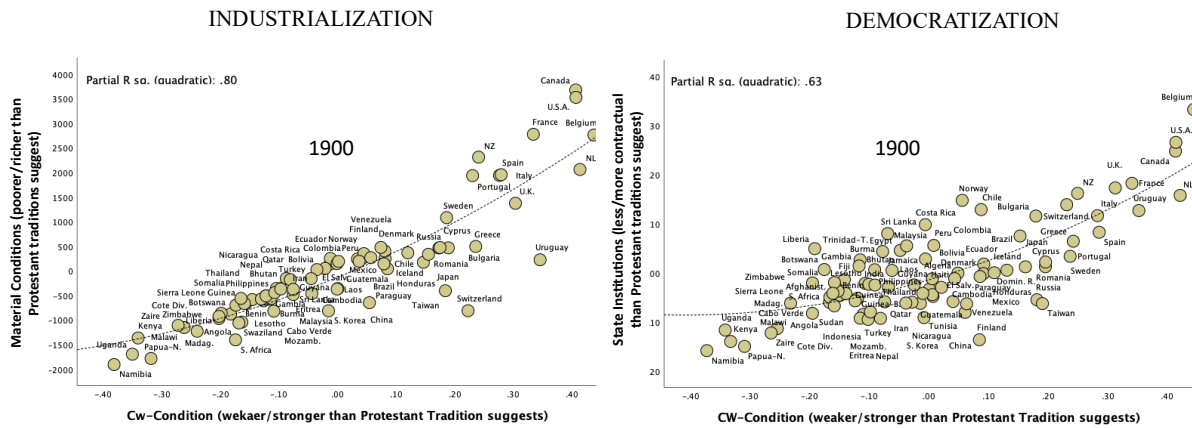
Time Point of Neolithic Revolution

Interpretation: Over time, areas' population densities decouple increasingly from the earliness of adopting agriculture, while associating more and more closely with the CW-Condition—until the (post-)industrial fertility drop re-dissolves this association.

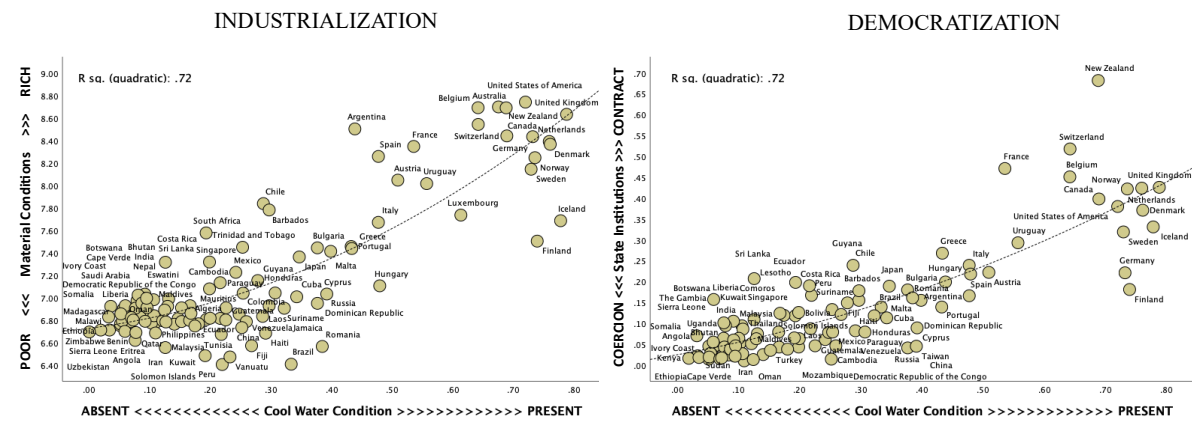
DEMOCRATIZATION



26

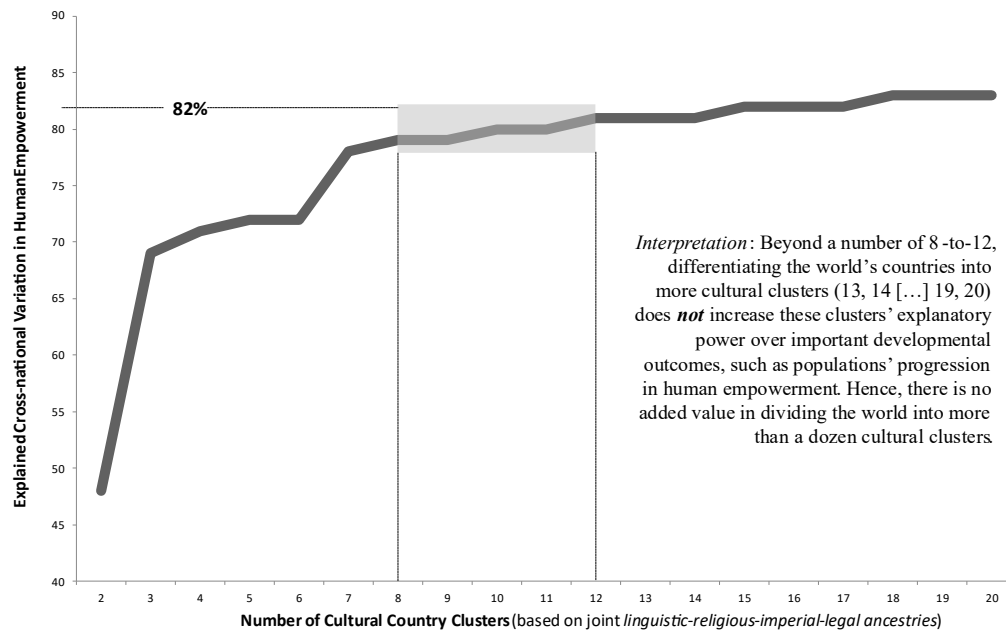
SOM-Figure S3-31. The CW-Condition and the Double Emancipatory Revolution in **1900** (controlling for Protestantism)

Interpretation: Controlling for countries' historic share of Protestants does not render insignificant or eliminate the CW -condition's double emancipatory effect on early industrialization and early democratization. Hence, it is **not** the CW-condition's existing association with Protestantism that accounts for its double emancipatory effect.

SOM-Figure S3-32. The CW-Condition and the Double Emancipatory Outcomes in **1900** (without controls)

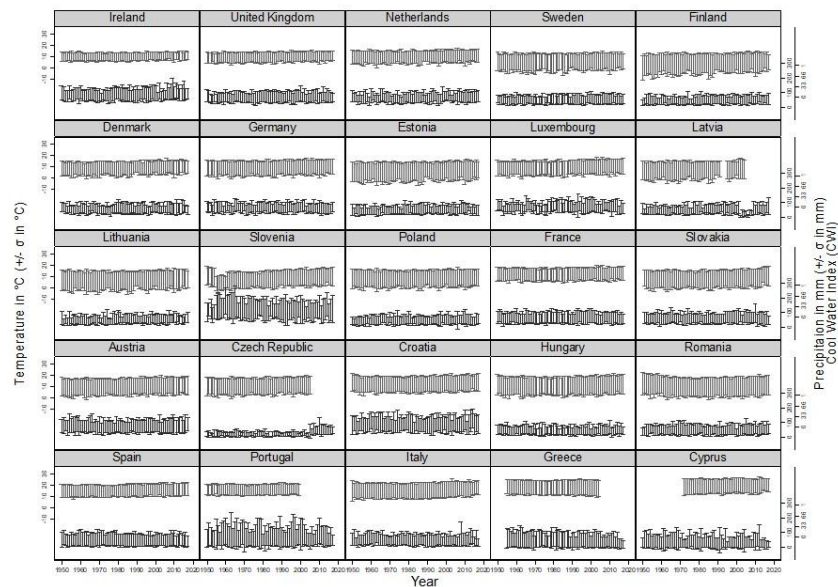
Interpretation: The CW-areas' double (industrializing-democratizing) emancipatory effect is visible early on, with and without controlling historic Protestantism.

SOM-Figure S3-33. Number of Cultural Country Clusters and Explained Variance in Human Empowerment



SOM-Figure S3-34. Temperature, Precipitation and the CW-Condition over Time

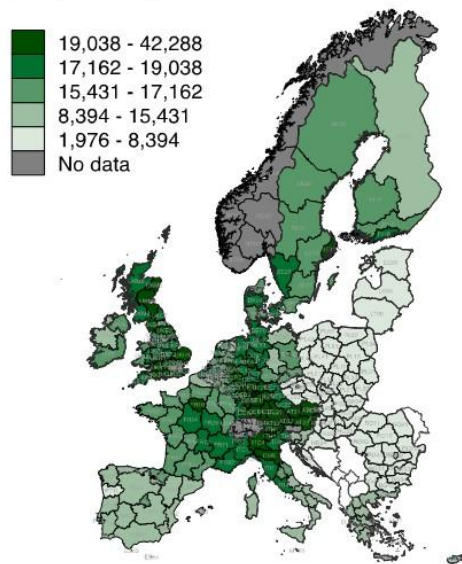
Interpretation: Over a 70-period from 1950 till 2020, the three components of the CW-Condition (i.e., precipitation, temperature, water coverage) exhibit hyper-stability, with a temporal auto-correlation above $r = .90$. If this is true for such a long period, it is certainly also true for any other 70-year period within the same inter-glacial cycle of planet Earth's climate—hence, since the end of the last Ice Age some 10,000 years ago. And if this hyper-stability holds true for such a diverse collection of micro-climates as those covered by the European Union's countries, it holds for sure also true for other areas on the globe. Consequently, presuming temporal priority of the CW-Condition over any of humanity's civilizational achievements is safe.



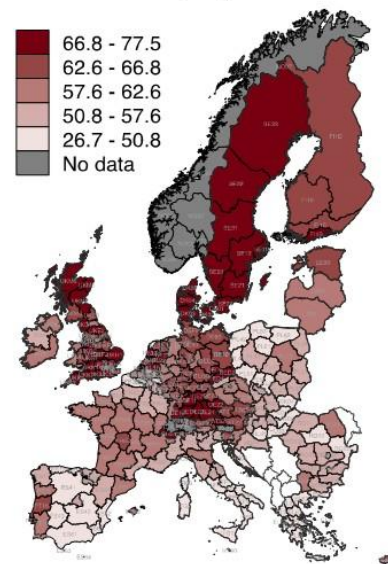
Notes: Precipitation in mm (blue) shown on inner right scale. Temperature in Celsius (grey) shown on left scale. Water-coverage adjusted CWI (red) shown on outer right scale.

SOM-Figure S3-35. The Topography of Socioeconomic Development across NUTS-II Regions

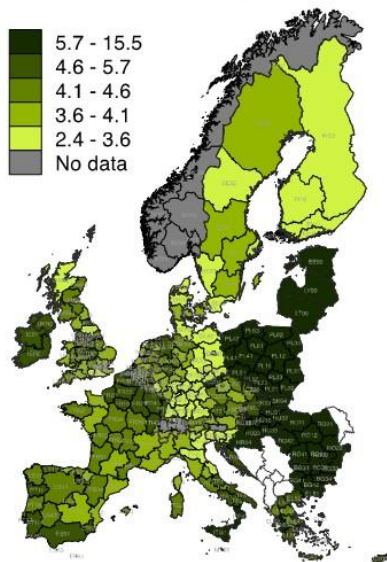
(Disposable) Household income per capita



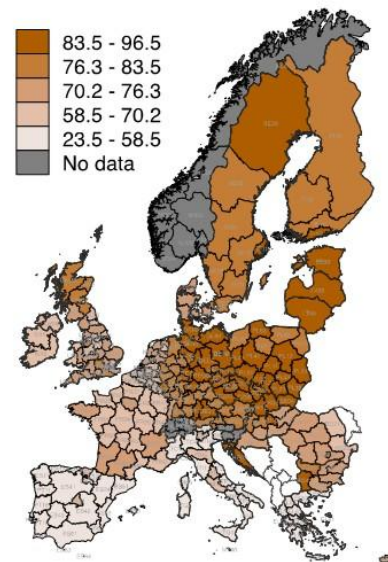
Female employment rate



Infant mortality rate



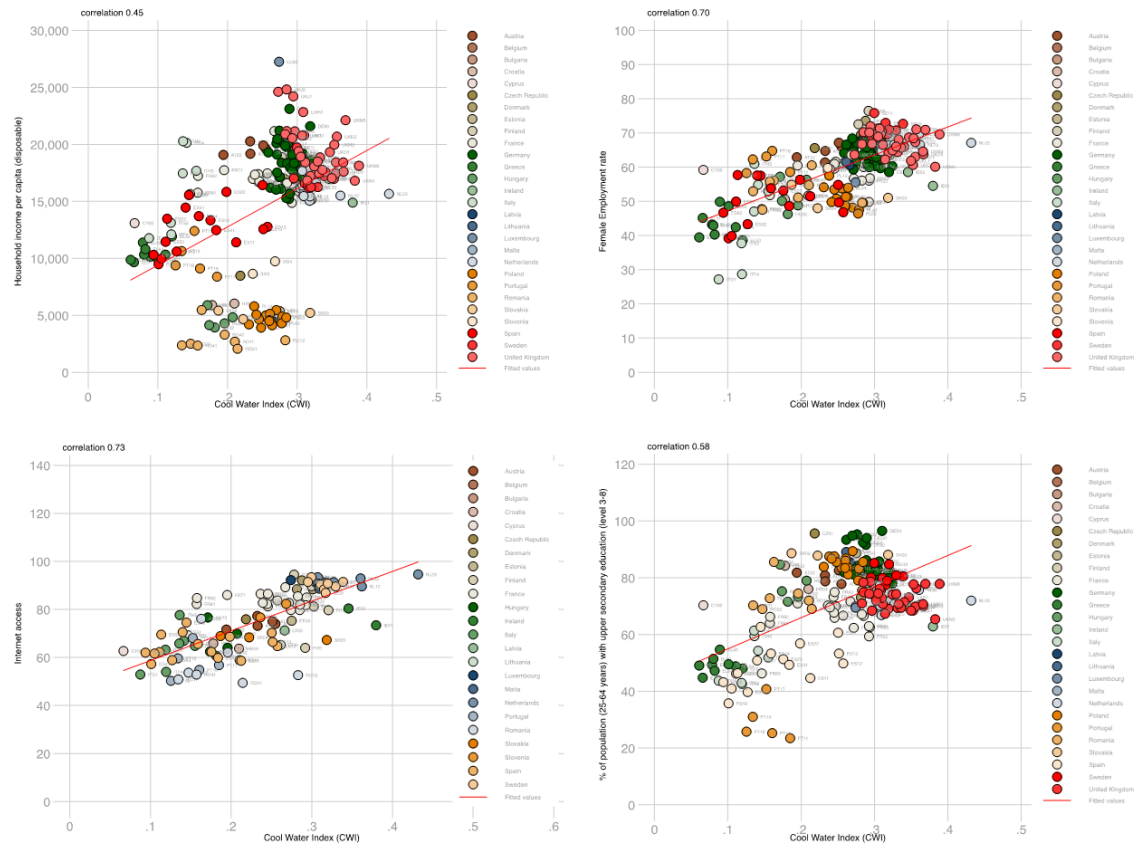
Education



Notes: Data on socio-economic development are averaged over the period 2000 to 2016. Source: Eurostat.

Interpretation: The differentiation of the European Union's NUTS -II provinces over developmental outcomes follows a West-East and North-South gradient, showing better results North - and Westwards.

SOM-Figure S3-36. The CW-Condition and Socioeconomic Development across the EU's NUTS-II Provinces

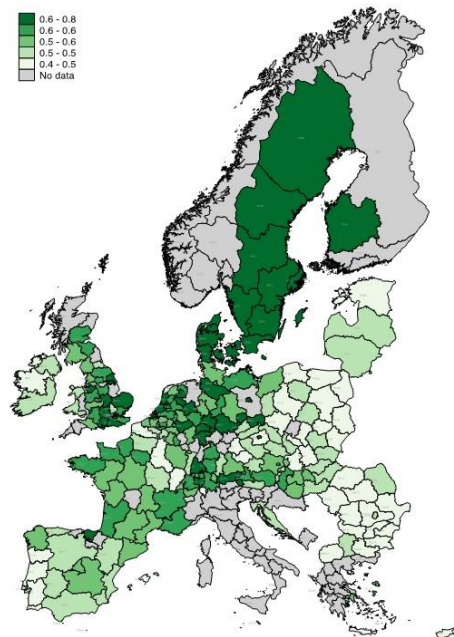


Notes: Correlation of CWI with income, education and infant mortality (2000-2016) across NUTS-II regions.

Interpretation: EU subnational NUTS-II provinces with a stronger CW-Condition are economically more advanced in all core aspects of human development.

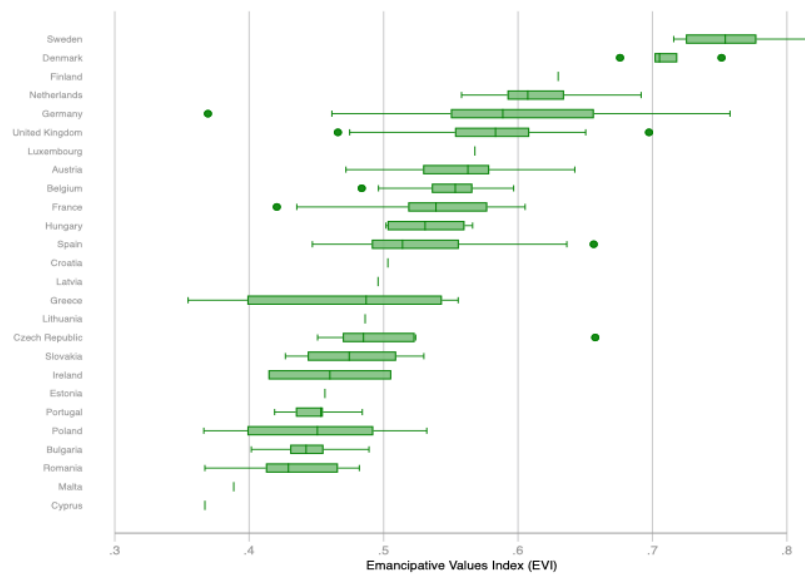
SOM-Figure S3-37.
The Topography of
Emancipative Values across
NUTS-II Regions

Interpretation: The differentiation of the European Union's NUTS-II provinces over emancipative values follows a West-East and North-South gradient, with emancipative values growing stronger North- and Westwards.



Note: Emancipative Values Index (EVI). Source: European Values Survey 2008-2009.

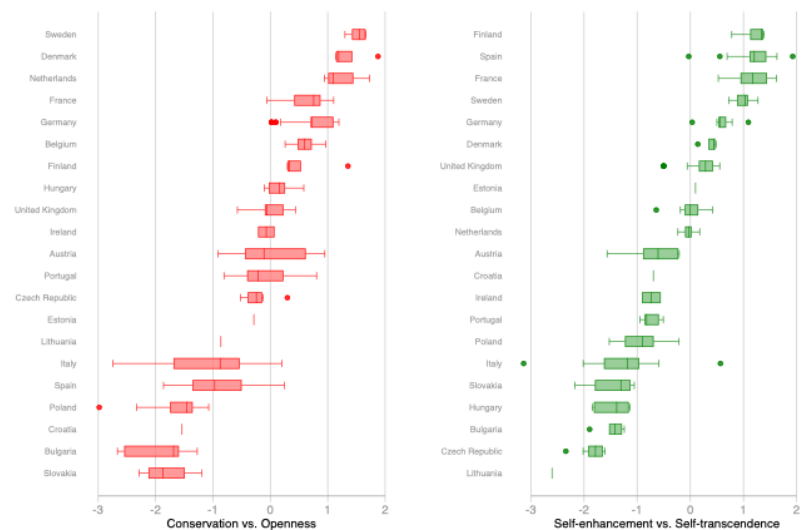
SOM-Figure S3-38. Province-Level Variation in Emancipative Values by EU-Country



Note: Emancipative Values Index (EVI). Source: European Values Survey 2008-2009 (not imputed).

Interpretation:
By far most of the cross-provincial variation in emancipative values is between rather than within countries.

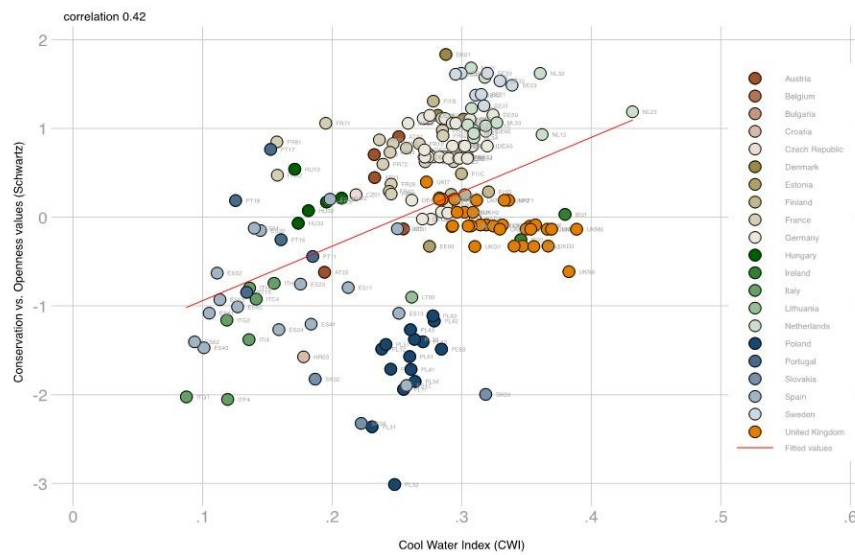
SOM-Figure S3-39. Province-Level Variation in Transcendence and Openness Values by EU-Country



Source: European Social Survey 2010-2016.

Interpretation:
By far most of the cross-provincial variation in transcendence and openness values is between rather than within countries.

SOM-Figure S3-40. The CW-Condition and Conservation-vs.-Openness Values

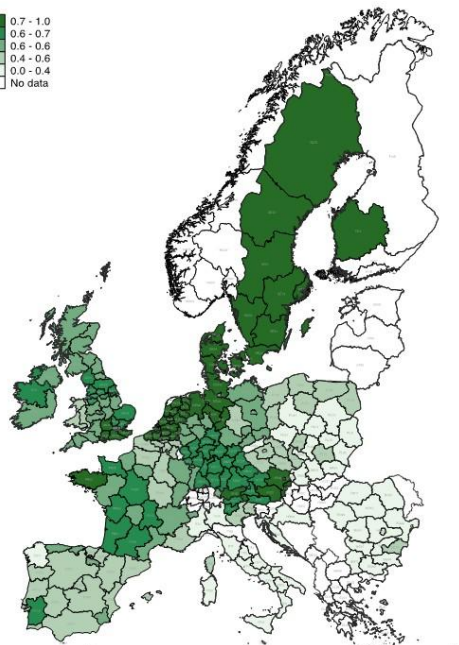


Interpretation: Cross-provincial variation among the EU's NUTS-II units' CW-condition significantly predicts corresponding variation in openness values.

SOM-Figure S3-41.
The Topography of Impartial
Governance across subnational
NUTS-II Provinces

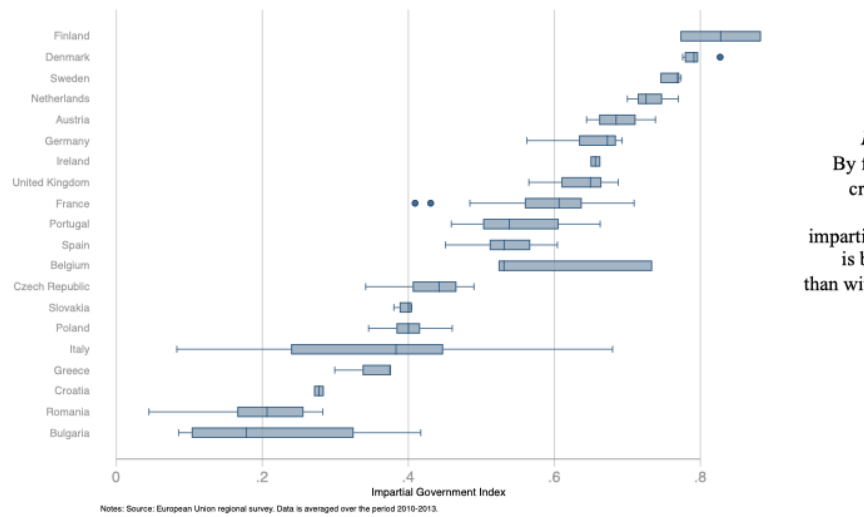


Interpretation: The
differentiation of the
European Union's
NUTS-II provinces
over impartial
governance follows a
West-East and North-
South gradient, with
better results
North- and Westwards.



Notes: Impartial Governance Index (2010-2013). Data for BE, DE, EL, GR, SE and UK are interpolated from the NUTS-I level.

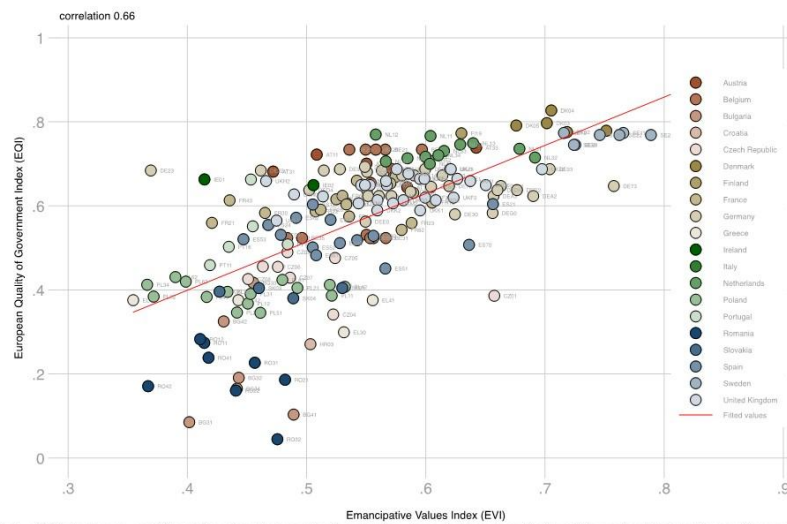
SOM-Figure S3-42. Province-Level Variation in Impartial Governance by EU-Country



Interpretation:
By far most of the
cross-provincial
variation in
impartial governance
is between rather
than within countries.

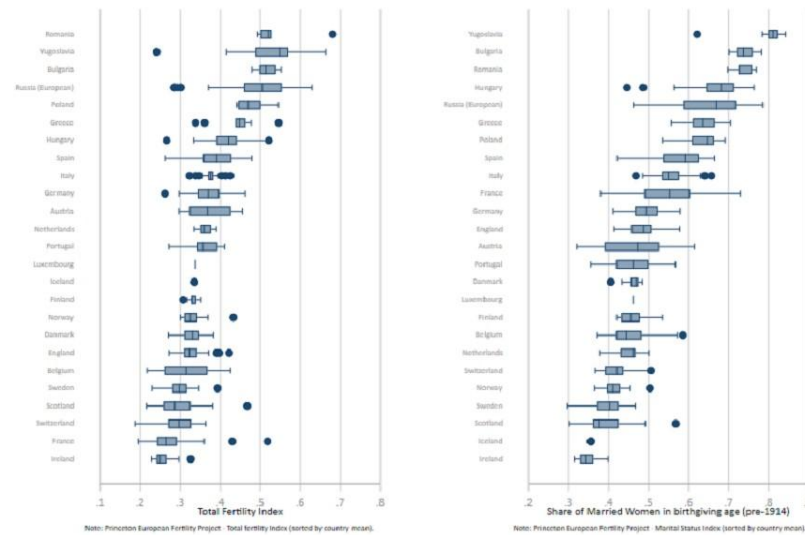
Notes: The IGI and its sub-indicators of perceived corruption, impartiality and quality in public service delivery. Source: European Union regional survey.

SOM-Figure S3-43. Emancipative Values and Impartial Governance across the EU's NUTS-II Provinces



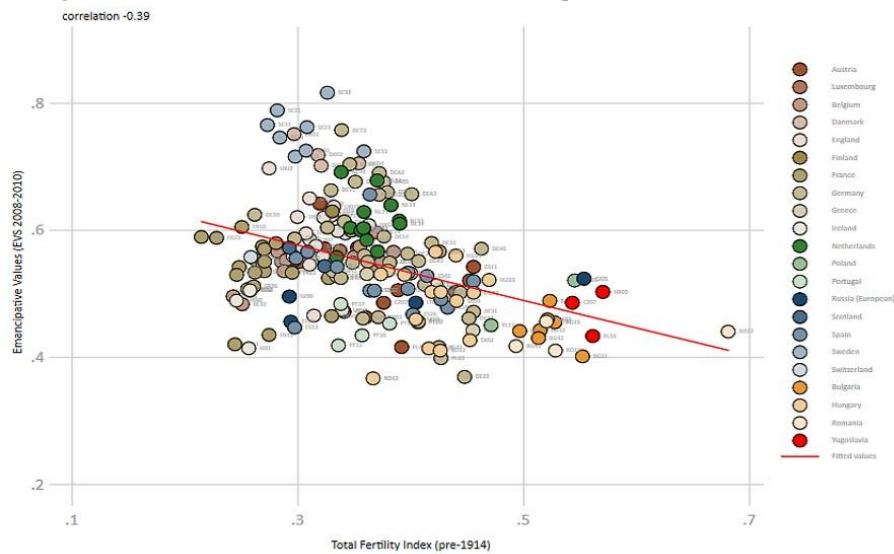
Interpretation: Cross-provincial variation among the EU's NUTS-II units' emancipative values significantly predicts corresponding variation in impartial governance.

SOM-Figure S3-44. European Provincial Variation in Historic Female Fertilities and Marriage Ages by Country



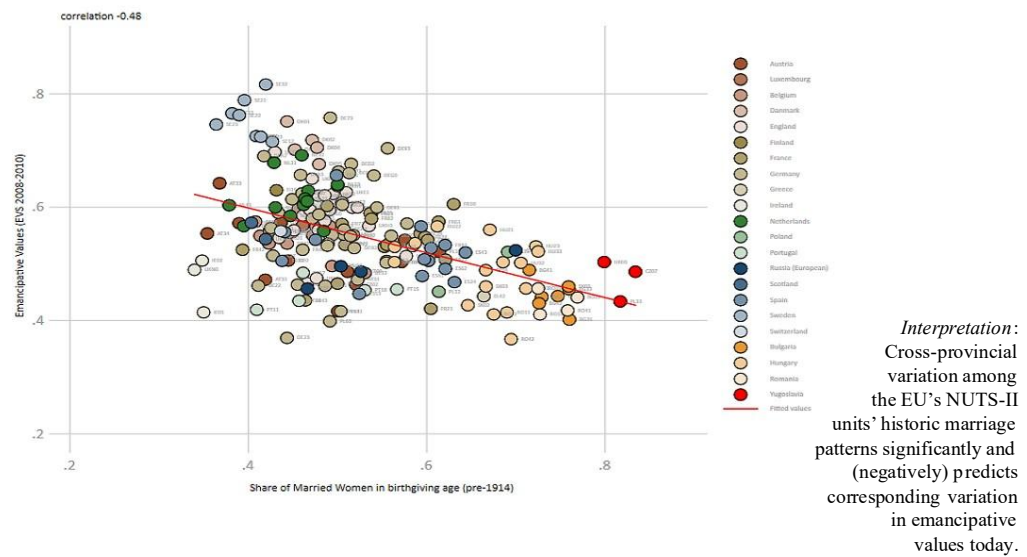
Interpretation: By far most of the cross-provincial variation in historic family and fertility patterns is between rather than within countries.

SOM-Figure S3-45. Historic Female Fertilities and Emancipative Values across the EU's NUTS-II Provinces

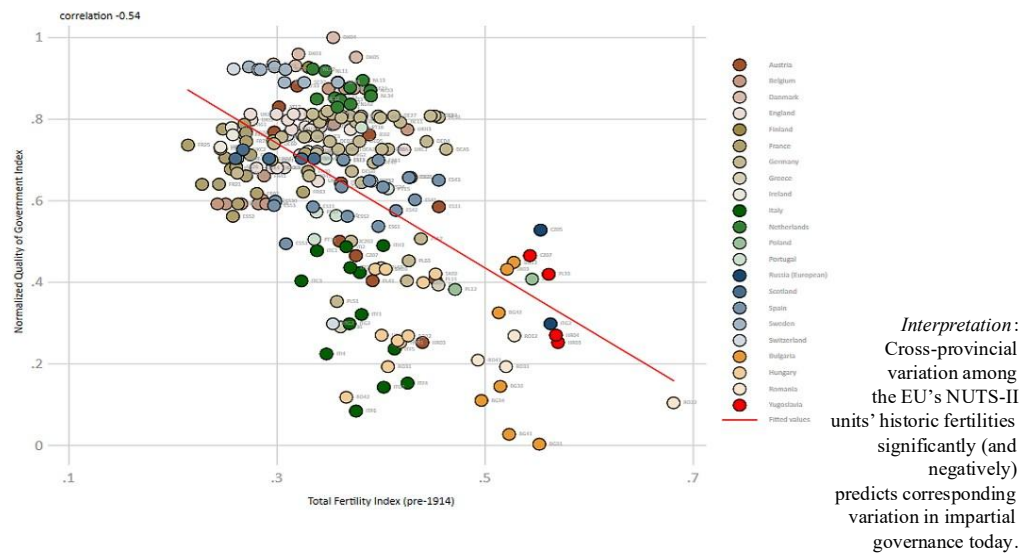


Interpretation: Cross-provincial variation among the EU's NUTS-II units' historic fertilities significantly (and negatively) predicts corresponding variation in emancipative values today.

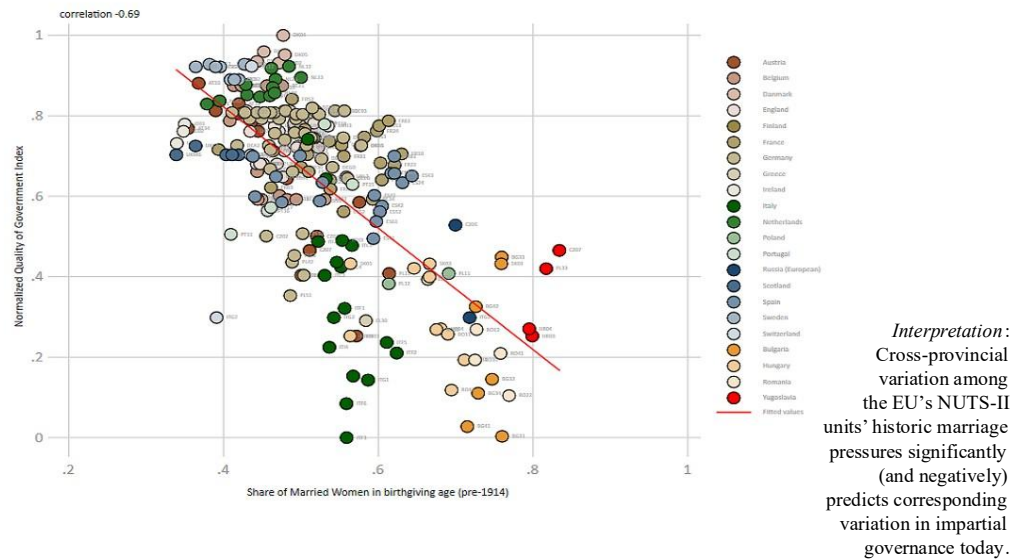
SOM-Figure S3-46. The Historic Share of Married Women and Emancipative Values across the EU's NUTS-II Provinces



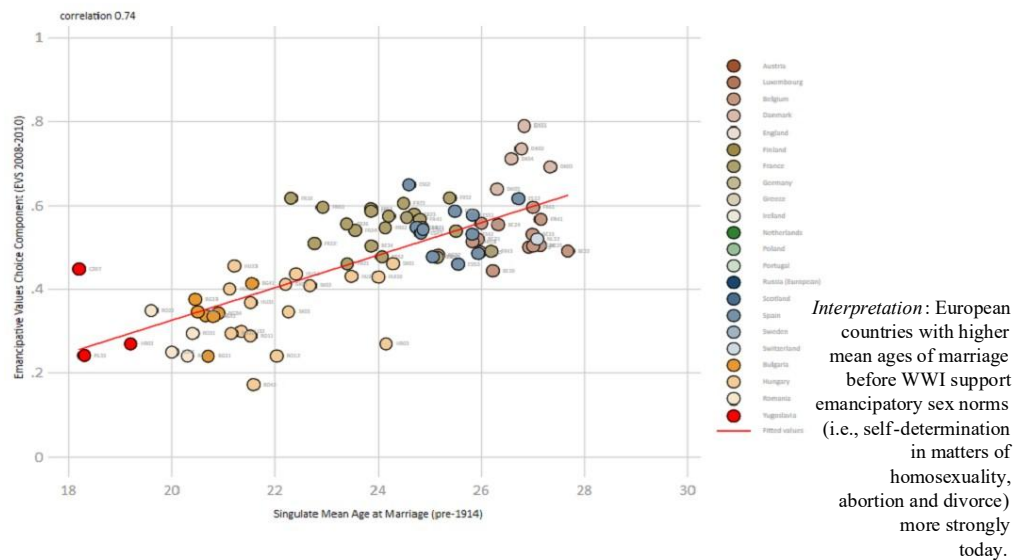
SOM-Figure S3-47. Historic Female Fertilities and Impartial Governance across the EU's NUTS-II Provinces



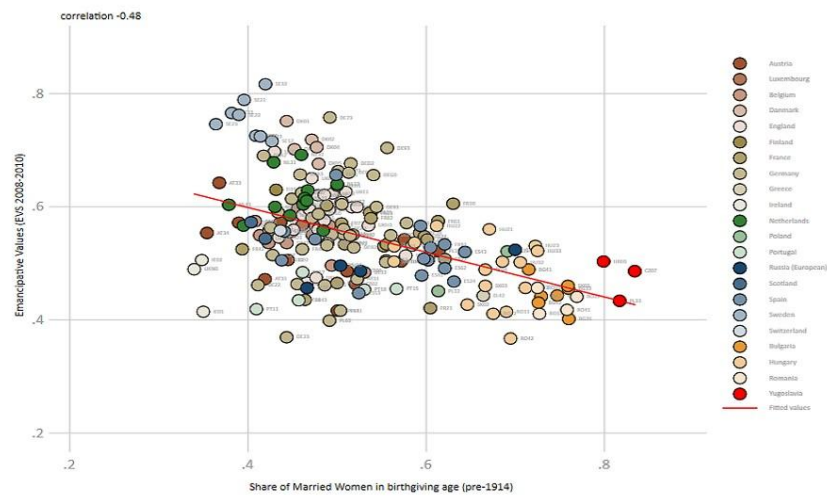
SOM-Figure S3-48. The Historic Share of Married Women and Impartial Governance across the EU's NUTS-II Provinces



SOM-Figure S3-49. Historic Female Marriage Ages and Emancipative Values across EU-Countries

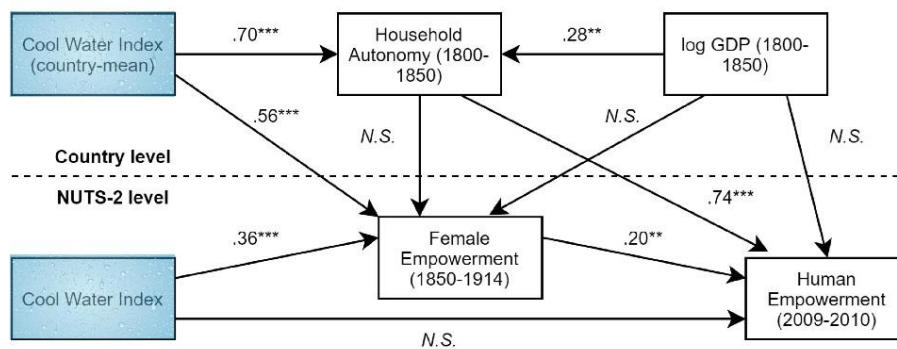


SOM-Figure S3-50. The Historic Share of Married Women and Emancipative Values across the EU's NUTS-II Provinces



Interpretation:
Cross-provincial
variation among
the EU's NUTS-II
units' historic marriage
ages significantly (and
negatively) predicts
corresponding variation
in emancipative
values today.

SOM-Figure S3-51. Path Model from the CW-Condition to Female Autonomy to Present-Day Human Empowerment



Notes Country-level variables are grand-mean centered. Standardized coefficients shown. Female Empowerment is the (inverted) arithmetic mean of the Total Fertility Index (TFI) and the Marriage Share Index (MSI). Human Empowerment is the arithmetic mean of the Emancipative Values Index (EVI), the Impartial Governance Index (IGI) and Female Employment Rate (FER). Insignificant path from country-level CWI to logged GDP not shown. Explained variance on the between level: Logged-GDP 6%, HA 67%, HE 61%, FE 35%; Within level: HE 4%, FE 13%.

SOM-Table S3-5. Cross-Provincial Correlations between the CW-Condition and Socioeconomic Development

	CWI
(Disposable) Household income per capita	.45***
Female employment rate (in % of total)	.70***
Infant mortality rate	-.23***
Internet access (in % of households)	.73***
Upper secondary education (in % of population between 25-64 years)	.58***

Note: NUTS-II regions 276<=N<=299. * $p < .05$, ** $p < .01$, *** $p < .001$. Data on socio-economic development are averaged over the period 2000 to 2016.
Source: Eurostat. Data on cool water conditions are averaged over 1950-2017.

SOM-Table S3-6. Correlations between Schwartz Values and Emancipative Values

	EVI	Choice	Voice	Autonomy	Equality
Conservation-vs.-Openness values	.67***	.57***	.48***	.35***	.41***
Self-enhancement-vs.-Self-transcendence	.41***	.48***	.26***	.11	.26***
N	266	266	267	266	267

Notes: Schwartz values are aggregated from European Social Survey 2010-2016. Emancipative values are aggregated from European Values Survey 2008-2009. * $p < .05$ ** $p < .01$ *** $p < .001$.

SOM-Table S3-7. Correlations between Emancipative Values and Impartial Governance

	IGI	Anti-corruption	Impartiality	Quality
EVI	.66***	.62***	.56***	.46***
Autonomy	.26***	.21**	.32***	.16*
Equality	.45***	.41***	.29***	.30***
Voice	.42***	.44***	.45***	.46***
Choice	.58***	.48***	.40***	.32***
N	255	255	255	255

Notes: IGI (also known as EQI) and its sub-indicators of anti-corruption, impartiality and quality in public service delivery. Source: European Union Regional Survey. IGI Data are averaged over the period 2010-2013. Emancipative values are aggregated from the European Values Study 2008-2009. * $p < .05$ ** $p < .01$ *** $p < .001$.

SOM-Table S3-9. Multilevel Model Explaining Perceived Impartial Governance

Impartial Government Index						
Country Level						
CWI	2.42**	4.25***		2.49**	4.32***	2.27*
	(1.188)	(0.986)		(1.221)	(1.007)	(1.203)
EVI	1.76**		2.90***	1.77**		2.63**
	(0.802)		(0.648)	(0.830)		(1.195)
EVI#CWI						-13.34
						(13.717)
NUTS II Level						
CWI	0.27	0.27	0.28	0.30	0.30	0.30
	(0.225)	(0.224)	(0.225)	(0.196)	(0.196)	(0.196)
EVI	0.24	0.23	0.25	0.29	0.29	0.29
	(0.236)	(0.236)	(0.236)	(0.206)	(0.206)	(0.206)
Individual Level						
eqi_gender	0.04***	0.04***	0.04***			
	(0.011)	(0.011)	(0.011)			
2.eqi_education_cl	0.06***	0.06***	0.06***			
	(0.013)	(0.013)	(0.013)			
3.eqi_education_cl	0.09***	0.09***	0.09***			
	(0.018)	(0.018)	(0.018)			
2.eqi_age_cl	0.05***	0.05***	0.05***			
	(0.016)	(0.016)	(0.016)			
3.eqi_age_cl	0.10***	0.10***	0.10***			
	(0.017)	(0.017)	(0.017)			
4.eqi_age_cl	0.22***	0.21***	0.22***			
	(0.019)	(0.019)	(0.019)			
2.eqi_income_cl	0.05***	0.05***	0.05***			
	(0.013)	(0.013)	(0.013)			
3.eqi_income_cl	0.09***	0.09***	0.09***			
	(0.018)	(0.018)	(0.018)			
Constant	-0.23***	-0.23***	-0.21***	-0.06	-0.06	-0.02
	(0.057)	(0.065)	(0.063)	(0.056)	(0.065)	(0.071)
Observations	16,344	16,344	16,344	18,601	18,601	18,601
Number of groups	14	14	14	14	14	14
chi2	779.2	1269	833.2	941.7	1490	906.1
p_chi2	0	0	0	0	0	0
AIC	34822	34824	34823	39771	39773	39772
BIC	34945	34939	34939	39834	39828	39843
Log-Likelihood	-17395	-17397	-17397	-19878	-19880	-19877
var_random_intercept_i3	0.0359	0.0495	0.0463	0.0394	0.0530	0.0367
var_random_intercept_i2	0.00643	0.00642	0.00647	0.00451	0.00450	0.00451
var_residual	0.487	0.487	0.487	0.492	0.492	0.492

Notes: Random Intercept Model. Standard errors in parentheses *** $p < 0.01$, ** $p < .05$, * $p < .1$

S4 The Human Empowerment Index (HEI)

S4.1 The Overall Human Empowerment Index (HEI)

This section describes the main dependent variable of the book manuscript, the Human Empowerment Index (HEI), and its components. The HEI intends to indicate human emancipation in a most encompassing manner, showing how free people in given societies are from existential, motivational and institutional constraints on how to shape their lives. In other words, we measure the extent to which people in different societies are empowered to utilize the most highly evolved human quality: *individual agency*. This is also our quintessential understanding of human *emancipation*.

To do so, the HEI summarizes three components: (1) Action Resources (AR) measure individuals' freedom from *existential* constraints in the *material* domain of social reality; (2) Emancipative Values (EV) measure their freedom from *motivational* constraints in the *mental* domain of social reality; and (3) Civic Entitlements (CE) measure individuals' freedom from *legal* constraints in the *institutional* domain of social reality. These three liberating elements, in turn, each emerge from a combination of ingredients, which we describe point by point below.

We situate measures of the HEI, AR, EV and CE within the latest version (version 12 as of February 2022) of the V-Dem dataset (www.vdem-net.org), which includes almost 30,000 country-year observations, covering some 200 countries in annual observations from 1789 till 2018, with varying numbers of countries per year depending on which countries were sovereign political entities at a given time (Coppedge et al. 2020). For now, it should suffice to note that country-year observations of the three components of the HEI, covering 170 countries and 218 years from 1800 to 2018, correlate pairwise with each other at $r = .73$ (N varying from 6,652 to 24,350). Accordingly, the three components of the HEI reflect a single underlying dimension with factor loadings of .97 (EV), .93 (AR) and .91 (CE). The mono-dimensionality of the three components justifies summarizing them in a single factorial measure, calculating for each country-year observation a weighted average across the three components that takes into account each component in proportion to its contribution to the shared variance (as indicated by the factor loadings).

We conduct this procedure across the pooled country-year dataset by using the SPSS factor extraction algorithm, which produces for each country-year observation a z -standardized factor score, with a global mean of 0 and standard deviation of 1. For ease of interpretation, we normalize these factor scores into a range from 0 (for the lowest ever observed HEI) to 1.0 (for the highest one). Intermediate scores are represented by decimal fractions between 0 and 1, indicating proportional closeness/remoteness to the observed minimum or maximum of the HEI on a country-by-year basis.

Before implementing these computations, we perform a missing value replacement procedure to avoid losing entire observations through listwise case deletion when just one of the three indicators is missing. In scenarios in which single indicators are such reliable linear representatives of each other, deleting an entire observation because only one of the indicators is missing means to waste information and to unnecessarily deflate statistical power through case loss. Therefore, we replace missing values when measures for one of the three indicators are absent with predicted values from the available two indicators, using linear regression. Given the three components' strong linear dependence on each other, our missing value replacement produces very reliable estimates, visible in a correlation between predicted and observed scores of $r = .95$.

SOM-Table S4-1. The Human Empowerment Index (HEI)

CATEGORY:	CONTENT:
Concept	Human Empowerment Index
Meaning	Extent to which people are empowered existentially, motivationally and institutionally to practice freedoms in pursuing their lives.
Components	• Action Resources (AR) - existential • Emancipative Moral Index (EV) - motivational • Civic Entitlements (CE) - institutional
Factor loadings	.97 EV .93 AR .91 CE
Explained variance	88%
Cronbach's alpha	.88
Source	AR and CE: V-Dem (www.v-dem.org) (Coppedge et al. 2020); EV: EVS/WVS (www.worldvaluessurvey.org) (Haerpfer et al. 2020).
Observations	24,350 country-by-year observations, 170 countries and 21 sub-national independent entities (until 1866 and 1871, respectively) over 218 years from 1800 till 2018 (number of countries varying by year, depending on the number of sovereign states at a time).

Note: Computation syntax is documented in *SOM-Section S16*.

S4.2 The HEI-Components

S4.2.1 ACTION RESOURCES (AR)

The concept of Action Resources (AR) intends to indicate human emancipation in the *sub-sistential* domain of social reality, showing how free the people in given societies are from *existential* constraints on how to shape their lives, assuming that longer lives, higher incomes, more education, lesser inequalities and lower fertilities work together to reduce these existential constraints and allowing people to orient their lives toward long-term investments into wealth, health and skills. We call these assets “action” resources because their inclusion into individuals’ disposal expands the repertoire of actions that they can choose to pursue.

Thus, AR summarizes five indicators: life expectancy (“life”), per capita GDP (“gdp”), schooling years (“edu”), educational equality (“igini”) and inverted female fertility (“ifert”). These indicators are all included in the V-Dem dataset in country-by-year observations and retrieved from multiple sources. Country-year observations of the five indicators of the AR, covering 170 countries and 218 years from 1800 till 2018, correlate pairwise with each other at a strength that varies from $r = .72$ to $r = .88$ (N varying from 7,395 to 13,909). Accordingly, the five indicators of the AR reflect a single underlying dimension with factor loadings of .96 (“edu”), .93 (“ifert”), .92 (“life”), .91 (“igini”) and .88 (“gdp”). The mono-dimensionality of the five indicators justifies to summarize them in a single factorial measure, calculating for each country-year observation a weighted average across the five indicators that takes into account each component in proportion to its contribution to the shared variance (as indicated by the factor loadings).

We conduct this procedure across the pooled country-year dataset by using the SPSS factor extraction algorithm, which produces for each country-year observation a z -standardized factor score, with a global mean of 0 and standard deviation of 1. For ease of interpretation, we normalize these factor scores into a range from 0 for the lowest ever observed AR to 1.0 for the highest one. Intermediate scores are represented by decimal fractions between 0 and 1, representing proportional closeness/remoteness to the observed minimum or maximum of the AR on a country-by-year basis.

Before implementing these computations, we perform a missing value replacement procedure to avoid losing entire observations through listwise deletion when just one of the five indicators is missing. In scenarios in which single indicators are such reliable representatives of each other, deleting an entire observation because only one of the indicators is missing is wasting information and unnecessarily deflating statistical power through case loss. Therefore, we replace missing values when measures for one of the indicators is absent with predicted values from the available indicators, using linear regression.

SOM-Table S4-2. Action Resources (AR)

CATEGORY:	CONTENT:
Concept	Action Resources
Meaning	Extent to which absence of material constraints enable people to invest into their wealth, skills and health.
Components	• Life expectancy (“life”) • Schooling years (“edu”) • GDP p.c., logged (“gdp”) • Educational equality (“igini”) • Female fertility, inv. (“ifert”)
Factor loadings	.98 edu .97 ifert .95 life .93 gdp .93 igini
Explained variance	91%
Alpha	.71
Source	V-Dem (www.v-dem.org) (Coppedge et al. 2020).
Observations	<i>Originally:</i> 24,029 country-by-year observations, 170 countries over 218 years from 1800 till 2018 (number of countries varying by year, depending on the number of sovereign states at a time). <i>After</i> replacing missing values with predicted values obtained by regressing AR on CE (to obtain scores for historically sovereign sub-national entities in Germany and Italy): 27,109 country-by-year observations, covering 170 countries and 21 sub-national independent entities (until 1866 and 1871, respectively) over 218 years from 1800 till 2018 (number of countries varying by year, depending on the number of sovereign states at a time).

Notes: Computation syntax is documented in SOM-Section S16.

S4.2.2 EMANCIPATIVE VALUES (EV)

The concept of Emancipative Values by Welzel² intends to indicate human emancipation in the *mental* domain of social reality, showing how free the people in given societies are from *motivational* constraints on how to shape their lives. We assume that a stronger valuation of universal freedoms embodies a stronger motivation to live one's life in a self-determined fashion, thus utilizing one's human agency more purposefully. EV use representative survey data from the existing seven waves of the European Values Study (www.evs.org) and World Values Surveys (www.worldvaluessurvey.org) to measure people's valuation of universal freedoms.³ To do so, we summarize EVS/WVS responses to a total of twelve items, which group into four themes, each consisting of three items: (1) *reproductive choice* (support for homosexuality, abortion and divorce as tolerable things), (2) *gender equality* (support for females' equal access to education, jobs and politics), (3) *child autonomy* (support for autonomy and imagination but not obedience as desired child qualities), (4) *people's voice* (support for freedom of speech, people's say in national affairs and people's say in local and job affairs).

Thus, EV summarizes four multi-point sub-indices, each standardized into a score range from minimum 0 to maximum 1, with multiple decimal fractions indicating intermediate positions: in short, "choice," "equality," "autonomy," and "voice." Across the 443 country-by-wave observations (covering 113 countries and 7 survey waves with varying numbers of countries by survey wave), the pairwise correlations of the four sub-indices vary from $r = .38$ to $r = .79$. Accordingly, the four sub-indices of the EV reflect a single underlying dimension with factor loadings of .93 ("choice"), .91 ("equality"), .80 ("voice") and .58 ("autonomy"). The mono-dimensionality of the five indicators would justify to summarize them in a single factorial measure. However, Welzel (Welzel 2013) introduces the EV using the set-theoretical assumptions of the "formative" (rather than "reflective") index logic. Accordingly, an overarching construct (here, EV) is a *composition* that emerges from the combination of *complementary* components, each of which contributes a unique variance partition to the construct as a whole. For this reason, the unique variance components of the four sub-components of EV should not be weighted down, which is however what happens when calculating a weighted average based on factor loadings. Hence, we follow Welzel and calculate the EV as the arithmetic mean across its four sub-indices, as documented in the command syntax in *SOM-06*. This way, the four sub-indices are *not* weighted down in proportion to the uniqueness of their variance partition. It is worthwhile to note that we execute this procedure with the time- and country-pooled individual-level data, which include 611,404 individual respondents from 113 countries and across seven survey waves. Only then do we aggregate the obtained individual-level EV scores to obtain average population scores on a country-by-year basis, which we then merge into the V-Dem dataset.

² C. Welzel, 2013, *Freedom Rising: Human Empowerment and the Quest for Emancipation*. New York: Cambridge University Press.

³ C. Haerpfer, R. Inglehart, A. Moreno and C. Welzel et al. (eds.), *The World Values Survey Dataset: Time Series 1981-2020* (release version 1.1). Madrid: JD Systems (WVS data archive, online at <http://www.worldvaluessurvey.org/WVSContents.jsp>).

Again, before implementing these computations, we perform a missing value replacement procedure that transposes birthyear differences in individual-level EV-scores in a given country into a series of yearly measures, thus filling missing values in non-covered survey years with backward estimations (as explained in the command syntax section in *SOM-16*). This procedure generates a database consisting of 9,408 country-by-year EV observations, covering 113 countries over 85 years from 1935 to 2020. This method is justified in light of repeatedly validated evidence showing that emancipative values change over time through generational replacement. Because of that, birthyear differences in individual-level EV-scores from a recent survey embody the footprints of generational value change in the past, which allows us to validly transpose birthyear differences in a cross-section into longitudinal differences that represent the same data in an annual time series.

Confirming this premise, truly observed country-year scores on EV correlate with the backwardly estimated EV-scores at $r = .95$ ($N = 437$), showing that the backward estimates are very precise approximations to the real scores. This precision is striking, given that backward estimated EV-scores in a given country-year are not estimated from the same people. Indeed, since the EVS/WVS are not panel surveys (in which the same individuals are repeatedly interviewed over regular time intervals), correlating the estimated EV-scores with the truly observed EV-scores is matching scores from different respondents from different surveys at different times. And yet, the estimated scores match the truly observed ones with striking precision.

Even after backward estimations, we have less than half as many observations on a country-by-year basis for EV compared to the other two components of the HEI: AR and CE. Thus, we replace missing EV scores with predicted scores, which we obtain by regressing EV on AR and CE with the country-year data. We document the technical details of this procedure in *SOM-16*. Given the strong linear dependence of EV on AR and CE, this procedure is appropriate to avoid losing too many observations.

SOM-Table S4-3. Emancipative Values (EV)

CATEGORY:	CONTENT:
Concept	Emancipative Values
Meaning	Extent to which people endorse and pursue freedom of choice and equal opportunities in their lives.
Components	• Reproductive choice (“choice”) • Gender equality (“equality”) • People’s voice (“voice”) • Child autonomy (“autonomy”)
Factor loadings	.93 choice .91 equality .80 voice .58 autonomy
Explained variance	67%
Alpha	.83
Source	EVS/WVS (www.worldvaluessurvey.org) (Haerpfer et al. 2020).

Observations *Originally*: 443 country-by-wave observations, covering 113 countries and 7 survey waves (number of countries varying by year). *After* backward estimations (as explained above), we obtain 9,408 country-by-year observations, covering 113 countries over 85 years from 1935 till 2020 (number of countries varying by year, depending on the number of sovereign states at a time). *After* replacing missing values with predicted values obtained by regressing EV on AR and CE: 27,109 country-by-year observations, covering 170 countries and 21 sub-national independent entities (until 1866 and 1871, respectively) over 220 years from 1800 till 2020 (number of countries varying by year, depending on the number of sovereign states at a time).

Notes: Computation syntax is documented in *SOM-Section SI6*.

S4.2.3 CIVIC ENTITLEMENTS (CE)

The concept of Civic Entitlements (CE) intends to indicate human emancipation in the *institutional* domain of social existence, showing how free the people in given societies are from *legal* constraints on how to shape their lives, assuming that electoral participation, civil liberties and rule of law work together to reduce these legal constraints and allow people to shape their lives in a self-determined manner.

Using data from the *Varieties of Democracy (V-Dem)* project (www.vdem.net)⁴, the CE summarizes two groups of indicators: (1) the liberal element (“liberal”), which comprises civil liberties, power separation and rule of law; and (2) the electoral element (“electoral”), which includes suffrage, electoral contestation and assemblies with legislative power. CE-scores are available for 27,109 country-by-year observations, covering 170 countries and 21 sub-national independent entities (until 1866 and 1871, respectively) over 229 years from 1789 till 2018 (number of countries varying by year, depending on the number of sovereign states at a time). Across these observations, the liberal and electoral elements correlate at $r = .85$. Accordingly, the two components reflect a single underlying dimension with factor loadings of .96 for both of them. The mono-dimensionality of the two components justifies to summarize them in a single factorial measure. Since the V-Dem dataset, from which we obtain these measures, already includes a summary of the liberal and electoral component (i.e., a variable named “v2x_libdem”), we simply adopt this measure as our indicator of the CE.

SOM-Table S4-4. Civic Entitlements (CE)

CATEGORY:	CONTENT:
Concept	Civic Entitlements
Meaning	Extent to which people are entitled to exercise civil liberties, empowered to elect representatives and protected from state oppression.
Components	• Civil liberties, power separation, rule of law (“liberal”) • Suffrage, elected assemblies with legislative power (“electoral”)
Factor loadings	.96 liberal element (“liberal”) .96 electoral element (“electoral”)
Explained variance	93%
Alpha	.92
Source	V-Dem (www.v-dem.org) (Coppedge et al. 2020).
Observations	27,109 country-by-year observations, 170 countries and 21 sub-national independent entities (until 1866 and 1871, respectively) over 218 years from 1800 till 2018 (number of countries varying by year, depending on the number of sovereign states at a time).

Notes: Computation syntax is documented in SOM-Section S16.

⁴ S. Lindberg, M. Coppedge and J. Gerring et al. (eds.), 2021, *Varieties of Democracy (V-Dem) Dataset* (release version 20), Gothenburg University: V-Dem Institute (www.vdem-net.org).

S5 Correlates of Human Empowerment (Past and Present)

This table is a slightly re-organized version of SOM-Table S3-4. In spite of this redundancy, we decided to keep the table here, simply to avoid changing the section structure of this SOM shortly before its finalization.

SOM-Table S5-1. Correlations of the Human Empowerment Index with Indicators of Societal Florescence and Societal Misery

VARIABLE	<i>r</i>	<i>N</i>	SOURCE
Gender Empowerment Measure (late 1990s)	.89	67	United Nations Development Program: www.undp.org
Social Cohesion Index (late 1990s)	.88	127	World Bank, social indicators program: www.worldbank.org
Knowledge Society Index (2008)	.87	136	World Bank, KI and KEI program: www.worldbank.org
Citizens' Knowledge of Democracy (2005-15)	.85	95	World Values Surveys: www.worldvaluessurvey.org
Electoral Integrity Index (2010s)	.84	147	Norris (2014), electoral integrity project: www.electoralintegrityproject.com ⁵
Nuclear Families, historic (1800-1850)	.84	146	Dilli (2015) ⁶
Good Society Index (2010s)	.83	147	Holmberg & Rothstein (2018), Quality of Government Institute: www.qog-institute.gu.se ⁷
Gender Inequality Index (2010s)	-.81	144	United Nations Development Program: www.undp.org
Cross-border Communications (late 1990s)	.81	149	Dreher, Gaston & Martens (2010), KOF indicators program (social globalization): https://kof.ethz.ch ⁸
Accident Proneness (late 1990s/early 2000s)	-.80	154	Minkov & Bond (2015) ⁹
Authoritarian Values (2000s)	-.80	31	Murray, Schaller & Suedfeld (2013) ¹⁰
LGBTQ+ Rights (2010s)	.79	85	Wikipedia: https://en.wikipedia.org/wiki/LGBT_rights_by_country_or_territory

to be continued ...

⁵ Norris (op. cit., footnote 1).

⁶ Dilli (op. cit., footnote 1).

⁷ Rothstein and Holmberg (op. cit., footnote 1).

⁸ Dreher, Gaston and Martens (op. cit., footnote 1).

⁹ Minkov and Bond (op. cit., footnote 1).

¹⁰ Murray, Schaller and Suedfeld (op. cit., footnote 1).

... continuation 1 of SOM-Table S5-1:

VARIABLE	R	N	SOURCE
Schooling Years, historic (1900)	.79	75	Murtin (2013) ¹¹
Cousin Marriage, historic (1900)	-.79	108	Woodley & Bell (2013) ¹²
Order and Stability (2010s)	.75	125	World Bank, good governance indicators: www.worldbank.org
Individualistic Orientations (early-mid 1990s)	.74	56	Oishi, Diener, Lucas & Suh (1999) ¹³
Autonomy Orientations (late 1990s-early 2000s)	.74	48	Schwartz et al. (2006) ¹⁴
Infant Mortality Rate (late 1990s)	-.72	165	World Bank, world development indicator series: www.worldbank.org
Pathogen Prevalence, historic (mid 19th century)	-.71	87	Murray & Schaller (2010) ¹⁵
Elite Quality Index (late 2010s)	.71	31	www.elitequality.org
Peace and Security (2010s)	.69	122	World Bank, good governance indicators: www.worldbank.org
Female Wedding Age (late 1990s)	.69	149	World Bank, world development indicator series
Intelligence Quotient (IQ) (mid-late 1990s)	.69	165	Vanhanen & Lynn (2002); Lynn & Vanhanen (2006)
Future Orientations Index (2012)	.68	45	Preis, Moat, Stanley & Bishop (2012)
Children's Rights Index (2010s)	.66	155	www.kidsrights.org
In-group Favoritism (1990s)	-.64	122	Smith (2015)
Social Inclusion Index (late 1990s)	.63	127	World Bank, social indicators program: www.worldbank.org
Settler Mortality Rate, historic (1800)	-.62	60	Acemoglu, Johnson & Robinson (2001)
Female Fertility, historic (1800)	-.61	161	Gapminder: www.gapminder.org

... to be continued

¹¹ Murtin (op. cit., footnote 1).¹² Woodley and Bell (op. cit., footnote 1).¹³ Oishi, Diener, Lucas and Suh (op. cit., footnote 1).¹⁴ Schwartz (op. cit., footnote 1).¹⁵ Murray and Schaller (op. cit., footnote 1).

... continuation 2 of SOM-Table S5-1:

VARIABLE	<i>R</i>	<i>N</i>	SOURCE
Digit Ratio (late 1990s-2010s)	-.63	29	Miscellaneous internet sources
Out-group Trust (2005-15)	.60	70	World Values Surveys: www.worldvaluessurvey.org
Lactose Tolerance (2000s)	.58	130	Cook (2014)
Infant Mortality, historic (1800)	-.59	162	Gapminder: www.gapminder.org
Environmental Performance Index (2000s)	.48	40	Yale University, environmental performance program: www.yale.edu
Life Satisfaction (2005-15)	.45	100	World Values Surveys: www.worldvaluessurvey.org

Notes: Table shows correlations of the HEI with country-level indicators of societal florescence (positive signs) and societal misery (negative signs): Lines appear in descending order of the magnitude of *r* (Pearson correlation).

S6 Correlates of the CW-Condition (Past and Present)

S6.1 *Pre- and Post-Industrial Human Empowerment*

SOM-Tables S6.1-1 and S6.1-2 document that both the CW-Condition (CWC) and the Western Church Exposure (WCE) [from Schulz et al. (2019)] correlate significantly and positively with the first measure of human empowerment in 1800 as well as with the last measure in 2018. Yet, in both cases, under mutual control the WCE turns insignificant, while the CWC remains highly significant. This result repeats itself for any given year between 1800 and 2018.

SOM-Table S6.1-1. Regressing the HEI 2018 on CWC and WCE

OUTCOME VARIABLE: Human Empowerment Index, 2018 (<i>SOM- S3-1</i>)		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.85***	.82 (.82)***
WCE	.43***	.08 (.14)
Constant		.41***
<i>N</i>		168
Adj. <i>R</i> ²		.73
<i>Note:</i> Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * <i>p</i> < .05, ** <i>p</i> < .01, *** <i>p</i> < .005.		

SOM-Table S6.1-2. Regressing the HEI 1800 on CWC and WCE

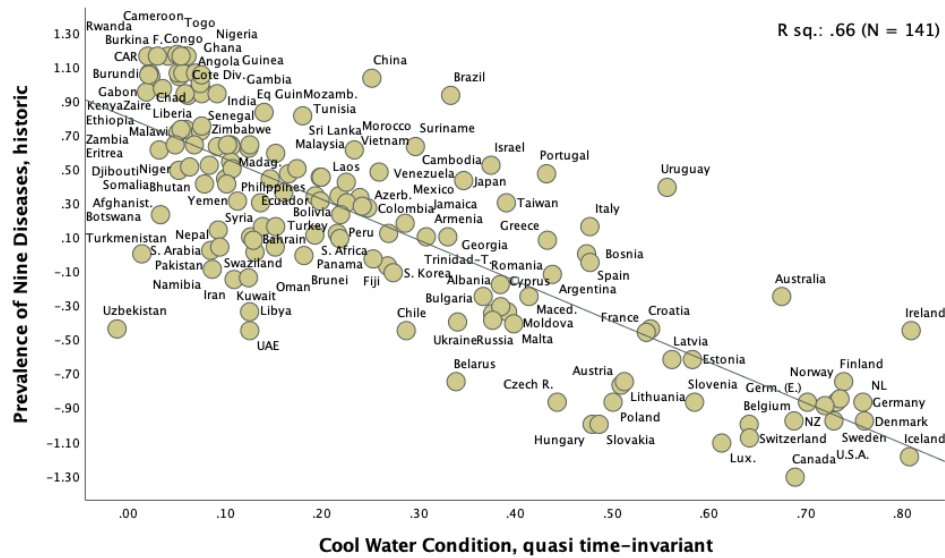
OUTCOME VARIABLE: Human Empowerment Index, 1800 (<i>SOM- S3.1</i>)		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.84***	.70 (.53)***
WCE	.77***	.16 (.14)
Constant	.15***	
<i>N</i>	31	
Adj. <i>R</i> ²	.69	

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.2 Pre-Industrial Disease Prevalence

SOM-Figure S6.2-1 shows that the CW-Condition has a significant and depressing effect on the historic prevalence of diseases.

SOM-Figure S6.2-1. The CW-Condition and Historic Disease Prevalence



Note: Disease data are from Murray and Schaller (2012) and refer to conditions in the early-mid 19th century before the Industrial Revolution brought modern medicine, hygiene and health services.

SOM-Table S6.2-1 documents that the CW-Condition's (CWC) disease-depressing effect is neither absorbed by the Western Church Exposure (WCE) nor by historic levels of per capita income.

SOM-Table S6.2-1. Regressing Historic Disease Prevalence on the CWC, WCE and GDP/p.c.

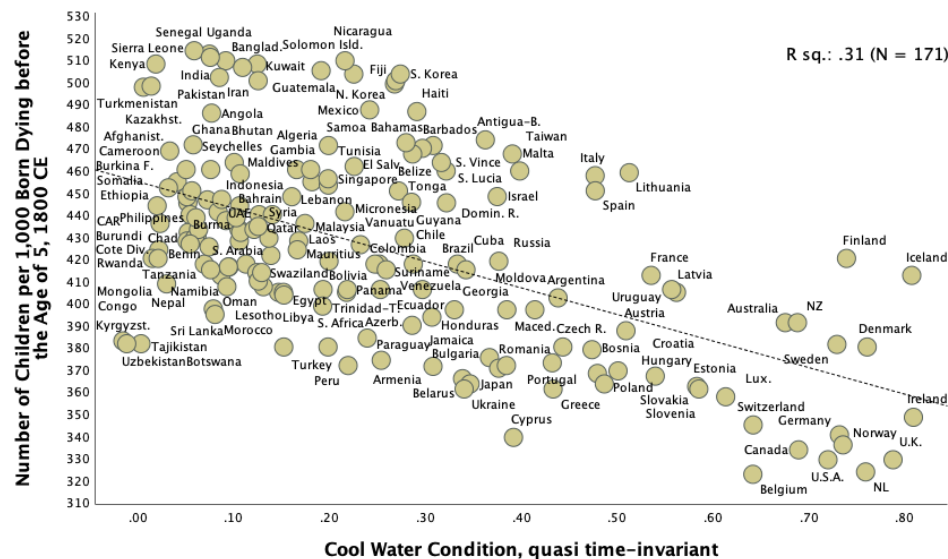
OUTCOME VARIABLE: Historic Prevalence of 9 Diseases		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	-.80***	-.77 (-.66)***
WCE	-.30***	.09 (.14)
GDP/p.c. 1800	-.63***	-.11 (-.13)
Constant	.85***	
<i>N</i>	141	
Adj. <i>R</i> ²	.65	

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.3 *Pre-Industrial Child Mortality*

SOM-Figure S6.3-1 shows that the CW-Condition has a significant and depressing effect on historic infant mortalities.

SOM-Figure S6.3-1. The CW-Condition and Historic Child Mortalities



Note: Infant mortality estimates are from Gapminder (www.gapminder.org) and refer to 1800 CE, that is, before the Industrial Revolution brought modern medicine, hygiene and health services.

SOM-Table S6.3-1 documents that the CW-Condition's (CWC) mortality-depressing effect is neither absorbed by the Western Church Exposure (WCE) nor by historic levels of per capita income.

SOM-Table S6.3-1. Regressing Historic Child Mortality on the CWC, WCE and GDP/p.c.

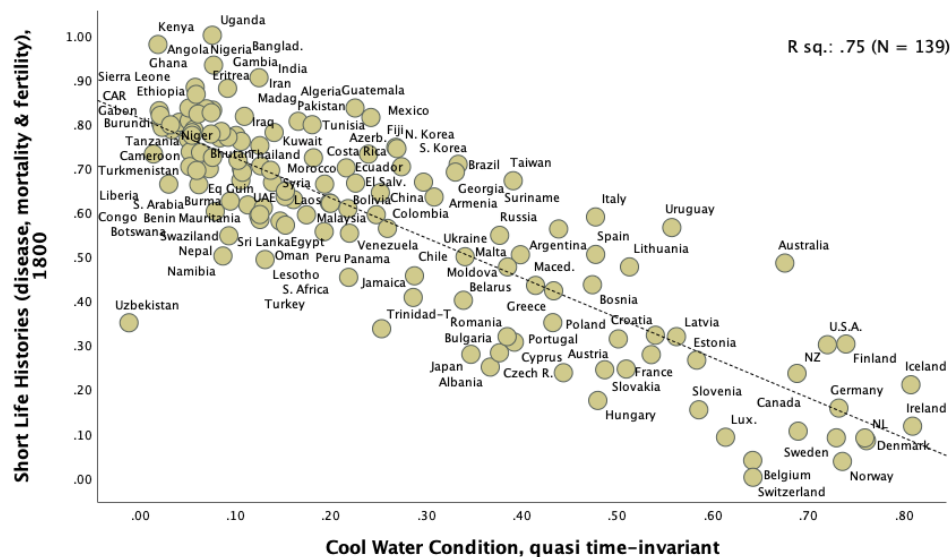
OUTCOME VARIABLE: Number of Children not Surviving the Age of 5 per 1,000 born, 1800		
TREATMENT VARIABLES:	r (bivariate)	β (r_{partial})
CWC	-.56***	-.58 (-.43)***
WCE	-.11*	.17 (.14)**
GDP/p.c. 1800	-.43***	-.07 (-.13)
Constant		455***
N		172
Adj. R^2		.32

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.5 *Pre-Industrial Life Histories* (Short-vs-Long)

SOM-Figure S6.5-1 shows that the CW-Condition has a significant and depressing effect on short life histories.

SOM-Figure S6.5-1. The CW-Condition and Short Life Histories in 1800



Note: Vertical axis is a factorial summary of disease, mortality and fertility estimates from the previous three graphs and refers to 1800 CE, that is, before the Industrial Revolution brought modern medicine, hygiene and health services.

SOM-Table S6.5-1 documents that the CW-Condition's (CWC) depressing effect on short life histories is neither absorbed by the Western Church Exposure (WCE) nor by historic levels of per capita income.

SOM-Table S6.5-1. Regressing Short Life Histories on the CWC, WCE and GDP/p.c.

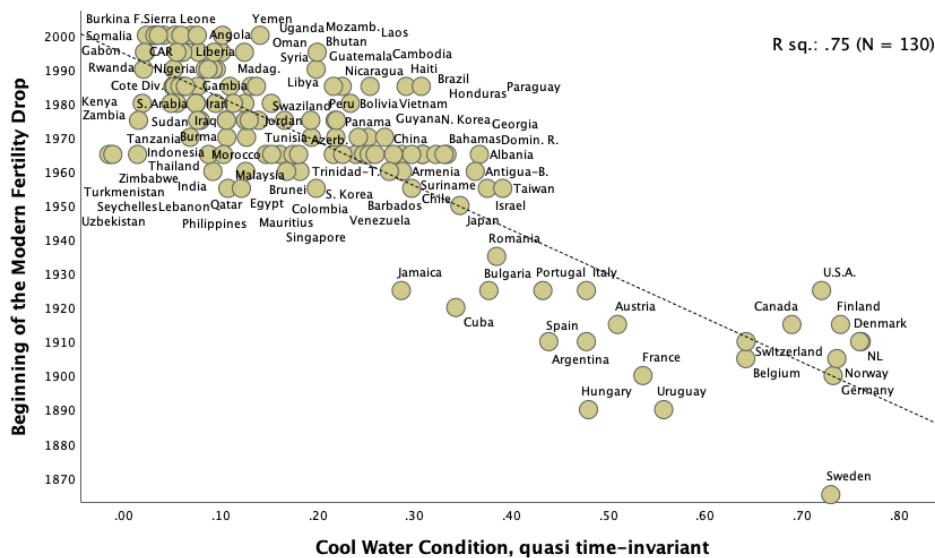
OUTCOME VARIABLE: Disease-Fertility-Mortality Factor, 1800		
TREATMENT VARIABLES:	r (bivariate)	β (r_{partial})
CWC	-.85***	-.76 (-.70)***
WCE	-.38***	.03 (.06)
GDP/p.c. 1800	-.68***	-.14 (-.19)**
Constant		.85***
N		139
Adj. R^2		.73

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.6 The *Timing* of the Modern Fertility Drop

SOM-Figure S6.6-1 shows that the CW-Condition has a significant accelerating effect on the temporal earliness of the modern fertility drop.

SOM-Figure S6.6-1. The CW-Condition and the Onset of the Modern Fertility Drop



Note: Data on the beginning of the modern fertility drop are from Gapminder (www.gapminder.org).

SOM-Table S6.6-1 documents that the CW-Condition's (CWC) accelerating effect on the modern fertility drop is neither absorbed by the Western Church Exposure (WCE) nor by historic levels of per capita income.

SOM-Table S6.6-1. Regressing the Beginning of the Demographic Transition on the CWC, WCE and GDP/p.c.

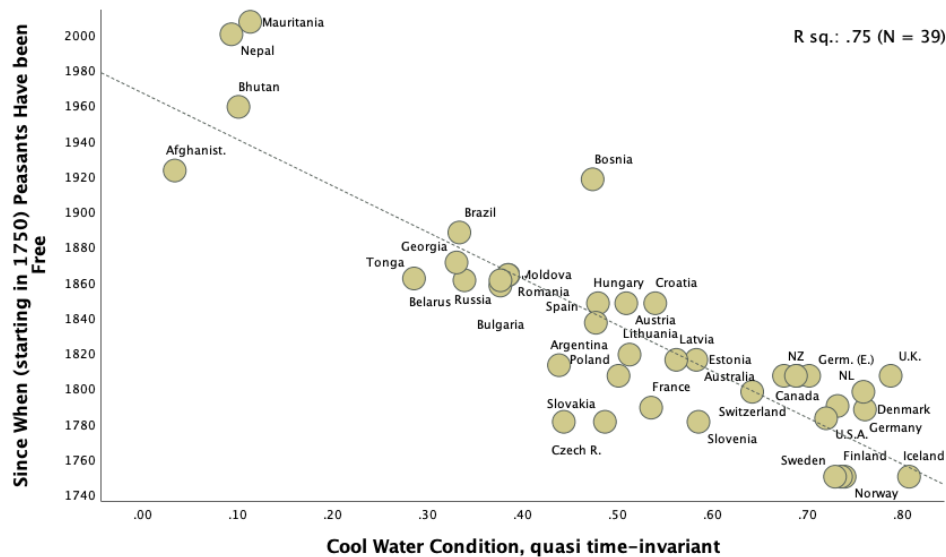
OUTCOME VARIABLE: Year of the Onset of the Modern Fertility Drop		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	-.87***	-.74 (-.66)***
WCE	-.35**	.03 (.06)
GDP/p.c. 1800	-.75***	-.18 (-.22)**
Constant	1999***	
<i>N</i>	130	
Adj. <i>R</i> ²	.76	

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.7 The *Timing* of Decrees of Emancipation

SOM-Figure S6.7-1 shows that the CW-Condition significantly accelerates the temporal earliness of when peasants had been or finally became free through decrees of emancipation.

SOM-Figure S6.7-1. The CW-Condition and Historic Decrees of Emancipation



Note: Data on the timing of decrees of emancipation downloaded from <http://en.wikipedia.org/wiki/Serfdom>.

SOM-Table S6.7-1 documents that the CW-Condition's (CWC) historic emancipatory effect is neither absorbed by the Western Church Exposure (WCE) nor by historic levels of per capita income.

SOM-Table S6.7-1. Regressing the Timing of Emancipatory Decrees on the CWC, WCE and GDP/p.c.

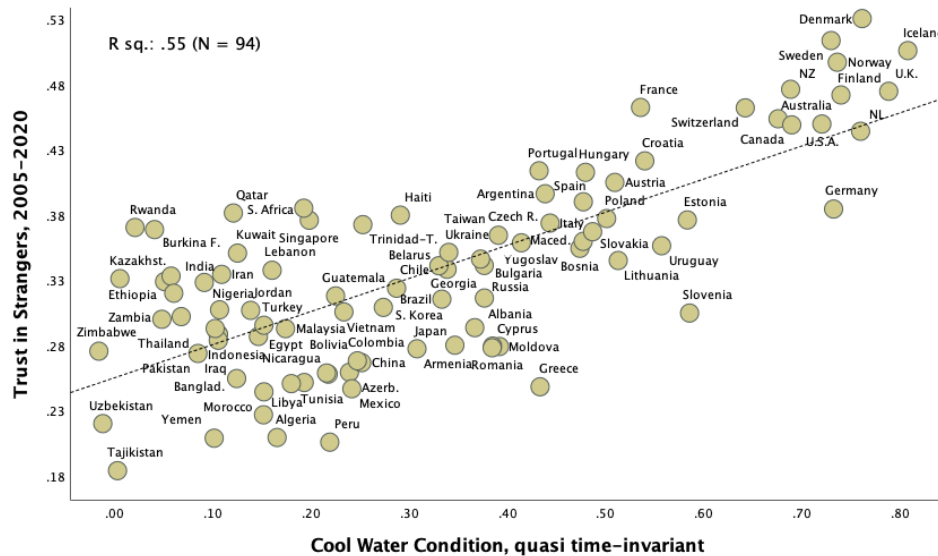
OUTCOME VARIABLE: Year of Emancipatory Decrees since 1750		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	-.89***	-.75 (-.71)***
WCE	-.69***	-.18 (-.25)
GDP/p.c. 1800	-.53***	.01 (.01)
Constant	1964***	
<i>N</i>	39	
Adj. <i>R</i> ²	.75	

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.8 Post-Industrial Trust in Strangers

SOM-Figure S6.8-1 shows that the CW-Condition has a significant strengthening effect on contemporary trust in strangers.

SOM-Figure S6.8-1. The CW-Condition and Contemporary Trust in Strangers



Note: Vertical axis measures trust in “people one meets for the first time,” “people of another religion” and “people of a different nationality,” based on data from the World Values Surveys, rounds 5 (2005-08) till seven (2017-20), released by Haerpfer, Inglehart, Moreno and Welzel et al. (2021), online at www.worldvaluessurvey.org.

SOM-Table S6.8-1 documents that the CW-Condition’s (CWC) strengthening effect on trust in strangers is neither absorbed by the Western Church Exposure (WCE) nor by recent levels of per capita income.

SOM-Table S6.8-1. Regressing Trust in Strangers on the CWC, WCE and GDP/p.c.

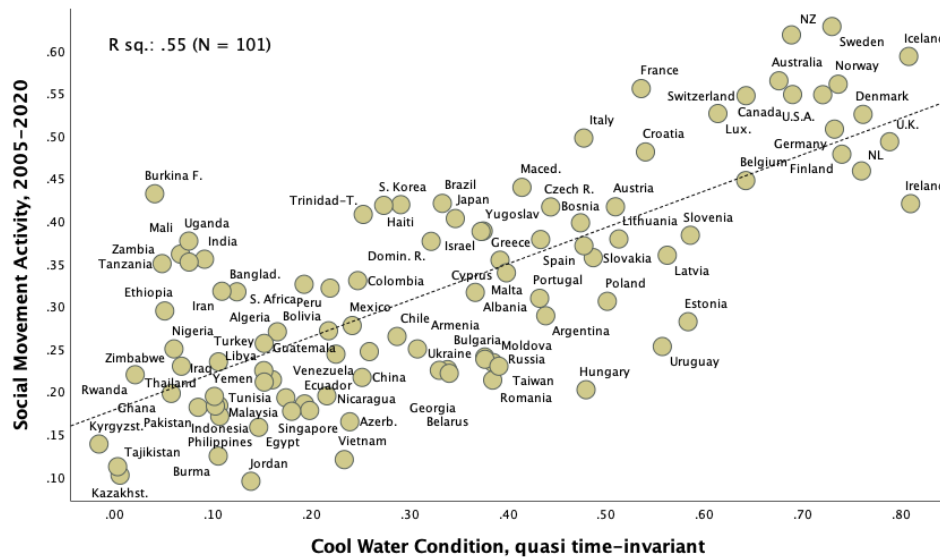
OUTCOME VARIABLE: Trust in Strangers, 2005-2020		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.75***	.56 (.48)***
WCE	.50***	.16 (.21)
GDP/p.c. 2010 (logged)	.62***	.14 (.14)
Constant	.20***	
<i>N</i>	88	
Adj. <i>R</i> ²	.57	

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.9 Post-Industrial Social Movement Activity

SOM-Figure S6.9-1 shows that the CW-Condition has a significant strengthening effect on contemporary social movement activity.

SOM-Figure S6.9-1. The CW-Condition and Contemporary Social Movement Activity



Note: Vertical axis measures participation in “signing petitions,” “attending peaceful demonstrations” and “joining consumer boycotts,” based on data from the World Values Surveys, rounds 5 (2005-08) till seven (2017-20), released by Haerpfer, Inglehart, Moreno and Welzel et al. (2021), online at www.worldvaluessurvey.org.

SOM-Table S6.9-1 documents that the CW-Condition’s (CWC) strengthening effect on social movement activity is absorbed neither by the Western Church Exposure (WCE) nor by recent levels of per capita income.

SOM-Table S6.9-1. Regressing Social Movement Activity on the CWC, WCE and GDP/p.c.

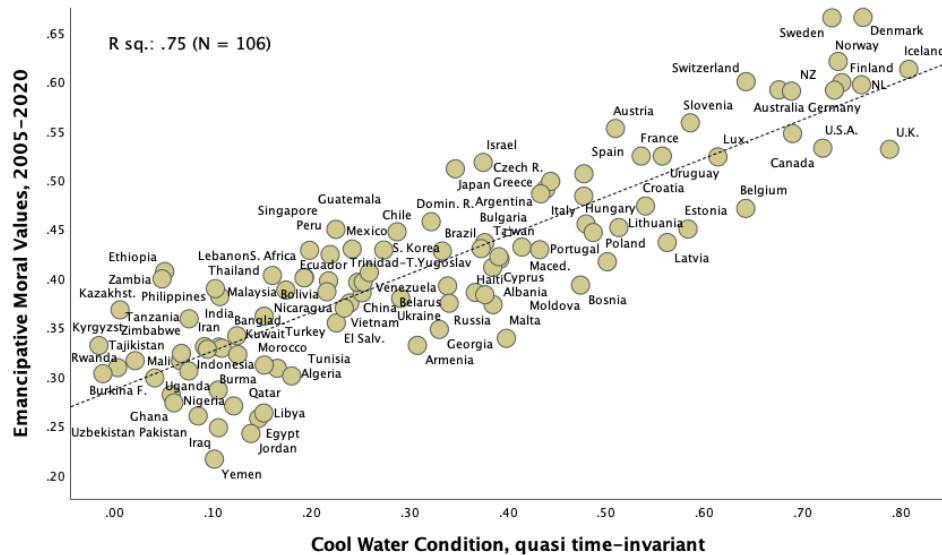
OUTCOME VARIABLE: Social Movement Activity, 2005-2020		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.76***	.64 (.52)***
WCE	.48***	.16 (.22)*
GDP/p.c. 2010 (logged)	.64***	.05 (.14)
Constant		.13*
<i>N</i>		94
Adj. <i>R</i> ²		.59

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.10 *Post-Industrial Emancipative Values*

SOM-Figure S6.10-1 shows that the CW-Condition has a significant strengthening effect on emancipative values.

SOM-Figure S6.10-1. The CW-Condition and Contemporary Emancipative Values



Note: Emancipative Moral Values measure support for universal and equal individual freedoms, as explained SOM section S .

SOM-Table S6.10-1 documents that the CW-Condition's (CWC) strengthening effect on emancipative values is neither absorbed by the Western Church Exposure (WCE) nor by recent levels of per capita income.

SOM-Table S6.10-1. Regressing Emancipative Values on the CWC, WCE and GDP/p.c.

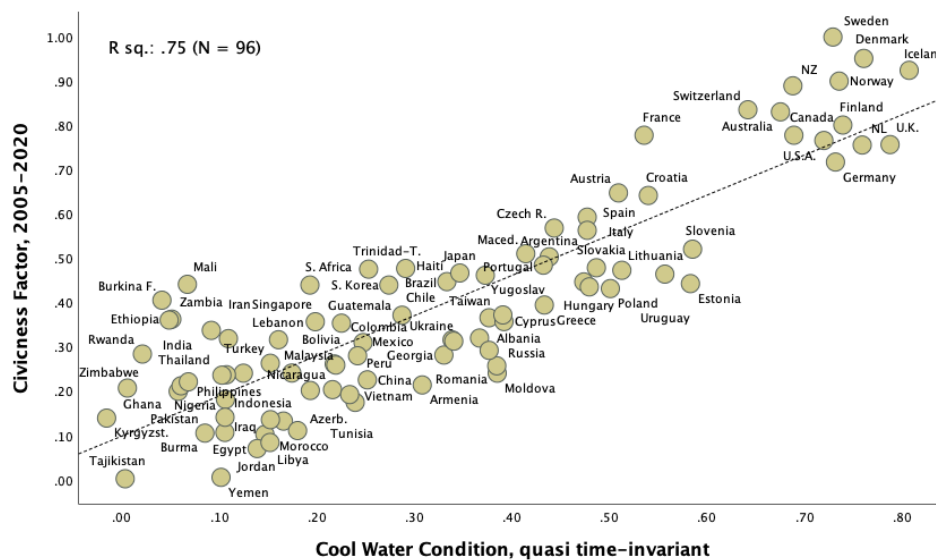
OUTCOME VARIABLE: Emancipative Values, 2005-2020		
TREATMENT VARIABLES:	r (bivariate)	β (r_{partial})
CWC	.87***	.64 (.66)***
WCE	.53***	.14 (.27)*
GDP/p.c. 2010 (logged)	.74***	.21 (.29)**
Constant		.19***
N		99
Adj. R^2		.79

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.11 *Post-Industrial Civiness Factor*

SOM-Figure S6.11-1 shows that the CW-Condition has a significant strengthening effect on contemporary civiness.

SOM-Figure S6.11-1. The CW-Condition and Contemporary Civiness



Note: Vertical axis is a factorial summary of emancipative moral values, trust in strangers and social movement activity, based on data from the World Values Surveys, rounds 5 (2005-08) till seven (2017-20), released by Haerpfer, Inglehart, Moreno and Welzel et al. (2021), online at www.worldvaluessurvey.org.

SOM-Table S6.11-1 documents that the CW-Condition's (CWC) strengthening effect on civiness is neither absorbed by the Western Church Exposure (WCE) nor by recent levels of per capita income.

SOM-Table S6.11-1. Regressing the Civiness Factor on the CWC, WCE and GDP/p.c.

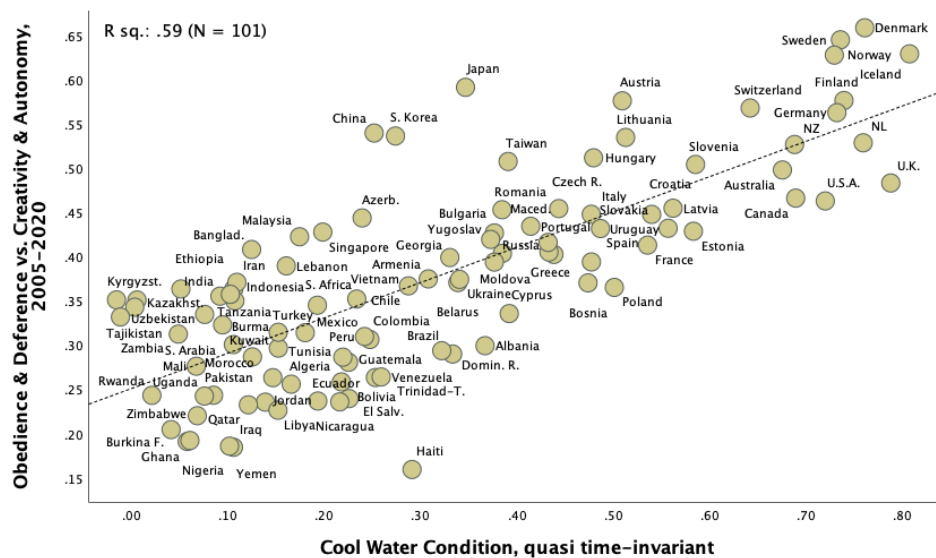
OUTCOME VARIABLE: Civiness Factor, 2005-2020		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.88***	.67 (.66)***
WCE	.57***	.18 (.33)**
GDP/p.c. 2010 (logged)	.76***	.15 (.20)
Constant		-.08
<i>N</i>		85
Adj. <i>R</i> ²		.80

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.12 Post-Industrial Deference-vs.-Autonomy

SOM-Figure S6.12-1 shows that the CW-Condition has a significant strengthening effect on support for creativity and autonomy versus obedience and deference as desired child qualities.

SOM-Figure S6.12-1. The CW-Condition and Child Autonomy and Creativity



Note: Vertical axis measures support for creativity and autonomy as desired child qualities versus obedience and deference as such qualities, based on data from the World Values Surveys, rounds 5 (2005-08) till seven (2017-20), released by Haerpfer, Inglehart, Moreno and Welzel et al. (2021), online at www.worldvaluessurvey.org.

SOM-Table S6.12-1 documents that the CW-Condition's (CWC) strengthening effect on child creativity and autonomy is neither absorbed by the Western Church Exposure (WCE) nor by recent levels of per capita income.

SOM-Table S6.12-1.1 Regressing Creativity/Autonomy on the CWC, WCE and GDP/p.c.

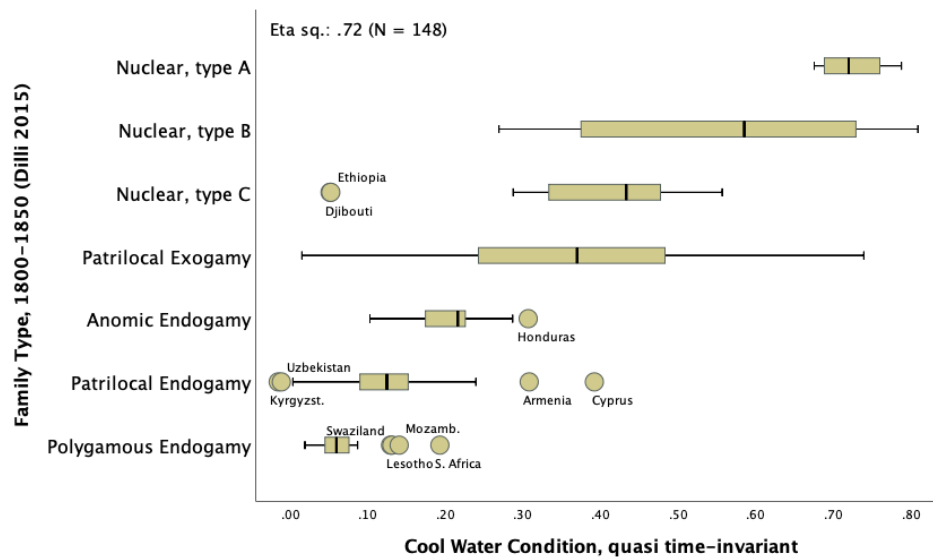
OUTCOME VARIABLE: Child Creativity and Autonomy, 2005-2020		
TREATMENT VARIABLES:	<i>r</i> (bivariate)	<i>beta</i> (<i>r</i> _{partial})
CWC	.80***	.68 (.59)***
WCE	.27**	-.20 (-.29)**
GDP/p.c. 2010 (logged)	.71***	.29 (.30)**
Constant		-.12
<i>N</i>		76
Adj. <i>R</i> ²		.67

Note: Measures of collinearity (VIF), heteroskedasticity (White Test) and influential cases (DFFITs) reveal no violation of OLS assumptions. Significance levels: * $p < .05$, ** $p < .01$, *** $p < .005$.

S6.14 Pre-Industrial Family Types

SOM-Figure S6.14-1 shows that the CW-Condition already favored the prevalence of nuclear families in pre-industrial and early industrial history.

SOM-Figure S6.14-1. The CW-Condition and Historic Family Types



SOM-Table S6.14-1. Dilli's Family Typology (adapted)

FAMILY TYPE (modified terminology)	MAIN CHARACTERISTICS (quoted from Dilli)	CULTURE ZONES
Nuclear, type A	"Children become independent from parental authority at an early age. Exogamous marriage, meaning choosing marriage partner outside of the family, is promoted. There are no strict rules regarding inheritance. Inheritance rules are based on wills. Therefore, while in theory unequal inheritance is an accepted practice, it is not unusual to see inheritance to be divided up equally between children. Liberalism is strongly promoted in this family type. Equal weight is given to the paternal and maternal authority."	Germanic West, English West
Nuclear, type B	"Cohabitation of male heir with the parents. Unequal transfer of inheritance between siblings is an accepted practice. Female successors are quite common in this type of family."	Germanic West, Israel, Japan, and Korea

to be continued ...

... continuation of SOM-Table S6.14-1:

FAMILY TYPE (modified terminology)	MAIN CHARACTERISTICS (quoted from Dilli)	CULTURE ZONES (<i>SOM-FEHLER! VERWEISQUELLE KONNTE NICHT GEFUNDEN WER- DEN.</i>)
Nuclear, type C	“No cohabitation, total emancipation of children in adulthood. Equal division of inheritance among male heirs. Despite the egalitarian inheritance practice between brothers, inequality of the sexes is a general norm. This system encourages the persistence of slightly stronger relations between parents and children until the inheritance is completely divided after the death of the parents. Exogamous marriage is practiced.”	Romanic West, parts of Latin America
Patrilocal Exogamy	“Same as endogamous community, except marriage between the children of two brothers is strictly forbidden.”	Slavic West, Slavic East, China, India
Anomic Endogamy	“Uncertainty about the inheritance, cohabitation and partner choice; egalitarian inheritance in theory, but flexible in practice; children would not cohabit with the parents in theory but is accepted in practice; flexible in terms of practicing cousin marriage.”	Indic East (ex- cept India)
Patrilocal Endogamy	“All sons can get married and bring their wives to the family home. Equality among male children in inheritance and marriage between the children of brothers is frequent. Next to the parents, custom also plays a role in the choice of marriage partner.”	Arab East, Turkic East
Polygamous Endogamy	“Unstable household and polygyny is commonly practiced.”	Sub-Saharan Af- rica
<i>Source:</i> S. Dilli ¹⁶ .		

¹⁶ Dilli, op. cit. (footnote 1).

S7 Alternate Remote Drivers of Societal Development

As *SOM-Table S7-1* shows, out of three dozen alternative historic drivers of development, not a single one exceeds the impact of the CW-Condition on human empowerment and no one turns the CW-Condition's own effect insignificant.

SOM-Table S7-1. The Effects of the CW-Condition and Alternative Remote Drivers (ARD) of Development on the Human Empowerment Index (HEI)

Alternative Remote Driver (ARD) of Development:	Zero-order Effects on HEI (<i>beta</i> , <i>r</i>):		Mutually controlled Effects on HEI (<i>r</i> _{partial}):		<i>N</i>
	ARD	CWC	ARD	CWC	
Western Religious Tradition ¹⁾	.74***	.85***	.17*	.64***	168
Global Power Status 1900 ²⁾	.71***	.85***	.15	.68***	168
Western Legal Tradition ³⁾	.68***	.85***	.21*	.72***	168
Western Linguistic Tradition ⁴⁾	.60***	.85***	.22**	.77***	168
Western Legacy Factor ⁵⁾	.67***	.85***	.23**	.72***	168
Western Church Exposure ⁶⁾	.43***	.85***	.14	.82***	168
Caucasian Descent ⁷⁾	.73***	.85***	.06	.64***	168
Protestants 1980s ⁸⁾	.37**	.85***	.16*	.83***	168
Agricultural Intensity ⁹⁾	.33***	.85***	-.08	.83***	167
Intelligence Quotient ¹⁰⁾	.69***	.86***	.21*	.72***	165
GDP/p.c. 1800 ¹¹⁾	.67***	.85***	.15	.72***	162
Infant Mortality 1800 ¹²⁾	-.51***	.85***	-.03	.80***	162
Population Density (historic) ¹³⁾	.17*	.86***	.09	.86***	162
Kinship Intensity ¹⁴⁾	-.60***	.85***	-.06	.76***	160
Female Fertility 1800 ¹⁵⁾	-.61***	.85***	-.30***	.78***	160
Migratory Distance ¹⁶⁾	.67***	.86***	.15*	.74***	155
Neolithic Revolution ¹⁷⁾	.04	.85***	-.11	.85***	155
Irrigation Dependence ¹⁸⁾	-.29***	.86***	-.04	.85***	151
Nuclear Families (1800-1850) ¹⁹⁾	.81***	.87***	.27**	.60***	146
Historic Pathogen Load ²⁰⁾	-.73***	.88***	-.08	.72***	145
State Antiquity ²¹⁾	.38**	.85***	.09	.83***	145
Genetic Distance to West (current) ²²⁾	-.45***	.85***	.01	.81***	142
Genetic Distance to West (1500) ²³⁾	-.39***	.85***	.04	.82***	142
Onset of Industrial Fertility Decline ²⁴⁾	-.83***	.84***	-.37***	.44***	132
Consanguine Marriages ²⁸⁾	-.69***	.87***	-.27*	.75***	71

to be continued ...

... continuation of SOM-Table S7-1:

Alternative Remote Driver (ARD) of Development:	Zero-order Effect on HEI (<i>beta</i> , <i>r</i>):		Mutually controlled Effect on HEI (<i>R</i> _{partial}):		<i>N</i>
	ARD	CWC	ARD	CWC	
White Settler Mortality ²⁹⁾	-.62**	.82***	-.19	.70***	60
Bio-Geo Climate ³⁰⁾	-.51**	.88***	.08	.84***	57
Linguistic Individualism ²⁵⁾	.67***	.85***	.17	.70***	113
Agrarian Suitability ²⁶⁾	.53***	.87***	-.03	.82***	109
Schooling Years 1870 ²⁷⁾	.80***	.88***	.12	.62***	76
Collectivism-vs-Individualism ³¹⁾	.74***	.88***	.10	.72***	56
Lactose Tolerance ³²⁾	.72***	.89***	-.15	.76***	54
COMT Val Gene ³³⁾	.52**	.89***	-.24	.86***	49
HTTLPR Gene ³⁴⁾	.12	.89***	.34*	.90***	48
LGSGF Gene ³⁵⁾	-.10	.83***	-.09	.83***	44
Family Farms 1860 ³⁶⁾	.47**	.82***	.01	.76***	37
Looseness-vs-Tightness ³⁷⁾	-.31*	.86***	.22	.85***	31

Note: Table shows the effects of the Cool Water Condition (CWC) and alternative remote drivers (ARD) of development on the 2018 Measure of the Human Empowerment Index (HEI), before and after mutual controls. Lines appear in descending order of *N*-size. *Sources* (full citations in footnote 17):

1) Own creation: 9-point index ordering countries' main historic religions alongside their tendency to sustain Western-style democracy (based on Polity IV scores 1900-2000): 1 - Buddhism, 2 - Islam, 3 - Christian-Orthodoxy, 4 - Confucianism, 5 - Animism, 6 - Catholicism, 7 - Hinduism, 8 - Protestantism, 9 - Judaism.

2) Own creation: 7-point index ordering countries' global power status in 1900 ascendingly: 1- colony of a European power (other than Britain), 2 - colony of Britain, 3 - occupied territory of a land empire, 4 - formally sovereign territory but effectively controlled by a colonial power, 5 - truly sovereign territory but no colonial power, 6 - territorial center of a land empire, 7 - colonial power.

3) Own creation: 7-point index ordering countries' main legal tradition alongside their tendency to sustain Western-style democracy (based on Polity IV scores 1900-2000): 1 - Byzantine law, 2 - Islamic law, 3 - Confucian law, 4 - Colonial law, 5 - Roman law, 6 - Germanic law, 7 - Anglo-Saxon law.

4) Own creation: 9-point index ordering countries' dominant language families alongside their tendency to sustain Western-style democracy (based on Polity IV scores 1900-2000): 1 - East Slavic, 2 - Semitic, 3 - West Slavic, 4 - East Asian, 5 - African, 6 - South Asian, 7 - Poly-, Mela-, Micronesian, 8 - Romanic, 9 - Germanic.

5) Factorial summary of 1), 3) and 4). Factor loadings are .94 (Western linguistic tradition), .93 (Western legal tradition) and .92 (Western religious tradition), with a shared variance of 86.5 percent. Cronbach's alpha for the three variables (*N* = 168) is .92.

6) Countries' endurance of exposure to the Western church in years, from Schulz et al. (2019).

7) Percentage of population with Caucasian ethnic roots from http://www.reddit.com/r/MapPorn/comments/2jgito/percentage_of_population_in_each_country_that_is/.

8) Percentage of denominational Protestants in a country during the 1980s from the Quality of Government Institute's Standard Dataset (version 2021): www.qog-ug.se.

9) Historic intensity of cultivation methods from Gallup, Mellinger & Sachs (1999).

10) Population average IQ during the late 1990s-early 2000s from Vanhanen & Lynn (2002), Lynn & Vanhanen (2006).

11) Estimated Gross Domestic Product per capita in 1800 in US-Dollars from Gapminder: www.gapminder.org.

12) Estimated number of children per 1,000 born not surviving until the age of five years in 1800, from Gapminder: www.gapminder.org.

13) Estimated number of residents per square kilometer in 1500 CE, from Klein Goldewijk et al. (2011).

14) Historic intensity of kinship relations from Schulz et al. (2019).

15) Estimated total number of births per woman in 1800, from Gapminder (www.gapminder.org).

16) Countries' centroids migration distance in kilometers from the human origin in East Africa (centroid of Ethiopia), calculated due to the procedure described by Galor (2012).

17) Number of centuries back in time when agriculture has become the main subsistence base in a country-territory, from Putterman (2008).

-
- 18) Historic measure of the additional crop yield a country would obtain by applying intensive irrigation methods, from Bentzen, Kaarsen, and Wingender (2017).
 - 19) Historic prevalence of nuclear family structures, from Dilli (2015).
 - 20) Historic prevalence of nine deadly diseases, from Murray & Schaller (2010).
 - 21) Number of centuries and decades a country uninterruptedly experienced organized statehood in 1500 CE, from Bockstette et al. (2002).
 - 22) Migration-adjusted measure of a national population's genetic distance to typical English people recently, from Spolaore & Wacziarg (2013).
 - 23) Migration-adjusted measure of a national population's genetic distance to typical English people in 1500 CE, from Spolaore and Wacziarg (2013).
 - 24) Year in which in a country the pre-industrial female fertility level began to drop, from Dyson (2010).
 - 25) The measure summarizes individualistic features (such as a dominance of active voice, necessity to keep personal pronouns etc.) of the countries' main language in a 9-point index; from Meyer-Schwarzenberger (2014).
 - 26) Suitability of the countries' inhabited territories to agriculture, from Olsson & Paik (2016).
 - 27) Mean years of schooling of the countries' populations in 1870, from Murtin (2013).
 - 28) Historic estimate of the prevalence of cousin marriages among countries' populations, from Woodley and Bell (2013).
 - 29) Countries' historic mortality among "white" settlers, from Acemoglu, Johnson and Robinson (2001).
 - 30) Countries' thermal stress in terms of temperature deviations upward and downward from an air temperature of 22 degrees Celsius, from van de Vliert (2011).
 - 31) Country populations' tendency towards collectivist-vs-individualistic orientations, from Oishi, Diener, Lucas and Suh (1999).
 - 32) Country populations' historic ability to digest milk products, from Cook (2014).
 - 33) Demographic prevalence of the Val108/158Met polymorphism of the catechol-o-methyltransferase (COMT) gene, which is supposed to elevate dopamine emissions, from Aguilera et al. (2009).
 - 34) Demographic prevalence of the long of the long-allelic version of the 5-HTTLPR gene, which is supposed to elevate serotonin emissions in national populations, from Chiao and Blizinsky (2010).
 - 35) Demographic prevalence of the LGSGF gene complex, which is supposed to strengthen long-term life orientations, from Minkov & Bond (2014).
 - 36) Percentage of agricultural land in the possession of nuclear families in 1860, from Vanhanen & Lynn (2002), Lynn & Vanhanen (2006).
 - 37) Demographic prevalence of loose-vs-tight orientations (i.e., tolerance vs intolerance of norm deviations), from Ogdie & Gelfand et al. (2014).

Note: Footnote 17 provides full citations to all the literature sources referenced here.¹⁷

¹⁷ Full citations follow here in the order of appearance in the footer of *SOM-Table S7-1*. J.F. Schulz, D. Bahrami-Rad, J.P. Beauchamp and J. Henrich, 2019, "The Church, Intensive Kinship and Global Psychological Variation," *Science* 366, 1-12. J.L. Gallup, A.D. Mellinger and J. Sachs, 1999, "Geography and Economic Development," *International Regional Science Review* 22, 179-232. Vanhanen and Lynn, 2002 (op. cit., footnote 1). Lynn and Vanhanen 2006 (op. cit., footnote 1). K. Klein Goldewijk, 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 Biogeography* 20, 73-86. O. Galor, 2011, *Unified Growth Theory*, New York: Cambridge University Press. L. Putterman, 2008, "Agriculture, Diffusion and Development: Ripple Effects of the Neolithic Revolution," *Economica* 75, 729-748. J.S. Bentzen, N. Kaarsen and A.M. Wingender, 2016, "Irrigation and Autocracy," *Journal of the European Economic Association* 15, 1-53. Dilli (op. cit., footnote 1). Murray and Schaller (op. cit., footnote 1). V. Bockstette, A. Chanda and L. Putterman, 2002, "States and Markets," *Journal of Economic Growth* 7, 347-369. E. Spolaore and R. Wacziarg, 2013, "How Deep are the Roots of Economic Development?" *Journal of Economic Literature* 51, 325-369. T. Dyson, 2010, *Population and Development: The Demographic Transition*. London: Zed Books. M. Meyer-Schwarzenberger, 2014, *Inherited Individualism: Evidence from Language Structures* (Dissertation, University of St. Gallen). O. Olsson and C. Paik, 2016, "Long-Run Cultural Divergence: Evidence from the Neolithic Revolution," *Journal of Development Economics* 122, 197-213. Murtin 2014 (op. cit., footnote 1). Oishi et al. 1999, op. cit. (footnote 1). Cook (op. cit., footnote 1). B. Aguilera, M. Arias, M. Wichers and N. Barrantes-Vidal et al., 2009, "Early Adversity and 5-HTT/BDNF Genes: New Evidence of Gene-Environment Interactions on Depressive Symptoms in a General Population," *Psychological Medicine* 39, 1425-1432. J.Y. Chiao and K.D. Blizinski, 2010, "Culture-Gene Coevolution of Individualism-Collectivism and the Serotonin Transporter Gene," *Proceedings of the Royal Society B - Biological Sciences* 277, 529-537. A. Ogdie and M. Gelfand et al., 2014, "Risk of Mortality in Patients with Psoriatic Arthritis, Rheumatoid Arthritis and Psoriasis: A Longitudinal Cohort Study." *Annals of the Rheumatic Diseases* 73 (1): 149-53. E.

S8 Path Analysis: How the CW-Condition Shaped the West

This SOM-Section presents a path model that places the supposed drivers of development relative to each other in a causal sequence, following the supposed drivers' inherent temporality. This is done in such a way that influences with a farther reach backward in time are placed prior to influences 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 from previous ones. Such a clear temporal sequencing assures that we avoid confusing causes and effects. Therefore, our findings stay clear of any endogeneity problems. If there is (a) systematic covariation, (b) if this covariation is strong enough to be considered non-random, (c) if no plausible confounders of this covariation can be identified and if (d) the covariates are clearly separated into an earlier-to-later sequence by their inherent temporality, then we can speak with reasonable confidence about causality—even in the absence of experimental control.

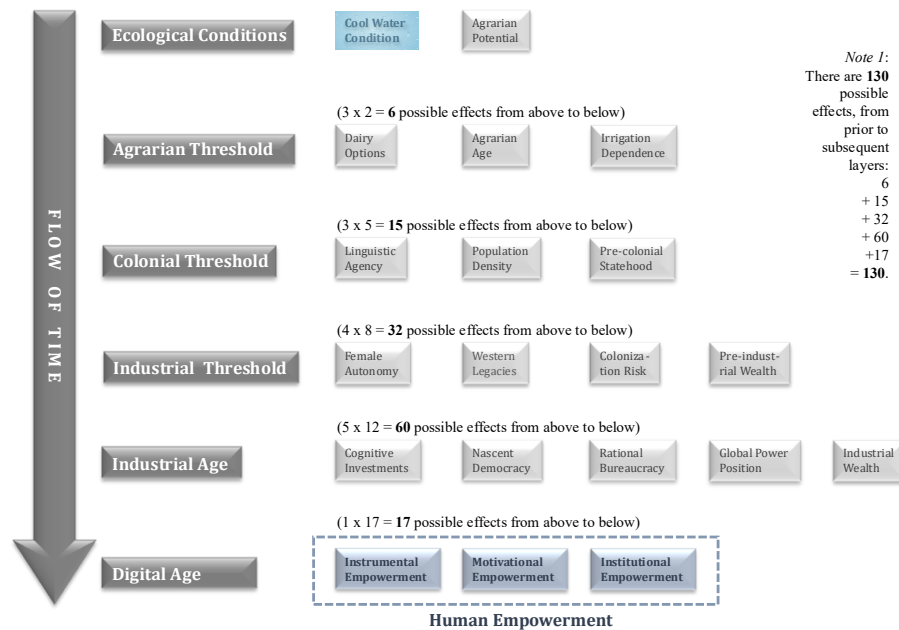
S8.1 A Tableau of Historic Layers

Following the trial-and-error logic of evolutionary selection, we apply an exploratory approach: A later situated variable is always regressed on all previously situated variables among our theoretically preselected set of potential influences. We use this explorative approach on purpose. The reason is that it is impossible to know beforehand exactly which of the theoretically relevant influences in a set of potentially confounding influences will show the strongest effect on which subsequent outcome. In order to reduce the random noise that would obscure the clarity of an existing pattern when many insignificant influences are kept in a model¹⁸, 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 potential influences in our model are selected based on prominent theories. We just do not know—and do not want to pretend to know—which of these theories finds more empirical support throughout our sequence of historical layers. Hence, we

van de Vliert, 2011, “Climato-Economic Origins of Variation in Ingroup Favoritism.” *Journal of Cross-Cultural Psychology* 42, 494–515.

¹⁸ K.A. Clarke, 2005, “The Phantom Menace: Omitted Variable Bias in Econometric Research,” *Conflict Management and Peace Science* 22, 341–352. K.A. Clarke, 2009, “Return of the Phantom Menace: Omitted Variable Bias in Political Research,” *Conflict Management and Peace Science* 26, 46–66.

SOM-Figure 8.1-1.

A *Roadmap* of Consecutive Historical Layers to Human Empowerment

try it out and apply an evolutionary selection that sorts out those supposed influences with the most competitive significance.

Before we show the results of this sorting out procedure, *SOM-Figure S8.1-1* first shows a purely conceptual diagram without any observed arrows of impact. The diagram identifies a total of seventeen remote drivers of societal development, apart from our dependent variable (i.e., the societies' advancement in human empowerment today), and situates the remote drivers in their respective historic layer, ordered from temporally more distant toward more proximate layers, from the top to the bottom. The subsequent figures highlight in blue the sequence of consecutive influences that originate in the CW-Condition.

Our analytical units are today's countries, which means that we cover between 150 and 185 observations, depending on data availability. We solve the problem of temporal variation in the sets of sovereign countries in several ways. To begin with, our country-level CW-scores are *not* territorial averages across countries' spatial extensions at particular points in time; instead, these scores refer to countries' historic population centers, which are entirely independent from temporal variability in countries' territorial extension as well as from temporal variability in their existence as sovereign political units. Moreover, we re-analyse the CW-Condition's emancipatory effects within the setting of independent nations and their colonies as it existed in 1900 CE and 1800 CE. Finally, Chapter 9 of the book and section S9 of this SOM ("The CW-Effects beyond Countries") examine the CW-effects among spatial units other than countries, using seven different territorial angles. To anticipate the result, we find strongly confirmatory evidence for the emancipatory CW-effect under all alternating perspectives. This effect is, hence, a multi-perspective reality.

S8.2 Layers and Stations

S8.2.1 ECOLOGICAL CONDITIONS (THE BEGINNING)

We now explain the logic of the temporal layering in *SOM Figure S8.1-1*. The most original conditions that predate any civilizational achievement are geo-climatically anchored features of a habitat's ecology. They 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.¹⁹ Ecological conditions embody the opportunity endowments that the members of a population can learn to use to the benefit of the population's livability. Ecological conditions determine what kind of food is available, what crops can be grown and which animals can be domesticated, what raw materials are available for production, what pathways exist for travel and migration 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 (pioneer) potential as well as their CW-Condition.

The history of civilization is characterized by three evolutionary leaps. The first leap occurred with the transition from foraging toward agriculture, the so-called Neolithic Revolution. The second leap happened with the transition from agrarian toward industrial societies, the so-called Industrial Revolution. The third leap happened with the transition from the industrial era toward the computing age, the Digital Revolution (with the entry into Artificial Intelligence marking the most recent station and, perhaps, the most incisive one). Among our two ecological conditions, we assume that the agrarian pioneer 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. Due to our argument, the CW-Condition slowed down the adoption of agriculture but catalyzed the leap into industrialization once agriculture was in place. Finally, as Chapter 11 of our book demonstrates, globalization diminishes the determining power of ecological conditions in the digital age, including that of the CW-Condition.

The CW-Condition. The CW-Condition belongs to this layer because it touches upon climatic features that are a direct outcome of geography: Equatorial distance and coastal proximity largely determine where moderately cool seasons and steady rain on decently high base levels are more abundant and where freshwater sources are more ubiquitous—the defining characteristics of the CW-Condition. To capture the CW-Condition, we use the measure portrayed in Chapter 3 of the book and in SOM-Section S2 in this document.

¹⁹ E.L. Jones, 1987, *The European Miracle: Environments, Economies and Geopolitics in the History of Europe and Asia*, New York: Cambridge University Press. D.S. Landes, 1999, *The Wealth and Poverty of Nations: Why Some are so Rich and some so Poor*, New York: W.W. Norton. P. Nolan and G. Lenski, 2008, *Human Societies: An Introduction to Macrosociology*, Seattle: McGraw Hill. M. Mann, 2012, *The Sources of Social Power - Vol I: A History of Power from the Beginning to AD 1760*, New York: Cambridge University Press. C.R. Ember and M. Ember, 1998, "Cross-Cultural Research," in H.R. Bernard (ed.), *Handbook of Methods in Cultural Anthropology*, Walnut Creek: Altamira, 647-687.

Agrarian Potential. Inspired by the ideas of Jared Diamond²⁰, Ola Olsson and John Paik²¹ provide an index combining the number of cultivable plants and animals that were originally present on a country-territory. They also measure the territory's East-West extension. Why the number of cultivable 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 over a North-South axis because climate zones differ mostly over geographical latitude and much less over longitude, all else held constant. Another element of this measure is the size of the continental landmass on which an agriculturally suitable territory is located. The reason is that the likelihood to adopt agriculture early by imitating its invention at other places increases naturally by the size of the continental landmass on which an agriculturally suitable place is located—simply because agriculture is more likely to be invented early when continental landmass size increases the number of places where agriculture is possible. Factoring in this point, elevates the agrarian pioneer potential of agriculturally suitable places in Eurasia greatly above similar such places on all other continents, especially those in the New World.

S8.2.2 THE AGRARIAN THRESHOLD (ONWARD FROM 10,000 YEARS BACK)

Agrarian Age. The next layer in the causal sequence addresses early adaptations to the environments by human populations. These adaptations are driven by selective pressures emanating from the different environments and occur in ways that enculture these adaptations durably, so the benefits of these adaptations are inherited over the generations. These adaptations represent the first stages at shaping a lasting cultural legacy. An early major step in this direction is the adoption of agriculture. Thus, we use Louis Putterman et al.'s data, labeled "agrarian age," which measures the number of years in hundreds and thousands since the adoption of agriculture in a country-territory.²²

Dairy Options. The Neolithic Revolution (i.e., the adoption of agriculture) demarcates the biggest leap in societal development before the Industrial Revolution and the Digital Revolution. Agriculture fundamentally transforms nutritional options and this requires genetic adaptations. Specifically, lactose tolerance became an advantageous trait once animal husbandry was adopted. When animal husbandry is practiced, lactose tolerance offers additional 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 D₃ deficiencies caused by low exposure to the sun's ultraviolet light radiation—a deficiency typical under the CW-Condition's cloudy skies, few daylight hours and flat sunshine angle in winter. Also, under the CW-Condition one finds the most fertile pastures to feed the animal with the highest milk production: the cow. Hence, we measure

²⁰ J. Diamond, 1997, *Guns, Germs and Steel: A Short History of Everybody for the Past 13,000 Years*, New York: W.W. Norton.

²¹ Olsson and Paik (op. cit., footnote 17).

²² Putterman et al. (op. cit., footnote 17).

“dairy options” using the lactose tolerance data from Justin Cook, as collected and amended by Andrey Sherback.²³ Since dairy options that emanate from lactose tolerance are an adjustment to agricultural practices, we place this variable at the same layer as “agrarian age.”²⁴

As much as the CW-Condition’s ubiquitous access to freshwater bestows hydration autonomy on its inhabitants, lactose tolerance bestows dietary autonomy on the individuals in its possession. Together, the CW-Condition and lactose tolerance provide an eco-biological basis for ordinary people’s existential autonomy writ large. In this capacity, these conditions proliferate the material basis of an individualistic culture. This is a lasting basis because the CW-Condition is embedded in persistent environmental conditions and because lactose tolerance becomes a hereditary genetic trait once selected by biological evolution. Accordingly, the CW-Condition and lactose tolerance are plausible original sources of individualistic tendencies.

Irrigation Dependence. The third variable in the early agrarian layer addresses the dependence of a country-territory’s crop yield on irrigation management. To capture this feature, we use the data collected by Jeannette Bentzen and her co-authors.²⁵ The assumption is that irrigation dependence favors elite control over water supplies and, hence, over land, labor and capital, which contributes to the emergence of coercive institutions. If anything, the coercive tendency inherent in irrigation dependence should be detrimental to human empowerment.

S8.2.3 THE COLONIAL THRESHOLD (ONWARD FROM AROUND 1500 CE)

The next layer leads us to early civilizational achievements after the transition to agriculture. An early manifestation of culture that enhances its heredity is the formation of written language²⁶—something that only occurs after the adoption of agriculture, given that foragers, pastoralists and horticulturalists did not bother to invent scripture to produce heritable text documents.²⁷ Once the basic grammar structure of a language has taken shape, its features preserve certain cognition patterns and inherit them from one generation to the next.²⁸ Inspired by Emiko and Yoshihisa Kashima’s research²⁹, we assume that the CW-Condition and dairy options indeed provide an eco-biological basis of subsequent individualistic tendencies. Accordingly, one of the first cultural crystallizations of these tendencies should be visible in “linguistic agency.”

²³ Cook (op. cit., footnote 1).

²⁴ We experimented with alternative indications of genetic population differences, with no promising results.

²⁵ Bentzen et al. (op. cit., footnote 17). J.C. Buggle, 2020, “Growing Collectivism: Irrigation, Group Conformity and Technological Divergence,” *Journal of Economic Growth* 25, 147-193.

²⁶ S. Pinker, 2007 [1994], *The Language Instinct: How the Mind Creates Language*, New York: Harper Collins.

²⁷ D. Lightfoot, 1999, *The Development of Language: Acquisition, Change and Evolution*, New York: Wiley-Blackwell.

²⁸ N. Chomsky, 2007 [1968], *Language and Mind*, New York: Cambridge University Press. A.N. Licht, C. Goldschmidt and S.H. Schwartz, 2007, “Culture Rules: The Foundations of the Rule of Law and Other Norms of Governance,” *Journal of Comparative Economics* 35, 659-688.

²⁹ E.S. Kashima and Y. Kashima, 1998, “Culture and Language: The Case of Cultural Dimensions and Personal Pronoun Use,” *Journal of Cross-Cultural Psychology* 29, 461-486. Y. Kashima and E.S. Kashima, 2003, “Individualism, GNP, Climate and Pronoun Drop: Is Individualism Determined by Affluence and Climate, or Does Language Use Play a Role?” *Journal of Cross-Cultural Psychology* 34, 125-134.

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 individualistic feature because an emphasis on agency is part of what defines individualism, that is, the faculty to pursue actions of one's deliberate choice or to act with intention.³⁰

In some languages, especially those of the Germanic family—including English, Dutch, the three Scandinavian languages and German—the grammatical emphasis on agency goes so far that even in happenings that actually do not have an agent, the sentence uses a personal pronoun in neutral form to pretend that the addressed happening does have an agent who performs the action.³¹ An example is the expression “*it rains*”: Raining has no actor but the pronoun “it” fulfills the function of an agent executing the act of raining. In most other languages outside the Germanic family, passive voice without a personal pronoun is 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 Frida” (*I call myself Frida*). In German, you say “ich heiße Frida.” Either way, the voice is active by placing the subject into the driver seat in saying who she is. The English version of this active voice (*I call myself Frida*) is even more agentic because of its reflexive character, which makes the act of naming a person something perfectly under control of the actor who tells a listener her or his name. In sharp contrast, in Russian you say “меня зовут Фрида” (*others call me Frida*), which is passive voice depicting the subject as a victim with no control over the act of naming. Clearly, in the active version the person telling the name is controlling the action, whereas in the passive version the person is the object to which the action happens, thus lacking agency.³²

Another manifestation of linguistic agency is a language's insistence on retaining the personal pronoun in expressing an activity. There are many languages that allow to drop the personal pronoun completely in a sentence.³³ 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 start with a language index created by Matthias Meyer-Schwarzenberger.³⁴ The index orders the grammar structures of a given country's main language on matters of subject centrality, emphasis on active voice, the insistence on personal pronoun usage and four additional criteria (each coded in a tripartite manner: absent, partially

³⁰ On misunderstandings of individualism and its confusion with egoism, see C. Welzel, 2024, “Evolution, Empowerment and Emancipation: How Societies Climb the Freedom Ladder.” *World Development* 64, 33-51.

³¹ M. Haspelmath, 1997, *Indefinite Pronouns*, Oxford: Oxford University Press. B. Comrie, S. Matthews and M. Polinsky, 2003, *The Atlas of Languages: The Origin and Development of Languages throughout the World*, London: Facts on File Inc. M. Haspelmath, M. Dryer, D. Gil and B. Comrie, 2005, *The World Atlas of Language Structures*, Oxford: Oxford University Press.

³² E.L. Keenan and M.S. Dryer, 1981, “Passive in the World's Languages,” in *Linguistic Agency* (University of Trier).

³³ Y. Kashima and E.S. Kashima, 2003, “Individualism, GNP, Climate and Pronoun Drop: Is Individualism Determined by Affluence and Climate, or Does Language Use Play a Role?” *Journal of Cross-Cultural Psychology* 34, 125-134..

³⁴ Meyer-Schwarzenberger (op. cit., footnote 17).

present, fully present). The index yields a (7 x 3 =) 21-point scale from the least to the most individualistic language. We standardize the scores into a range from minimum 0 to maximum 1.0, with increasing fractions indicating a stronger presence of individualistic features. We label the resulting index “grammatical individualism.”³⁵

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 consult the *World Atlas of Languages*.³⁶ 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-authors’ “democracy stock” index³⁷, which adds up a country’s annual democracy ratings³⁸ over a time span of a hundred years, from 1900 to 2000.³⁹

Democracy is a rock-solid indicator of emancipatory tendencies because the essence of democracy consists in the fact that it grants each individual citizen an extensive set of civil rights, including an equal vote and voice in public affairs. This is precisely the combination of individualistic and egalitarian features that we define as human emancipation.⁴⁰ Also, 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 leave its imprint most visibly over a long timespan. To measure democratic traditions before 1900 is problematic because democracy did not exist before this time; at least it did not if we define democracy by universal female and male suffrage, which surfaced only in 1893—the year when New Zealand introduced universal suffrage for both sexes as the first country in the world.

Support for the assumption that democratic traditions indeed represent an emancipatory tendency is provided by the fact that democratic traditions correlate strongly with both Michael

³⁵ Besides, the idea that grammatical individualism shapes people’s perception of situations finds support from experimental evidence among people who are equally fluent in two languages at opposite ends of grammatical individualism, like Mandarin and English. When confronted with the same situation framed separately in the two different languages, the same speakers feel to be less in control of the situation when thinking through it in Mandarin instead of in English. The evidence is cited in Meyer-Schwarzenberger (op. cit., footnote 17).

³⁶ Haspelmath et al. (op. cit., footnote 31).

³⁷ J. Gerring, P. Bond, W.T. Barndt and C. Moreno, 2005, “Democracy and Economic Growth: A Historical Perspective,” *World Politics* 57, 323-364.

³⁸ Gerring et al. (ibid.) summarize the annual democracy ratings from the Polity project (see: www.systemicpeace.org). 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.

³⁹ 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.

⁴⁰ For the definition of democracy, see Welzel (op. cit., footnote 2, chapter 8). R.A. Dahl, 1977 [1971], *Polity: Participation and Opposition*, New Haven: Yale University Press. D. Held, 2006, *Models of Democracy*, Oxford: Oxford University Press.

Minkov's index of individualism⁴¹ and with Christian Welzel's emancipative values index,⁴² which measures an emphasis on freedom of choice and equality of opportunities in people's orientations.

Given these premises, we create nine linguistically defined country-groups based on the language family of the countries' main tongues. 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), East Asian languages 0.33 (0.20), African languages 0.39 (0.09), South Asian languages 0.46 (0.19), Melanesian/Polynesian languages 0.55 (0.09), Romanic languages 0.56 (0.20), and Germanic languages 0.91 (0.12).⁴³

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 and, hence, equally homogenous as concerns the weakness or strength of their inherent emancipatory tendency. Accordingly, the countries' language families capture fully 62 percent of the entire cross-national variation in democratic traditions.⁴⁴ The boxplot in *SOM-Figure S8.7-1* (at the end of this section) shows how distinctly the language families cluster on autocratic-vs-democratic traditions.

When countries show different autocratic-vs-democratic traditions in close correspondence with their linguistic ancestry, this can be an indication that this ancestry in and by itself encultures emancipatory tendencies—like a grammatical mind programming that orients people towards long-term emancipatory outcomes, such as democracy. Of course, such correspondence is not yet 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 enculture emancipatory tendencies. Nevertheless, because a decently strong correspondence between the countries' linguistic ancestries and autocratic-vs-democratic traditions indeed exists, the assumption that emancipatory tendencies are inherent to languages addresses at least a plausible possibility. How inherent to languages themselves the emancipatory tendencies truly are will become apparent when we examine the linguistic ancestries' democratic traditions under control of possible confounders.

⁴¹ The correlation amounts to $r = .71$ ($N = 56$; $p < .001$). M. Minkov, M. Schachner and C. Welzel, 2019, "Rising Individualism Rewires Happiness from Religion to Freedom," *Journal of Happiness Studies* 21, 2873-2888.

⁴² The correlation amounts to $r = .69$ ($N = 101$; $p < .001$).

⁴³ 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, Romance languages 42 countries, and Germanic languages 17 countries.

⁴⁴ When we summarize the five different measures of (electoral, participatory, liberal, deliberative and egalitarian) democracy provided by the V-Dem project (Lindberg et al., op. cit., footnote 4) 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 ($N = 96$; $p < .001$).

Until we have identified such confounders, we preliminary consider all cross-country variation in democratic traditions that correspond with language families as inherent to these language families. Again, this is a probational assumption, pending on whether the correspondence holds under proper controls. With this probational assumption, we order and code language families in a manner that captures their power over emancipatory cultural tendencies at its possible maximum. Technically, we assign each country the mean score in democratic traditions of the linguistic country-group to which it belongs.⁴⁵ This way, we measure the countries' incorporations of democratic traditions to the maximum extent to which these incorporations could possibly be attributed to language families. The resulting index measures "language-encoded emancipation."

EXCURSION: UNDERSTANDING POTENTIALS

Some scholars might criticize our placement of the index of "language-encoded emancipatory tendencies" in the pre-colonial layer of time because democracy, on which this index relies, appeared *after* this time. In fact, this is a noteworthy point. Nevertheless, it does not invalidate our measurement approach, at least not upon closer scrutiny. What we intend to measure is language differences from the viewpoint of their inherent emancipatory potential, to the maximum extent to which such a potential is attributable to languages. And we think we have provided convincing reasons why democratic traditions are a first-rate manifestation of emancipatory potentials.

Now, the manifestation of a potential inevitably materializes later than the timepoint since which the potential itself exists: This lies in the logic of what a potential is—namely a possibility for the future. An egg embodies the potential to turn into a chick, for which reason observing the hatch of a chick is proof of the egg's potential, even though the proof of the potential is temporally posterior to the potential's presence.

Consequently, when no direct measure of a potential itself is available, it is perfectly logical to infer its previous existence backward from its subsequent materialization. In the same vein, it is perfectly sensible to measure the languages' emancipatory potentials by their later manifestations in democratic traditions and nevertheless place the potentials at an earlier layer of time. For they were already there; only their actualization occurred later.⁴⁶ 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 millions of years back in time.

More generally speaking, this interpretive principle applies whenever societies develop on lasting trajectories. Such trajectories and their lasting differences show that distances in current achievements are indicative of relative distances in previous achievements. Put differently, a country's position on its developmental trajectory at a given point in time is—by definition—time-specific, but when country trajectories differ *enduringly* in intercepts and slopes, the trajectories as a *whole* embody a higher degree of temporal *invariance* than all the timepoint-specific single positions along their course.

⁴⁵ Technically speaking, this is the same as assigning each country the score in democratic traditions predicted by the mean of its linguistic country-group.

⁴⁶ Whenever phenomena emerge alongside a "from-potential-to-manifestation logic," it is accurate to infer the potential backward from its manifestation.

“Language-encoded emancipation” as defined above 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*.⁴⁷ In doing so, we obtain measures of linguistic agency for 169 countries.⁴⁸

As the scatterplot in *SOM-Figure 8.7-2* (see addendum at the end of this section) shows, countries that score high in linguistic agency show a significant and pronounced tendency to also score high in human empowerment today. The evidence looks very similar for the 113 countries with Meyer-Schwarzenberger’s measure of grammatical individualism, shown in *SOM-Figure 8.7-3* (addendum, end of this section).

Population Density. Another feature resulting from agriculture is population density. Agrarian societies are able to feed many more people per unit of land than foraging, horticultural or pastoral communities can feed.⁴⁹ This advantage in numbers allowed agrarian societies to push back pre-agrarian populations wherever agriculture was feasible. On truly advanced levels of pre-industrial agriculture, societies could yield such a sizeable food surplus that a considerable proportion of the population did not need to work in food production. This allows for occupational specialization and the concentration of non-agrarian professions in urban agglomerations, which generate higher population densities. Hence, population density is a valid measure of progress in organizational complexity since the invention of agriculture until the Industrial Revolution.⁵⁰

⁴⁷ To do so, we use a two-step matching procedure. In the first step, we standardize the two 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%, 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 devise 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-examine 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.

⁴⁸ Our final index of linguistic agency accounts for 75% of the entire cross-national variance in democratic traditions ($N = 178$; $p < .001$). When we summarize the five different measures of (electoral, participatory, liberal, deliberative and egalitarian) democracy provided by the V-Dem project (Lindberg et al., op. cit., footnote 4) into a single measure for the year 1900 (which is justified given the strong mono-dimensionality of these measures), the index of linguistic agency accounts even for 86% of the entire cross-national variance in 1900 democracy ($N = 96$; $p < .001$).

⁴⁹ As for the “manpower” advantage of agrarian over foraging societies, see Nolan and Lenski (op. cit., footnote 19), Diamond (op. cit., footnote 20).

⁵⁰ With the Industrial Revolution, population density ceases to be an indicator of more advanced societal development because this transition is linked with a dramatic reversal in reproductive strategies. As Welzel (op. cit., footnote 1, chapter 11) points out, we see a massive reversal from a “quantity breeding” strategy

As Oded Galor argues, population density might be the only measure of societal 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.⁵¹ Before this incision, gains in food production were channeled into population growth and the expansion of the cultivated land area, but not into mass income growth and other aspects of individual life quality. Moreover, some scholars consider pre-colonial population densities as an important factor in the history of colonialism because densely populated territories escaped—for obvious reasons—mass settlement by Europeans.⁵² To test the influence of pre-colonial population densities in the historic sequence leading towards human empowerment today, we look at population densities at the eve of the colonial era, that is, in about 1500 CE. We take the data from Kees Klein Goldewijk and his co-authors.⁵³

The default assumption is that more densely populated countries in 1500 CE have been more progressed in organizational complexity at the eve of the colonial age, which would have equipped the respective populations with larger stocks of encultured knowledge. A larger accumulated stock of encultured knowledge, in turn, appears to be a better precondition to make the evolutionary jump into industrialization and democratization, followed by human empowerment today.

Pre-colonial Statehood. An important consequence of pre-industrial agrarian maturation 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 and floodplain 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.⁵⁴

To this day, many scholars regard the emergence of state order as the quintessential achievement of civilization, if not its core definition.⁵⁵ As Valerie Bockstette and her co-authors argue⁵⁶, 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.

(producing many children with little investment in skills) to a “quality building” strategy (producing few children with large investment in skills). This also means a transition from extensive growth (growing the number of individuals without increasing their incomes) towards intensive growth (growing the individuals’ incomes while keeping their numbers in check). See also Galor (op. cit., footnote 17).

⁵¹ Ibid.

⁵² This statement comes with an important qualification. Population density prevented European mass settlement in non-European CW-areas only where the indigenous peoples were immune against European diseases, which was the case in the Old World’s CW-areas (most notably Korea and Japan) but not in the New World.

⁵³ Klein Goldewijk et al. (op. cit., footnote 17).

⁵⁴ For the link between collectively coordinated irrigation and coercive statehood, see Bentzen et al. (op. cit., footnote 17).

⁵⁵ For statehood as the essence of civilization, see E.R. Service, 1975, *Origins of the State and Civilizations: The Process of Cultural Evolution*, New York: W.W. Norton. R. Carneiro, 2003, *Evolutionism in Cultural Anthropology: A Critical History*, Routledge: London. F. Fukuyama, 2011, *The Origins of Political Order – From Prehuman Times to the French Revolution*, New York: Farrar, Strauss and Giroux.

⁵⁶ For the role of state antiquity in societal development, see Bockstette et al. (op. cit., footnote 17).

Roberto Foa's analysis of statehood traditions among sub-national regions in India provides additional support for this argument.⁵⁷ 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.⁵⁸ 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.

S8.2.4 FROM IMPLICIT TO EXPLICIT LEGACIES

Linguistic agency creates an anchor that makes an individualistic 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, although East Asians represent a noteworthy exception from this pattern (since they perform well in IQ-tests despite the low linguistic agency in Mandarin, Korean and Japanese).⁵⁹ 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 the more strongly encoded agency.⁶⁰ 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 that as it is, there is reasonable evidence suggesting that linguistic agency represents a grammatical encoding of an individualistic cognition. The strong correlation between linguistic agency and emancipative values across the worlds' countries is part of this evidence.⁶¹

Equipped with an individualistic predisposition implicitly encoded in linguistic features' favored cognition patterns, a population's subsequently evolving ideologies are likely to give explicit expression to an individualistic worldview and to preserve these expressions in the form of lasting ideologies and norms. Thus, linguistic anchors represent population characteristics that are still implicit. With the formulation of doctrines and laws, the *implicit* predispositions crystallize into *explicit* ideologies and institutions. Crossing this threshold leads us into a new field of legacies that are characterized by intentional social engineering.

Lasting institutions evolve when a population's environmentally, biologically and linguistically anchored predispositions crystallize into a heritable organizational form. This means to encode predispositions in explicit beliefs and rules, transmitted over the generations through the process of acculturation.

⁵⁷ On Indian state traditions, see R. Foa, 2016, *Ancient Polities, Modern States*, Doctoral Dissertation, Harvard University: Graduate School of Arts and Sciences.

⁵⁸ Data on state antiquity are from Bockstette et al. (op. cit., footnote 17).

⁵⁹ Meyer-Schwarzenberger (op. cit., footnote 17).

⁶⁰ Ibid.

⁶¹ The correlation amounts to $r = .75$ ($N = 101$; $p < .001$).

Among the societal configurations that emerged at different points in history, those present at the dawn of colonialism, that is around 1500 CE, are of outstanding importance. The reason is that this era marks a true singularity in world history. Indeed, never before in the course of 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. Therefore, the institutional and ideological repertoires with which the territories of different civilizations had been equipped by then are of critical importance. These repertoires determined how well the respective populations were prepared to cope with rising Western powers' imperial ambitions. Consequently, we measure linguistic agency, population density and pre-colonial statehood at a time close to the dawn of the colonial age.

S8.2.5 THE PRE-INDUSTRIAL THRESHOLD (CA. 1500-1800 CE)

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 grassroots structures of every society. From this point of view, our most favored influence relates to the prevalence of nuclear families and their embodied female autonomy.

Female Autonomy. At the original stage of human societies—foraging—fertility rates are modest because the mobility of hunter-gatherers sets a limit to the number of children that can be fed and carried around at once. Fertility certainly varied to some extent in response to seasonally fluctuating food supplies. But fertilities way above replacement level could not be sustained for long among nomadic tribal communities. Consequently, population growth in foraging societies is slow, population density thin and cohabitating groups are rather small in the number of people, while covering a large territorial range of roaming.⁶²

The situation changes dramatically with the transition to agriculture. Food surpluses and the ability to store them for times of shortage allow for much higher fertility. In addition, high fertility becomes a decisive advantage because, in the competition between neighboring agrarian populations, those reproducing faster outnumber slower growing populations, which also means to outcompete them in terms of military power. Thus, competition between agrarian populations for arable land favored high fertilities. These pressures were so strong that they offset humans' natural disposition for a fertility rate at or slightly above the replacement level.⁶³

Consequently, all agrarian empires in history encultured patriarchal family norms, usually wrapped in religious doctrines, that fervently propagate high fertility. Together with high

⁶² For fertility levels in foraging societies, see Nolan and Lenski (op. cit., footnote 19), Ember and Ember (op. cit., footnote 19) and R.L. Blumberg, 2015, “‘Dry’ versus ‘Wet’ Development and Women in Three World Regions,” *Sociology and Development* 1, 91-122.

⁶³ Ibid.

fertility, most religious doctrines advocate derivative reproductive norms, which include strict heterosexuality, earliness, necessity and sanctity of marriage for the female half of the population and female virginity before an early marriage. These patriarchal family, fertility and sex norms had dramatic consequences for gender relations. If the gendered division of labor in foraging societies was already somehow uneven, high fertility rates in agrarian societies now greatly reinforced the initial inequality by forcing women into maximized reproduction over their *entire* fertile lifespan.⁶⁴ Hence, the patriarchal reproduction norms that become the “evolutionary norm” in agrarian societies are all about maximizing male control over female sexuality.⁶⁵ 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, condemning half of our species to be reduced to their biological function.⁶⁶

Against this evolutionary norm in agrarian societies, Northwestern Europe’s grassroots social fabric appears distinctly “weird” already in pre-industrial times. Although fertility rates were high in all agrarian societies by today’s standards, Northwestern Europe’s CW-areas nevertheless showed suspiciously lower fertilities, as SOM-Figure S6.4-1 illustrates. 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 a preferred choice in this agrarian setting.

Lower fertilities correlate very closely with lower pathogen loads, lower child mortalities and closeness to the nuclear family in Selin Dilli’s⁶⁷ classification of household systems. In fact, all these variables correlate significantly with each other and actually represent a single dimension of cross-country variation.⁶⁸ Along this single dimension, we find high pre-industrial pathogen loads, high child mortalities, high female fertilities and the extended family with early, pre-arranged and endogamous marriages as well as patrilocal households at one end, juxtaposed to low pre-industrial pathogen loads, low child mortalities, low female fertilities and the nuclear family with late, consensual and exogamous marriages as well as neolocal households at the opposite end.⁶⁹

Thinking about what this single dimension covers in substantive terms, we suggest that when these four components come together at the low mortality-fertility end (also known as

⁶⁴ On women’s reduction to reproduction in most agrarian societies, see Blumberg (op. cit., footnote 62) and, of course, E. Boserup, 2007 [1970], *Women’s Role in Economic Development*, London: Routledge.

⁶⁵ For evolutionary normality in agrarian society’s fertility, family and sex norms, see V.M. Hudson, B. Ballif-Spanvill, M. Caprioli and C.F. Emmett, 2012, *Sex and World Peace*, New York: Columbia University Press.

⁶⁶ On the prevalence of patriarchy in most agrarian societies, see Boserup (op. cit., footnote 64) and Blumberg (op. cit., footnote 62).

⁶⁷ Dilli (op. cit., footnote 1).

⁶⁸ Factor loadings are .87 for the closeness to the nuclear household type, .82 for the lowness of the pathogen load, .74 for the lowness of child mortality and .68 for the lowness of the female fertility in a given country-population in about 1800 CE. The Kaiser-Meyer-Olkin measure for the factor analysis is .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%. The Cronbach’s alpha for the four constituent variables is .73, indicating a high degree of reliability for the overall measure as concerns its summary function.

⁶⁹ In evolutionary psychology, the same juxtaposition is described as “fast” versus “slow” or “short” versus “long” life histories, with fast life histories corresponding with conditions at the vicious end and slow life histories with those at the virtuous end, see M.A. Woodley, 2011, “A Life History Model of the Lynn-Flynn Effect,” *Personality and Individual Differences* 72, 1-5.

“long” life histories), what we get is female autonomy in family planning, or reproductive choice, to put it simply. Indeed, lower child mortalities and lower pathogen loads provide an opportunity for female reproductive autonomy, while lower fertility rates 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* female reproductive autonomy.⁷⁰ 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. Female reproductive autonomy in this sense indicates a major deviation from “evolutionary normality” in the otherwise heavily patriarchal sex norms of agrarian societies. Figure 3-3a of the book addresses societal differences on this demographic dimension as “smaller-vs-greater female (reproductive) autonomy.” For reasons of brevity, SOM-Figures S8.3-1 to S8.3-2 and S8.3-3 label the same dimension as “female autonomy.”

So far, we suggest a series of derivative autonomies, starting from hydration autonomy inherent in the CW-Condition to nutritional autonomy provided by dairy options (based on lactose tolerance) to imaginative autonomy rooted in linguistic agency. To this sequence, we now add reproductive autonomy. As a whole, this set of partial autonomies establishes existential autonomy writ large.

Next to female reproductive autonomy, 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 colonial exploitation by European powers and (3) the country-territories’ different levels of pre-industrial material wealth per capita.

Western Legacies. Scholars from Douglas North to Jack Goldsmith to Niall Ferguson argue that the West’s pioneering role in the Industrial Revolution results from institutionally encoded ideological legacies that embody an emancipatory seed.⁷¹ The germination of this emancipatory seed was programmed towards individualistic-egalitarian outcomes through which human initiative became unlocked on a mass scale. Many scholars also agree that the institutionalization of the Western emancipatory legacy is most clearly visible in Protestant religious doctrines⁷² and Anglo-Saxon customary law⁷³ traditions.⁷⁴

⁷⁰ SOM-Section S2 documents measurement details.

⁷¹ D.C. North, 1982, *Structure and Change in Economic History*, New York: W.W. Norton. N. Ferguson, 2010, *Civilization: The West and the Rest*, London: Penguin. J.A. Goldstone, 2008, *Why Europe? The Rise of the West in World History 1500-1850*, Seattle: McGraw Hill.

⁷² On the role of Protestantism, see M. Weber, 2010 [1904], *The Protestant Ethic and the Spirit of Capitalism*, Oxford: Oxford University Press. L. Dumont, 1986, *Essays on Individualism*, Chicago: Chicago University Press. D. Lal, 1998, *Unintended Consequences: The Impact of Factor Endowments, Culture and Politics on Long-Run Economic Performance*, Boston: MIT Press. L. Siedentop, 2014, *Inventing the Individual: The Origins of Western Liberalism*, London: Belknap Press.

⁷³ On the positive role of Anglo-Saxon customary law, see North (op. cit., footnote 71) and R. La Porta, F. Lopez-de-Silanes and A. Shleifer, 2008, “The Economic Consequences of Legal Origins.” *Journal of Economic Literature* 46, 285-332.

⁷⁴ The idea goes back to Weber (op. cit., footnote 72) who specifically addressed the initiative-unleashing role of the Calvinist doctrine of predestination. The notion that God’s already made choice of whether one will go to heaven or hell in after-life will be visible in one’s this-worldly achievements, supposedly generated a strong achievement motivation. Other scholars, like Lal (op. cit., footnote 72), refer to the individualism and egalitarianism inherent in Protestantism more generally. For instance, the Protestant idea that every single

These ideas resonate well with our own reasoning. We argue 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 predisposition. It would be logical, then, that these implicit predispositions operate as a selective force that at one point crystallizes in an explicit institutional expression, finding concrete formulation in doctrines and laws.

In shaping doctrines, religion acted as the chief force in history.⁷⁵ This seems to be true especially with respect to emancipatory tendencies or their very opposite: patriarchy. Indeed, as we just mentioned, scholars have argued since the times of Max Weber⁷⁶ that Protestantism sticks out as the religion with the most pronounced emancipatory impulse.⁷⁷ Protestantism emerged through the Reformation, which fell together with the early colonial period and the florescence of pre-industrial capitalism. Not coincidentally, pre-industrial capitalism and the Reformation succeeded most sweepingly in those regions of Europe where the CW-Condition already provided hydration, dietary, imaginative and reproductive 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 Martin Luther, John Calvin and Ulrich Zwingli placed this option on the table. In other words, Protestantism encoded in religious doctrine an emancipatory predisposition that has already been there.

Relative to Protestantism, Samuel Huntington and Timur Kuran place Orthodox Christianity and Islam at the opposite end of emancipation, attributing to these religions a particularly patriarchal outlook.⁷⁸ As Huntington points out, this outlook became typical of the “Eastern” religions because they were allied in their history with despotic agrarian empires: the Byzantine and Russian empires in the case of Orthodox Christianity, and the Arab/Persian Caliphates and Ottoman Sultanates in the case of Islam. Catholicism has also been embedded in an inherently patriarchal institution—the Roman Church with the Pope as its infallible leader at the top. But the secular movement’s emancipatory struggles aimed to separate the Catholic church from the state and succeeded in pushing back its patriarchal influence. From this point of view, one would place Catholicism in between Protestantism, on the one hand, and Orthodox Christianity and Islam, on the other, when it comes to the ideological encoding of patriarchal-vs-emancipatory orientations.

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 individualizing and egalitarian impulse. To allow every individual to build her 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 Johannes Gutenberg’s printing press (invented ca. 1440 CE) accelerated after Luther’s Bible translation, which he finalized in 1534 (the New Testament was translated from Latin into German already in 1522).

⁷⁵ On the centrality of religion, see Nolan and Lenski (op. cit., footnote 19), Ember and Ember (op. cit., footnote 19) and C. Quigley, 1979, *The Evolution of Civilizations: An Introduction to Historical Analysis*, Indianapolis: Liberty Press.

⁷⁶ Weber (op. cit., footnote 72).

⁷⁷ Dumont (op. cit., footnote 72), Lal (op. cit., footnote 72).

⁷⁸ S.P. Huntington, 1996, *The Clash of Civilizations and the Remaking of the World Order*, New York: Simon & Schuster. T. Kuran, 2010, *The Long Divergence: How Islamic Law Held Back the Middle East*, Princeton: Princeton University Press.

Most likely, the patriarchal-vs-emancipatory tendencies of different religions are inherent to both their ideological doctrines and their organizational structures, 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 (“congregations”), especially in Presbyterian Church communities, which are fundamentally democratic: “*Ruling elders are men or women who are elected by the congregation.*”⁷⁹

It is indeed true that the major world religions vary by the degree of their position on a continuum from patriarchal to emancipatory tendencies. At least, this is obvious when we again accept autocratic-vs-democratic traditions as a proxy for such tendencies, using the same measure introduced above.

We work with nine religiously defined countries. Of course, many countries have been influenced by different religions in their history, but in most cases, it is possible to identify the religion with the strongest influence in a country’s history. For instance, The Netherlands are divided into a Catholic and a Protestant part, but the Protestant Reformation has shaped the history of this country. Hence, our classification counts The Netherlands as a historically Protestant country. The same story holds for Switzerland: Despite being a mixed Catholic/Protestant country, we categorize it as historically Protestant because Switzerland acted as a central playing field of the 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 to the religion that shaped its history most significantly.

Comparing our country-groups’ mean scores on autocratic-vs-democratic traditions, it turns out that the religion-anchored variation in these traditions is highly significant and accounts for almost fifty percent of the entire cross-national variance in autocratic-vs-democratic traditions.⁸⁰ In ascending order, the boxplot in *SOM-Figure S8.7-4* (at the end of this section) reveals the religious country-groups’ mean scores on autocratic-vs-democratic traditions, with higher scores indicating stronger democratic traditions (standard deviations in parentheses): Buddhism⁸¹ 0.25 (0.10), Islam⁸² 0.27 (0.15), Orthodox Christianity 0.29 (0.20), Confucianism⁸³ 0.39 (0.27), Animism⁸⁴ 0.42 (0.12), Catholicism 0.52 (0.22), Hinduism⁸⁵ 0.72 (0.04),

⁷⁹ For the role religious doctrines, see Weber (op. cit., footnote 72), Lal (op. cit., footnote 72), Schulz et al. (op. cit., footnote 17). For the role of institutional structures, see North (op. cit., footnote 71) and Acemoglu, Johnson and Robinson 2001 (op. cit., footnote 1).

⁸⁰ Observations amount to $N = 184$ ($p < .001$).

⁸¹ We find no significant difference between Buddhist countries depending on whether they mostly belong to Theravada or Mahayana Buddhism.

⁸² We find no significant difference between Muslim countries depending on whether they mostly belong to Sunni or Shia Islam.

⁸³ We are aware of the fact that Confucianism is strictly speaking not a religion but a philosophy or cosmology. In shaping moral codes and ethical norms, Confucianism is however a functional equivalent of religion.

⁸⁴ 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 Poly-/Mela-/Micronesia was at that stage of development before colonization, we classify countries in these areas as belonging to the religious tradition of Animism.

⁸⁵ Only India and Sri Lanka are categorized as mostly Hindu majority countries.

Protestantism 0.81 (0.27), Judaism⁸⁶ 0.82. It is, once more, noteworthy that, for most religious country groups, the standard deviations are considerably smaller than the mean scores.⁸⁷ This shows that the countries with the same religious heritage are relatively similar as concerns their autocratic-vs-democratic traditions, which further underlines the significance of religion as a force shaping patriarchal-vs-emancipatory tendencies.

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 the South Pacific; Catholicism originates in Southern and Central Europe and spreads 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 geographic space is a confounding factor of ethnic compositions, language families and land 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 shape a religion's institutional frame and doctrinal orientation, which led to firmer enculturation. In terms of imperial anchors, Islam is related to the Arab and Persian Caliphates and the Ottoman Sultanate, Orthodox Christianity to the Byzantine and Tsarist empires, Confucianism to the Han empires, Catholicism to the Western hemisphere of the 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 that deliberately propagated these religions.

As for Animism, which is clearly the least institutionalized religious legacy, the respective territories were mostly at the tribal, pastoral or horticultural stage when they came into contact with Europeans. This made them easy victims of colonizers from areas with more advanced levels of organization, technology and armory. In this sense, the Animist tradition is also linked to the history of empires: The fact that this tradition is indicative of the absence of antique agrarian empires made it particularly vulnerable to colonial imperialism.

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

⁸⁶ Israel is treated as the only Jewish majority country.

⁸⁷ 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 examine this issue, we create a variable called “religion-encoded emancipation.” This variable assigns each country the mean score in autocratic-vs-democratic traditions of the religious country group to which it belongs.⁸⁸ Religion-encoded emancipation, in this sense, measures the countries’ placements on the continuum of autocratic-vs-democratic traditions *in as much* as these placements are attributable to the countries’ religious legacies.

Compared to religion, legal systems constitute an even more formal tool to institutionalize a patriarchal-vs-emancipatory tendency. Scholars have long argued that law systems are a first-rate crystallizer of culture and differ significantly between countries.⁸⁹ Rafael La Porta, Florencio Lopez-de-Silanes and Andrei Shleifer, for instance, claim that the Anglo-Saxon customary law provides stronger protection of private property and individual freedoms than the Roman law, which in turn is more emancipatory in these terms than most of the non-Western law traditions. 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 religiously defined country-groups, we create seven country groups based on their type of law tradition and then measure their position on our continuum of autocratic-vs-democratic traditions. Finally, we assign each country the mean score in autocratic-vs-democratic traditions of its legal country group, which measures democratic traditions in as much as they have an anchor in different legal traditions. Even more than religious legacies, legal heritages have been shaped by empires. Thus, we distinguish seven legal heritages.

As *SOM-Figure S8.7-5* (end of this section) shows, the seven legal heritages are positioned as follows on the continuum of autocratic-vs-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), Germanic law 0.93 (0.07), Anglo-Saxon law 0.98 (0.04).⁹⁰ As before, it is 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 fifty-four percent of the entire cross-national variation in autocratic-vs-democratic traditions.⁹¹

⁸⁸ Technically speaking, this is the same as assigning each country the score in democratic traditions predicted by the mean of its religious country-group.

⁸⁹ On the significance of law traditions, see La Porta, Lopez-de-Silanes and Shleifer (op. cit., footnote 73).

⁹⁰ 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). 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 foreign 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).

⁹¹ Observations amount to $N = 179$ ($p < .001$).

With historic empires as their joint link, it is not surprising that religiously and legally encoded emancipation overlap largely.⁹² Accordingly, it makes sense to combine the two encodings into a single variable that measures the different countries' inherited patriarchal-vs-emancipatory legacies—to the maximum extent that these legacies are encoded in both religious heritage and legal tradition.⁹³

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.” Scholars thinking along the lines of sociologist Max Weber (ideologies) and economist Douglas North (institutions) will certainly attribute great weight to this continuous measure of combined ideological-institutional legacies typical of the West.

In a widely cited article, Jonathan F. Schulz and his co-authors champion an indicator that they label “Western Church exposure” as an explanation of the West's emancipatory dynamic. This indicator measures the number of years since a country is under the influence of the Catholic church, from 0 years for Japan to 1500 years for Italy. The argument is that the church pursued a very particular marriage policy, namely a strict ban on endogamy. Accordingly, the longer a population lived under the influence of this exogamous marriage regime, the more its family, fertility and sex norms detached from patriarchal kinship ties, which then gave rise to the nuclear family pattern. Allegedly, the church pursued this marriage policy out of its material interest in land property: The prohibition of inheritance within the wider kinship circle enhanced the church's chances of seizing property due to the absence of legitimate heirs.

Not surprisingly, Schulz et al.'s measure of Western church exposure correlates positively and strongly with our indicator of the Western (religious and legal) legacy.⁹⁴ However, Schulz et al.'s Western church exposure is available for thirty countries less than our Western legacy.⁹⁵ Western church exposure is also a weaker indicator of the West's emancipatory drive from the viewpoint of autocratic-vs-democratic traditions than our measure of the Western legacy.⁹⁶ For these reasons, we prefer our measure of the Western legacy.⁹⁷ Besides, Figure 6-2 in the book

⁹² The correlation amounts to $r = .94$ ($N = 188$; $p < .001$).

⁹³ Technically speaking, we calculate for each country its arithmetic mean of religiously 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 religious legacy component and 55% for its legal tradition component ($N = 178$; $p < .001$). 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 (Lindberg et al., op. cit., footnote 4) into a single measure for the year 1900 (which is justified given the strong mono-dimensionality of these measures), our Western legacy index captures even 78% of the entire cross-national variance in 1900 democracy ($N = 96$; $p < .001$), which in this case compares to 68% for its religious legacy component and 69% for its legal tradition component.

⁹⁴ The correlation amounts to $r = .71$ ($N = 156$, $p < .001$).

⁹⁵ Observations amount to $N = 156$.

⁹⁶ Schulz et al.'s (op. cit., footnote 17) Western Church exposure correlates at $r = .62$ with democratic traditions ($N = 155$; $p < .001$), while our Western legacy correlates at $r = .75$ with democratic traditions ($N = 179$; $p < .001$).

⁹⁷ Other authors stressing the role of the church as the source of the West's nuclear family pattern include J.L. van Zanden, T. de Moor and S. Carmichael, 2019, *Capital Women: The European Marriage Pattern, Female Empowerment and Economic Development in Western Europe 1300-1800*, New York: Cambridge University

demonstrates that Western church exposure turns insignificant as a predictor of the pre-industrial Western family pattern, once we control for the CW-Condition.

Colonization Risk. A country's colonization risk indicates its likelihood back in time to fall victim to predatory forms of European plantation and mining colonialism. Daron Acemoglu, Simon Johnson and James Robinson argue that the "white settler mortality" determined this risk: Where this mortality was high, large-scale settlement of European farmers who work the land by themselves would not happen.⁹⁸ 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 tropical and sub-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 Daron Acemoglu and his co-authors. However, Enrico Spolaore and Romain Wacziarg's⁹⁹ measure of residential populations' genetic distance to Northwestern Europeans¹⁰⁰ in 1500 CE covers more territories and shows better (negative) 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 of falling victim to colonial exploitation. We label this variable "colonization risk."

Given that evolution has anchored racism in the human mind, it is expectable that Northwest Europeans were less scrupulous in exploiting indigenous populations whose members were genetically more distant because then they looked more different, which made it easier to de-humanize these people and categorize them as naturally inferior to Europeans. Humans have indeed an evolved innate tendency to group-categorize others. Such categorization turns more easily into de-humanization, the stronger the categorization involves perceptions of ethnic-racial distance.¹⁰¹ Hence, our measure pays tribute to the racism inherent in colonial history.

Pre-industrial Wealth. The "reversal of fortunes" thesis propagated by Daron Acemoglu and his co-authors¹⁰² claims that the Industrial Revolution inverted the global income distribution of pre-industrial times: Areas, like the Middle East and China, that supposedly were richer in pre-industrial times than Northwestern Europe fell behind Northwestern Europe and its overseas settler colonies after the Industrial Revolution. If this is true, the countries' per capita income at pre-industrial times should be a negative predictor of industrial-era prosperity and its subsequent emancipatory outcomes, such as mass-level democracy. To consider this possibility, we use estimates of per capita incomes in 1800 CE from "Gapminder," which in turn go

Press. J. Goody, 1983, *The Development of the Family and Marriage in Europe*, New York: Cambridge University Press). Fukuyama (op. cit., footnote 55), pp. 229-244.

⁹⁸ For the role of the "white settler mortality," see Acemoglu et al. (op. cit., footnote 1).

⁹⁹ For the genetic distance data, see Spolaore and Wacziarg (op. cit., footnote 17).

¹⁰⁰ To be precise, Spolaore and Wacziarg (op. cit., footnote 17) measure genetic distance from the English, but this is literally the same as saying genetic distance from Northwestern Europeans.

¹⁰¹ It is a natural human tendency to group-stereotype others. This tendency turns more easily into de-humanizing others if those others are perceived as genetically distant, based on easily recognizable visual and accoustic sensual markers, like skin color and language. See H. Tajfel and J.C. Turner, 2004 [1986], "The Social Identity Theory of Intergroup Behavior," in J.T. Jost and J. Sidanius (eds.), *Key Readings in Social Psychology*, New York: Psychology Press, 276-293. A. Gat, 2008, *War in Human Civilization*, Oxford: Oxford University Press.

¹⁰² On the "reversal of fortunes," see Acemoglu et al. (op. cit., footnote 1), Olsson and Paik (op. cit., footnote 17).

back to Angus Maddison's calculations.¹⁰³ Let us emphasize again that 1800 CE is the first year providing income data for most countries worldwide. And for all countries, except England and Belgium, this is indeed a time before industrialization.

S8.2.6 THE INDUSTRIAL AGE (CA. 1900)

The next temporal layer after the colonial era is the industrial age. Because of data limitations, 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.

Cognitive Investments. A study by Eric Uslaner¹⁰⁴ shows convincingly that today's impartial government can be traced back to the late 19th century, when states whose rulers were committed to modernizing 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 the mass-scale cognitive mobilization emitted by expanding education is, until this day, one of the key drivers of emancipative values—in Western and non-Western countries. We measure a country-territory's advancement in universal schooling in the late 19th century based on data collected by Fabrice Murtin¹⁰⁵, taking advantage of Uslaner's scheme of attributing these data to contemporary countries. The data are from around 1900, and we combine them with fertility and mortality data from the same period and with information on when the industrial-era fertility drop started in different countries. The reason to combine these data into a single index of countries' "lower-vs-higher cognitive investments" in around 1900 is the powerful inverse correlation between mortality/fertility, on the one hand, and schooling/education, on the other, reflecting the polarity in reproductive behavior, family planning and lifetime investment between a "quantity breeding" strategy linked with "short" life histories and a "quality building" strategy linked with "long" life histories. Cognitive investments into societies' individuals are low at the "quantity breeding" end of reproductive behavior, while these investments are high at the "quality building" end, reflecting the "births"-vs-"brains" trade-off in individuals' lifetime investments. The vertical axis in Figure 3-3b of our book in Chapter 3 displays this measure. For reasons of brevity, we refer henceforth to this variable simply as "cognitive investments."

Nascent Democracy. As concerns democracy, the period around 1900 is the time at which the first fully fledged democracies with universal male and female suffrage occur (in 1893 New Zealand is the first country in the world to establish universal male and female suffrage). Thus, here we see the vanguards of modern mass democracy. To measure a pioneering role in democratization around 1900, we use data from the "varieties of democracy" (V-Dem) project in

¹⁰³ Angus Maddison's per capita income estimates for 1800 CE are retrievable from Gapminder (www.gapminder.org). A. Maddison, 2007, *Contours of the World Economy 1-2030 AD: Essays in Macro-Economic History*, Oxford: Oxford University Press.

¹⁰⁴ E. Uslaner, 2017, *The Historical Roots of Corruption: Mass Education, Economic Inequality and State Capacity*, New York: Cambridge University Press.

¹⁰⁵ The data source is Murtin (op. cit., footnote 1).

Gothenburg, Sweden.¹⁰⁶ 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.”

Rational Bureaucracy. From Max Weber to Talcott Parsons to Francis Fukuyama¹⁰⁷, influential thinkers argue that features labeled interchangeably as “rule of law,” “benevolent government,” “enlightened absolutism,” “effective order,” “output impartiality” or “rational bureaucracy” (to stick with Weber) reflect institutional qualities that utilize regulatory state capacities to pursue “good governance” for a more indiscriminate provision of high-quality public goods. If this is true, it should also apply to emancipatory outcomes, in which case “rational bureaucracy” in 1900 would predict more advanced levels of human empowerment today. To measure this aspect of society, we use the “public corruption” indicator in 1900 from the V-Dem project and invert it to obtain a measure of rational bureaucracy.¹⁰⁸ Clearly, in as much as the prevalence of corruption indicates discriminatory governance practices that selectively distribute privileges, non-corrupt governance equates with an indiscriminate pursuance of the common good.

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.¹⁰⁹ 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, in 1900. Examples include the French colonies in sub-Saharan Africa and Indochina. The next weakest position is represented by former colonies of Britain in 1900, like the British colonies in sub-Saharan Africa, India and the Caribbean. We distinguish non-British and British colonies because a large amount of literature argues that Britain was a less predatory colonial power than other European nations and imprinted on many of its colonies a liberal institutional legacy.¹¹⁰ Therefore, although colonial legacies always incur a burden, a British colonial legacy should at least be less impairing with respect to emancipatory societal dynamics leading to human empowerment. The next weakest position is present when a contemporary country was an occupied territory of an autocratic land empire in 1900, such as the Ottoman, Russian or Austro-Hungarian empires. Examples include most countries of Eastern and Southeastern Europe, like the Balkan countries as well as Romania

¹⁰⁶ The data source is the V-Dem project (Lindberg et al., op. cit., footnote 4).

¹⁰⁷ On state order and bureaucracy, see North et al. (op. cit., footnote 1), Weber (op. cit., footnote 72), Mann (op. cit., footnote 19), Fukuyama (op. cit., footnote 55), T. Parsons, 1964, “Evolutionary Universals in Society,” *American Sociological Review* 29, 339-357. S.E. Finer, 1997, *The History of Government – Vol I: Ancient Monarchies and Empires*, Oxford: Oxford University Press.

¹⁰⁸ The data source is the V-Dem project (Lindberg et al., op. cit., footnote 4).

¹⁰⁹ A.G. Frank, 1978, *Dependent Accumulation and Underdevelopment*, London: Macmillan. I. Wallerstein, 1992, “The West, Capitalism and the Modern World-System,” *Review* 15, 561-619. C.K. Chase-Dunn and P. Grimes, 1995, “World-Systems Analysis,” *Annual Review of Sociology* 21, 387-417.

¹¹⁰ S.M. Lipset, 1960, *Political Man: The Social Bases of Politics*, Garden City: Doubleday. Dahl (op. cit., footnote 40).

and Bulgaria. Next are countries that were formally independent in 1900, but were effectively controlled by a colonial power. Examples cover much of Latin America, where most of today's countries have been independent since the early 19th century but nevertheless operated under the heavy influence of the US, in one way or the other. Other examples include Thailand, Iran or China, none of which has ever been a colony in the formal sense but nevertheless under the control of one or more of the colonial powers. The next rank up on the ladder of power is given when a contemporary country already existed as a truly independent nation in 1900 but was not the center of a colonial empire or land empire. Examples include the Scandinavian countries, Switzerland, Canada, Australia and New Zealand. On top of this, we place contemporary countries that were the center of autocratic 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 naval empires, in other words colonial powers, like Britain, France, the Netherlands and Portugal.¹¹¹

This seven-category ranking in the world order of the time around 1900, ascending from “non-British colonies” (1) via “British colonies” (2), “occupied territories” (3), “formally sovereign countries” (4), “truly sovereign countries” (5) and “land empires” (6) to “colonial powers” (7), explains indeed forty-nine percent of the entire cross-national variation in human empowerment today.¹¹² In other words, countries higher in the world's power ranking in 1900 CE tend to be more advanced in their populations' human empowerment today.

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 that industrial development is strongly path-dependent. Consequently, pioneers of industrialization around 1900 should still be more developed than other countries today. If this is an accurate view, 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.¹¹³

S8.2.7 THE DIGITAL POST-INDUSTRIAL (DIGITAL) AGE

The final temporal layer after the industrial era is the digital age in which we locate our ultimate dependent variable, the human empowerment index, which indicates impairing-vs-empowering human conditions.

Human Empowerment. We measure human empowerment based on the three-component human empowerment index for 2018, as described in SOM-Section S3. To repeat, the index

¹¹¹ Spain, by then, has lost almost all of its former colonial possessions and is, hence, not classified as a colonial power in around 1900 but just as an independent nation.

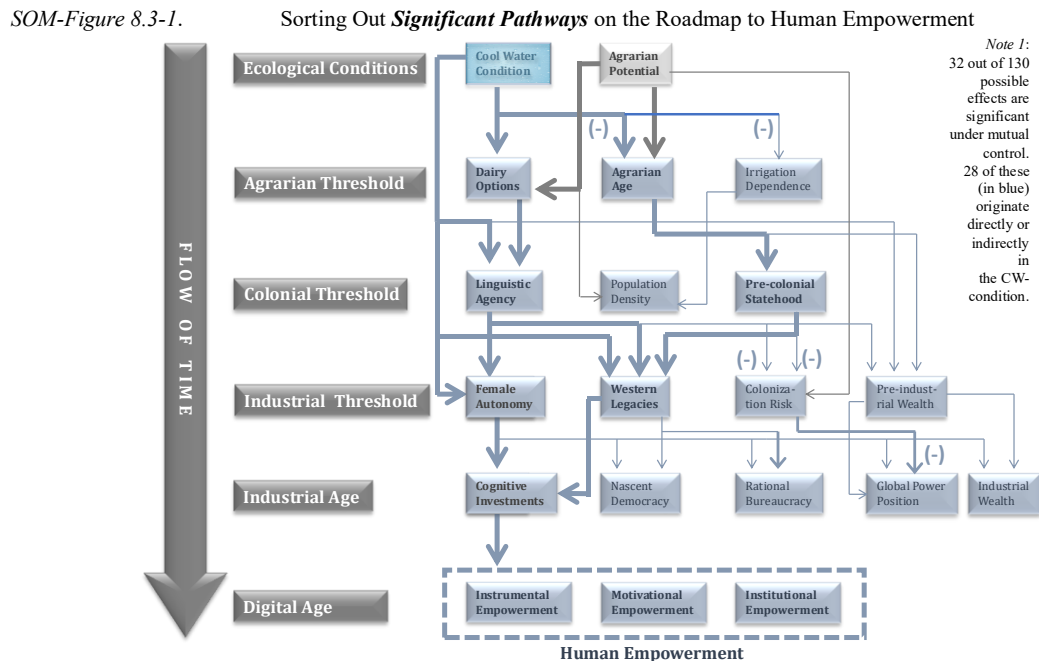
¹¹² Observations amount to $N = 169$ ($p < .001$).

¹¹³ Per capita income estimates for 1900 CE are from Gapminder (www.gapminder.org).

summarizes (1) “poor-vs-rich action resources” as an indicator of people’s *instrumental* empowerment, (2) “dormant-vs-viral emancipative values” as an indicator of their *motivational* empowerment, and (3) “narrow-vs-wide civic entitlements” as an indicator of their *institutional* empowerment—thus bundling together the human condition across the material, mental and legal domains of societal existence. Again, our final outcome variable summarizes these three partial empowerments into a *single* index of overall human empowerment. As we have already seen with plenty of evidence, the human empowerment index is an encompassing catchall measure of everything that can be used to measure a country’s general functioning, wellbeing and its overall life quality (for proof, see *SOM-Table S5-1* again). Because we use as our final outcome variable an indicator that is so broadly representative of all kinds of other indicators linked to emancipatory developmental outcomes, we can be certain that our model is valid for various alternative specifications of the final outcome variable.

S8.3 The Main Road towards Human Empowerment

SOM-Figure S8.5-1 shows the same diagram as *SOM-Figure S8.1-1*, but now with all the significant influences we have been able to identify empirically. Thus, *SOM-Figure S8.3-1* results from a sequence of temporally ordered multiple regressions, each conducted with stepwise elimination, such that a variable located at a later 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.



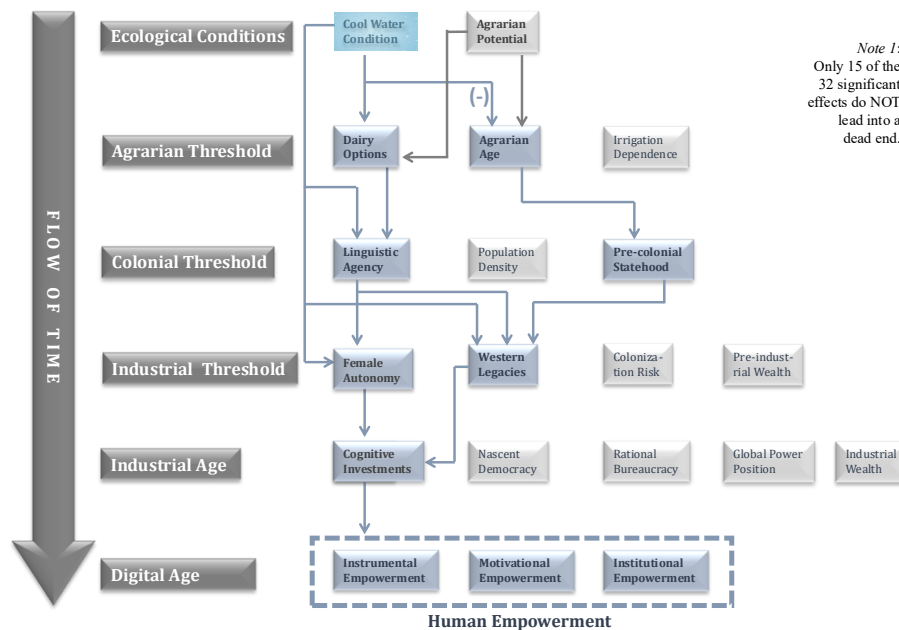
Of the 130 possible influences, only thirty-two influences prove significant throughout our multiple series of temporally ordered regressions. This sounds like a great reduction, and it is. But as *SOM-Figure S8.3-1* shows, even this reduced number of significant influences provides a complex picture. Representing this complexity is, for once, a helpful exercise because it reminds us to avoid oversimplified interpretations of history.

To demonstrate the CW-Condition's outstanding importance as the deep source of human empowerment, *SOM-Figure S8.3-1* highlights in blue twenty-eight of the thirty-two pathways with a direct or indirect origin in the CW-Condition. The only four pathways that do neither directly nor indirectly relate back to the CW-Condition are shown in grey. Strikingly, none of the four grey pathways leads directly to the final outcome variable (i.e., contemporary human empowerment), nor its immediate precursor (i.e., cognitive investments in 1900) or the precursor's own two precursors (i.e., female autonomy and Western legacies in around 1500-1800). Noticing the overwhelming majority of blue arrows in *SOM-Figure S8.3-1* already reveals something truly remarkable: All of our eighteen variables—except the agrarian potential—are in one way or the other related to the CW-Condition. Hence, the CW-Condition is the quintessential connecting source of most of the later situated “deep root” drivers of development.

INSIGHT:

The correlations in our book's Table 8-1 re-enforce this conclusion, showing that all of the suggested remote drivers of societal development associate with human empowerment today in exactly the same manner as they associate with the CW-Condition: (1) negatively (and equally in negative strength) when the connection with the CW-Condition is negative; (2) positively (and equally in positive strength) when the connection with the CW-Condition is positive; and (3) insignificantly (and equally weak) when the connection with the CW-Condition is insignificant. Figures 8-1 and 8-2 in our book further below visualize this insight.

SOM-Figure 8.3-2.

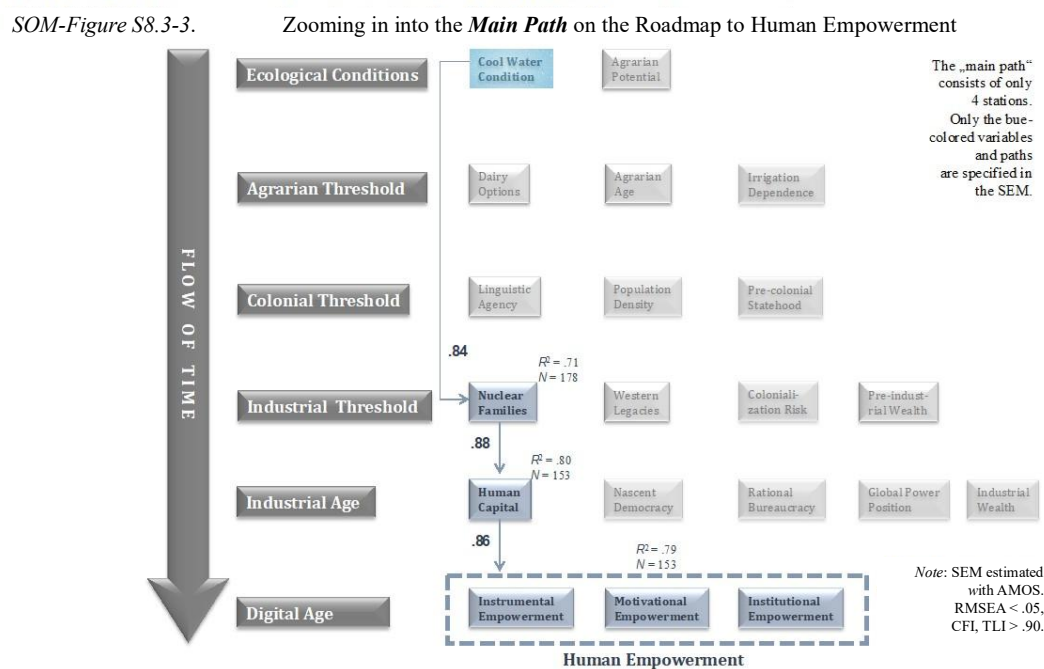
Narrowing Down **Major Pathways** on the Roadmap to to Human Empowerment

Among the five remote drivers in the second-last layer of historic thresholds—cognitive investments, nascent democracy, rational bureaucracy, global power position and industrial wealth—only cognitive investments exert a significant influence on the societies' contemporary human empowerment under mutual control, although the literature treats the other suggested influences as potent drivers of societal development.¹¹⁴

Hence, any of the more remote drivers in our historic tableau that should influence today's human empowerment must operate through an influence on cognitive investments in the industrial age. This finding underlines once more the quintessential developmental importance of the demographic shift in reproductive investment from fertility to education or, more broadly speaking, from the "quantity breeding" strategy to the "quality building" strategy in lifetime usage and the related erosion of patriarchal family, fertility and sex norms.

¹¹⁴ The importance of cognitive investments confirms the emphasis that Uslaner (op. cit., footnote 104) places on education and human capital as drivers of beneficial developmental outcomes. See also H. Rindermann, 2018, *Cognitive Capitalism: Human Capital and the Wellbeing of Nations*, New York: Cambridge university Press.

As indicated by the fat arrows in *SOM-Figure S8.3-1*, only two pathways from the CW-Condition lead toward cognitive investments in the industrial era. To clear up the picture, *SOM-Figure S8.3-2* isolates these two pathways towards human capital in the industrial era, thus blinding out all effects in *SOM-Figure S8.3-1* that lead to a dead end on the way to cognitive investments in 1900. This clearing up procedure further reduces complexity, eliminating seventeen of the initially thirty-two significant effects, thus reducing complexity to fifteen relevant pathways. One of these pathways runs over Western legacies in the pre-industrial era, and the other over female autonomy. The path via Western legacies underlines the importance of the CW-Condition's (direct and indirect) influence on institutionalized religious and legal traditions typical of the West, above all the Protestant doctrine and Anglo-Saxon law with their joint individualistic-egalitarian imprint. By contrast, the pathway via female autonomy stresses the importance of the CW-Condition's impact on patriarchal-vs-emancipative family, fertility and sex norms at the grassroots of society and the CW-Condition's tendency to shift this balance to the emancipatory side. Of course, the simultaneity of these two distinct pathways towards today's human empowerment raises the question of whether one of the two is more important.



In answering this question, Figure 8-3 of our book only shows the strongest influence on each station on the pathways towards human empowerment today. Doing so, our stepwise sorting-out procedure eventually isolates the flow of influence from the CW-Condition over female autonomy at pre-industrial times, and then from there on cognitive investments in the industrial era as the main pathway towards human empowerment today, clearing up the picture to just four variables and three relevant connections between them. Figure 8-3 of our book zooms into just this main path toward human empowerment.

A shortcoming of our analyses is that many separate regressions do 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 test in a single path model how much we can reduce the salient influences in *SOM-Figure S8.3-2* to fit the data among the ten involved

variables. The result is shown in *SOM-Figure S8.3-3*, which illustrates that only three paths in the flow diagram are relevant to get us to human empowerment today. The goodness of fit statistics testify to an exceptional model quality. Accordingly, the path model in *SOM-Figure S8.3-3* neither overlooks significant paths nor does it specify insignificant ones. We conclude from this finding that our reduced-form path model is valid, at least as concerns the data at hand. Besides, we also used a machine learning tool, called “random forest,” which as well strongly confirms our results.

Insight:

For a causal interpretation of the strong linkage between the quasi time-invariant CW-Condition and human empowerment today, the CW-Condition’s undeniable temporal priority is of critical relevance. This becomes even more obvious when we consider that the linkage of any other potential driver of societal development with human empowerment today is a linear function of this potential driver’s linkage with the CW-Condition. We have seen this already in Table 8-1, but Figures 8-1 and 8-2 of our book visualize this statement in striking clarity for fully forty potential drivers of societal development, which cover everything from a society’s agrarian, state and colonial legacy to its religious tradition as well as wealth, corruption, democracy, human rights, elite quality, gender equality, environmental performance, familism-vs-individualism, pro-sociality etc.—whether historic or contemporary. Indeed, the direction and strength at which potential drivers of societal development correlate with the CW-Condition explain an overwhelming ninety-nine percent of the direction and strength at which the same potential drivers correlate with human empowerment today. Consequently, the tight connection between the quasi time-invariant CW-Condition and contemporary human empowerment is a genuinely universal catch-all linkage of developmental path dependencies.

S8.4 Summary

We situate the CW-Condition among more than twenty other temporally remote drivers of emancipatory societal dynamics, leading to the societies’ human empowerment today. We order the remote drivers alongside their inherent temporality, from the most distal to the most proximal drivers, following a sequence of historic layers, starting from ecological conditions via the agrarian threshold to the colonial threshold to the industrial threshold to the industrial age itself and finally to the digital age of our current era. We locate the CW-Condition in the temporally most distal layer of historic thresholds, namely ecological conditions that stand at the beginning of an emerging developmental differentiation between societies. As the final outcome of emancipatory dynamics, the human empowerment index resides in the most current contemporary layer of history (*SOM-Figure S8.1-1*).

We model all possible influences in this tableau of historic drivers in such a manner that each driver is specified as a simultaneous outcome of *all* temporally *prior* drivers, yet not as an outcome of drivers in the same historic layer. This way, our path analysis is temporally ordered in a strict manner.

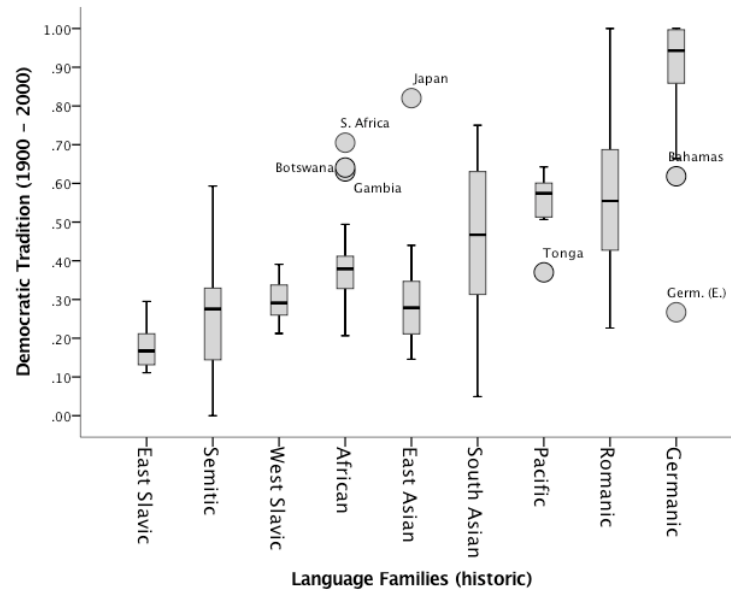
Ordering the path analyses along this temporal principle allows for a total of 130 significant influences from more distal to more proximal drivers. Of these 130 potentially significant influences, thirty-two influences actually prove to be significant under mutual control, with the sign of the respective effect always pointing in the expected direction (*SOM-Figure S8.3-1*). From here on, we filter the thirty-two significant influences through a stepwise sorting-out procedure in order to isolate the main pathway to human empowerment today. In the first filtering stage, we blind out all influences that end up in a historic impasse from which no further influences follow all the way down the road to human empowerment today. Thus, of the thirty-two significant influences, only fifteen are on a pathway following through all the way to human empowerment today, and thirteen of them have their origin in the CW-Condition (*SOM-Figure S8.3-2*). Next, isolating the strongest influence on each station on these pathways towards human empowerment, deselects dairy options, linguistic agency, Western legacies, pre-colonial statehood, agrarian age and agrarian potential as dead-ending pathway stations. Hence, the main pathway towards human empowerment is identified. It originates in the CW-Condition and leads from there via female autonomy at the industrial threshold to cognitive investments in the industrial era (*SOM-Figure S8.3-3*).

The subsequent SOM-Section S8.5 (“Addendum”) displays some more graphical illustrations with additional confirmatory evidence for our line of argument.

S8.5 Addendum

SOM-Figure S8.5-1.

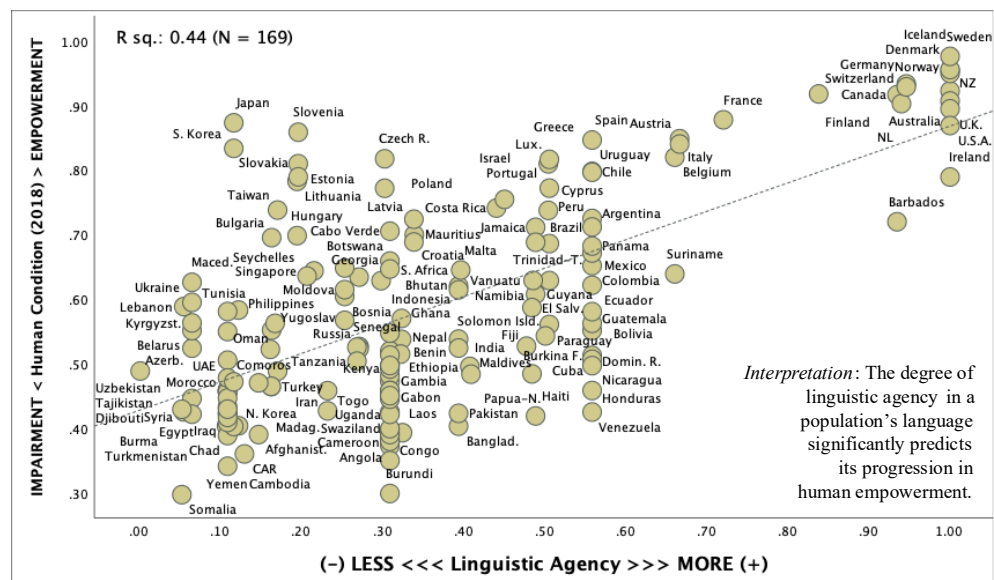
Mapping Language Families on Democratic Traditions



Interpretation:
National populations'
democratic traditions
map systematically on these
populations' larger language
families.

SOM-Figure S8.5-2.

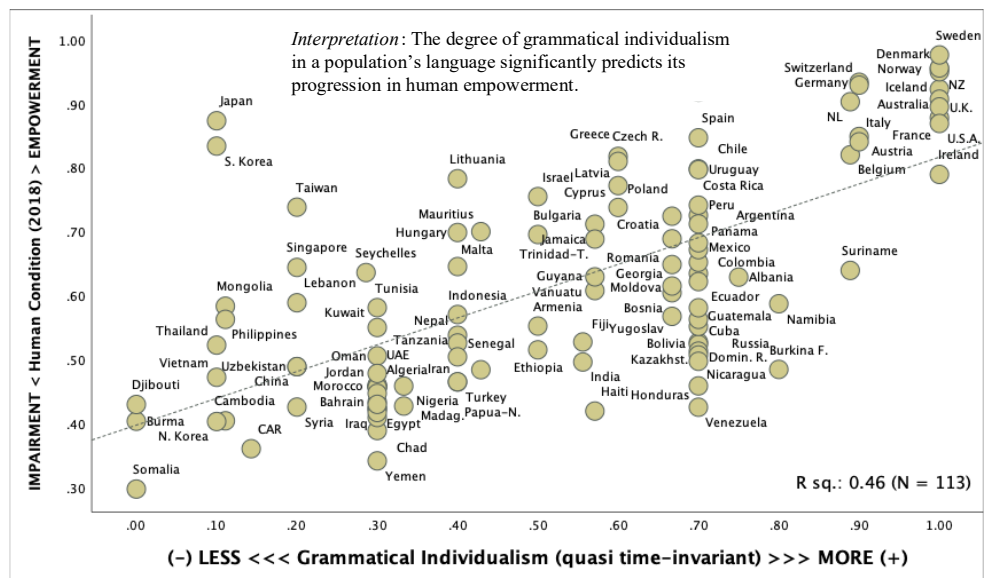
Linguistic Agency and Human Empowerment



Interpretation: The degree of linguistic agency in a population's language significantly predicts its progression in human empowerment.

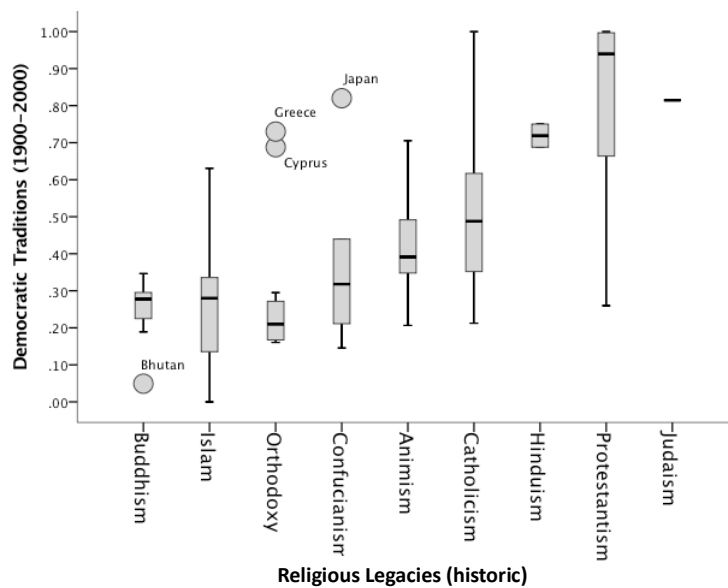
SOM-Figure S8.5-3.

Grammatical Individualism and Human Empowerment



SOM-Figure S8.5-4.

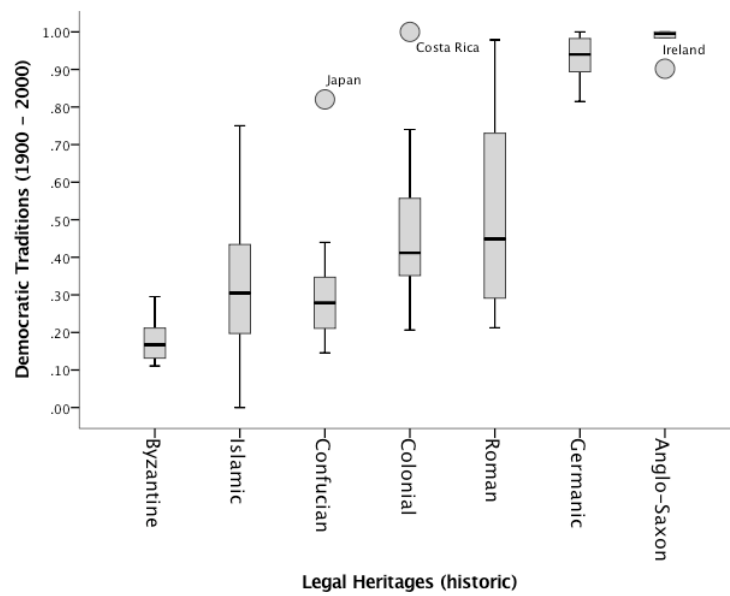
Mapping Religious Legacies on Democratic Traditions



Interpretation:
National populations' democratic traditions map systematically on these populations' major religious legacies.

SOM-Figure S8.5-5.

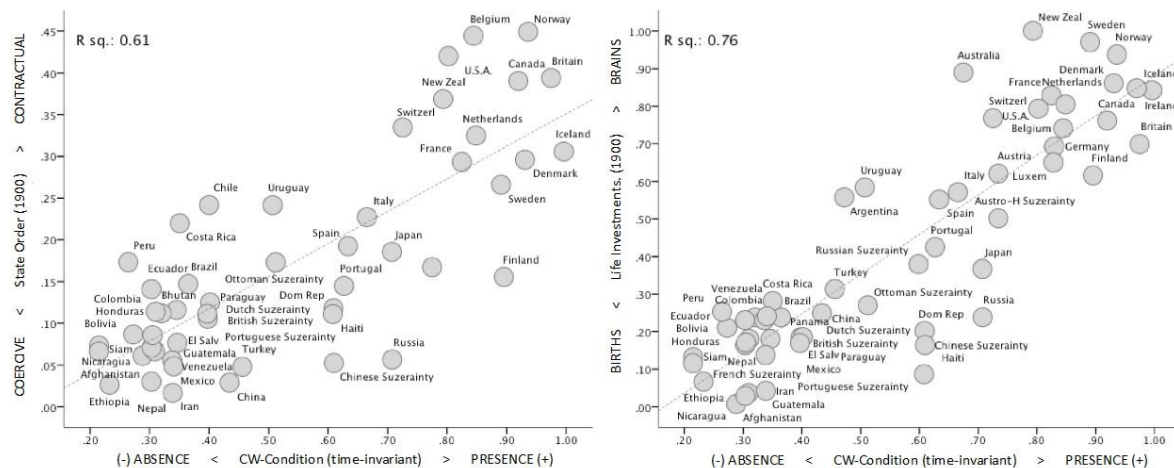
Mapping Legal Heritages on Democratic Traditions



Interpretation:
National populations' democratic traditions map systematically on these populations' main legal heritages.

SOM-Figure S8.5-6.

Links between the CW-Condition and Emancipatory Outcomes among State Entities in 1900



Interpretation: Recognizing the division of the world of 1900 into imperial centers and their suzerain territories and independent countries, the differences in the CW-Condition between these entities explain corresponding differences in coercive vs. contractual state orders as well as corresponding differences in fertility-maximizing ("births") versus education-maximizing ("brains") lifetime investments.

S9 Evidence beyond Countries

S9.1 Provinces of the World's Largest Countries

Today's more than two-hundred countries cover about 131 million square kilometers of our planet's surface area. But the world's nine largest countries alone cover already 68 million square kilometers of this surface area, which is roughly fifty-three percent. In other words, five percent of the world's countries have jurisdiction over ten (!) times the Earth's inhabited area than they should have, would all countries have an equal territorial coverage.¹¹⁵ These nine countries include (in the order of their territorial extension) Russia, Canada, the US, China, Brazil, Australia, Kazakhstan, India and Sudan. Of course, countries of such spatial dimensions are divided into smaller territorial units, like the fifty states of the US. For ease of readability, we address these sub-national units in the following as *provinces*. In total, the nine countries under consideration comprise 275 such provinces.

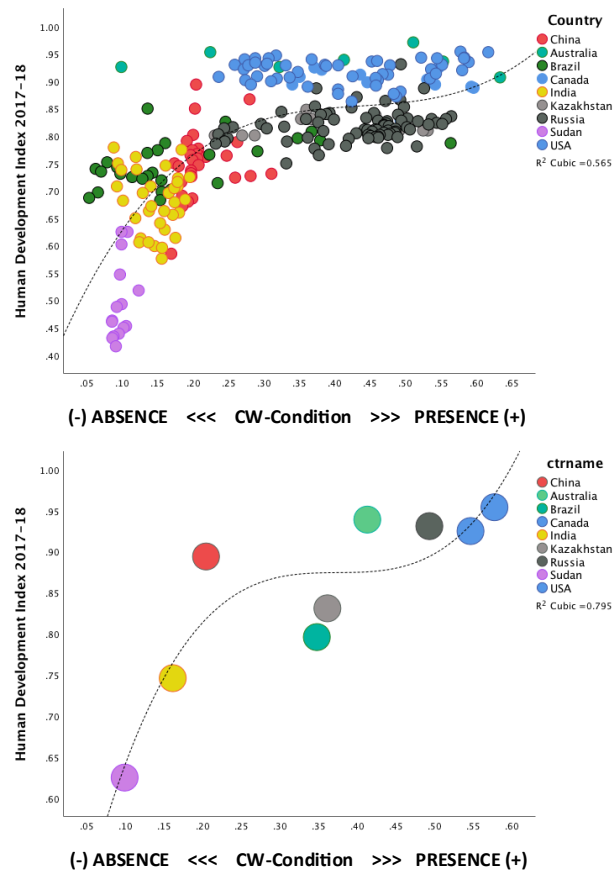
Pooling those 275 provinces into a single dataset, with measures taken of their CW-Condition and developmental outcomes, is an entirely artificial creation because there is no obvious commonality that naturally groups these countries' sub-national provinces into a cultural universe of any joint meaning. Indeed, apart from the triviality that these are just the largest countries in the world, nothing ties them together as a universe—neither neighborhood, nor political alliances, cultural traditions, levels of development or similar regimes. Few scholars will see an intuitive connection between Sudan and Kazakhstan, Brazil and Australia, the US and India or Canada and China, more than between any randomly selected pair of countries from the world's entire pool of nations. In a nutshell, this is an arbitrary collection of countries, except on the grounds of area size.

Precisely because of the randomness of this country selection, pooling the related provinces into a single universe in which to examine whether provinces with a stronger CW-Condition are also more emancipatory in their developmental outcomes (independent of the country to which they belong), strikes us as yet another rather tough and, hence, conclusive test of the CW-Theory. The reason is simple: It is less likely to find any meaningful pattern of spatial covariation across several hundred provinces pooled together for no other reason than their surrounding countries being so large that each of them contains a large number of sub-national provinces.

¹¹⁵ Given that the world's roughly 200 countries cover 131 million square kilometers of the earth's inhabited surface area, the average territorial coverage per country is $(131 / 200 =) 0.66$ million square kilometers. Thus, nine average countries should rule over $(9 \times 0.66 =) 5.9$ million square kilometers of inhabited land. But the inhabited land area under control of the nine largest countries is 68 million square kilometers, which is roughly 11.5 times larger than 5.9 million square kilometers.

SOM-Figure 9.1-1.

The CW-Condition and Human Development across 275 Provinces of the World's Nine Largest Countries



Interpretation: Cross-provincial differences between the world's nine largest countries systematically associate with corresponding differences in human development, alongside a cubic (S-shaped) fitting line.

We estimate each province's CW-Condition using the provincial capital's absolute latitude and thermal seasonality as well as rainfall data from the sources listed in Chapter 3. We combine this information in the same manner as Chapter 3 explains. Specifically, we average seasonality-minimized coolness and the ratio of rainfall in the driest over the wettest month and weight this average by multiplication for coastal proximity. As before, the resulting CW-index works in such fashion that scores increase (a) alongside cooler summers and less extreme summer-winter differences in temperature, (b) alongside a rainfall pattern that is steady on a decently high base level and (c) alongside proximity to the sea.

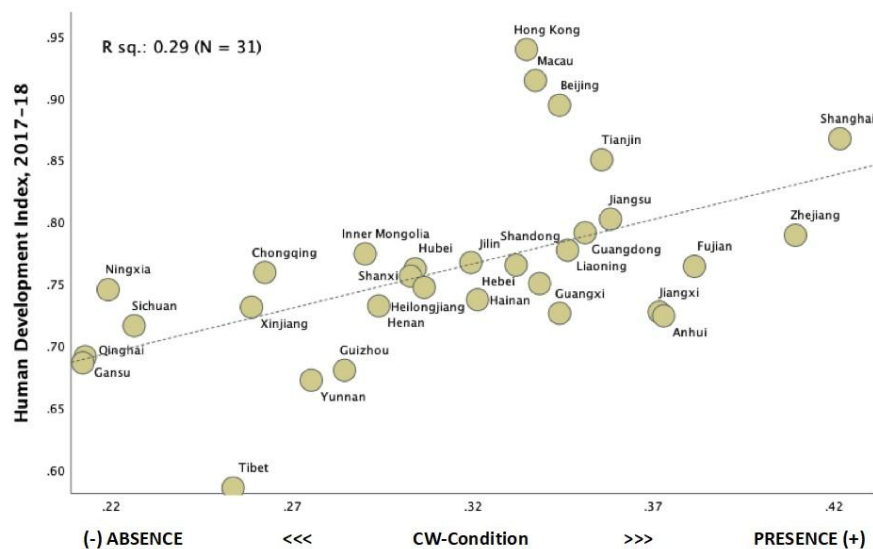
As far as developmental outcomes with an emancipatory signature are concerned, there is not much comparable data on the provincial level that is standardized across countries. The most reliable and encompassing indicator we could find is the Human Development Index (HDI) by the United Nations Development Program. Indeed, the HDI is available for all 275 provinces of the nine countries in question. It combines per capita incomes, average life expectancies and indicators of education in a single index. We presume that the three polarities represented by these indicators—namely poverty-vs-prosperity, mortality-vs-longevity and illiteracy-vs-education—are indicative of impairing-vs-empowering human conditions writ large.¹¹⁶

SOM-Figure S9.1-1 plots the 275 provinces' HDI-scores on the vertical axis against their CW-scores on the horizontal axis. As is evident, variation in the provinces' CW-Condition

¹¹⁶ United Nations Development Program (ed.), 2019, *Human Development Report 2018*, New York: United Nations Development Program (www.undp.org).

SOM-Figure S9.1-2.

The CW-Condition and Human Development across China's 31 Provinces



explains fifty-seven percent of their variation in the HDI, with a stronger CW-Condition implying a better HDI performance. The relationship is cubic rather than strictly linear, with the HDI performance growing more steeply at the lower and the upper scale ends of the CW-Condition, and less steeply within the middle range of the CW-Condition. Why the relationship appears in such an inverted S-curve shape is not intuitively obvious but what is clear is that the direction, significance and strength of the relationship unequivocally confirm the CW-Theory: Sub-national provinces with a stronger CW-Condition tend to be more advanced in human development.

The relationship between the CW-Condition and the HDI across the 275 provinces amounts to a statistically significant correlation of $r = .67$.¹¹⁷ Since development takes shape mostly within the spatial frame of countries, it is not surprising that the cross-provincial correlation is mostly due to provincial differences *between* rather than provincial differences *within* countries. This becomes obvious when we center the provinces' scores for the CW-Condition and the HDI on the respective country means and recalculate the correlation. The correlation strength then drops to $r = .16$, which is weak but still positive and statistically significant.¹¹⁸ Hence, the CW-Theory is also confirmed from a purely within-country perspective, in spite of the fact that the scope conditions within which we can find significant relationships in confirmation of the CW-Theory are severely truncated when selecting nine out of two-hundred countries for no other reason than merely their large number of sub-national provinces.

SOM-Figure S9.1-2 singles out just one country, China, with its thirty-one provinces to exemplify the within-country cross-provincial relationship. Hong Kong and Macau are over-achievers, with a considerably higher HDI score than their CW-Condition suggests. Obviously, this is due to these two cities' strategic harbors and their inherited strong position in sea trade,

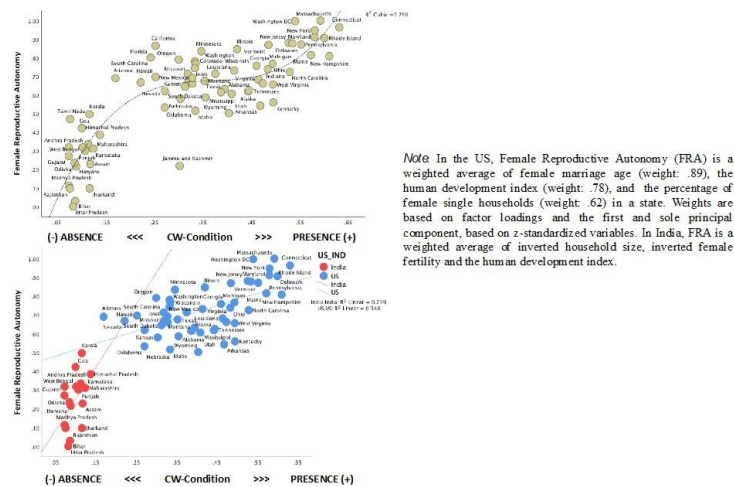
¹¹⁷ Significance is at $p < .001$ ($N = 275$).

¹¹⁸ Significance is at $p < .009$ ($N = 275$).

which the European colonial powers (Britain in the case of Hong Kong, Portugal in the case of

SOM-Figure S9.1.-3.

The CW-Condition and Female Emancipation across Indian and US-States



Macau) further consolidated. Vice versa, Tibet is a clear under-achiever, with an HDI score visibly below what its CW-Condition suggests. In this case, we may guess that the underperformance reflects economic disadvantages resulting from the Chinese occupation regime. Yet, apart from these three outliers, the distribution between the lowest CW-scoring province, Gansu, and the highest CW-scoring province, Shanghai, looks pretty linear—thus, confirming the CW-Theory. This is a striking result because Chinese provinces only vary in a score range between 0.22 and 0.42 in the CW-Condition. Such truncated scope conditions shift the odds against finding a theoretically meaningful relationship of statistical significance, thus increasing the likelihood of stumbling into a “false negative.” Yet, the evidence for the CW-Theory is powerful enough to escape this deception.

For the federal states of two countries, the US and India, we have measures that represent female reproductive autonomy, that is, how empowered women are to shape their reproductive career—in other words, how free women are in deciding if, when and whom to marry, how to live together and how many children to raise.¹¹⁹ The upper diagram of *SOM-Figure S9.1-3* pools the fifty US states and the nineteen Indian states and plots them on the CW-Condition (horizontal axis) and on female reproductive autonomy (vertical axis). We obtain again a curvilinear relationship, although this should not bother us too much because the key takeaway is that the relationship is significant and positive in direction, thus documenting for Indian and US states that a stronger CW-Condition at the provincial level associates with more female

¹¹⁹ Unfortunately, the indicators of female reproductive autonomy are not exactly identical in the US and India, for which reason we bundle the indicators by means of a factor analysis separately for each of the two countries. Now, summarizing indicators into a single variable by means of a factor analysis yields so called factor scores, which are always centered on a mean of zero with negative and positive deviation scores, mostly in a range between -2 and +2. Therefore, the mean in reproductive autonomy across India's federal states is the same (namely zero) as the one for the US federal states (also zero), which is deceptive because the US is a more developed country. To take this developmental difference into account, we center the US and Indian states on two different country means whose distance reflects the difference between the US and India's HDI scores. Then we standardize the rescaled reproductive autonomy measure across all of India's and the US's states into normalized range from 0 to 1, with decimal fractions representing a multiplicity of intermediate positions.

reproductive autonomy. The lower diagram in *SOM-Figure S9.1-3* separates the Indian and US states by marking them in blue and red. The diagram, thus, visualizes that Indian and US states exist in different zones of both the CW-index and the reproductive autonomy scale, with Indian states varying within a narrow range on the lower end of the CW-index, and also on the lower end of reproductive autonomy. Still, the diagram shows that the positive cross-provincial relationship between the CW-Condition and reproductive autonomy holds within both countries. For India, however, to obtain this result we had to exclude the state Jammu and Kashmir, which is a special case given the ongoing tensions between India and Pakistan over the Kashmir province. At any rate, sub-national evidence from the world's largest countries, which cover more than half of planet Earth's inhabited surface area, unequivocally confirms the CW-Theory.

S9.2 The Russian Empire's Oblasts

by *Maria Kravtsova*

This SOM-Section presents another set of supplementary evidence for the CW-Condition's emancipatory effects (past and present), zooming into the sub-national level of the by far largest territorial state on the globe: Russia. We examine region-level data from the Czarist Empire's roughly hundred gubernatorial districts, called "oblasts," based on archival records from several censuses in the 19th century, most notably in 1897. We look at more recent data from the Russian Federation's Statistics Bureau. Since Russian history is mostly known for its overall autocratic—instead of emancipatory—trajectory, the empire provides a particularly challenging case to demonstrate the CW-Condition's emancipatory effects.

We concentrate our attention on the link between the CW-Condition and female reproductive autonomy. We do so in light of the plenty of evidence from other testing grounds, showing that female reproductive autonomy is among the most essential early mediators of the CW-Condition's emancipatory outcomes further down to contemporary times. In our understanding, reproductive autonomy reflects diminished fertility pressures on women to produce as many children as possible throughout their fertile life span. When women are pressured to produce as many children as possible, they have less time left to build their own and their children's human capital and they are less likely to challenge their husbands' idle patriarchal posture and position in the family.¹²⁰

So far, we have measured reproductive autonomy inversely by female fertility rates, female ages at first marriage, consensual marriage rules, and nuclear family features that reflect women's control over their sexuality.

The Russian data do not include a measure of consensual marriage rules, while nuclear households require a case-specific interpretation in the Russian context.¹²¹ In Northwestern Europe, nuclear families have been linked with "unigeniture" as the dominant inheritance practice: The oldest child (preferably the son) inherits the entire family farm and lives there with his closer family. At the same time, the siblings leave to find their own households, often far away from their kin. This pattern was conducive to the independence of the nuclear family from their extended kin in many aspects, including a freer choice of when to have children and how many.

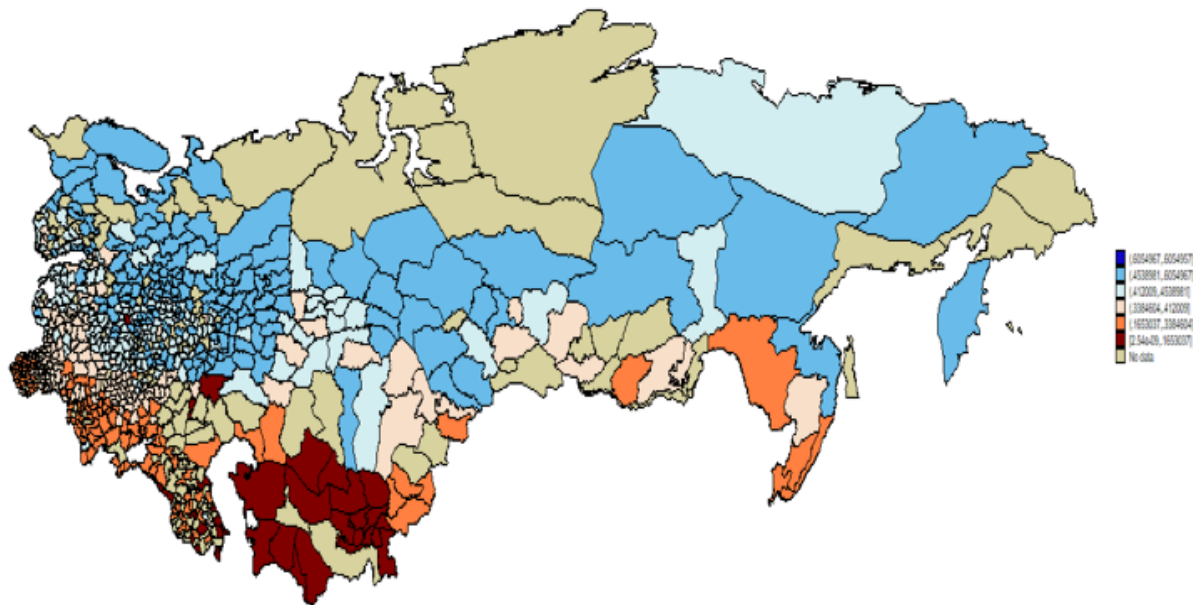
By contrast, unigeniture was as uncommon in the Russian Empire as it was in other agrarian empires. Instead, apart from outright confiscation, "partible (male) inheritance" prevailed,

¹²⁰ van Zanden et al. (op. cit., footnote 97).

¹²¹ R. Durante, 2010, "Risk, Cooperation and the Economic Origins of Social Trust: An Empirical Investigation," HAL (multi-disciplinary open access archive, ID: hal-00972949, <https://hal-sciencespo.archives-ouvertes.fr>).

SOM-Figure S9.2-1.

The Cool Water Map of Russia



Interpretation: The CW-Condition weakens on a North-to-South and Coast-to-Center gradient across the Czarist Empire's *oblasts*.

such that all the sons divide the parental farm among themselves and live together on it. In this case, the core households live surrounded by their kin and experience less autonomy from obligations to the wider family circle.

For these reasons, we concentrate on female fertility rates and ages at first marriage. As we will see, the results replicate our country-level findings as well as those for tribes and grid cells: *Oblasts* in Russia with a more pronounced CW-Condition show historically higher ages at first marriage and lower numbers of births per woman. Not surprisingly, fertility rates and ages at first marriage among women are closely correlated: Women who marry later give birth to fewer children over their fertile lifespan. From a “short-vs-long” life history perspective, this is exactly what we would expect. And while higher ages at first marriage address more directly the capacity of women to build their own skills and savings, low marital fertility rates mirror more closely a mother's investment in her individual children's qualities, assuming that children with fewer siblings receive more attention and care.

A specificity of the Russian Empire is the early abandonment of breastfeeding among Christian-Orthodox/Caucasian women. This peculiarity is likely to alter the otherwise positive effect of the CW-Condition on child mortality. Indeed, Christian-Orthodox/Caucasian women (who largely prevailed in Russia's CW-regions) stopped breastfeeding already several days after giving birth, instead feeding their babies early on with bread, cereals and cow milk.¹²²

¹²² T. Natkhov and N. Vasilenok, 2019, “Technology Adoption in Agrarian Societies: The Effect of Volga Germans in Imperial Russia,” *Higher School of Economics Research Paper* No. WP BRP 220, Moscow: HSE.

Why this distaste for breastfeeding existed is not exactly clear¹²³, but it increased child mortality, especially in the very initial childrearing phase until the age of one year, turning diarrhea into a main cause of infant death.¹²⁴ By contrast, the Muslim/non-Caucasian population, which prevailed outside Russia's CW-areas, practiced breastfeeding into higher infant ages. Consequently, child mortality from birth to the end of the first birthyear has been lower outside than inside Russia's CW-regions.

However, once children survive the period in which breastfeeding would have been healthier, our initially expected negative mortality effect of the CW-Condition now kicks in powerfully: Children between three and four years of age showed lower mortality inside than outside Russia's CW-areas. In other words, because of the Russian peculiarity with breastfeeding practices, the correlation between the CW-Condition and infant mortality points in diametrically opposite directions, depending on the age group of infants one is looking at. So again, the CW-Condition in Russia correlates positively with historic infant mortality in the age group from birth to one year, while the same condition correlates negatively with child mortality in the age group from three to four.

SOM-Table S9.2-1 (addendum at the end of this section) documents our historic data and their sources. To calculate *oblast*-specific scores of the CW-index, we use temperature and precipitation data for the biggest cities of the Russian *oblasts*.¹²⁵ *SOM-Figure S9.2-1* presents the distribution of the CW-scores across the *oblasts* of Czarist Russia. Using the Prussian agricultural census from 1886, Vasili Fouka and Alain Schlaepfer estimate the labor intensity of a variety of crops.¹²⁶ We document their calculation in *SOM-Table S9.2-2* (addendum, end of this section) and use their formula to obtain *oblast*-specific measures of labor intensity. In total, fifty-eight of the ninety-eight *oblasts* obtain a score on the labor intensity index.¹²⁷ Besides, we operationalize female reproductive autonomy, using (a) marital fertility rates and (b) the percentage of married women in the age group from fifteen to nineteen years of age. We treat this information as an inverse indication of female reproductive autonomy.

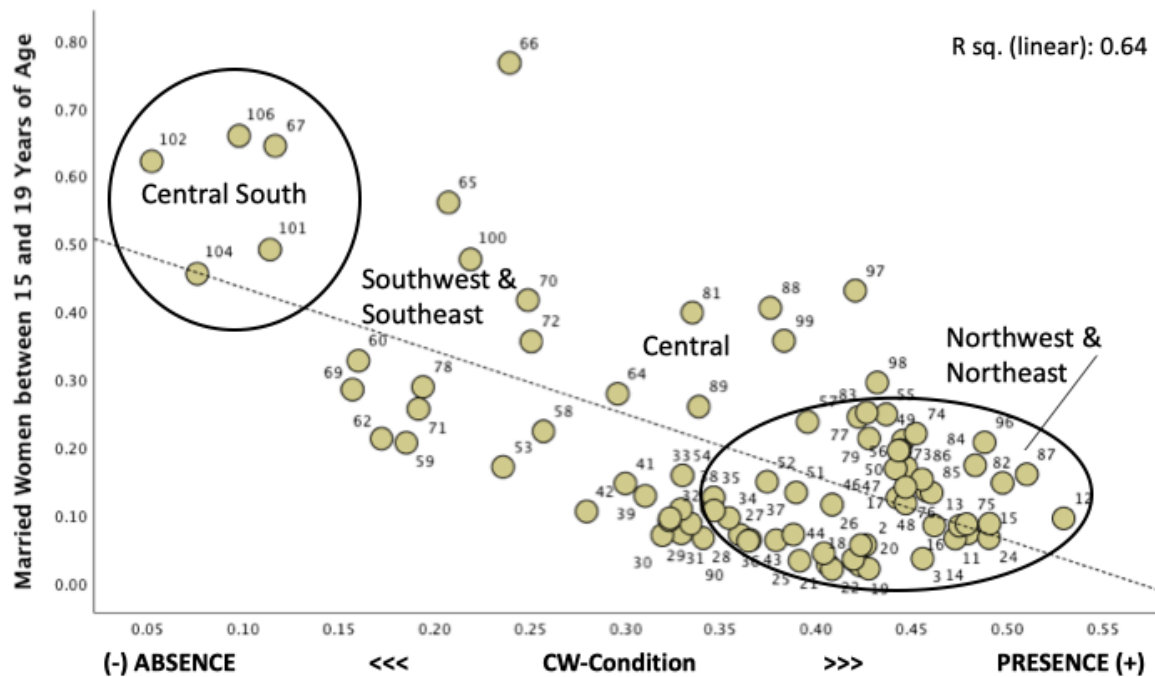
¹²³ One interpretation is that, on matters of sexuality and sensual pleasures, the Christian Orthodox Church traditionally advocated even more anti-promiscuitive positions than the Catholic Church. From its anti-promiscuitive/prudish point of view, the Orthodox clergy considered breastfeeding as a pleasurable practice whose enjoyment distracts women from their spiritual purity and focus—hence, the discouragement of breastfeeding (see, V. Lossky, 2001, *Orthodox Theology: An Introduction*. New York: St Vladimir's Seminary (SVS) Press). However, this explanation leaves open why the clergies of other religions, which all tended to be sexually prudish-conservative in history, did not also discourage breastfeeding (which, from a fertility-maximizing point of view, would also be a strategy to get women earlier into the next pregnancy after child birth).
¹²⁴ Ibid.

¹²⁵ The website www.meteoblue.com provides climatic indicators averaged over the last 30 years to avoid data to be driven by yearly fluctuations. We merged data collected at the city level with historical regions. If we had information for more than one city in a region, we calculated the average. To calculate CW-index scores, we combine temperature and precipitation data in a manner equivalent to the country level. Hence, index scores increase alongside (a) lower seasonal temperatures, (b) less extreme summer-winter differences, (c) a higher base level of minimum rainfall combined with less seasonal fluctuation and (d) more abundant freshwater sources.

¹²⁶ V. Fouka and A. Schlaepfer, 2020, "Agricultural Returns to Labor and the Origins of Work Ethics," *The Economic Journal* 130, 1081-1113.

¹²⁷ This is a weighted average of labor intensity for each crop presented in the region. The data on percentages of territory sowed with a particular crop derive from the Russian agricultural census presented on <http://ristat.org/>. Labor intensity_i = labor share 1 * % territory with crop 1_i + labor share 2 * % territory with crop 2_i.

SOM-Figure S9.2-2. The CW-Condition and Young Married Women across Historic Russian Oblasts



Interpretation: Across the Russian Empire's oblasts, variation in the CW-Condition associates systematically with corresponding variation in the proportion of women married at the age from 15 to 19, meaning smaller shares of married women at this young age alongside a stronger CW-Condition.

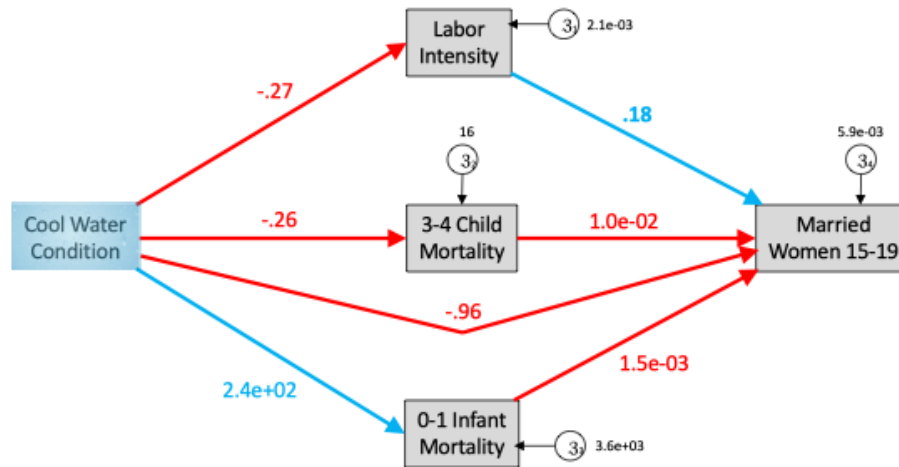
The correlations in *SOM-Table S9.2-3* (addendum, end of this section) illustrate that the CW-regions of the Russian Empire were more densely populated, more industrialized and more affluent at the end of the 19th century. Their populations are also more literate.

The main crop cultivated in the CW-areas of the Russian Empire is rye. Since rye cultivation requires a low number of workers per unit of land, as evidenced in *SOM-Table S9.2-3* (see addendum), agriculture in CW-territories is less labor intensive. Consistent with this evidence, *SOM-Table S9.2-4* (see addendum) shows that relatively large land plots (i.e., 4-6 hectares) prevail in CW-regions because large pieces of land can be cultivated with the effort of a single household. To keep land plots sufficiently large under partible inheritance sets an incentive to lower the number of surviving children. It is of course speculative, but for this reason the practice of infanticide might explain the higher than usual child mortality shortly after birth in Russian CW-areas. At any rate, the negative correlation between the CW-Condition and agricultural labor intensity confirms our proposition that lower fertility pressures and stronger female reproductive autonomy in CW-areas reflect lower demands for cheap mass labor, including the work of children and aid by extended kin.

As expected, *SOM-Table S9.2-5* documents a strong correlation between the CW-index and the proportion of women marrying at a very young age in around 1900 CE: With a correlation coefficient of $r = -.80$, this is the strongest association in our data. *SOM-Figure 9.2-2* visualizes the strongly negative effect of the CW-Condition on the proportion of women being married at ages fifteen to nineteen.

Unexpectedly at first glance, the link between the CW-Condition and fertility rates is insignificant. But the adversarial correlations between the CW-Condition and child mortalities

SOM-Figure S9.2-3. The Effect of CW-Condition on Historic Labor Intensity, Mortalities and Marriage

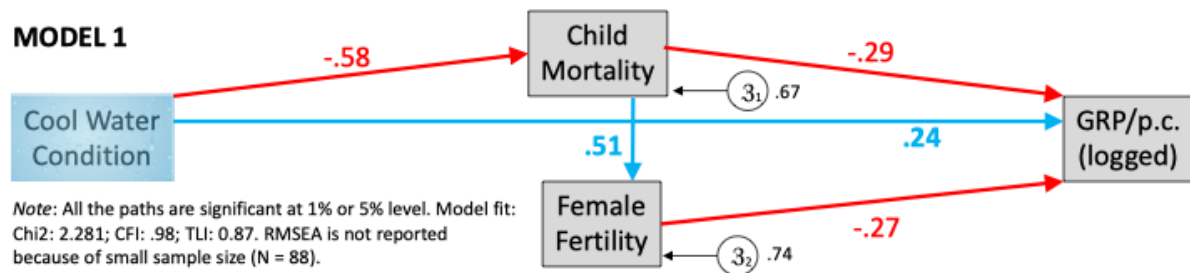
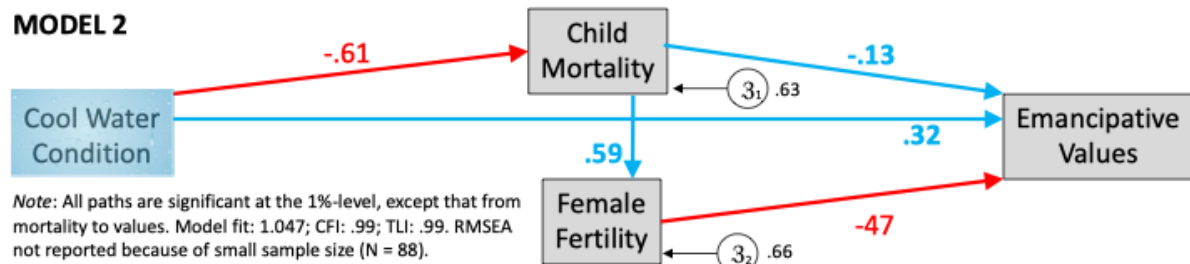
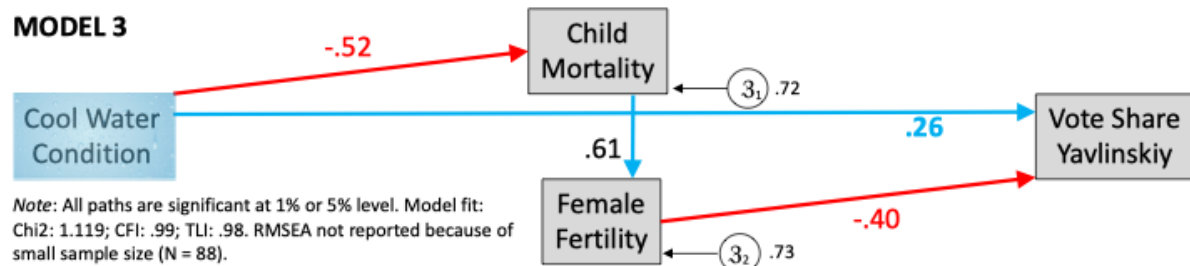


Notes: The most coefficients are significant at 1 % level, the effect of CWI on child mortality 3-4 is significant at 5%, the effect of labor intensity on women's age at first marriage is insignificant, N with FIML = 98. Model fit: Chi-Square 1.56*; CFI 1.000; TLI 1.065. We don't compute RMSEA because it is not recommended for the models with small sample size (N = 88).

in different age groups resolve this issue: Child mortality at ages zero to one and child mortality at ages three to four both correlate positively with female fertility; and since the CW-Condition affects these two mortalities adversely, it shows no overall correlation with fertility.

The path model in *SOM-Figure S9.2-3* situates the correlational findings in a bigger picture with an underlying causal narrative. The calculations indeed suggest that (1) the CW-Condition embodies lower agrarian labor intensity, which then (2) diminishes fertility pressures. Moreover, we see (3) a negative effect of the CW-Condition on child mortality at ages three to four and (4) a negative effect of child mortality in this age group on fertility rates. Simultaneously, we observe (5) a positive effect of the CW-Condition on infant mortality at ages zero to one (perhaps, as mentioned, indicating the practice of infanticide to avoid rapidly shrinking land plot sizes under partible inheritance). Finally, the two child mortalities each exert (6) a negative effect on female fertilities. The contrariness of the CW-Condition's effects on the two child mortalities is so exhaustive that no room is left for an additional direct effect of the CW-Condition on female fertility.

The path model in *SOM-Figure S9.2-4* uses the percentage of women married at ages fifteen to nineteen as the outcome variable. The negative effects of the CW-Condition on infant mortality at ages zero to one and child mortality at ages three to four remain significant. Logically, higher child mortalities in both age groups go hand in hand with a larger proportion of married teenage girls. Labor intensity, however, turns insignificant in this model. In its place, the CW-Condition here shows a powerfully direct and negative effect on the percentage of married teenage girls, in addition to its two adversarial mortality effects.

*SOM-Figure S9.2-4. The Effect of the CW-Condition on Current Emancipatory Outcomes***MODEL 1****MODEL 2****MODEL 3**

Despite their nuanced differences, both models strongly support the idea of a causal role of the CW-Condition in the making of autonomous agrarian households and families. The question is whether we see more credibility in a model in which the CW-effect is entirely absorbed by its impact on labor intensity and child mortalities, or in a model in which—in addition to these indirect effects—there is still a direct effect. Obviously, this depends on the choice of the final outcome variable, which raises the question of whether there are good reasons to consider one of them preferable over the other.

Relying on model fit statistics, the evidence speaks in favor of the proportion of married teenage girls rather than fertility rates to be the more indicative measure. This would also be plausible if one recognizes that historic church records are—for obvious reasons—more reliable when it comes to marriages than fertilities: Practically all marriages have been professed by the church, but not every birth might have been registered (especially when infanticide was practiced). For this reason, the second path model in Figure 10-3-3 seems preferable. This would imply placing less emphasis on the CW-Condition's lowering effect on labor intensity as the mechanism through which the CW-Condition contributes to female reproductive autonomy. But we believe this conclusion would be premature because our labor intensity index only captures differences in labor intensity related to crops. This is a limitation because the lush pastures typical of CW-areas also lend themselves to animal husbandry, which is even less labor-intense than growing the crops suitable to the CW-Condition. Therefore, we should wait to see how an improved version of the labor intensity index works (including the role of livestock farming) before we dismiss it as a possible mechanism through which the CW-Condition enhances female reproductive autonomy.

The CW-Condition's emancipatory effect within Russia is not limited to historic developmental outcomes with an emancipatory signature. Instead, the effect is also visible among current outcomes, and quite strongly so. We demonstrate this point with respect to three such outcomes: (a) the per capita Gross Regional Product (GRP) in 2019 across today's governmental districts; (b) the district populations' aggregate emancipative values in 2020; and (c) the vote share per district for the liberal candidate Grigoriy Yavlinskiy ("Yabloko" party) in Russia's 2000 presidential elections. In all three instances, it is evident that the CW-Condition continues to positively affect current emancipatory outcomes, visible in higher per capita GRPs, stronger aggregate emancipative values and larger liberal vote shares for Yavlinskiy in districts with a stronger CW-Condition. The three diagrams in Figure 10-3-4 visualize the evidence, showing that the emancipatory CW-effects are both indirect and direct.

Our results from the Russian Empire's historic *oblasts* confirm in a more limited, smaller-than-global context that the CW-Condition is conducive to female reproductive autonomy as well as other emancipatory outcomes, past and present. The mechanisms feeding this effect are two-fold. First, lower labor intensity for the staple agricultural products suited to the CW-Condition (especially rye) emits lower fertility pressures on women, thus favoring diminished fertility rates. Second, lower child mortality in the age group three to four in CW-regions results in lower fertility and higher ages of women at first marriage. Depending on the specification of the final outcome variable, the CW-effect on female reproductive autonomy is either fully indirect, operating entirely over the two specified mechanisms (when historic female fertility is the outcome variable); or the CW-effect is only partly indirect and shows a direct effect in addition (when the historic proportion of married teenage girls is the outcome variable). The jury is still out to examine which of these two scenarios is more accurate. But whichever it is, the evidence underlines a causal role of the CW-Condition in the making of autonomous family households. And this is a key element of the CW-Theory of human emancipation writ large.

Despite Russia's vast territorial size, the CW-Condition among the empire's historically most populated districts varies in an only limited range compared to the global CW-variation across countries. To be specific, the inner-Russian variation in the CW-Condition remains within a range of 0.05 to 0.52 score points but heavily clusters around a score of 0.42 (see Figure 10-3-2). The coefficient of variation for the inner-Russian differentiation in the CW-Condition is .09 (of a possible maximum of 1.0), which indicates a five-times lower variation in the CW-Condition than across the world as a whole (global coefficient of variation of .45.), in line with Russia's share in the inhabited world's surface area of almost twenty percent. Hence, for the CW-mechanisms to become visible within Russia, they have to work within a much narrower margin, that is, on a finer resolution of variance/covariance patterns. But this makes it more likely that the mechanisms—even if they exist—get buried under measurement imprecision. If they nevertheless surface against these odds, as they do, the CW-Theory has another grain of credibility. Given the outlined peculiarities of the Russian case, this conclusion seems to be all the more forceful.

Addendum

SOM-Table S9.2-1. Historical Indicators for Russia

Variable Name	Variable Description	Source	Year	N
Fertility	Coale A.J. fertility index compares the number of births to married women in a population with the number of births these women would have had if they had experienced the highest births as Hutterite women.	Vishnevskiy, Volkov, 1977	1897	50
Married women 15-19	Share of married women 15-19	Census of the Russian Empire	1897	88
Child mortality 0-1	Number of children died 0-1 / number of birth		1903-1905	50
Child mortality 3-4	Number of children died 3-4 / number of birth		1903-1905	50
Forests	Share of territory covered by forest	http://ristat.org/	1897	88
Cult land	Share of cultivated land	http://ristat.org/	1897	71
% area rye	Share of land cropped with rye	http://ristat.org/	1897	72
Rye productivity	Rye output in pud (16.3 kg) / area cropped by rye (decyatin)	http://ristat.org/	1897	58
Literacy	Share of people 9+ who can read and write	Census of the Russian Empire	1897	89
Density	Population density population per 1km ²	Census of the Russian Empire	1897	89
Industrial output	Industrial output per capita in thousands rubel	http://ristat.org/	1897	88
Share HH6 plus	Share of households with 6 persons and more	Census of the Russian Empire	1897	89
Mean hh size	Mean household size without 1 person households	Census of the Russian Empire	1897	89

SOM-Table S9.2-2. Estimates of Labor Share for Different Crops

	Beans	Potatoes	Wheat	Oat	Peas	Rye	Barley
Labor Share	.60	.57	.40	.37	.30	.15	.08

Source: Fouka & Schlaepfer (op. cit., footnote 126).

SOM-Table S9.2-3. Correlations between the CW-index and Historical Economic Indicators

CWI-versions	Literacy	Density	Industrial output per capita (rub)
CW1	.46***	.38***	.22**
CW2	.33***	.13	.21*
CW3	.47***	.43***	.22**
CW4	.28***	.04	.22**
CW5	.41***	.25**	.22**
CW6	.35***	.18*	.21*

SOM-Table S9.2-4. Correlations between the CW-Index and Natural/Agricultural Conditions

CWI-versions	Forests	Cult. land	% area rye	Rye productivity (rub per decyatina)	Labor intensity
CW1	.37***	.34***	.56***	.27**	-.06
CW2	.36***	.01	.33***	.50***	-.38***
CW3	.37***	.38***	.62***	.18	.10
CW4	.42***	-.10	.27**	.55***	-.40***
CW5	.40***	.13	.45***	.43***	-.26**
CW6	.35***	.09	.39***	.45***	-.31**

SOM-Table S9.2-5. Correlations between the CW-Index and Land Plot Sizes

	% of people living on land plots less than 2 decy- atin	% of people living on land plots 2-4 decy- atin	% of people living on landplots 4-6 decyatin	% of people liv- ing on 6+ decy- atin
CW1	-.04	.30	.31**	-.53***
CW2	.11	.18	.43***	-.38***
CW3	-.16	.31**	.47***	-.51***
CW4	.07	.17	.31**	-.35**
CW5	-.01	.27*	.42***	-.50***
CW6	.11	.19	.31**	-.40***

1 decyatina = 1.09 hectar

SOM-Table S9.2-6. Correlations between the CWI and Reproductive Autonomy Indicators

CWI-Version	Share HH6 plus	Mean HH Size	Married women 15-19	Fertility	Child mor- tality 0-1	Child mor- tality 3-4
CW1	.13	.09	-.81***	-.00	.17	-.12
CW2	.12	.05	-.72***	.04	.50***	-.30**
CW3	.13	.07	-.73***	-.06	.20	-.15
CW4	.11	.05	-.64***	.01	.55***	-.33**
CW5	.12	.10	-.78***	-.01	.33**	-.23
CW6	.12	.05	-.74***	.05	.46***	-.28**

S9.3 Migrants to Sweden

by *Bi Puranen*

During the refugee crisis in 2015, the most emancipatory country in the world—Sweden—welcomed on a per capita count by far the most immigrants from countries with some of the least emancipatory (i.e., most patriarchal) cultures in the world. Most notably, those countries include Syria, Libya, Eritrea, Ethiopia, Somalia, Iraq and other countries of Northern and sub-Saharan Africa, the Middle East and South Asia. The resulting cultural contrast offers another indicative test setting to examine some of the CW-Theory's key implications. In this setting, it is worthwhile to look at first-generation migrants because they have been socialized in their country of origin rather than in their destination country's highly emancipatory and secular culture. Indeed, if the CW-Theory is accurate, the migrants' posture to emancipative values should still reflect the weakness-vs-strength of the CW-Condition in their country of origin. Specifically, migrants from countries with a stronger CW-Condition should cherish emancipative values (as well as secular values) significantly more pronouncedly than migrants from countries with a weaker CW-Condition.

Again, this is a rather tough and, hence, conclusive test setting because the scope conditions under which this setting tests the CW-Theory are seriously truncated, given that the generally weaker CW-Condition of most migrants' countries of origin offer only limited variation.

Among the roughly hundred countries on the globe covered by the *World Values Survey*, Sweden shows the strongest emphasis on emancipative values (i.e., a population average close to 0.80, with a standard deviation of 0.14).

The Swedish government invests a great deal of effort into the cultural integration of these refugees. Part of these efforts was the funding of a large representative survey among first-generation migrants to Sweden. The intention was to figure out how different these migrants' value orientations are compared to the "typical" Swedish citizen. Under the direction of Bi Puranen, the Institute for Future Studies in Stockholm conducted this migrant survey in 2018 as part of the *World Values Survey*'s seventh wave.¹²⁸

¹²⁸ The survey uses a stratified random probability sampling method to select the respondents. The migrant population of interest is defined as those who had moved to Sweden during the last ten years, that is, between 2007 and 2018. The sampling frame specified two additional criteria, namely: (a) migrants are registered as residents in Sweden and (b) they live in one of fifty-four pre-selected municipalities chosen as a representative sample of urban and rural localities distributed across Sweden. Respondents who met these criteria were selected for an interview through three different methods: (i) via written invitations sent to migrants who had stayed in Sweden for more than five years, (ii) by contacting migrants attending courses on Swedish for Immigrants, and (iii) by interviewing all those attending selected language classes in the upper secondary school system. Through these selection criteria, a total of 7,161 respondents have been identified and invited to participate in the study. Of these, only eleven percent declined the invitation, yielding a total sample size

SOM-Table S9.3-1. Descriptive Statistics for WVS7-Migrants to Sweden Survey

Variables	Categories	% of sample
Age Group	Under 25	29
	25-34	27
	35-44	23
	45 and above	20
Education	No school	4
	Elementary	40
	Upper secondary	36
	University graduate	19
Citizenship Status	Swedish citizen	18
	Not	82
Duration of Residency in Sweden	Less than 1 year	12
	1 year	16
	2 years	12
	3 years	31
	4 years	11
	5 years	5
	6 years	4
	More than 6	10
Religious Denomination	Muslim	67
	Catholic	5
	Protestant	3
	Orthodox	8
	Other	9
	None	8
Gender	Female	55
	Male	45
Country of Origin	Afghanistan	9
	Eritrea	7
	Iran	3
	Iraq	7
	Somalia	6
	Syria	36
	Other	33
Employment Status	Full-time worker	11
	Part-time worker	7
	Self-employed	1
	Houseperson	7
	Retiree	2
	Student	49
	Unemployed	12
	Other	12
Reason for Migration (multiple choice)	War and conflict	43
	Better life	27

Data source: The World Values Survey (WVS-7) - Survey of Migrants to Sweden.

The majority of interviewed migrants (53%) come from countries in the Middle East and North Africa (MENA), notably Afghanistan, Iran, Iraq and Syria. Around one fifth is from sub-Saharan Africa, with the plurality fleeing from Somalia and Eritrea. Other migrants emigrate to

of 6,516 respondents. The interviewees could choose to answer the survey in any of seven different languages (English, Arabic, Somali, Tigrinya, Dari, Turkish or Swedish). Interviews were conducted via computer-assisted questionnaires available both in Swedish and in the chosen mother-tongue. For illiterate respondents, translation assistants fluent in the respondents' native languages were present.

Sweden from South Asia, South East Asia and East Asia as well as Central and Eastern Europe, with small groups of migrants arriving from countries elsewhere worldwide, including a minority of migrants from Western countries.¹²⁹ Three quarters of the migrants moved to Sweden from authoritarian states¹³⁰, with around one fifth being socialized in low-income economies.¹³¹ When asked why they had left their home country, the majority (57%) answered that they fled to escape war, violence and terror, while a quarter (27%) reported to seek for a better living standard.¹³² The survey draws upon the core questionnaire used of the seventh *World Values Survey* with the addition of items that are of particular interest in an acculturation study.¹³³ *SOM-Table S9.3-1* provides descriptive statistics for the migrant sample.

Emancipative values are a key marker of cultural difference, especially in a Western/non-Western comparison. Of course, the expectation is that migrants from non-Western countries score significantly and considerably below “typical” Swedes on emancipative values, which— together with other Scandinavian countries—emphasize these cultural values more than the people in other world regions. Another important marker of cultural difference is religiosity: Sweden is a highly secular country, while many of the migrants from the Middle East, North Africa and South Asia come from strongly religious countries. These differences from the Swedish host population should be particularly pronounced for first-generation migrants who have not been socialized under the imprint of Sweden’s secular-emancipatory culture.

¹²⁹ The number of observations is $N = 309$.

¹³⁰ This includes countries classified as “not free” by Freedom House (www.freedomhouse.org).

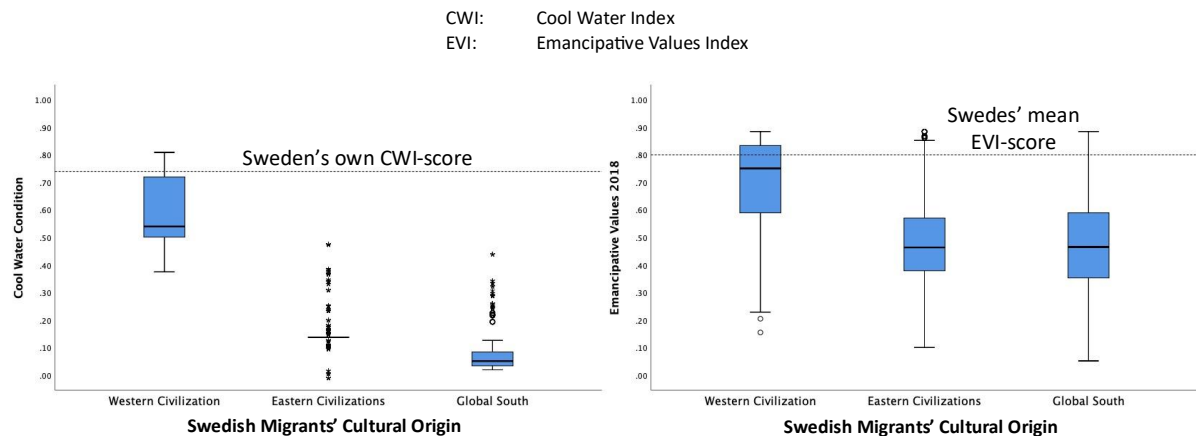
¹³¹ This includes countries with per capita incomes below 10,000 international US-Dollars per year, due to recent World Bank data (www.worldbank.org).

¹³² The data source is The World Values Survey (WVS-7) - Survey of Migrants to Sweden.

¹³³ According to our tripartite division of global culture zones, 309 migrants in the sample are from countries belonging to Western civilization (74 migrants from Poland, 37 from Latvia, 25 from Germany, 18 from the UK and 155 from twenty Western countries, including Australia, Austria, Belgium, Canada, Denmark, Finland, France, Norway and the US). The average CW-score of these Western migrants’ home countries (weighted for the share of migrants) is 0.58 ($SD = 0.11$). In the same tripartite division of global culture zones, 3,877 migrants in the sample are from Eastern civilizations (2,338 migrants from Syria, 558 from Afghanistan, 440 from Iraq, 167 from Turkey, 46 from China and 328 from twenty-eight countries in the Middle East, the post-Soviet space and Central and East Asia). The average CW-score of these Eastern migrants’ home countries (weighted for the share of migrants) is 0.15 ($SD = 0.07$). Again, in the same tripartite division of global culture zones, 2,150 migrants in the sample are from the Global South (478 from Eritrea, 374 from Somalia, 105 from Thailand, 94 from Ethiopia, 47 from Pakistan, 47 from the Philippines, 45 from India and 960 from roughly fifty countries in South America, South Asia and Sub-Saharan Africa). The average CW-score of these Southern migrants’ home countries (weighted for the share of migrants) is 0.07 ($SD = 0.05$). The lowest CW-score for a migrant’s country of origin is 0.01 for Uzbekistan; the highest CW-score is 0.81 for Iceland. The mean CW-score for all the migrants’ countries of origin (weighted in proportion to the share among all migrants in the sample) is 0.15 ($SD = 0.13$), which is about the CW-score of Egypt, from where 38 migrants are in the Swedish sample. This compares with a CW-score of about 0.75 for Sweden. The migrants’ scoring on emancipative values varies from a minimum of 0.05 to a maximum of 0.88, with a mean of 0.49 for the entire migrant sample ($SD = 0.16$). Scores on emancipative values are normally distributed (skewness = .39, kurtosis = -.16). However, since emancipative values summarize responses to a total of twelve items, we lose more than half of the sample ($N = 2,415$ with observed scores on emancipative values). *SOM-Table S9.3-1* documents the composition of the sample, indicating a diverse and socio-demographically rather balanced respondent selection.

SOM-Figure S9.3-1.

Swedish Migrants' CWI- and EVI-Scores compared to the Swedish "Standard"



Interpretation: The CWI-scores of Swedish immigrants' home countries and the immigrants' own EVI-scores are much below the Swedish "standard" for immigrants from non-Western countries and much closer to the Swedish "standard" for those from Western countries.

With respect to the Swedish situation, the CW-Theory suggests that the migrants' expectedly strong religiosity and weak emancipative values reflect the lack of secular-emancipatory traditions in their countries of origin, which in turn go back to the long-term impact of a generally weak CW-Condition in these countries. This is clearly our expectation because we have seen throughout this book that a weak CW-Condition triggers patriarchal civilizational dynamics that keep emancipative values dormant and enculture submissive values instead. Now, if most migrants have indeed been socialized in countries with categorically weaker CW-Conditions than Sweden, the migrants' supposedly weak emancipative values might contrast starkly with the median Swede's strong emancipative values, all the while the migrants' might hardly differ in their emancipative values among each other, as their emphasis on these values is weak anyways. But even though the migrants' countries of origin exhibit categorically weaker CW-Conditions than Sweden, these countries of origin still vary at least to some degree in the exact strength of their CW-Condition. This raises the question of whether these smaller-scale differences in CW-Conditions translate into corresponding differences in the migrants' emancipative values. If so, this would confirm the CW-Theory within scope conditions so narrow that the likelihood of confirmation drops, thus lending further credibility to the CW-Theory when confirmed against these odds.

We test the CW-Theory against Jonathan Schulz and his co-authors' Western Church thesis, which implies that the expectedly strong religiosity and weak emancipative values among first-generation migrants to Sweden reflects these people's socialization in countries with a generally shorter, or absent, Western Church (WC-) exposure. Since the CW-Condition and the WC-exposure are themselves correlated with each other, both expectations might hold true. But even if so, the question remains which of the two expectations is more strongly confirmed in direct comparison and which one turns out to be more robust when considered in the context of the migrants' individual characteristics. As said, the migrants' religiosity is expected to be generally stronger, their emancipative values generally weaker and the CW-Condition and WC-exposure of their countries of origin generally less pronounced compared to Swedish

standards. And yet, depending on their particular country of origin and its cultural distance to the West, migrants are certainly not completely invariant on these issues. Therefore, the existing—albeit limited—variation among migrants on these issues provides a particularly tough test case for the WC- and CW-Theories.

The two boxplots in *SOM-Figure S9.3-1* illustrate two patterns. First and as expected, the CW-Condition of the migrants' home countries are way below Sweden's own CW-score (left-hand diagram). Accordingly, the migrants' mean level of emancipative values is also greatly below the Swedish standard (right-hand diagram), although not without visible variation. Second, the few Western migrants to Sweden come from countries with a CW-Condition that is considerably closer to Sweden's CW-Condition and they emphasize emancipative values at a strength considerably closer to the Swedish level than is the case for the large majority of migrants from the East and the Global South. Since a strong CW-Condition and strong emancipative values are signature features of Western civilization, this pattern is by no means surprising.

SOM-Table S9.3-2. Correlations between the WC-Exposure, CW-Condition, Emancipative Values and Religiosity

	CW-Condition	WC-Exposure	Religiosity	Emancipative Values
CW-Condition ^{a)}	1.00 (6,187)			
WC-Exposure ^{b)}	.78*** (6,133)	1.00 (6,187)		
Religiosity ^{c)}	-.37*** (3,092)	-.33*** (3,091)	1.00 (3,265)	
Emancipative Values ^{d)}	.34*** (2,280)	.30*** (2,278)	-.39*** (1,904)	1.00 (2,415)

Notes: Entries are Pearson correlation coefficients (r) with the number of respondents in parentheses. Significance levels: ^{a)} Cool Water Condition of respondent's home country. ^{b)} Western Church exposure of respondent's home country from Schulz et al., as explained in SOM 3. ^{c)} 10-point scale on importance of God in respondent's life. ^{d)} Welzel's Emancipative Moral Values, multi-point 0-to-1 scale. *Data source:* The World Values Survey (WVS-7) (28) - survey of migrants to Sweden part. * $p < .10$, ** $p < .05$, *** $p < .01$.

SOM-Table S9.3-2 shows that the CW-Condition and WC-exposure of the migrants' countries of origin correlate strongly with each other and that both correlate strongly negatively with the migrants' religiosity and strongly positively with their emancipative values, which in turn correlate strongly negatively with each other. However, the correlations with the CW-Condition are slightly stronger than those with the WC-exposure, providing a somewhat more credible confirmation of the CW-Theory than the WC-Theory.

The regression models in *SOM-Table S9.3-3* test whether the CW-Condition and WC-exposure continue to retain significant predictive power over the migrants' emancipative values under mutual control and in the context of the migrants' individual characteristics. Among the individual characteristics, age and gender are included as standard demographic controls. Marital status and the number of children are included under the assumption that being married and having more children are often markers of traditional family, fertility and sex norms, which

implies weak emancipative values. Education is supposed to increase emancipative values because it might make people more familiar with Western ideas, such as democracy, or because education enhances people's ability to think for themselves, in which case they do not want to be told what to believe and what to do—a predisposition under which the emphasis on self-determination inherent in emancipative values should be more appealing. Language proficiency in Swedish and English is supposed to correspond with stronger emancipative values because speaking these Western languages might indicate a greater cognitive involvement in Western thinking and its underlying values, of which emancipative values are a signature. Economic integration and duration of residence in Sweden are supposed to contribute to stronger emancipative values, although the duration of residence only shows limited variation from one to ten years and does not eliminate the fact that migrants are first-generation migrants who finalized their formative phase of socialization in their country of origin. Since people from a Muslim background and strongly religious people tend to adhere to patriarchal family, fertility and sex norms and because these norms stay in conflict with emancipative values¹³⁴, we expect Muslim denomination and religiosity (independent of its specific denomination) to exert a depressing effect on emancipative values.

Model 1 in *SOM-Table S9.3-3* shows only the effects of the respondents' individual characteristics. It turns out that the migrants' education and religiosity exert by far the strongest effects on their emancipative values and do so in the expected direction, that is, increasing emancipative values in the case of more education and decreasing them in the case of stronger religiosity. Language proficiency (with a positive influence) and Muslim denomination (with a negative influence) are also highly significant in the expected direction. Besides, we tested for an interaction between Muslim denomination and religiosity but found no significant effect, indicating that the impact of these two manifestations of religion is additive rather than mutually amplifying. Taken together, the significant variables explain twenty-two percent of the total variation in the migrants' emancipative values, which—for individual-level data—is quite impressive.

Model 2 uses only the WC-exposure and the CW-Condition of the migrants' countries of origin as predictors. With only these two background variables, the model explains a highly significant twelve percent of the total variation in the migrants' emancipative values. The effects of both the WC-exposure and the CW-Condition are significant and positive but, under mutual control, the CW-Condition's effect is more significant and more than four times larger in magnitude than the effect of the WC-exposure.

Model 3 adds both the two background variables and the previous set of individual characteristics, except the religion-related variables. The CW-Condition retains its highly significant positive effect, while that of the WC-exposure drops further in magnitude and turns insignificant. This model also controls for the level of economic development (using the UNDP's

¹³⁴ A.C. Alexander and C. Welzel, 2014, "Eroding Patriarchy: The Co-Evolution of Women's Rights and Emancipative Values," *International Sociological Review* 25, 144-165. A.C. Alexander, R. Inglehart and C. Welzel, 2015, "Emancipating Sexuality: Breakthroughs into a Bulwark of Tradition," *Social Indicators Research* 102, 1-27.

Human Development Index¹³⁵) and the level of democracy (using V-Dem's Liberal Democracy Index¹³⁶) of the migrants' country of origin at the time when they left it.

SOM-Table S9.3-3. Explaining the Emancipative Values of Migrants to Sweden

	DEPENDENT VARIABLE: Emancipative Values ^{a)}				
	Model 1	Model 2	Model 3	Model 4	Model 5
Age ^{b)}	-.03 (-.03)		-.02 (-.02)	-.05 (-.04)	-.06 (-.05)*
Gender ^{c)}	.04 (.05)*		.04 (.04)*	.04 (.05)	.05 (.06)*
Married ^{d)}	-.02 (-.02)		-.02 (-.02)	-.03 (-.03)	-.04 (-.03)
No. of Children ^{e)}	-.02 (-.02)		-.04 (-.04)	-.01 (-.01)	.01 (.00)
Education Level ^{f)}	.20 (.20)***		.17 (.18)***	.20 (.21)***	.21 (.27)***
Language Proficiency ^{g)}	.10 (.08)***		.17 (.15)***	.06 (.05)	.07 (.06)**
Economic Integration ^{h)}	.02 (.02)		-.01 (-.01)	-.01 (-.01)	-.01 (-.01)
Duration of Residence ⁱ⁾	.04 (.04)		-.01 (-.01)	-.01 (-.01)	-.02 (-.02)
Muslim ^{j)}	-.11 (-.09)***			-.12 (-.10)***	-.12 (-.10)
Religiosity ^{k)}	-.22 (-.21)***			-.16 (-.14)***	-.14 (-.13)***
WC-Exposure ^{l)}		.07 (.04)**	.06 (.04)	.08 (.05)*	.04 (.04)
CW-Condition ^{m)}		.28 (.17)***	.20 (.12)***	.13 (.08)***	.08 (.08)***
Controls for Economic Development and Democracy Level in Country of Origin	No	No	No	YES	No
Adj. R ²	.22	.12	.21	.25	.15
N (respondents)	1,287	2,264	1,545	1,211	1,140 (Westerners out)

Notes: Entries are standardized beta-coefficients with partial correlations in parentheses. Test statistics for multicollinearity, heteroskedasticity and influential cases reveal no violation of OLS assumptions. ^{a)} Welzel's Emancipative Values, multi-point 0-to-1 scale. ^{b)} Measured in years. ^{c)} Dummy (1: female, 0: male) ^{d)} Dummy (1: married, 0: otherwise) ^{e)} Count variable. ^{f)} 9-point scale in ascending order of education level. ^{g)} Dummy (1: interview in Swedish or English, 0: all else). ^{h)} 4-point scale indicating in ascending order whether respondent has a job, a car and savings (0: none of them, .33: one of them, .66: two of them, 1: all of them). ⁱ⁾ Measured in number of years since 2007. ^{j)} Dummy (1: Muslim, 0: all else). ^{k)} 10-point scale on importance of God. ^{l)} Western Church exposure of respondent's home country from Schulz et al. ^{m)} CW-Condition of respondent's home country. Data source: The World Values Survey (WVS-7) - survey of migrants to Sweden part. Significance levels: * $p < .10$, ** $p < .05$, *** $p < .01$.

Model 4 now adds the two religion-related variables. The CW-Condition again retains its highly significant positive effect, while the effect of the WC-exposure now just passes the lowest significance threshold. And the effect remains weak. The effect of the CW-Condition, albeit remaining significant and positive, drops to two-thirds of its previous magnitude after

¹³⁵ The measure is provided by the United Nations Development Program (op. cit., footnote 116) and combines data on life expectancy, per capita income and education into a single index, scaled from minimum 0 to maximum 1 (available online at: www.undp.org).

¹³⁶ The measure is provided by the V-Dem Institute at Gothenburg University in Sweden (see Lindberg et al. (op. cit., footnote 4). It is based on expert judgements on the fairness, competitiveness and cleanliness of general elections and the strength of liberal institutional qualities, including horizontal checks on executive power and minority protection, scaled from minimum 0 to maximum 1.

introducing religiosity. Hence, religiosity absorbs some of the CW-effect, which suggests that the positive CW-effect on emancipative values operates partly via its diminishing effect on religiosity, which then in turn gives room for stronger emancipative values. Model 5 excludes migrants from Western countries in order to test whether the CW-effect only shows up as significant and positive because of the sharp contrast in the CW-Condition and emancipative values between migrants from Western and non-Western countries. Yet, the CW-effect remains highly significant and positive, while the WC-effect turns insignificant again and remains weak. Because of the truncation of variance that the exclusion of Western migrants incurs, the explained variance now drops to fifteen percent, which is nevertheless still decent for individual-level data.

SOM-Table 9.3-4. Explaining the Religiosity of Migrants to Sweden

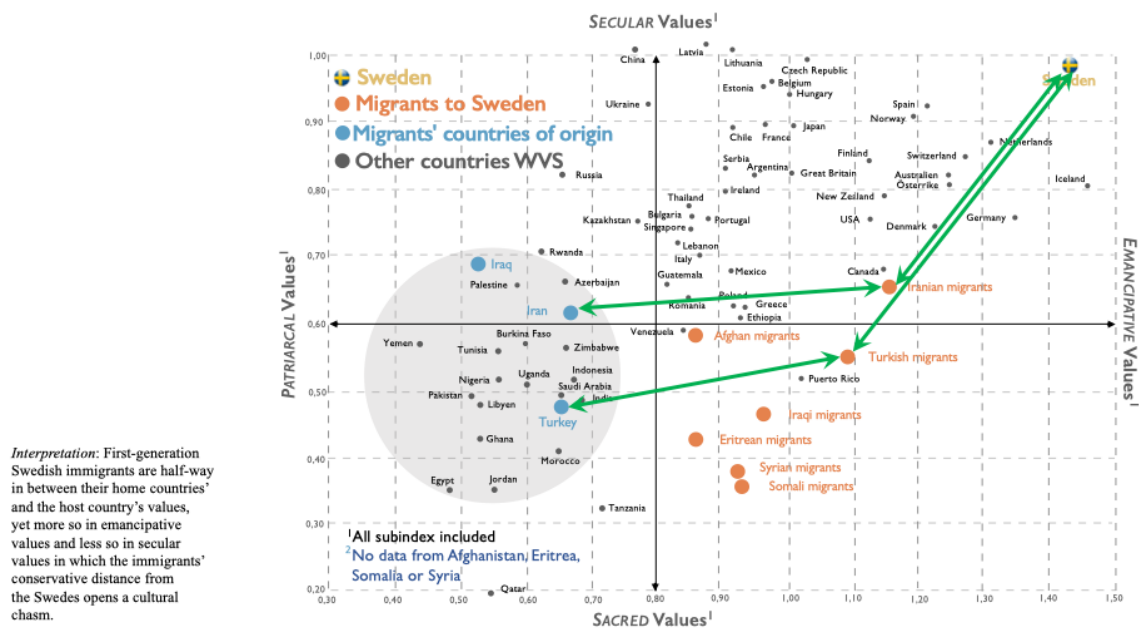
	DEPENDENT VARIABLE: Religiosity ^{a)}				
	Model 1	Model 2	Model 3	Model 4	Model 5
Age ^{b)}	-.03 (-.03)		-.03 (-.03)	-.01 (-.01)	-.01 (-.01)
Gender ^{c)}	.07 (.08)***		.09 (.10)***	.08 (.10)***	.09 (.10)***
Married ^{d)}	.04 (.04)*		.04 (.04)*	.04 (.04)*	.05 (.05)**
No. of Children ^{e)}	.05 (.04)*		.07 (.06)**	.04 (.03)	.03 (.03)
Education Level ^{f)}	-.04 (-.05)**		-.04 (-.04)	-.02 (-.03)	-.03 (-.03)
Language Proficiency ^{g)}	-.25 (-.24)***		-.28 (-.25)***	-.16 (-.14)***	-.16 (-.15)***
Economic Integration ^{h)}	-.08 (-.08)***		-.07 (-.07)***	-.05 (-.05)**	-.06 (-.06)**
Duration of Residence ⁱ⁾	-.03 (-.03)		-.00 (-.00)	-.00 (-.00)	-.00 (-.00)
Muslim ^{j)}	.26 (.24)***			.25 (.24)***	.27 (.25)***
WC-Exposure ^{k)}		-.10 (-.06)**	-.01 (-.01)	.04 (.02)	.04 (.04)*
CW-Condition ^{l)}		-.29 (-.18)***	-.26 (-.16)***	-.29 (-.18)***	-.15 (-.15)***
Controls for Economic Development and Democracy Level in Country of Origin	No	No	No	YES	No
Adj. R ²	.26	.14	.28	.32	.20
N (respondents)	2,051	3,069	1,940	1,940	1,825 (Westerners out)

Notes: Entries are standardized beta-coefficients with partial correlation coefficients in parentheses. Test statistics for multicollinearity (VIFs), heteroskedasticity (White test) and influential cases (DFFITs) reveal no violation of Ordinary Least Squares assumptions. ^{a)} 10-point scale on importance of God in respondent's life. ^{b)} Measured in years. ^{c)} Dummy (1: female, 0: male) ^{d)} Dummy (1: married, 0: otherwise) ^{e)} Count variable. ^{f)} 9-point ordinal scale in ascending order of education level. ^{g)} Dummy (1: interview in Swedish or English, 0: all else). ^{h)} 4-point ordinal scale indicating in ascending order whether respondent has a job, a car and savings (0: none of them, .33: one of them, .66: two of them, 1: all of them). ⁱ⁾ Dummy (1: Muslim denomination, 0: all else). ^{j)} Measured in number of years since 2007. ^{k)} Western Church exposure of respondent's home country from Schulz et al. ^{l)} CW-Condition of respondent's home country. *Data source:* The World Values Survey (WVS-7) - survey of migrants to Sweden part. Significance levels: * $p < .10$, ** $p < .05$, *** $p < .01$.

The regression models in *SOM-Table S9.3-4* mirror those from before; we just switch to religiosity as the dependent variable. As is obvious throughout all models, the CW-Condition shows a highly significant and strongly diminishing effect on the migrants' religiosity, also

SOM-Figure S9.3-2.

Swedish Immigrants' and their Home Countries' Location on the WVS Cultural World Map

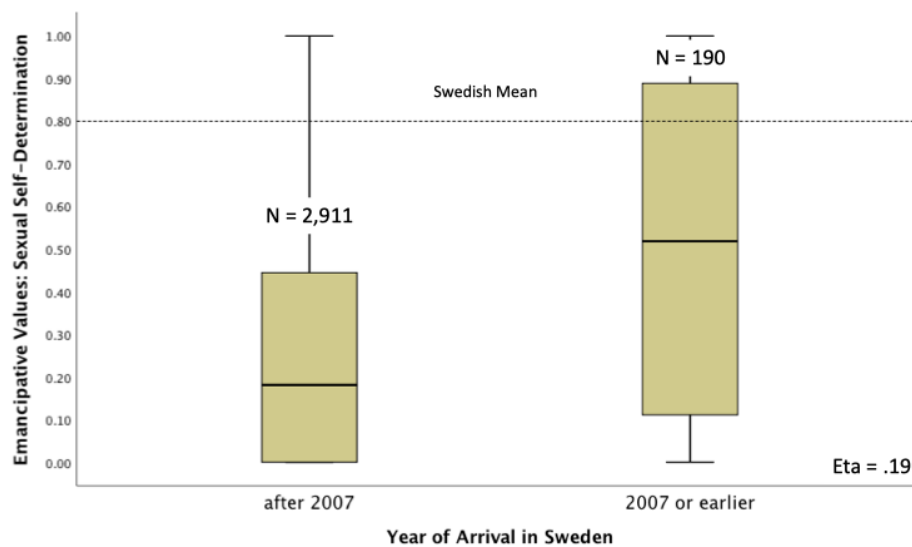


under exclusion of Western migrants. The effect of WC-exposure is mostly insignificant and weak and not consistently negative. In combination with the fact that the CW-effect on emancipative values drops in magnitude upon the inclusion of religiosity, the CW-Condition's strongly diminishing effect on religiosity shows that the CW-Condition enhances emancipative values partly by diminishing religiosity. Given that the WC-exposure is itself a directly religion-related variable, the fact that its effect on religiosity is greatly outperformed by the CW-Condition lends further credibility to the CW-Theory.

From the viewpoint of descriptive evidence, it is interesting to note that Middle Eastern migrants to Sweden (e.g., Iranian and Turkish immigrants) are located half-way in between the huge cultural gap that separates the average emancipative values of the populations of their home countries (i.e., Turkey and Iran) from those of their host population (i.e., Sweden). This is obvious from the cultural world map shown in *SOM-Figure S9.3-2*. Because most of the respondents interviewed in the Swedish migrant survey are first-generation newcomers, it is unlikely that their relative approximation to the Swedes' emancipative values is already the result of an acculturation merely by the duration of migrants' physical presence in Sweden. Acculturation processes are usually too slow to yield a mental shift of this scope in a short time. Therefore, it is more plausible that self-selection into migration is at work here. That is, an existing affinity to the culture of destiny and its values (probably nurtured by personal network connections into the targeted host country) helped trigger the decision to leave the home country.

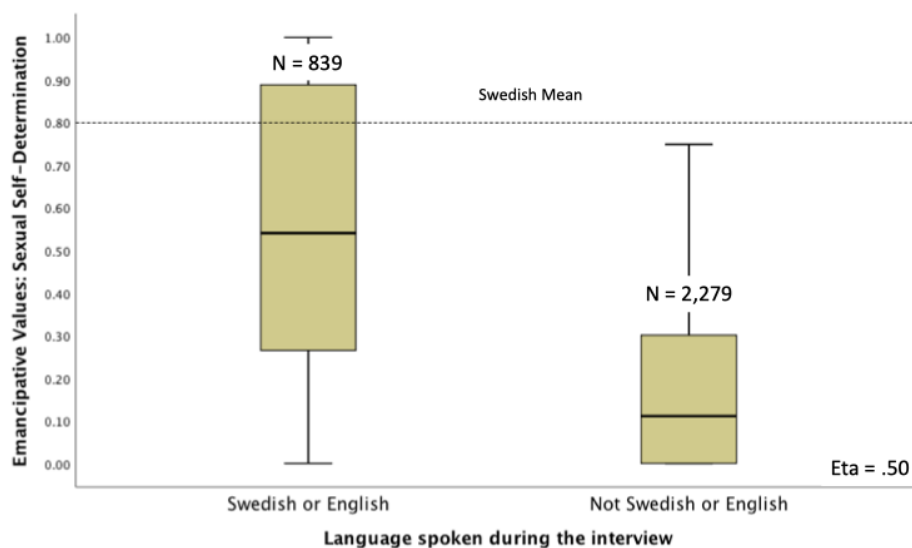
Still, even among first-generation migrants the mere duration of presence in the host country favors acculturation to the host country's emancipative values. This is evident from the fact that even a very crude differentiation of migrants' temporal presence in the host society makes a significant difference. Indeed, the simple fact of whether first-generation immigrants to Sweden arrived before 2007 or after 2007 (dividing respondents into those having an at least eleven year presence or a shorter one) accounts for a difference in emancipative values of .32 scale points between an average of .18 (those arriving after 2007) and .50 scale points (the ones

SOM-Figure S9.3-3. The Impact of Immigrants' Arrival Time on their Emancipatory Acculturation



Interpretation: Immigrants having arrived in Sweden earlier than 2008 are half-way more acculturated to Swedes' emancipative values than immigrants having arrived later.

SOM-Figure S9.3-4. The Impact of Immigrants' Linguistic Westernization on their Emancipatory Acculturation



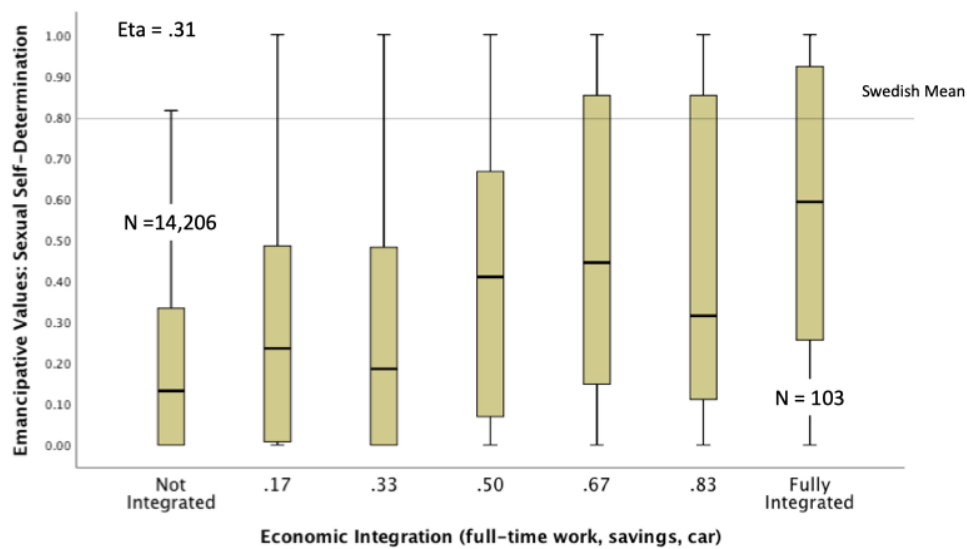
Interpretation: Immigrants speaking Swedish or English (i.e., a Western language) are more acculturated to Swedes' emancipative values than immigrants speaking only their home language.

arriving before 2007). Even the crudest differentiation of residential presence in the absence of any further controls leaves a positive mark in an acculturation perspective, although residential presence is insufficient to complete the process in and by itself

Since the evidence just presented looks at the acculturating effect of residential duration without any additional controls, the question arises of what factors hinder or accelerate the acculturation speed of mere presence. *SOM-Figures S9.3-4 to S9.3-6* answer this question, illustrating that immigrants' (1) linguistic Westernization (i.e., whether they answered the interview questions in English or Swedish), (2) their economic integration (i.e, whether they have a full-time job, savings and a car) and (3) their secularization strengthen immigrants' acculturation to Swedes' average emphasis on emancipative values. And when all three elements come together among immigrants who have lived ten or more years in Sweden, their

SOM-Figure S9.3-5.

The Impact of Immigrants' Economic Integration on their Emancipatory Acculturation

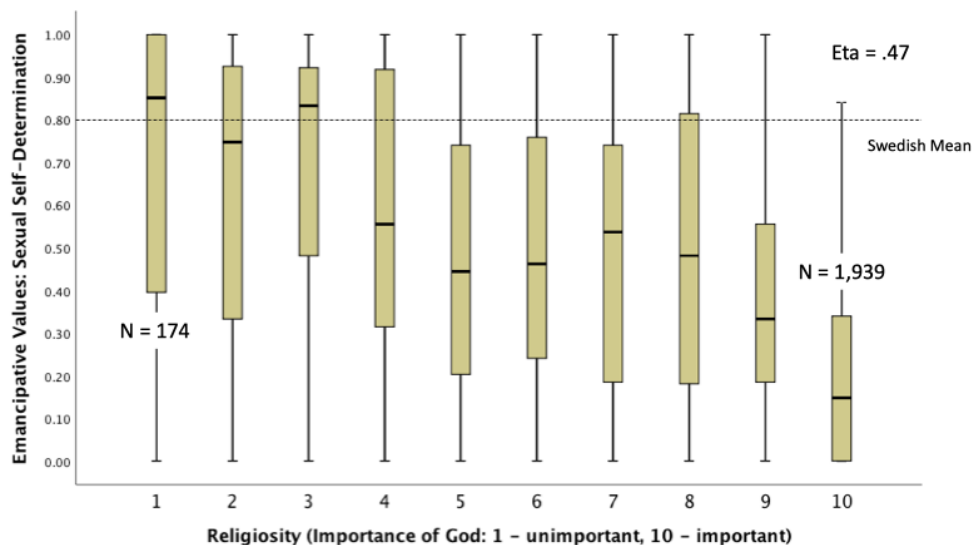


Interpretation: Immigrants having full-time work, savings and access to a car are more acculturated to Swedes' emancipative values than immigrants without these assets.

emancipative values match those of their host population. SOM-Figure S9.3-7 confirms these insights in a multivariate setting.

SOM-Figure S9.3-6.

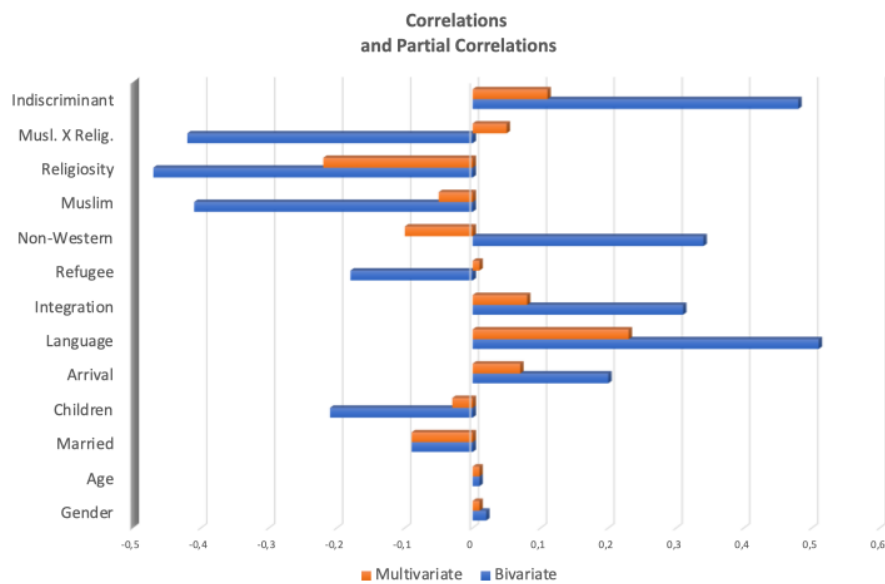
The Impact of Immigrants' Religiosity on their Emancipatory Acculturation



Interpretation: Immigrants being less religious are more acculturated to Swedes' emancipative values than more religious immigrants.

We take three important lessons from these pieces of evidence. First, acculturation of immigrants from even the most “foreign” places is possible if the necessary elements come together. If so, the duration of immigrants’ presence operates as an accelerator of their acculturation. Second, the necessary elements include economic integration, linguistic Westernization and cultural secularization. Third, these assets should be the targets of integration policies and civic education programs. Fourth, acculturation is essential not only for social cohesion but also because emancipative values constitute the most important psychological ingredient of democracy-fit societies.

SOM-Figure S9.3-7. The Simultaneous Impact of Immigrants' Various Characteristics on their Emancipatory Acculturation



Interpretation: Religiosity among the negative factors and economic integration and linguistic Westernization among the positive factors stick out as the most important determinants of immigrants' acculturation to Swedes' emancipative values.

Leaving these important lessons aside, we conclude by emphasizing that even the truncated scope conditions of immigrants to Sweden confirms the CW-Theory in its central point: Depending on whether migrants have been socialized in environments that harbor a weaker or stronger CW-Condition, they bring a less or more emancipatory imprint with them—on which then acculturation strategies have to work.

S9.4 Historic Local Populations

PRELUDE

In 1969, George P. Murdock and Douglas R. White started an ethnographic data collection, known as the Standard Cross-cultural Sample (SCCS).¹³⁷ Since then, dozens of anthropologists expanded the dataset by adding ethnographic descriptions of historic local populations.¹³⁸ As a result, the dataset includes as the units of observation a total of 186 local populations across the world.¹³⁹ Local populations are drawn from all inhabited continents and all levels of subsistence, from foraging to advanced agriculture. Only two population descriptions—namely those of the Irish in 1930 and the Japanese in 1950—relate to industrial societies. The time range is from 1750 BCE for the Babylonians, 110 CE for the Romans, 1530 CE for the Incas to 1930 for the Irish and 1950 for the Japanese, with the average observation year being 1853 CE (albeit with a standard deviation of 350 years). Most of the studied populations are historic and therefore, as said, at the pre-industrial level of subsistence. Many of these populations no longer exist and a large proportion of them practiced a foraging lifestyle, including the !Kung Bushmen, the Tuareg, Lapps, Mongols, Inuit, Hurons, Maoris and Yanomamo. In total, twenty percent of the 186 studied populations relied entirely on hunting and gathering and an additional fifteen percent practiced only the most rudimentary forms of agriculture, neither using the plow nor sophisticated irrigation.

Consequently, the SCCS covers conditions typical of most of human history rather than our very recent and “weird” industrial and post-industrial past. The data are, thus, suited to test some of the supposed emancipatory impulses of the CW-Condition for their *temporal* and *spatial* universality.

The SCCS includes basic lifestyle variables, from marriage patterns to child rearing habits to subsistence technology, settlement arrangements, inheritance practices and political organization. Most of these variables are ordinal four- or five-point scales, measured in a coding scheme on which 1 indicates the absence and 4 or 5 the complete presence of the property of interest.¹⁴⁰ The codes are based on expert judgments of ethnographic records or archeological evidence. The SCCS provides a detailed documentation of coding standards and is widely

¹³⁷ G.P. Murdock and D. White, 1969, “The Standard Cross-Cultural Sample.” *Ethnology* 8, 329-369.

¹³⁸ Murdock and White (op. cit., footnote 137). G.P. Murdock, R. Textor, H. Barry III, D.R. White, J.P. Gray and W. T. Divale, 1999, “Ethnographic Atlas.” *World Cultures* 10, 24-136. W. Divale, 2004, “Codebook for the Standard Cross-Cultural Sample.” *World Cultures* 14, 1-362.

¹³⁹ Ibid.

¹⁴⁰ As always, we have transformed every variable into a range from minimum 0 to maximum 1.0, with intermediate positions as fractions.

acknowledged in anthropology as the most important source of systematic data on societal differences across space and time.

An extension of the SCCS, known as the Ethnographic Atlas (EA)¹⁴¹, also goes back to George P. Murdock's work and includes a larger set of historic tribal populations, namely some 1,200 tribes. The demographic characteristics included in the EA are, however, more crudely coded, less precise and cover a more idiosyncratic set of populations from one variable to the next. Still, at the end of this sub-chapter as well as in SOM-Section S10.4 we report some findings from the EA in accordance with the SCCS-evidence.

The SCCS includes geographic information that allows us to measure the CW-Condition by combining a population's central latitudinal location with the continuity of rain in a similar, albeit less nuanced, manner as we did for capital cities before. To cover an essential hydrological component of the CW-Condition, the ubiquity of water reservoirs (including the sea, lakes, ponds, rivers, brooks and springs), we use a proxy indicating the degree to which a population relies on fishing for its sustenance. Obviously, when reliance on fishing is high, water reservoirs must be in easy reach. As before, we use this proxy of water access as a conditioner rather than a complement of high latitude's cool seasons, as detailed in SOM-Section S11.16.

S9.4.1 POPULATION TIMING

We relate the population's CW-Conditions to a number of other variables of foremost interest. To begin with, we are interested in the length of time that has elapsed since modern humans originally arrived and began to populate a given habitat. In a developmental context, this is an obviously important variable. Indeed, the more time has passed since humans have existed in a given habitat, the more time they have had to learn how to take advantage of the habitat's naturally embodied opportunities and to refine and enrich this knowledge over the generations. For this reason, the sheer duration of human presence at a place should already, in and by itself, be conducive to a population's technological and organizational development—all else equal.

We do not have information about when exactly the first members of a population reached the habitat for which the SCCS records its lifestyle. But Stephen Oppenheimer and Alexander Harcourt provide rough estimates of how many thousands of years ago the world's regions have first been populated by our species.¹⁴² Moreover, and despite existing disputes¹⁴³, we have a rough idea about the routes that humans have taken on their way out of Africa to populate the other habitable areas of our planet. These migratory paths document the logical fact that places farther away from the supposed origin of humanity in East Africa have been populated correspondingly later than closer places. Accordingly, we can use a place's geographic distance from the supposed human origin in Ethiopia as a rough proxy for how long human populations

¹⁴¹ Murdock and White, Murdock et al., Divale (op. cit., footnotes 137 and 138).

¹⁴² S. Oppenheimer, 2004, *Out of Eden: The Peopling of the World*, New York: Robinson. A.H. Harcourt, 2015, *Humankind: How Biology and Geography Shape Human Diversity*, New York: Pegasus.

¹⁴³ For instance, scholars continue to debate whether South America has been populated only via land migration from the North or whether there was an earlier arrival of humans by boat from Southeast Asia via the Pacific.

existed there, assuming a longer-vs-shorter human presence in proportion to a place's closer-vs-farther distance to Ethiopia.

However, mere air distance overlooks that most regions of the world have been populated via land routes. Hence, the migratory distance from Ethiopia is for most places in the world—except all those in Africa itself—larger than the air distance.

Using waypoints, we can add up partial air distances to estimate a place's migratory distance from Ethiopia. For instance, the out-migration from Africa into Eurasia passed over the Sinai peninsula to Palestine. Thus, Palestine is the decisive waypoint out of Africa into Eurasia. Consequently, for all places in Eurasia, the migratory distance from Ethiopia is the sum of Palestine's air distance from Ethiopia, plus the respective place's air distance from Palestine.¹⁴⁴ Then the original out-migration from Eurasia into the Americas led over the Bering Strait and Alaska, which makes the Bering Strait the decisive waypoint. Hence, any American place's migratory distance from Ethiopia is the sum of Palestine's distance from Ethiopia, plus the Bering Strait's distance from Palestine, plus the respective place's distance from the Bering Strait. Finally, the first human out-migration from Eurasia into Australasia supposedly led over the Southern tip of Malaysia (i.e., basically Singapore) and the Indonesian archipelago, so the location of Singapore is a decisive waypoint. Consequently, an Australasian place's migratory distance from Ethiopia is the sum of the following partial distances: Palestine's distance from Ethiopia, plus Singapore's distance from Palestine, plus the respective place's distance from Singapore. In all these cases, a place's migratory distance from Ethiopia is considerably larger than the place's straight air distance from Ethiopia.

Following this scheme, we calculate the migratory distance of each population's location from the origin of humanity in kilometers, assuming that this migratory distance translates proportionally into a corresponding time sequence of first human presence. We use a simple linear transformation of migratory distances to estimate how long humans exist in a place, hence translating kilometers in the distance measure into years of human presence. Among the peoples covered by the SCCS, our calculation flags out the Yahgan (a tribe living in Terra del Fuego at the very Southern tip of South America) as the most distant population from the geographic human origin at a distance of about 31,300 kilometers. Transforming this distance measure into a temporal measure of human arrival, we estimate that the Yahgan probably arrived some 4,550 years ago in their habitat.¹⁴⁵ However, we need to recognize that the

¹⁴⁴ Out of intuition, we use as a rough approximation the geographic centroids of today's countries as the base to calculate air distances of remote places in kilometers.

¹⁴⁵ The underlying formula assumes a translation rate due to which human settlement advanced on average one kilometer per seven years. In terms of mere migration time, this might sound suspiciously slow at first glance because humans are capable to cover much larger distances in a much shorter time. However, we do not deal here with just migration but with the expansion of the human population, without leaving the original place deserted. Such population expansion does not only require migration; above all it requires population growth through reproduction and that takes time. In that sense, a one kilometer population expansion per seven years does not seem particularly slow. We can, of course, manipulate the translation rate in our formula and specify one kilometer expansion every six, five, four or whatever number of years, which will give us different absolute numbers for the time spans humans exist in given places. But no matter which translation rate we assume, the estimation remains a linear transformation, for which reason the relative proportions of the estimates for the different populations remain exactly the same. For these reasons, our primary concern is not the precision of the absolute numbers but the relative differences between places.

characteristics of this population coded in the SCCS have been ascribed to the year 1865 CE, at which point these people had 155 years less of a presence in their area than today. Thus, for all populations we subtracted from the estimated temporal length of their presence today the number of years separating 2015 from the year of record. In the case of the Yahgan population in Terra del Fuego, we accordingly estimate a presence of 4,400 years in 1865. In proportion to the initial estimates, these corrections change numbers only negligibly; yet for reasons of accuracy we stick to this correction.

Using the estimated duration of human presence at a place as a constant background control, we make the developmental achievements of given populations comparable across the different calendrical time points for which these achievements have been recorded. For example, the sophistication of the Yahgans' subsistence methods in 1865 CE and those of the Babylonians in 1750 BCE become comparable if we look at both of them relative to the endurance of human presence at their respective locations.

Our data reveal that migratory distances provide a considerably better basis to estimate human arrivals than mere geographic air distances. This is obvious from the fact that our fine-scaled presence estimates correspond more closely with Oppenheimer's rough estimates when we use migratory instead of air distances as the estimation base. It is indeed a difference in correspondence between fifty percent in the case of geographic air distances and ninety percent in the case of migratory distances. *SOM-Figure S9.4.9-1* in the addendum (at the end of this section) illustrates the point.

Additional variables of interest include a place's disease security and food security as basic aspects of ecological opportunity endowments. As concerns measures of development in pre-industrial contexts, we look at a population's reliance on foraging versus advanced forms of agriculture, as well as urban settlement and state organization—which both follow from mature forms of intensive agriculture. Moreover, we consider the variety of a population's produced tools and the amount of trade ("tools and trade") as a measure of technological-commercial ("tech-comm") development. Finally, we focus on aspects of women's reproductive autonomy, which we consider one of the key human autonomies embodied in the CW-Condition.

S9.4.2 HUMAN PRESENCE

Starting with the most basic fact, *SOM-Figure S9.4.9-2* (see addendum, end of this section) documents that the populations with the longest human presence at their place had a very weak or absent CW-Condition. These are the populations in East and Central Africa at the right-hand end in *SOM-Figure S9.4.9-2*. When we follow the distribution from right to left, that is from longer to shorter human presences, we see what happened during the sequence of human migrations into other parts of the world. Specifically, as out-migration from East Africa happened northward towards the Middle East and then into Eurasia and further towards Northwestern Europe and Northeastern Asia, the CW-Condition becomes increasingly pronounced, visible in the upward slope of the distribution. Out-migration from South Asia further South and East towards Australasia also came with a stronger CW-Condition. Consequently, human out-migration along the African-Eurasian-Australasian route usually meant settlement under a more

pronounced CW-Condition, evident in the steep slope upward from right to left in the right-hand part of the distribution in *SOM-Figure S9.4.9-2*.

With the continuation of human out-migration into the Americas, the pattern changes. Here, people started from the pronounced CW-Condition in North America's North, while their further migration southwards led them towards an increasingly weak CW-Condition, visible in the dramatic change of the curve from an upward right-to-left slope to a downward right-to-left slope. Further migration southward, finally, turns again into a migration towards an increasingly pronounced CW-Condition once American people crossed the equator, South of Ecuador. But the populations covered by the SCCS in the South of South America—the Tehuelche, Mapuche and Yahgan—are too few in number to turn the right-to-left slope of the fitting line upward again at the left-hand end of the distribution.

The takeaway from this evidence is that the overall pattern in the relationship between the CW-Condition and human out-migration is a tendency towards an increasingly pronounced CW-Condition alongside recency in the arrival of modern humans at a given place. This tendency reverts itself in one particular section of the human migratory path leading from Alaska to the equator in South America. However, it turns back to its previous tendency towards a stronger CW-Condition further down South from Ecuador. This means that—overall—CW-areas tend to be younger human habitats and that this is particularly true for the African-Eurasian landmass, where agriculture was invented first. Accordingly, the people arriving in the CW-areas of Africa-Eurasia had less time to invent agriculture than people in the places they left behind. For this reason alone, CW-areas should show a tendency to diminish a population's reliance on agriculture and the developments following agriculture, most notably urban settlements and state organization.

S9.4.3 ECOLOGICAL SECURITY

We argued earlier that CW-environments are more secure in certain aspects because the cool temperatures reduce the number of sickening parasites, keep freshwater less infested and widen the dietary options by fish, seafood and dairy products. The ubiquitous availability of freshwater is another security element, being the source of a lush fauna and flora that makes sustaining a foraging lifestyle relatively easy without over-depleting local resources. In line with these assumptions, we find that CW-habitats tend to embody higher degrees of disease and food security. This is obvious from *SOM-Figures S9.4.9-3* and *S9.4.9-4* (addendum, end of this section). CW-areas are also ecologically more secure because they are less exposed to uncontrollable natural disasters, including prolonged droughts, excessive heat waves, tropical storms and sudden monsoon-like floods. *SOM-Figure S9.4.9-5* (addendum, end of section) shows this regularity only at the country level. But since the local tribal populations analyzed here are clearly attributable in their habitats' locations to today's countries, it is safe to conclude that the same regularity applies to these populations as well, meaning that CW-strong habitats are generally safer ecologically speaking.

Moreover, the two scatterplots in *SOM-Figure S9.4.9-6* (addendum, end of section) demonstrate that the positive association of the CW-Condition with nutritionally and

pathogenetically more secure environments is not an artifact of the CW-areas' tendency to reach higher levels of "tech-comm" development later in time. Indeed, if we control the populations' levels of "tech-comm" development (in terms of the diversity of tools and the extension of trade), the CW-Condition retains a positive and statistically significant effect on an environment's nutritional and pathogenic security.

S9.4.4 SUBSISTENCE METHODS

Besides the shorter human presence in CW-areas, their greater environmental security could be another reason why populations in these areas lived under little pressure to quit their foraging lifestyle and invent agriculture. And indeed, the three boxplots in *SOM-Figure S9.4.9-7* (addendum, end of section) confirm that populations pursuing evolutionary later forms of subsistence, including pastoralism and agriculture, tended to live in areas with a weaker CW-Condition. In numbers, populations not relying at all on animal husbandry have a median CW-score of 0.42, which contrasts with a median of 0.22 among those relying almost entirely on animal husbandry. With agriculture, it is 0.30 for those relying the most and 0.40 for those relying the least on crop cultivation. Vice versa, among populations relying the most on hunting and gathering (including fishing), the median CW-score is 0.38, which contrasts with 0.20 among those relying the least on foraging. Needless to say, all of these mean differences are statistically significant.

Because populations' reliance on foraging correlates inversely with their reliance on agriculture, we summarize both types of subsistence in a single bipolar variable, measuring reliance on agriculture-vs-foraging.¹⁴⁶ Looking at this variable, the scatterplot in the lower right corner of *SOM-Figure S9.4.9-7* shows that, alongside increasing CW-scores, the reliance on agriculture drops on an increasingly steep downward slope. This tendency accounts for 21 percent of the total variation in pre-industrial subsistence modes. The group of populations deviating from this tendency—like the Hadza, Mbuti and Comanche—rely fully on foraging despite a weak or only mediocre CW-Condition. These deviating populations lived far from other centers of agriculture and their natural habitats were not very suited for agriculture to begin with, because of aridity and poor soil quality. Therefore, a weak CW-Condition makes it likelier but does not guarantee a reliance on agriculture, especially when local conditions are unsuited for farming. The opposite deviation from the main tendency, indicating a more pronounced reliance on agriculture than a strong CW-Condition would otherwise suggest, is less extreme and includes only a small number of populations, including the Romans and the Japanese. In contrast to the other deviating group of populations (with little agriculture despite a relatively weak CW-Condition), these two deviating populations (with much agriculture despite a relatively strong CW-Condition) evolved in the vicinity of major agrarian civilizations: Japan in the vicinity of China and Rome in the vicinity of the Middle East.

¹⁴⁶ In a factor analysis, these subsistence methods load on opposite poles of a single dimension with factor loadings of .75 for agriculture, .57 for pastoralism and -.92 for foraging. This single dimension captures 58% of the variance in all three subsistence methods together.

Besides the neighborhood aspect, these patterns suggest that part of the tendency of the CW-populations to stick to foraging actually derives from the fact that these are evolutionary more recent populations in their habitats, for which reason they had less time to invent, discover and refine agriculture. The question then is whether this time factor accounts entirely for the CW-populations' tendency to rely on foraging, or whether something inherent in the CW-Condition in and by itself, like its embodied nutritional, pathogenic and ecological security, favors a continued reliance on foraging.

The two scatterplots in *SOM-Figure S9.4.9-8* are the result of a regression predicting a population's reliance on agriculture-vs-foraging by (a) the CW-Condition of the respective population's habitat and (b) the length of the population's estimated presence in its habitat. As is obvious, the duration of human presence in a population's habitat explains some of the variation in the reliance on agriculture-vs-foraging. Actually, it takes away some of the explanatory power of the CW-Condition over these subsistence methods, reducing it from 21 to 13 percent. Nevertheless, the tendency of populations in CW-areas to stick to foraging and resist agriculture remains (a) highly significant and (b) a stronger force in shaping subsistence modes than the duration of humans' local presence. In other words, even among similarly young habitats, a stronger CW-Condition implies more reliance on foraging and less on agriculture.¹⁴⁷

S9.4.5 URBANIZATION AND STATEHOOD

We have just seen that the CW-Condition embodies a genuine delaying tendency concerning the initial step of societal development, that is, the transition from foraging to agriculture. The question is whether this initial delay continues to operate on subsequent developmental steps that follow in the wake of adopting agriculture, most notably urban settlement and state organization. Alternatively, a delay of subsequent developmental stages might merely be due to the initial delay and vanish once we control for the initial late start. As the boxplots in *SOM-Figure S9.4.9-9* (addendum, end of section) document, populations in habitats with a stronger CW-Condition are less developed when it comes to urban settlement and state organization. This tendency is modest, accounting for twenty-five percent of the variation in urban settlement and ten percent of the variation in state organization. Yet, it is a statistically significant tendency that—when continuously in operation—can easily accrue to an increasingly longer developmental delay over time.

However, as *Figures S9.4.9-10* and *S9.4.9-11* (addendum, end of section) illustrate, when we control the seemingly negative effect of the CW-Condition on urban settlement and state organization for a population's level of agrarian development, it turns out that the CW-Condition has no more negative impact at all. Instead, it is actually a population's level of agrarian

¹⁴⁷ Besides, it is partly—yet not entirely—the CW-Condition's naturally embodied nutritional and pathogenic security that accounts for its initially disfavoring influence on the adoption of agriculture: When we include these two variables as predictors of a population's reliance on agriculture-vs-foraging, the CW-Condition's negative effect becomes somewhat weaker but remains significant. But since these security aspects are naturally embodied in the CW-Condition, we continue using the CW-Condition itself as a proxy for them. Otherwise, we lose too many observations to pursue conclusive analyses.

development that influences its level of urban settlement and state organization, accounting for about thirty-five percent of the total variation in both instances. This means that the CW-Condition restricted urban settlement and state organization *only insofar* as it delayed the emergence of agriculture. But beyond the initial delay in adopting agriculture, the CW-Condition does not decelerate the consecutive developmental steps towards urban settlement and state organization. In other words, among populations at the same level of agrarian development, the CW-Condition neither impeded nor delayed urban settlement and state organization. We can also say that CW-areas either avoided the transition to agriculture or made it later but those CW-areas that did make the transition (however late) have *not* been slower than the non-CW areas in reaching the consecutive developmental stages of intensive agriculture, namely cities and states.

S9.4.6 COMMERCIAL-TECHNOLOGICAL (“COMM-TECH”) DEVELOPMENT

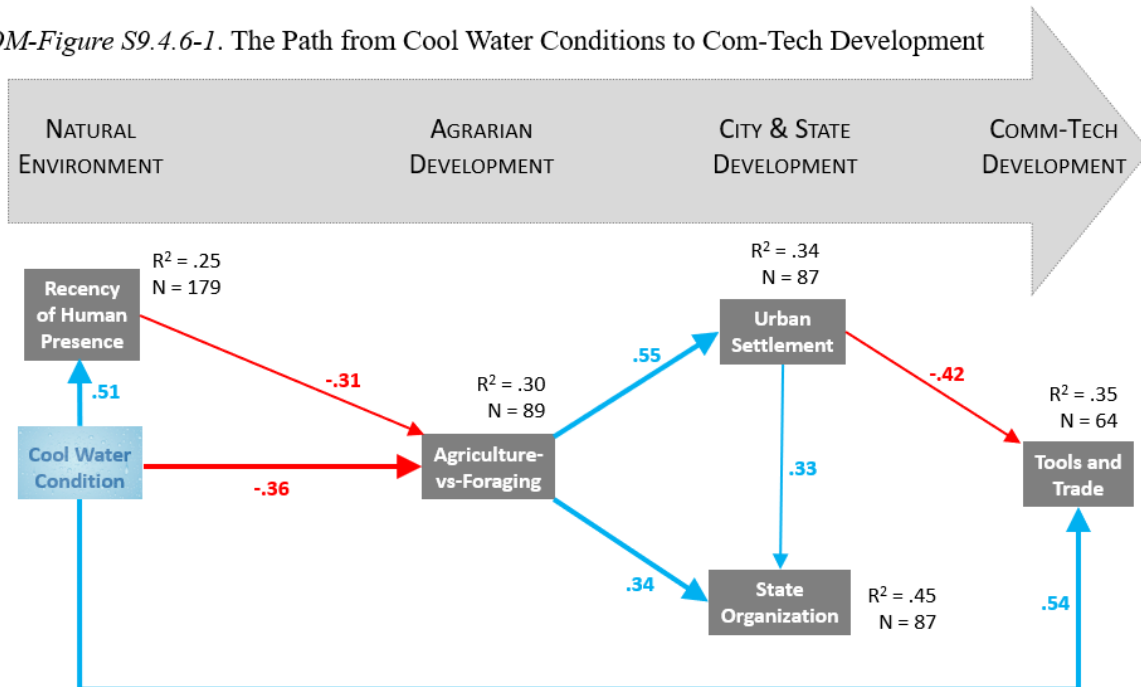
Apart from urban settlement and state organization, other indications of pre-industrial development and industriousness include the prevalence of trade, use of money and wage labor as well as technologies used for mining ores and building weapons, houses, boats and ships. We summarize these seven aspects of commercial-technological (“comm-tech”) development in a single variable labeled “tools & trade.”¹⁴⁸ Interestingly, the upper scatterplot in *SOM-Figure S9.4.9-12* (addendum, next section) shows that—in spite of its negative effect on agrarian development—the CW-Condition is modestly conducive to comm-tech development, as captured by “tools & trade.” Using controls for a population’s agrarian, urban and state development, the CW-Condition’s positive influence on a population’s comm-tech development surfaces even stronger. Indeed, as the lower scatterplot in *SOM-Figure S9.4.9-12* shows, this tendency accounts for a noteworthy twenty-nine percent of the total variation in “tools & trade.”

Using a series of sequentially ordered multiple regressions, the path diagram in *SOM-Figure S9.4.6-1* (directly below) summarizes our collection of separate findings in a causal funnel capturing societal differences along the logical sequence of pre-industrial development. As is evident, the CW-Condition embodies a delay already insofar as it is associated with later populated human habitats, which in and by itself disfavors the initial developmental step towards agriculture. In addition to this delay, the CW-Condition itself further disfavors the initial developmental step towards agriculture. All of this explains why the CW-areas turned out to be late in making progress in societal development: If they made that step at all, it took them much longer to develop mature forms of agriculture. However, once CW-areas overcame their initial delay and did adopt agriculture, their previous delay did *not* continue into the next developmental steps towards urban settlement and state organization. Compared to populations at the same level of agrarian development, those living under a pronounced CW-Condition were no less likely to develop cities and states. Finally, the initial delay in agrarian development turned

¹⁴⁸ In a hierarchical two-level factor analysis, the seven aspects converge in three sub-factors at the lower level of abstraction. Using an oblique rotation to allow these three sub-factors to be correlated, they converge in a single super-factor at the second level of abstraction.

into a pronounced advantage in “comm-tech” development. Indeed, among populations at the same level of urban settlement and state organization, those inhabiting CW-areas had advanced further in developing tools and trade. This advantage placed the CW-areas in a decisively better position to pioneer the Industrial Revolution.

SOM-Figure S9.4.6-1. The Path from Cool Water Conditions to Com-Tech Development



Note: Results from a sequence of multiple regressions. The sequence is organized such that each variable in the path model is specified as the dependent variable of all other variables to its left. Entries are partial correlation coefficients. Any missing paths from left to right indicate that there is no significant effect. Recency of Human Presence denotes the time since the arrival of first modern humans in a tribe's habitat, which we proxy by the Migratory Distance from the human origin. All partial regressions include as a control the year for which the data were recorded.

S9.4.7 FEMALE REPRODUCTIVE AUTONOMY

In this SOM's monograph, we place a great deal of emphasis on the CW-Condition's effects on female reproductive autonomy. The best indication we could find in the SCCS of this concept is information indicating whether a woman's consent is necessary to marry her as well as the women's mean age at first marriage. Unfortunately, this information is only available for a sub-sample of the SCCS, covering forty to fifty populations. Paired with other variables, the number of observations drops further down, even to a number as low as fifteen. The paucity of these data calls for serious caution concerning any evidence we might find in them. Still, out of sheer curiosity, it is of inherent interest to figure out whether these sparse data do at least not contradict our expectations.

With these caveats in mind, the boxplots in *SOM-Figure S9.4.9-13* (addendum, end of section) confirm (a) that in CW-areas women's consent is more necessary for a marriage than in non-CW areas and (b) that the average female marriage age increases alongside a stronger CW-Condition. This finding is fully in line with our expectations. Zooming in on women's marriage age, the scatterplot in *SOM-Figure S9.4.9-14* (addendum, end of section) illustrates that a stronger CW-Condition favors higher marriage ages among women, even if we control

for a population's agrarian development. We obtain the same result when we control for the use of irrigation and the plow in agriculture, both of which have been reported to magnify gender inequality.¹⁴⁹

Finally, *SOM-Figure S9.4.9-15* (addendum, end of section) shows for an even more reduced set of fifteen populations that higher female marriage ages are conducive to a population's comm-tech development, controlling for agrarian development. Thus, populations on the same level of agrarian development in pre-industrial times tended to reach a higher level of comm-tech development when women married later. From an ethnographic angle, these findings confirm Jan Luiten van Zanden and his co-authors' massive evidence on the decisive role of female reproductive autonomy during the pre-industrial era in launching the Double Emancipatory Turn towards industrialization and democratization in the first half of the 19th century.¹⁵⁰

We would not lend much credibility to the latter set of findings regarding women's marriage ages, given the sparsity of the data and the limited amount of controls they allow for. However, the fact that these findings confirm from a completely different angle what we already found with ample evidence at the country level increases the weight of these findings. At any rate, the takeaway is that historic data on local tribal populations around the globe support the key mechanisms that we established at the country level and that prepared pre-industrial populations for better or worse to launch the industrial-democratic double revolution, or in short: the Emancipatory Turn in human history.

S9.4.8 EVIDENCE FROM THE ETHNOGRAPHIC ATLAS

An extension of the SCCS, known as the Ethnographic Atlas (EA)¹⁵¹, also goes back to George P. Murdock's work and includes a larger set of historic tribal populations, namely some 1,290 tribes. The demographic characteristics included in the EA are, however, more crudely coded, less precise and cover a more variable set of populations from one variable to the next.

Nevertheless, we can report some confirming evidence for our SCCS-based findings from the EA, as documented in SOM-Section S10.4. To summarize, CW-populations in the EA exhibit more frequently emancipatory instead of patriarchal societal features on ten accounts:

- (1) more *roaming* foraging subsistence and less labor-intensive forms of *settled* agriculture,
- (2) *elected* rather than *inherited* or *appointed* local leaders,
- (3) *absent* instead of *present* slavery,
- (4) *weak* instead of *strong* kinship ties,
- (5) *less* instead of *more* clan segmentation,

¹⁴⁹ A. Alesina, P. Giuliano and N. Nunn, 2013, "The Origin of Gender Roles: Women and the Plough," *The Quarterly Journal of Economics* 128, 469-530.

¹⁵⁰ van Zanden et al. (op. cit., footnote 97).

¹⁵¹ Murdock and White, Murdock et al., Divale (op. cit., footnotes 137 and 138).

- (6) *nuclear* instead of *extended* families,
- (7) *neolocal* instead of *patrilocal* residence of family households,
- (8) *bilateral* instead of *unilateral* descent,
- (9) *exogamous* instead of *endogamous* marriages as well as
- (10) *monogamous* instead of *polygamous* marriages.

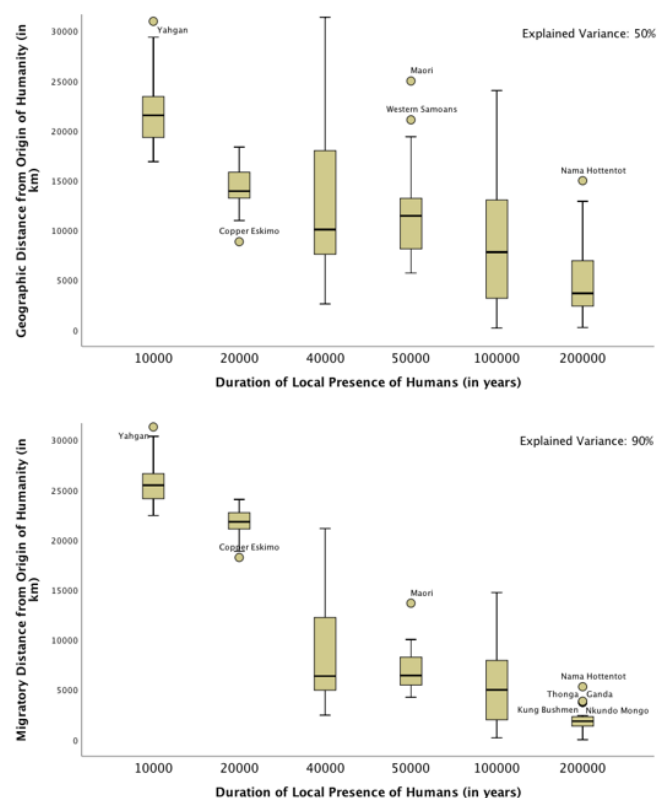
Populations on the patriarchal end of these ten dichotomies score on average at about 0.18 on the 0-to-1 CW-index. By contrast, populations on the emancipatory end of these dichotomies score at about 0.30. The difference in the CW-Condition over these patriarchal-vs-emancipatory polarities is statistically significant in each instance. It varies in magnitude between $r = .20$ and $.41$, with the number of observed populations ranging from roughly 1,000 to 1,200. At any rate, the evidence from historic tribal populations confirms that the CW-Condition tilts the patriarchal-vs-emancipatory polarity in pre-industrial family, fertility and sex norms towards the emancipatory end, which pinpoints the emancipatory seed inherent in the CW-Condition.

S9.4.9 ADDENDUM

SOM-Figure S9.4.9-1.

Duration of Human
Local Presence and
the Location's
Distance from the
Origin of Humanity

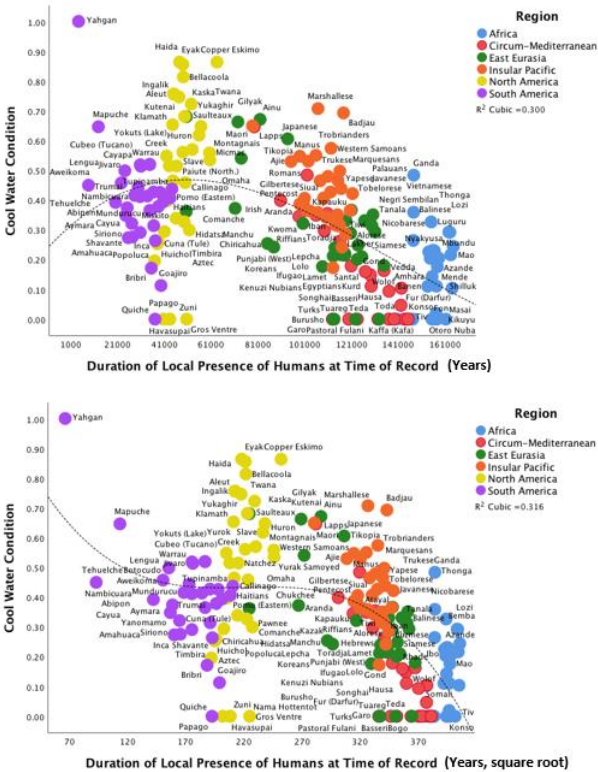
Interpretation: Places' migratory distance from the human origin in East Africa (lower diagram) map more tightly on Oppenheimer's crude human arrival estimates (measured in 10,000s of years) than is true for places' geographic air distance (upper diagram).



SOM-Figure S9.4.9-2.

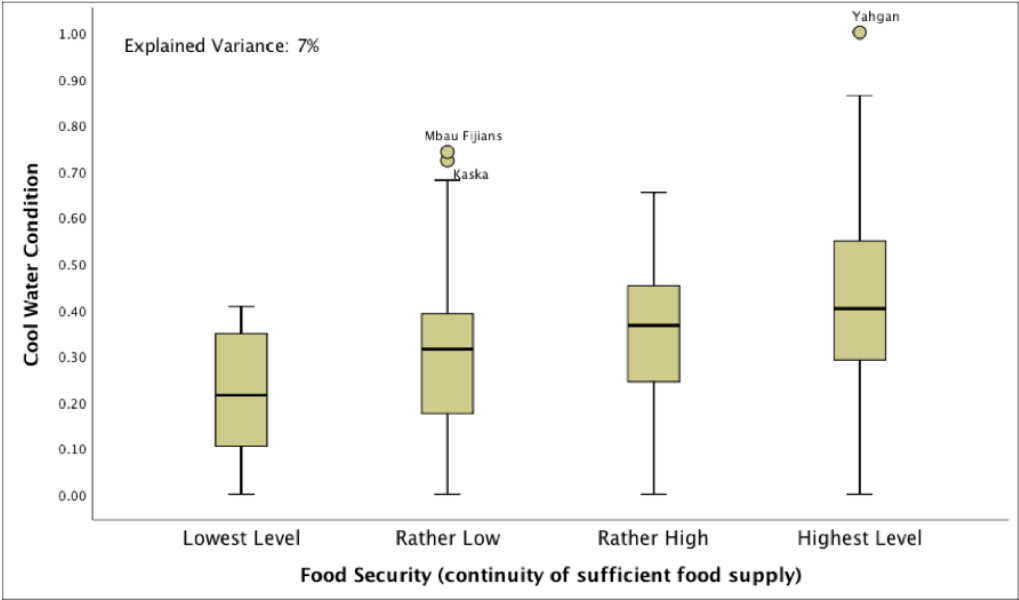
The CW-Condition and the Duration of Humans' Local Presence

Interpretation: Reading the evidence from right to left (in both diagrams), the human conquest of planet Earth generally led from weaker to stronger CW-Conditions, implying later human arrivals in habitats with stronger CW-Conditions. The human conquest of the Americas deviates from this pattern because the North-to-South advancement of the human population led first to weaker and then, again, to stronger CW-Conditions—hence, the quadratic relationship (upper diagram), which turns cubic (lower diagram) after taking the square root of the estimated years of local human presence.



SOM-Figure S9.4.9-3.

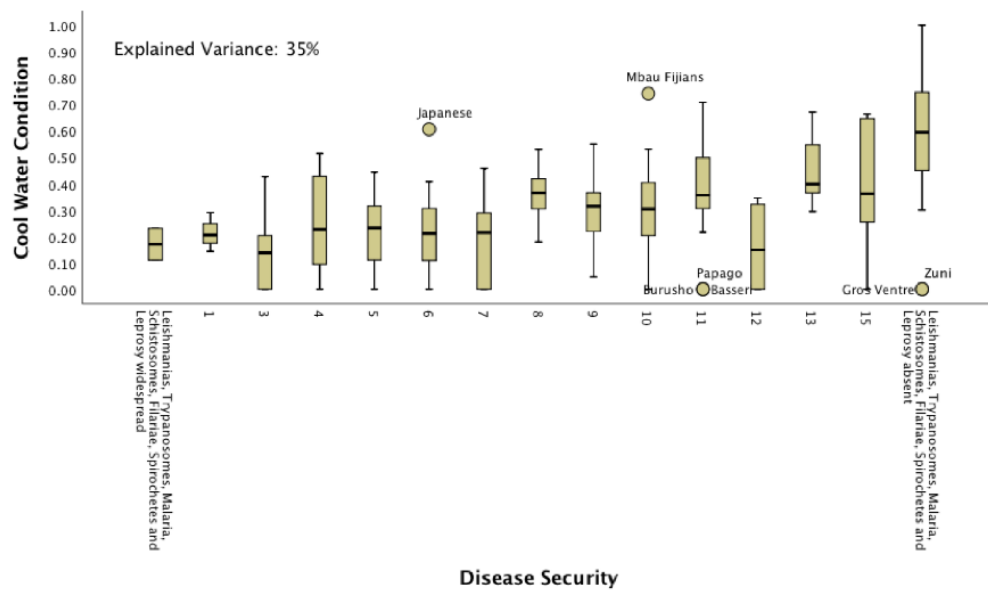
The CW-Condition and Food Security



Interpretation: A stronger CW-Condition associates slightly but significantly with greater security in the continuity of food supply.

SOM-Figure S9.4.9-4.

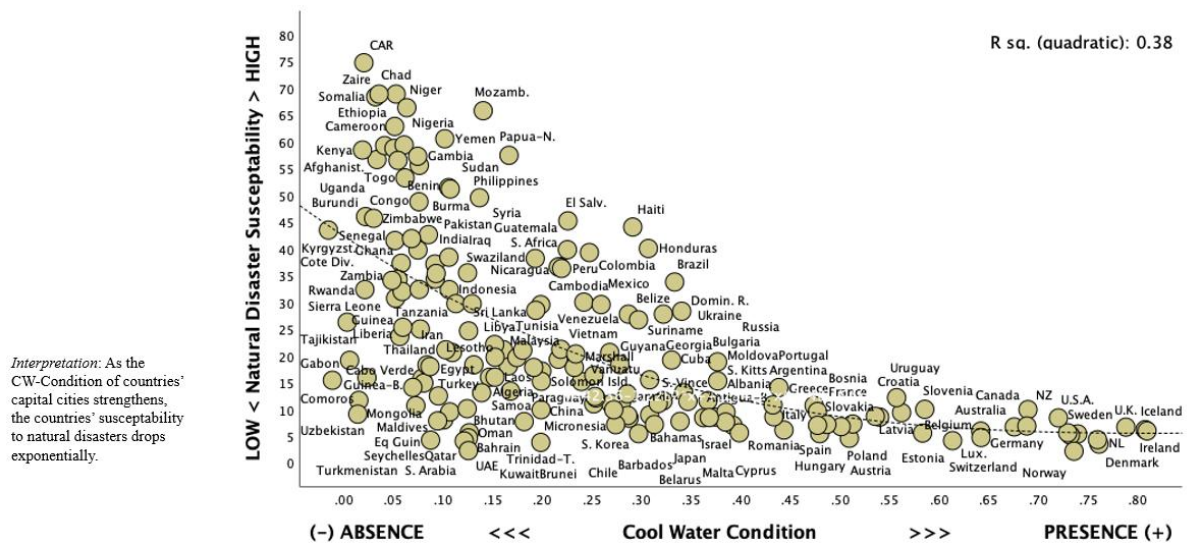
The CW-Condition and Disease Security



Interpretation: Clothing, shelter and the mastery of fire provided, a stronger CW-Condition associates considerably and significantly with greater safety from diseases.

SOM-Figure S9.4.9-5.

The CW-Condition and Natural Disaster Risk

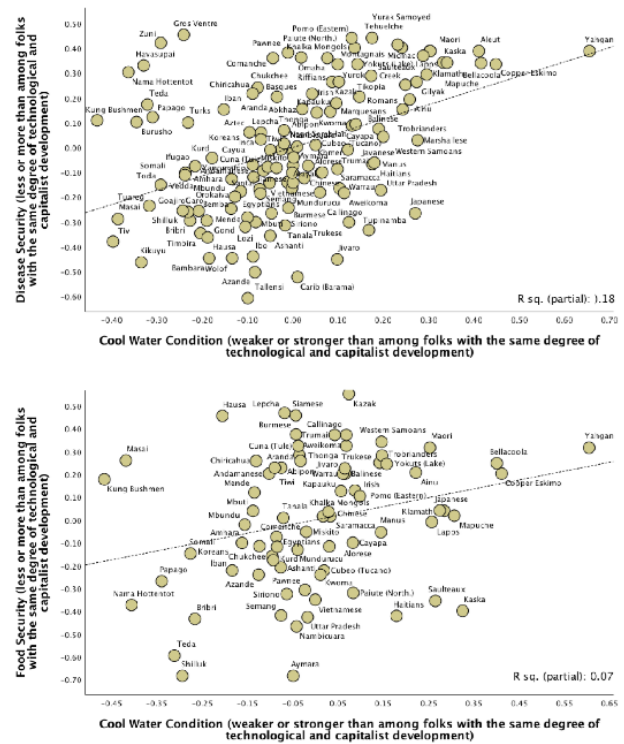


Source: World Risk Report (2022). Disasters considered include earthquakes, tsunamis, cyclones, floodings and droughts (www.weltrisikobericht.de)

SOM-Figure S9.4.9-6.

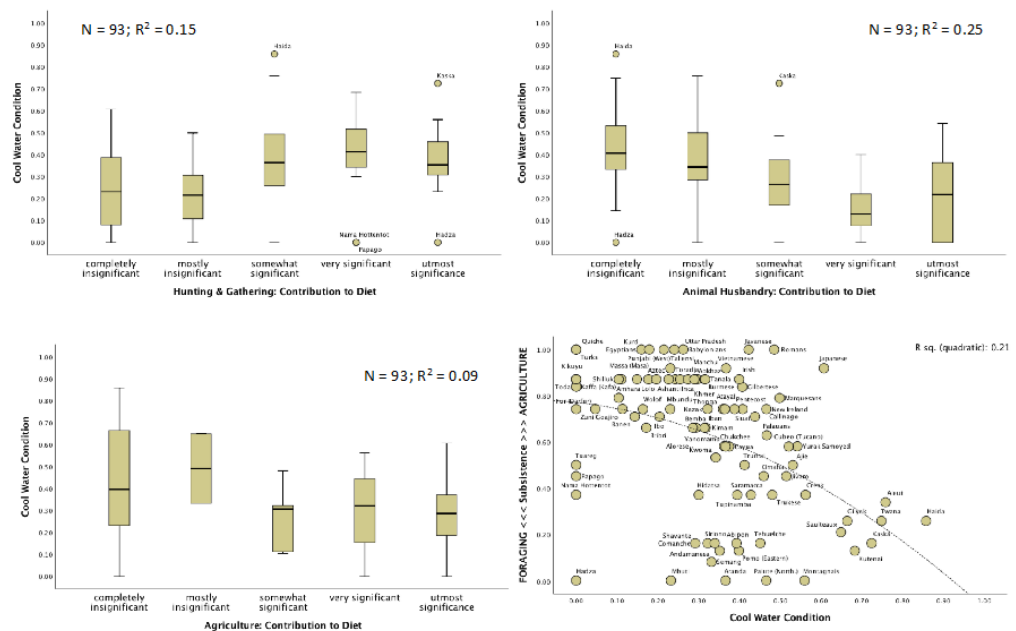
The CW-Condition,
Food Security and
Disease Security on
Similar Levels of
Commercial-
Technological
Development

Interpretation: The tendency of habitats' CW-condition to harbor greater food and disease security persists, even holding constant the same habitats' technological-commercial development.



SOM-Figure S9.4.9-7.

The CW-Condition and Subsistence Modes

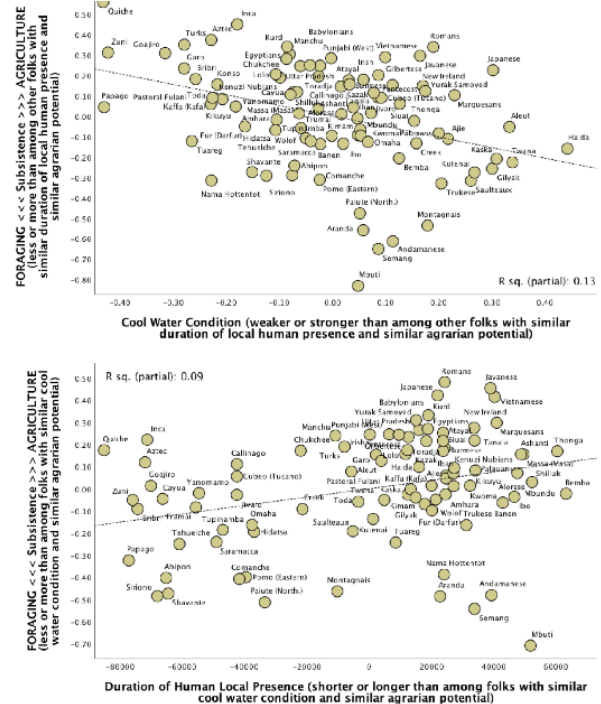


Interpretation: Habitats' CW-condition associates significantly with a stronger existential reliance on foraging at the expense of agriculture.

SOM-Figure S9.4.9-8.

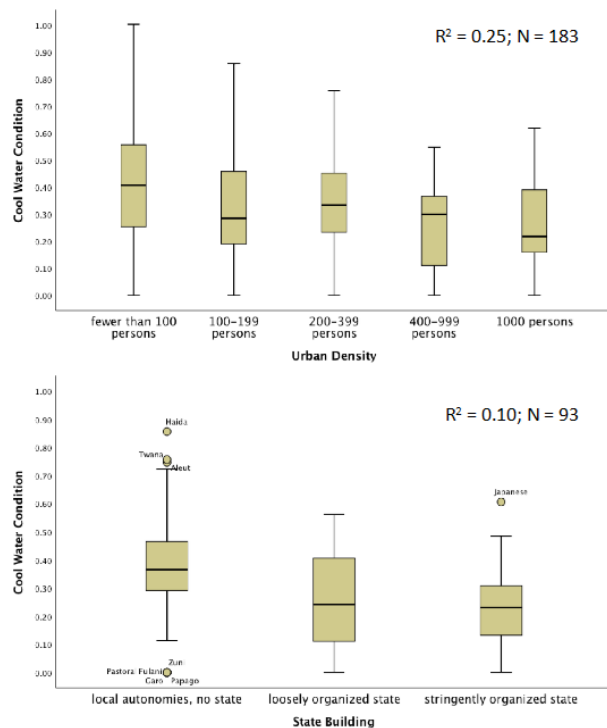
The CW-Condition,
the Duration of Local
Human Presence
and Economic
Subsistence
Modes

Interpretation: Under mutual control, the duration of humans' local presence strengthens (lower diagram), while the CW-condition weakens (upper diagram) a population's tendency to adopt agriculture. Hence, the CW-Condition's tendency to preserve the reliance on foraging and to resist the adoption of agriculture is partly, yet not entirely, due to the CW-areas' later reception of human populations. There is something in the CW-areas' endemic mix of environmental challenges and opportunities in and by itself that hinders an early-quick adoption of agriculture.



SOM-Figure S9.4.9-9.

The CW-Condition,
Urban Density and
State Formation

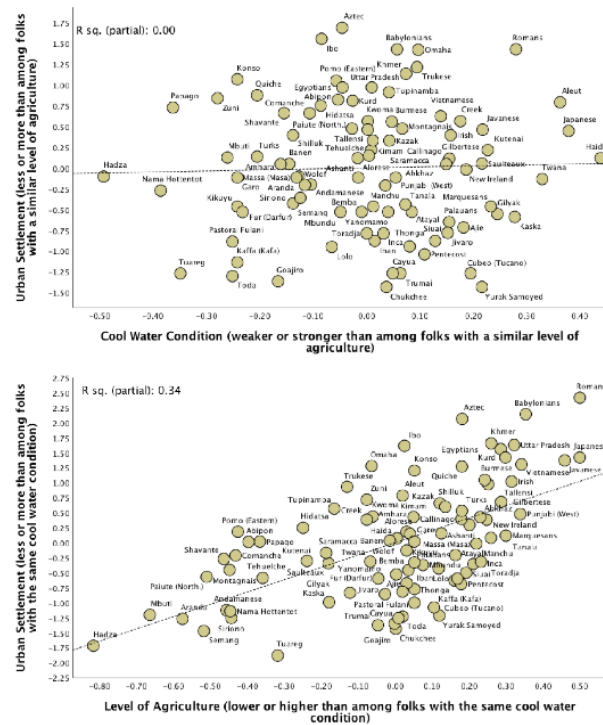


Interpretation: Habitats' CW-condition associates with a weaker tendency to propel urban density and state organization.

SOM-Figure S9.4.9-10.

Urban Settlement,
the CW-Condition
and the Level
of Agriculture

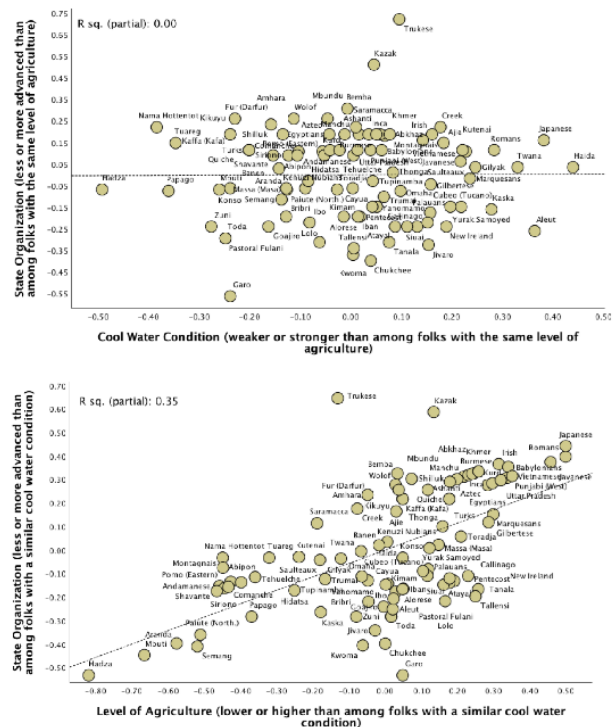
Interpretation: Under mutual control, the intensity of agriculture strenghtens (lower diagram) a population's tendency to propel dense urban settlement, while the CW-condition (upper diagram) has no effect, independent of its tendency to delay the adoption of intense agriculture.



SOM-Figure S9.4.9-11.

State Organization,
the CW-Condition
and the Level
of Agriculture

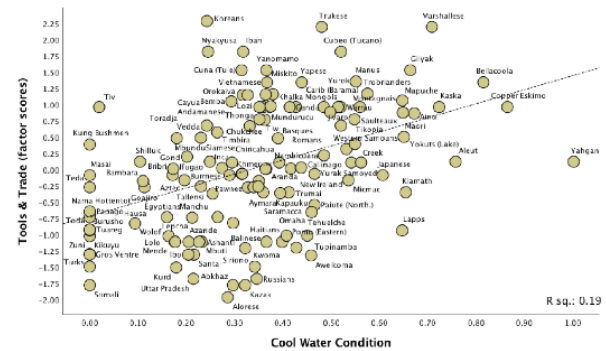
Interpretation: Under mutual control, the intensity of agriculture strenghtens (lower diagram) a population's tendency to propel State organization, while the CW-condition (upper diagram) has no effect independent of its tendency to delay the adoption of intense agriculture.



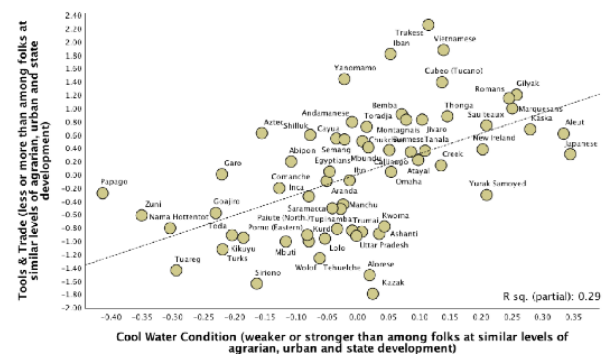
SOM-Figure S9.4.9-12.

The CW-Condition
and Comm-Tech
Development

Before Controls

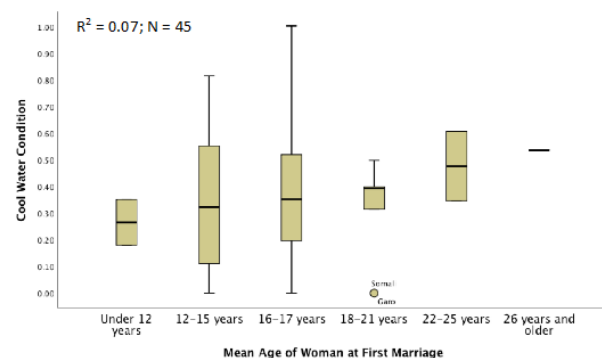
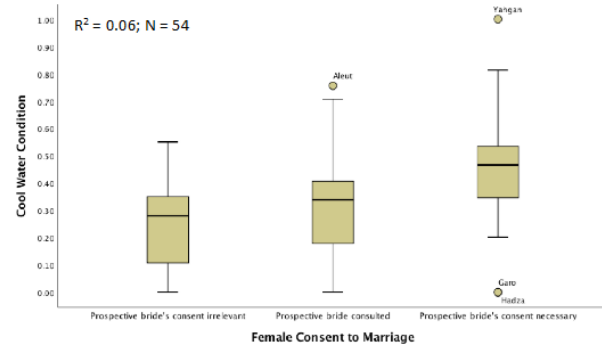


After Controls



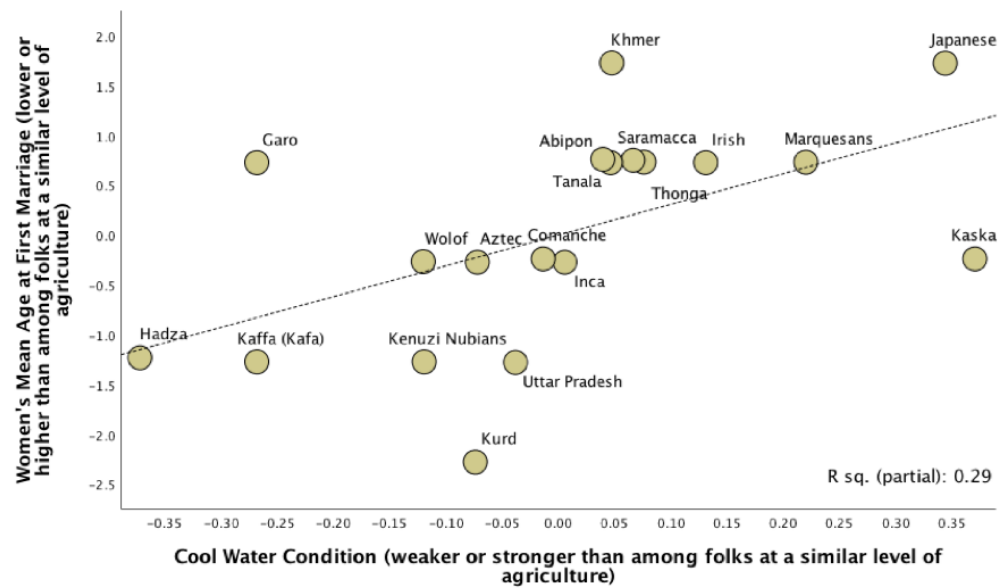
Interpretation: Habitats' CW-condition favors commercial-technological development (upper diagram), while this tendency surfaces even stronger among populations on the same level of agricultural intensity (lower diagram).

SOM-Figure S9.4.9-13.

The CW-Condition
and Marriage Patterns

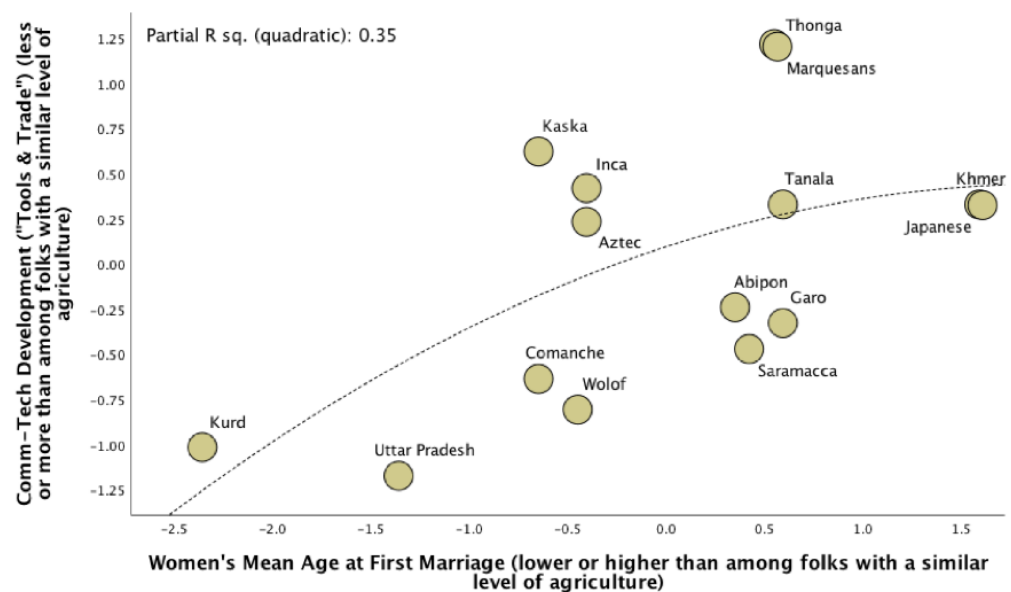
Interpretation: Habitats' CW-condition associates visibly with a tendency to insist on female consent at marriage (upper diagram) and to favor higher female marriage ages (lower diagram).

SOM-Figure S9.4.9-14. The CW-Condition and Female Marriage Ages



Interpretation: Controlling for habitats' agrarian intensity, a stronger CW-condition favors higher female marriage ages.

SOM-Figure S9.4.9-15. Female Marriage Ages and Comm-Tech Development



Interpretation: Controlling for habitats' agrarian intensity, higher female marriage ages favor commercial-technological development.

S10 Cool Water (CW) vs. Western Church (WC)

The most categorical alternative to the CW-Theory is the Western Church (WC-) thesis by Schulz, Henrich and their co-authors.¹⁵² The WC-thesis posits that the Medieval marriage policy of the Catholic church, especially a ban on cousin marriage, is responsible for Western societies' rather kinship-detached, individualistic-egalitarian form of pro-sociality and other emancipatory features of Western societies that Schulz et al. summarize under the term "WEIRD" (*W*estern, *E*ducated, *I*ndividualistic, *R*ich, *D*emocratic).

From the viewpoint of the WC-thesis, it should be noted that the most favored outcome variable of the CW-Theory to indicate human progress captures in a most comprehensive manner all the features that the term WEIRD addresses. Indeed, our Human Empowerment Index (HEI), which SOM-Section S3 describes in detail, includes each of the WEIRD aspects.

First, the *material* component of the HEI (i.e., "action resources") includes measures of education (*E*ducated) and prosperity (*R*ich); second, the HEI's *psychological* element (i.e., "emancipative values") covers an orientation towards egalitarian individualism (*I*ndividualistic); third the *institutional* ingredient of the HEI ("civic entitlements") focuses on democracy's key facets (*D*emocratic). Finally, our analyses reveal that societies' progression in human empowerment started its incipient ascension (prepared by Enlightenment philosophy) in Western (*W*est) countries and continues to stick out as a signature feature of Western culture, although human empowerment is spreading out from its once Western origin into all corners of the world—not the least because its emancipatory inspiration is of natural appeal to all human beings who have discovered their capacity to think for themselves through education.

Against this backdrop, our models to explain the world's historic and contemporary differentiation in terms of human empowerment actually provide a full-scale explanation of the West's WEIRD-ness.

Furthermore, in explaining precisely this WEIRD-ness, the CW-Theory is in a fundamental sense epistemologically deeper than the WC-thesis. This is true because only the CW-Theory pinpoints the *first difference* from which derivative ideological and institutional differences, including the Western Church's marriage doctrine, emerged subsequently. In our analyses, the first difference principle surfaced powerfully in striking evidence showing that the documented impact of all remote drivers of societal development championed in the "deep roots" literature¹⁵³ basically dissolved—once we include the CW-Condition in our models (see especially Chapter 8 of the book manuscript). This result explicitly includes the impact of societies' Western Church exposure, as advocated so prominently by Schulz et al. as the key explanation of Western exceptionalism.

Given the theoretical weight of our insights, it is important to corroborate their empirical validity. In the book manuscript and in large parts of this SOM we do so in the framework of

¹⁵² Schulz et al. (op. cit., footnote 17).

¹⁵³ SOM-Section S14 lists some key pieces in this literature.

all the variables that loom prominently in our emancipatory theory of human progress. In this section, by contrast, we leave the theoretical framework of our own variable creations and instead dive into Schulz et al.'s variable framework, just to replicate their study design with one single modification: inclusion of the CW-Condition (henceforth: CWC) among the set of explanatory variables. To anticipate the consistent outcome of this encompassing replication, the inclusion of the CW-Condition not only (*a*) considerably elevates the explanatory power of Schulz et al.'s original models, it also always turns out (*b*) as a more powerful predictor of emancipatory outcomes than the WC-Exposure (henceforth: WCE) and (*c*) usually renders the impact of the WCE insignificant.

To avoid misunderstandings, these findings do not altogether invalidate the WC-thesis. Instead, they correct its causal status by pinpointing its intermediate position as a derivative of prior circumstances in the causal chain from first differences to the developmental outcomes of today.

We proceed in two steps. In SOM-Section S10A we pursue a more condensed replication in that we focus on the two most encompassing intermediate/dependent variables in the Schulz et al. framework on the pathway from populations' WCE to emancipatory outcomes of today. SOM-Section S10B, by contrast, goes into greater detail by decomposing the more comprehensive variables into their constituents and by subjecting them one-by-one to the statistical horse race between the CWC and WCE.

S10A CW vs. WC - Part 1: The BIG Picture

As the main dependent variable alternative to the Human Empowerment Index, we use Schulz et al.'s "individualistic-impersonal pro-sociality psychology scale," which summarizes seventeen psychological and behavioral variables, showing populations' contemporary individualistic and egalitarian (i.e., emancipatory) pro-sociality, as opposed to familistic-patriarchal forms of pro-sociality. IIP includes indicators of individualism, creativity, analytical thinking, out-group trust as well as inverse indicators of tradition, conformity and nepotism. Schulz et al. explain the scale and its components in detail in their article and in the SOM. This section focuses on IIP because it is the most encompassing and, hence, most informative and conclusive outcome variable in the Schulz et al. framework, thus offering the most comprehensive contender of our otherwise preferred Human Empowerment Index.

We replicate Schulz et al.'s study on three domains of observation: (1) the countries of today's world, (2) individuals within European sub-national provinces, (3) pre-industrial local populations from around the globe. Information available to construct a meaningful measure of the CWC varies across the three domains of observation just mentioned. Accordingly, the CWC measure used varies in its exact construction recipe between the three domains. Yet, despite this variability in detail, the overall logic of how the CWC operates remains the same: Scores increase alongside cooler seasons (especially cooler summers) and more steady rain on higher base levels.

S10A.1 Measurements

CWC MEASURES

For the world's countries, we use the exact same CWC measure as that described in Chapter 3 of the book manuscript. This is our most sophisticated, information-richest and most theory-grounded construction of the CWC.

On the domain of individuals within sub-national European provinces, we operate with two different versions of the CWC.¹⁵⁴ The first version is simpler and combines the sub-national provinces' coastal proximities and absolute latitudes (averaging the two variables after a 0-to-1 normalization of both and taking the square root of coastal proximity to reduce skewness). This succinct construction allows us to operate with a maximum number of observations and to compare the effects of the CWC with those of the WCE for the same sample of individuals as that analyzed by Schulz et al. for a total of 440 sub-national provinces from 36 European

¹⁵⁴ Both indices correlate at $r = .70$ ($N = 185$, $p = .000$).

countries, all interviewed within the framework of the European Social Survey (ESS) over the period 2002-2016.

The second version of the CWC incorporates more precision but covers fewer observations: individual respondents within 185 sub-national provinces from 17 European countries interviewed by the ESS over the period 2010-2016. The second CWC measure relies on precipitation and temperature data over the period 1950-2017, as documented in Harris et al. as well as in Willmott and Matsuura (op. cit., footnote 171). The temporal auto-correlation among the annual measures amounts roughly to $r = .90$ for temperature and $r = .73$ for precipitation. Based on this information, the second CWC version incorporates three components, including *Extremity Minimized Cool Temperatures* (EACT), the *Minimum-to-Maximum Rain Ratio* (MMRR) and *Surface Water Abundance* (SWA). To create and combine these components, we proceed in the following eight steps.

First, to calculate EMCT we average provinces' annual mean temperatures and their annual temperature lows, indicating higher temperatures overall as both figures are up. *Second*, we invert this measure so that higher scores indicate cooler temperatures. *Third*, we calculate the difference between the provinces' annual temperature highs and lows to capture thermal extremity. *Fourth*, we regress thermal extremity on cool temperatures (after having normalized both measures into a 0-to-1 scale range). *Fifth*, we save the unexplained residuals of this regression (indicating "excess" thermal extremity) and subtract these residuals from cool temperature, which leads us to extremity minimized cool temperature (EMCT). *Sixth*, we calculate each province's minimum-to-maximum rain ratio (MMRR), dividing the yearly minimum by the yearly maximum rainfall (here no additional 0-to-1 normalization is necessary because fractions are automatically bound in this scale range). *Seventh*, we use Eurostat data on estimated water coverage from 2015 (we assume this to be a constant) to estimate surface water coverage (SWA) as a province's coverage with lakes and rivers as a share of its entire surface area (since this is also a fraction, no 0-to-1 normalization is needed). *Eighth*, we average each province's EMCT, MMRR and SWA to arrive at our final CWC measure.

Besides, SWA as measured here naturally correlates with the length of navigable waterways, which—accordingly—does not affect results when used instead of the SWA measure. Moreover, applying a factorial indicator summarization of EMCT, MMRR and SWA (i.e., weighted average), a simple multiplicative component combination of the three or the geometric mean (cubic root of the three components' product) leads to qualitatively similar results. Since these indicator combinations are more complicated and involve more assumptions, albeit without showing better results, we stick to the more intuitive additive indicator combination.

Finally, even though our CWC measure correlates negatively and significantly ($r = -.79$) with van de Vliert's (op. cit., footnote 17) indicator of "thermal stress" (and especially with the "summer heat stress" component), the CWC outperforms van de Vliert's thermal stress in terms of predictive power on all domains of relevance in the CWC-vs-WCE test setting.

Moving to pre-industrial local communities, we rely on the Ethnographic Atlas (op. cit., footnotes 137-138), which provides information on cultural traits—including kinship, marriage, subsistence economy, religion, and the division of labor—for 1,291 (mostly) pre-industrial local communities. We accessed this information via the Database of Places, Language, Culture and Environment (D-PLACE) which collects information on the geography, language,

culture, and environment of over 1,400 human populations (op. cit., footnote 173). The time period to which the cultural data refer ranges from before 1800 (for 3%), the 19th century (25%), between 1900 and 1950 (69%), and after 1950 (2%). The geographic coverage of the Ethnographic Atlas is global, while populations from North America and Africa are over-sampled.

With the Ethnographic Atlas, we lack some of the information to construct the CWC as nuanced as we do for the world's countries and Europe's sub-national provinces. Still, the logic remains the same: the CWC grows more pronounced alongside cooler seasons (especially summers) and more continuous rain. At any rate, to measure the CWC we use geocoded information from the Ethnographic Atlas in combination with the ecoClimate database (op. cit., footnote 174). In particular, to obtain a measure of *cool seasons* we calculate for each local community the inverse average temperature and adjust it for the location's yearly temperature variation (standard deviation). Both measures are square root-transformed before to reduce skewness. To capture *steady rainfall*, we use overall annual level of rain and downgrade for seasonal variation in rain precipitation (standard deviation). And to cover coastal proximity, we use locations' inverted distance to the nearest coastline in kilometers (normalized into a 0-to-1 scale range). To create the overall CW-index we multiply the three components (cool seasons, steady rain, coastal proximity) and take the cubic root of the product (thus, arriving at the geometric mean).

EXPLANATORY VARIABLES

The key explanatory variables in the Schulz et al. framework include the WCE and Eastern Church Exposure (ECE) as well as kinship intensity and cousin marriage. We refer to kinship intensity and cousin marriage as measures of historic patriarchy because both phenomena reach back in time before the Industrial Revolution and go closely together with strict inner-familial hierarchies in terms of strong masculinity- and seniority-based primacies.¹⁵⁵

The WCE and ECE measure how long the ancestors of modern-day populations were exposed to the influence of the Western (Catholic) and Eastern (Orthodox) Church in terms of marriage and family norms until 1500 CE (the Church's obsession with incest taboos was stricter in this time and became less strict after 1500 CE). Schulz et al. measure the variables in three steps. First, they determine the starting point of each country's exposure to the Western and Eastern Church's influence with regard to marriage and family norms. Second, they calculate the years up until 1500 CE during which a Christian ruler governed the respective countries. Finally, the authors "ancestry-adjust" the measure to account for population movements post-1500 CE.

¹⁵⁵ This is also indicated by a significant positive correlation with the "historic patriarchy index" developed by Szołtysek et al. At the country level, the correlation between kinship intensity and historic patriarchy is $r = .54$ ($N = 23$, $p < .01$). M. Szołtysek, S. Klüsener, R. Poniat and S. Gruber, 2017, "The Patriarchy Index: A New Measure of Gender and Generational Inequalities in the Past." *Cross-Cultural Research* 51 (3): 228–62.

Besides, since the Protestant Reformation did not start before 1517 CE, Schulz et al.'s limitation of the WCE measure to the pre-1500 period means that the WCE does not cover any influence of the Protestant church specifically. It constitutes instead a measure of the Catholic church's influence only.

The "kinship intensity index" (KII) measures the tightness of blood bonds among family households, using five indicators: (1) cousin marriage preference, (2) polygamy, (3) co-residence of extended families, (4) lineage organization, and (5) community organization. To calculate this index, Schulz et al. rely on the data from the Ethnographic Atlas.

Schulz et al.'s cousin marriage measure is based on Bittles'¹⁵⁶ work and captures the prevalence of kin marriages up to and including second cousins in the 20th century. We also employ Enke's¹⁵⁷ index of kinship tightness, which combines two societal characteristics that reflect extended family networks in terms of marital residence with parents and the presence of localized clans.

CONTROL VARIABLES

As control variables for the country-level part of their study, Schulz et al. include the following set of measures:

- *Adherence to major religions*: fractions of the countries' population belonging in 2000 to the following denominations: Catholicism, Protestantism, Orthodox Christianity, other Christian denominations, Islam, Hinduism and Buddhism.
- *Absolute latitude*: country centroids of today.
- *Caloric suitability for oat*: country-territories' medium level rain-fed potential for agricultural outputs from oat, expressed in calories per hectare per year.
- *Caloric suitability for rye*: same as above for rye.
- *Genetic heterogeneity (ancestry-adjusted)*: genetic diversity of a country's population.
- *Irrigation potential*: the percentage of an area that would experience at least a doubling of yields, if irrigation were introduced.
- *Log GDP per capita*: Real Gross Domestic Product per capita in 2000 CE in international dollars (adjusted for purchasing power parity).
- *Distance to navigable waterways*: distance, in thousands of km, from a GIS grid cell to the nearest ice-free coastline or sea-navigable river, averaged across the grid cells of a country.
- *Parasite stress*: Presence of tropical diseases.
- *Population density in 1 CE*: number of inhabitants per square kilometre in the year 1 CE.
- *Terrain ruggedness*: country-territories' elevation differences.

¹⁵⁶ A.H. Bittles, 2001, "A Background Summary of Consanguineous Marriage," *Centre for Human Genetics* 10: WA6027. A.H. Bittles, 2003, "The Bases of Western Attitudes to Consanguineous Marriage," *Developmental Medicine & Child Neurology* 45 (2): 135–38. A.H. Bittles and M.L. Black. 2010. "Consanguinity, Human Evolution, and Complex Diseases." *Proceedings of the National Academy of Sciences* 107, 1779–1786.

¹⁵⁷ B. Enke, 2019, "Kinship, Cooperation, and the Evolution of Moral Systems," *The Quarterly Journal of Economics* 134 (2), 953–1019.

- *Timing of Neolithic Transformation* (ancestry- adjusted): number of years in thousands and hundreds since intensive agriculture has been introduced.
- *Tropical area*: percentage of the land surface area that falls in any of Köppen-Geiger tropical climate indicators.¹⁵⁸

In their province-level analyses for Europe, Schulz et al. use the following control variables:

- *Absolute latitude*: absolute latitude of regions' centroids.
- *Bishopric density*: average number of medieval bishoprics that existed between the year 500 CE and 1500 CE per km².
- *Caloric suitability for oat*: medium level rain-fed potential agricultural outputs of oat, expressed in calories per hectare per year.
- *Caloric suitability for rye*: same as above for rye.
- *Carolingian Empire*: territorial share of a region that fell within the borders of the Carolingian Empire in 814 AD.
- *Distance to the coast*: distance in kilometers of the centroid of a region from the nearest coast.
- *Elevation*: Average sea-level elevation of a region's terrain.
- *Irrigation potential*: percentage of an area that would have experienced at least a doubling of yields if irrigation were introduced.
- *Lakes or rivers*: Dummy variable indicating whether a river or lake is located within a region.
- *Monastic presence*: Indicator of monastic presence for each of five monastic orders: Cistercians, Cluniac, Dominicans, Franciscans and Premonstratensians.
- *Roman roads*: Added length of Roman roads within a region
- *Ruggedness*: Areas' differences in elevation.
- *Socialist history*: Dummy variable indicating whether a region has a socialist history.
- *Temperature*: average of the entire annual cycles of temperature for the period between 1901 and 2014.
- *Population density*: Population density (inhabitants per square kilometre) in 500 CE
- *Precipitation*: Entire annual cycles of precipitation constructed for the time period between 1901 and 2014 CE.
- *University exposure*: Medieval university exposure constructed analogously to regional medieval Church exposure.¹⁵⁹

¹⁵⁸ Schulz et al. (op. cit., footnote 17) rely on the following sources: Q. Ashraf and O. Galor, 2013, "The 'Out of Africa' Hypothesis: Human Genetic Diversity, and Comparative Economic Development," *American Economic Review* 103, 1–46. O. Galor and Ö. Özak, 2016, "The Agricultural Origins of Time Preference," *American Economic Review* 106, 3064–3103. Bentzen, Kaarsen and Wingender (op. cit., footnote 17). Gallup, Mellinger and Sachs (op. cit., footnote 17). N. Nunn and D. Puga, 2012, "Ruggedness: The Blessing of Bad Geography in Africa," *Review of Economics and Statistics* 94, 20–36, the latter being based on: S.J. Riley, S.D. DeGloria and R. Elliot, 1999, "A Terrain Ruggedness Index That Quantifies Topographic Heterogeneity," *Intermountain Journal of Sciences* 5: 23–27. M. McCormick, G. Huang, G. Zambotti and J. Lavash, 2013, "Roman Road Network (Version 2008)." *Harvard Dataverse*. W.R. Shepherd, 1911, *Historical Atlas*. New York: Henry Holt. M. Kottek, J. Grieser, C. Beck, B. Rudolf and F. Rubel, 2006, "World Map of the Köppen-Geiger Climate Classification Updated," *Meteorologische Zeitschrift* 15, 259–63. C. Fincher and R. Thornhill, 2012, "Parasite-Stress Promotes in-Group Assortative Sociality: The Cases of Strong Family Ties and Heightened Religiosity," *Behavioral and Brain Sciences* 35, 61–79.

¹⁵⁹ Apart from the works mentioned in the previous footnote, Schulz et al. (op. cit., footnote 17) rely on the following sources: Klein Goldewijk et al. (op. cit., footnote 17). I. Harris, P.D. Jones, T.J. Osborn and D.H.

OUTCOME VARIABLE

The main target of explanation by Schulz et al. is the “individualistic-impersonal pro-sociality” psychology scale (henceforth: IIP), which summarizes seventeen psychological and behavioral variables, showing populations’ contemporary individualistic and egalitarian (i.e., emancipatory) pro-sociality, as opposed to familistic-patriarchal forms of pro-sociality. The IIP includes indicators of individualism, creativity, analytical thinking, out-group trust as well as inverse indicators of tradition, conformity and nepotism. Schulz et al. explain the scale and its components in detail in their article and in the SOM.

S10A.2 The World’s Country Populations

SOM-Table S10A.2-1 reports descriptive statistics, while SOM-SOM-Table S10A.2-210A.2-2 reports the bivariate correlations of the CWC with the WCE, ECE, KII, cousin marriage and IIP. As is obvious, the CWC associates more tightly with IIP than do the KII, cousin marriage and the WCE. At the same time, the CWC correlates strongly with the WCE in a positive direction. To interpret these correlations, one needs to acknowledge that the CWC directly addresses a geo-climatic constellation that reaches much farther back in time¹⁶⁰ than the contemporary IIP as well as any of its supposed historic determinants, including the WCE, KII and cousin marriage. Therefore, the differential strength and direction of these correlations already suggests, and quite decisively so, that the CWC is the key selective force behind the emergence of the KII, cousin marriage and the WCE’s encouragement of these social cohesion features. At least, there is no logical possibility to interpret these correlations in such a manner that the CWC is in any sense an outcome, an artifact, or a confounded element of the other variables. So, if these correlations embody any element of true causality, temporal order dictates that the only possible direction runs from the CWC to the other variables.

In predicting the IIP, SOM-Table S10A.2-3 shows what happens when we include the CWC and the WCE simultaneously, while accounting for the same set of control variables used by Schulz et al. Evidently, the CWC-effect always trumps the WCE-effect and renders the latter insignificant most of the time. The CWC also predicts the IIP considerably better than do the KII and cousin marriage. Indeed, the latter two variables’ previously remarkable effects on the IIP turn either entirely insignificant or weakly significant and negligible in size once the CWC enters the equation.

Lister, 2014, “Updated High-Resolution Grids of Monthly Climatic Observations - the CRU TS3.10 Dataset,” *International Journal of Climatology* 34, 623–642.

¹⁶⁰ This statement is as certain as certainty can be: The temporal autocorrelation between the CWC-components amounts $r = +1.0$ (i.e., a perfect correlation) for its two geographic components (absolute latitude, coastal proximity) and at $r > .90$ (i.e., an almost perfect correlation) for its rainfall component. The latter holds true over the full time span within the same glacial cycle of our planet—hence, since the last 10,000 years (i.e., the end of the last ice age).

SOM-Table S10A.2-1. Descriptive Statistics (countries)

Variables	N	Mean	SD	Min	Max
Individualistic-Impersonal Pro-Sociality (IIP)	179	-.19	.67	-1.75	1.83
Western Church Exposure (WCE, in 100 y.)	161	1.53	2.56	0	9.75
Eastern Church Exposure (ECE, in 100 y.)	161	.3	1.12	0	7.61
Kinship intensity index (KII)	228	0	1	-1.56	1.63
Cousin marriage (%) (log)	74	1.54	1.78	-2.30	4.19
CW-Condition (CWC)	182	.25	.20	-.02	.81
Ruggedness (100 m.)	228	1.39	1.38	0	7.81
Caloric suitability	199	1,222	665	0	2743
Catholic, year 2000 (%)	188	.29	.33	0	.94
Protestant, year 2000 (%)	188	.14	.21	0	.90
Other Christian, year 2000 (%)	188	.08	.11	0	.63
Orthodox Christ., year 2000 (%)	188	.05	.16	0	.92
Muslims, year 2000 (%)	188	.23	.35	0	.99
Hindi, year 2000 (%)	188	.02	.09	0	.77
Buddhist, year 2000 (%)	188	.04	.14	0	.85
Combined Parasite-Stress	192	.26	2.79	-3.62	6.18
Tropical climate (%)	228	45	47	0	100
Irrigation potential (%)	199	.17	.3	0	1
Caloric suitability for Oat	199	1,971	2,768	0	7,674
Caloric suitability for Rye	199	3,105	4,418	0	12,497
Timing of Neolithic transition	157	5,436	2,111	1,357	10,400
Predicted genetic diversity	163	.73	.03	.63	.77
Religiousness	107	2.07	.65	.61	2.99

SOM-Table S10A.2-2. Bivariate Correlations with CWC (countries)

Variables	CWC	N
Western Church Exposure (WCE) (in 100 y.)	.80***	157
Eastern Church Exposure (ECE) (in 100 y.)	.17*	157
Cousin marriage (%) (log)	-.80***	72
Kinship intensity index (KII)	-.60***	180
Individualistic-Impersonal Pro-Sociality (IIP)	.68***	178

Notes: * $p < 0.1$, ** $p < .05$, *** $p < .01$.

Given the natural temporal order of the involved variables, SOM-Table S10A.2-4 regresses the WCE, ECE, KII and cousin marriage on the CWC, under the inclusion of the same controls as before. Specifically, SOM-Table S10A.2-4 introduces the CWC as a predictor of the KII, (panel 1), cousin marriage (panel 2), the WCE (panel 3) and the ECE (panel 4). The results reveal that the CWC exerts a significantly negative effect on both the KII and cousin marriage. Moreover, the CWC shows a significant and strongly positive effect on the WCE, while the CWC's effect on the ECE is considerably weaker and strongly negative in model 9 (with continent-fixed effects). The weakness and negativity of the CWC-effect on the ECE is an expression of the CW-Theory's discriminant validity: Since the CWC covers geo-climatic conditions mostly prevalent in Northwestern Europe, while the ECE is prevalent in Eastern and South-eastern Europe, the CWC should actually *not* provide a strongly positive prediction of the ECE—and it doesn't.

Further supporting this evidence, SOM-Fehler! Verweisquelle konnte nicht gefunden werden. shows that the CWC's strongly negative effect on the KII and cousin marriage

diminishes the magnitude and significance of both the WCE- and ECE-effects on these two indications of historic patriarchy. In fact, the ECE's effect on both historic patriarchy measures is rendered entirely insignificant (except for models 6 and 7). The same applies to the WCE, once we control for the countries' average religiousness, the share of religious people, or continent-fixed effects.

	Individualistic-Impersonal Pro-Sociality Psychology (IIP)										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1											
WCE	.03 [†] (.02)	.03 (.02)	.03 (.02)	.03 [†] (.02)	.03 (.02)	.02 (.02)	.07** (.02)	.01 (.02)	.04 (.03)		
ECE	-.05 (.03)	-.05 (.03)	-.07 [†] (.04)	-.04 (.03)	-.06 [†] (.04)	-.07 [†] (.04)	-.08 (.07)	-.08* (.04)	-.05 (.04)		
CWC	2.13*** (.27)	2.18*** (.27)	1.86*** (.33)	2.06*** (.30)	2.04*** (.30)	2.29*** (.27)	1.66*** (.30)	2.15*** (.34)	2.25*** (.38)		
N	146	146	146	146	146	146	146	90	146		
adj. R ²	.63	.63	.63	.63	.62	.63	.66	.75	.63		
Panel 2											
KII	-.00 (.05)	-.01 (.05)	-.01 (.05)	.00 (.05)	-.01 (.05)	-.07 (.06)	-.05 (.06)	-.10 [†] (.06)	-.07 (.06)	-.10 [†] (.06)	-.06 (.06)
CWC	2.34*** (.20)	2.34*** (.20)	2.22*** (.28)	2.30*** (.20)	2.32*** (.25)	2.27*** (.22)	2.18*** (.21)	1.86*** (.28)	2.51*** (.33)	1.31* (.65)	1.17 [†] (.62)
N	150	150	150	150	150	150	150	94	150	87	87
adj. R ²	.58	.58	.58	.58	.57	.58	.63	.68	.58	.08	.09
Panel 3											
Cousin marriage	-.00 (.04)	.02 (.05)	.02 (.05)	.05 (.05)	.02 (.05)	-.01 (.06)	.06 (.07)	.01 (.05)	-.03 (.06)	-.02 (.06)	.06 (.05)
CWC	2.57*** (.31)	2.71*** (.33)	2.49*** (.48)	2.72*** (.32)	2.68*** (.44)	2.51*** (.40)	2.50*** (.33)	2.35*** (.42)	2.89*** (.44)	3.40* (1.27)	3.00** (.83)
N	69	69	69	69	69	69	69	55	69	34	34
adj. R ²	.69	.70	.69	.71	.69	.70	.73	.77	.70	.18	.35
Baseline geographic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & genetic	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of IIP on the CWC, together with WCE and ECE (panel 1), kinship intensity (KII) (panel 2), and cousin marriage (panel 3). Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: KII									
WCE	-.08*	-.07 [†]	-.08*	-.08*	-.08*	-.12***	-.02	-.05	-.06
	(.04)	(.04)	(.04)	(.04)	(.04)	(.03)	(.03)	(.03)	(.04)
ECE	-.09	-.04	-.10	-.07	-.09 [†]	-.16**	.17**	-.02	-.01
	(.05)	(.06)	(.06)	(.06)	(.06)	(.06)	(.05)	(.06)	(.06)
CWC	-2.16***	-2.23***	-2.64***	-1.86***	-2.87***	-1.52***	-1.79***	-1.95***	-.79
	(.49)	(.45)	(.54)	(.49)	(.56)	(.44)	(.45)	(.53)	(.59)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.45	.47	.51	.49	.49	.67	.69	.45	.611
Panel 2: Log % cousin marriage									
WCE	-.21**	-.11	-.16*	-.17*	-.16*	-.19*	-.02	-.09	.05
	(.07)	(.08)	(.08)	(.08)	(.07)	(.07)	(.06)	(.08)	(.09)
ECE	-.34	.56	-.93	-.48	.51	-2.40	-2.00	.16	-.68
	(2.17)	(2.30)	(2.36)	(2.36)	(2.28)	(2.06)	(2.02)	(2.34)	(1.59)
CWC	-4.02***	-4.66***	-4.94***	-3.31**	-5.41***	-3.81***	-2.75**	-3.95***	-3.13**
	(.79)	(.87)	(1.07)	(1.05)	(.91)	(.78)	(.94)	(1.11)	(1.11)
N	69	69	69	69	69	69	69	55	69
adj. R ²	.66	.69	.73	.73	.75	.79	.82	.68	.76
Panel 3: Western Church Exposure (WCE)									
CWC	9.85***	9.85***	1.59***	9.94***	1.11***	9.90***	1.21***	1.81***	1.40***
	(.77)	(.78)	(1.06)	(.78)	(.94)	(.86)	(.84)	(1.43)	(1.19)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.65	.65	.64	.64	.65	.64	.77	.61	.65
Sample 4: Eastern Church Exposure (ECE)									
CWC	.92*	.80*	-.84*	1.02**	-.52	.47 [†]	.14	.47	-3.37***
	(.35)	(.31)	(.39)	(.36)	(.36)	(.26)	(.20)	(.93)	(.74)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.02	.07	.13	.08	.15	.15	.82	.09	.31
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—
Neolithic transitions and genetic heter.	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of kinship intensity (panel 1), cousin marriage preference (panel 2), Western Church Exposure (panel 3) and Eastern Church Exposure (panel 4) on the CW-Condition and Western Church Exposure (WCE) and Eastern Church Exposure (ECE). Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses.

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

S10A.3 Europe's Sub-national Populations

This section examines the effects of the CWC, the WCE and ECE for sub-national European provinces (ca. 200 NUTS-II regions à la Eurostat) based on representative population surveys. In these analyses, we expand the evidence by examining the CWC's effects on individual level Emancipative Values (EV, see SOM-Section S3) as the most encompassing measure for emancipatory outcomes.

We use multilevel models to take into account the nested structure of the data, with individuals being nested in sub-national European provinces. When individuals are nested in spatial units, ignoring the interdependency between individual- and aggregate-level characteristics yields inefficient estimations and biased standard errors, which may result in artificially significant effects.¹⁶¹ The intraclass correlation coefficient for our dependent variable EV amounts to a highly significant score of .28, indicating that multilevel modeling is indeed the appropriate method to analyze the data.¹⁶² Accordingly, we estimate random intercept models to predict individual-level EVs by both the personal characteristics of the respective individuals themselves (level 1) as well as the contextual characteristics of their sub-national province of residence (level 2). We also include dummies for the periods in which the respective surveys were fielded.

Our analysis relies on the European Values Study (EVS) and its measurement of EVs. Following Schulz et al., we use their same set of control variables at the province level. At the individual level, we control for respondents' religiosity and socio-economic characteristics, including education, income, employment status, and whether individuals live in rather urban or rural areas. SOM-Table S10.3-1 displays the descriptive statistics of our variables.

All regressions paint a consistent picture, as shown in SOM-Table S10A.3-2: Stronger provincial CWCs enhance respondents' EVs. Consistent with the CW-Theory, the CWC predicts the EVs considerably better than does the WCE—with or without controls, no matter which particular set of controls is included. As of note, this applies even to other geographic and climatic measures—in spite of the fact that the CWC is itself a geo-climatic variable. Evidently, the CWC's particular combination of geo-climatic features captures an extraordinarily impactful entity of elements. The latter conclusion is further supported by the simple but robust fact that the size of the CWC-effect towers over any other variable, including the WCE.

In numbers, the average effect size of the CWC (a coefficient of about .25) means that a province's CWC adds about a quarter of its given score to the constant of EVs of about .50. To be concrete, for most provinces in Scandinavian countries where the CWC-score is close to 1.0, we add a quarter of this score (i.e., .25) to the constant of the EV, which then enhances the province's mean EV-level from an overall European mean of .50 to a province-level mean of .75 (which is about the level of EVs typical for most provinces of Sweden and Denmark).

¹⁶¹ T.A.B. Snijders and R. J. Bosker, 2012, *Multilevel Analysis: An Introduction to Basic and Advanced Multilevel Modeling*. 2nd ed. Los Angeles: Sage.

¹⁶² J.J. Hox, 2010, *Multilevel Analysis: Techniques and Applications*. 2nd ed., New York: Routledge.

SOM-Table S10A.3-1. Descriptive Statistics: Sub-national European Regions (Sample I)

	<i>N</i>	Mean	<i>SD</i>	Min	Max
LEVEL 2 (Province-level characteristics)					
Precipitation (mm)	38,353	32	262	0	136
Temperature (degree Celsius)	38,353	-15	259	-5031	15
Presence of river or lake	38,382	.65	.45	.00	1.00
Distance to coast (km)	38,382	157	149	.34	614
Absolute latitude	38,382	50	6	28	69
Elevation (100m)	38,382	328	359	-.03	1,743
Ruggedness (100m)	38,382	1.19	1.40	.01	7.38
Caloric suitability	38,382	1,490	551	.00	2,697
Caloric suitability for rye (rain-fed)	38,382	9973	2,583	.00	1,277
Caloric suitability for oat (rain-fed)	38,382	6,309	1,486	65	7,644
Irrigation potential	38,382	.02	.10	.00	1.00
Length of roads (in km) per area (in km ²)	38,382	.02	.03	.00	.20
Socialist exposure	38,382	.25	.43	.00	1.00
Carolingian empire (% of region part of)	38,382	.40	.49	.00	1.00
Medieval Exposure to Premonstratensians monastic house	38,382	.43	.38	.00	1.00
Medieval Exposure to Franciscan monastic house	38,382	.69	.37	.00	1.00
Medieval Exposure to Dominican monastic house	38,382	.69	.33	.00	1.00
Medieval Exposure to Cluny monastic house	38,382	.11	.26	.00	1.00
Medieval Exposure to Cistercians monastic house	38,382	.59	.36	.00	1.00
Medieval University exposure	38,382	.63	.93	.00	4.50
Medieval bishopric density	38,382	.00	.00	.00	0.00
Population density 500 AD	38,382	1,399	1,904	7.52	13,471
Western Church exposure	38,382	5.76	3.42	.00	10.00
CW-Condition	38,382	.55	.16	.25	.92
LEVEL 1 (Individual-level characteristics)					
Age	38,382	50	18	16	100
Age squared	38,382	2,843	1,828	256	10,000
Female	38,382	.55	.50	.00	1.00
Education	37,991	.61	.28	.00	1.00
Income	38,382	.43	.32	.00	1.00
Unemployed	38,108	.05	.21	.00	1.00
Religiousness	37,197	.75	.33	.00	1.00
City size (urban vs. rural)	33,261	.40	.32	.00	1.00

		Emancipative Values (EVs)									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	.01*** (.00)	.01*** (.00)	.01*** (.00)	.01*** (.00)	.00** (.00)	.00** (.00)	.01*** (.00)	.01*** (.00)	.01*** (.00)	.01*** (.00)
	CWC	.36*** (.03)	.24*** (.04)	.23*** (.05)	.24*** (.04)	.24*** (.04)	.14*** (.04)	.30*** (.04)	.24*** (.04)	.24*** (.04)	.24*** (.04)
LEVEL 1	Age	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)	.00*** (.00)
	Age squared	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)	-.00*** (.00)
	Female	.03*** (.02)	.03*** (.00)	.03*** (.00)	.03*** (.00)	.03*** (.00)	.03*** (.00)	.03*** (.00)	.04*** (.00)	.03*** (.00)	.03*** (.00)
	Constant	.46*** (.02)	.47*** (.01)	.51*** (.02)	.47*** (.02)	.47*** (.02)	.43*** (.02)	.47*** (.02)	.45*** (.02)	.50*** (.02)	.48*** (.02)
	Individuals	37,448	37,448	37,419	37,448	37,448	37,448	37,448	36,357	36,915	32,563
	Regions	198	198	197	198	198	198	198	198	198	182
	chi2	5297	5083	4456	4892	4608	3147	3931	5201	5410	4213
	Variance RI	.00445	.00383	.00357	.00379	.00356	.00305	.00327	.00385	.00388	.00374
	Variance residual	.0230	.0230	.0229	.0230	.0230	.0230	.0230	.0218	.0213	.0227
	R ² SB_L1	.21	.23	.24	.23	.24	.25	.24	.26	.27	.25
	R ² SB_L2	.54	.60	.62	.60	.63	.67	.65	.60	.60	.62
CONTROLS											
LEVEL 2	Ruggedness	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
LEVEL 1	Monastic presence	—	—	—	—	—	—	yes	—	—	—
	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, empl	—	—	—	—	—	—	—	—	yes	—
	City size & pop. density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include precipitation, temperature, presence of rivers, elevation, irrigation potential as well as caloric suitability for rye and oat. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscan, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .10$, ** $p < .05$, *** $p < .01$.

S10A.4 Pre-industrial Local Populations Around the Globe

Due to the CW-Theory, the specific geo-climatic features of the CWC bestow on nuclear households vital existential autonomies in water access and labor organization that diminish individuals' dependence on the support of extended kinship circles. These local autonomies favor patterns of family formation based on neolocal residence, consensual marriage and weaker patriarchal norms. The CW-Theory further predicts that the structure of nuclear families in CW-areas fosters the emergence of a less hierarchical, less monocentral state order characterized by a plurality of power centers and contractual arrangements, which then favor the individualistic-egalitarian pro-sociality of today. In line with these propositions, we first demonstrate that among local communities of the pre-industrial era, the nuclear type of family is most prevalent in areas with a pronounced CWC and that the CWC is associated with lower kinship intensity. We further show that pre-industrial ethnicities in CW-areas are more likely to choose local leaders by formal or informal consent rather than hereditary appointment. Pre-industrial communities in CW-areas also are less likely to rely on slavery, thus avoiding repressive labor regimes.

To establish these points, we use data from the Ethnographic Atlas (EA)¹⁶³ for some 1,230 pre-industrial local communities from around the world. To distinguish between nuclear families and extended family systems, we follow Enke¹⁶⁴ and generate two binary variables that measure the absence of extended family networks in pre-industrial populations.¹⁶⁵ Both dummy variables are correlated with the CWC. Moreover, averaging both into a composite index yields a significantly negative (rank) correlation ($r = -.26$) between the presence of extended family networks and clan communities with the CWC. In other words, the nuclear family type is more prevalent in areas with a pronounced CWC (SOM-Figure S10A.4-1).

Furthermore, to capture the dependence on kinship ties, we use again the Kinship Intensity Index (KII) suggested by Schulz et al.. The KII used for pre-industrial communities captures the level of kinship organization of households and summarizes information about (cousin) marriage preferences and community marriage organization, polygamy, co-residence of extended families, and lineage organization. The relationship between the CWC and the KII reveals a significantly negative correlation ($r = -.33$) (SOM-SOM-Figure S10A.4-2.). This negative correlation implies that pre-industrial populations in CW-areas depend less on intensive kinship ties.

This negative effect is robust, accounting for communities' population size, settlement patterns, their extent of foraging versus reliance on agriculture, as well as the use of plow agriculture and dairy farming (SOM-SOM-Table S10A.4-).¹⁶⁶ Yet, our theory further predicts that the

¹⁶³ Murdock and White, Mudock et al., Divale (op. cit., footnotes 137 and 138).

¹⁶⁴ Enke (op. cit., footnote 157).

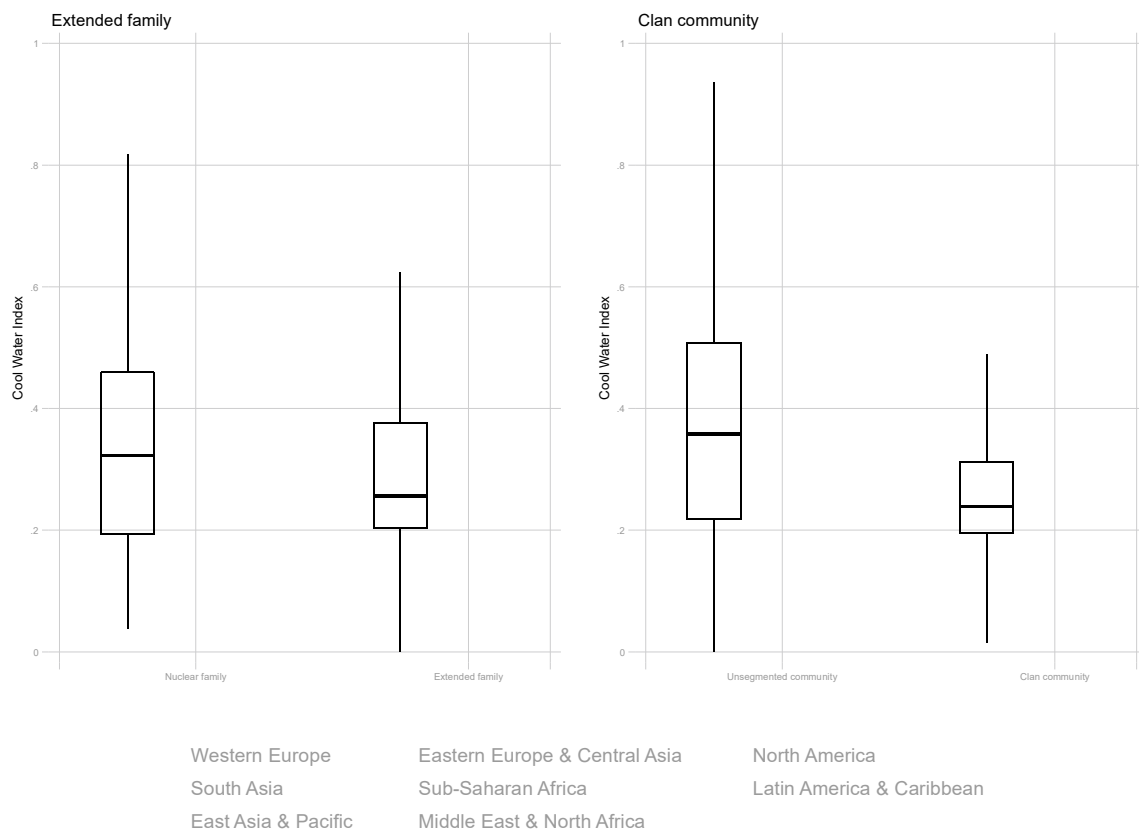
¹⁶⁵ Following Enke (ibid.), the first variable ("extended family") equals 0 if the domestic organization is around independent nuclear families and 1 otherwise. The second variable ("clan community") is coded 1 if people are part of localized clans that live as segmented communities and 0 otherwise. We average both variables to generate the Extended Family Networks (EFN) index.

¹⁶⁶ We measure "foraging" as the average of three 10-point scales that measure populations' reliance on hunting, gathering and fishing. "Dairy cattle" is a binary variable indicating whether or not domestic animals are

kind of agriculture most suitable under the CWC—i.e., wheat, rye, and barley cultivation, plus cattle herding—allows households to work large stretches of land autonomously—thus, lowering the demands for labor and kinship support. Hence, the emergence of agriculture in areas with a pronounced CWC did not increase extended kinship dependence.

By contrast, in the absence of cool seasons and steady rain, intensive forms of agriculture actually do increase local communities' dependence on support from extended kinship circles, as indicated by the negative sloping line in SOM-Figure S10A.4-2. In particular, the significant interaction between local communities' CWC and their agricultural intensity reported in SOM-SOM-Table S10A.4-S10A.4-2 demonstrates that, with the emergence and intensification of agriculture, the CWC fosters the formation of nuclear families and lowers their dependence on support from extended kinship circles. Put differently, while reliance on agriculture usually strengthens kinship ties, in interaction with the CWC it does the exact opposite, which should strike us as conclusive evidence that the CWC saved areas from the otherwise well-documented patriarchal implications of intensive agriculture. The marginal effects plot in SOM-Figure S10A.4-3 visualizes this striking evidence.

SOM-Figure S10A.4-1. The CW-Condition and Kinship Intensity

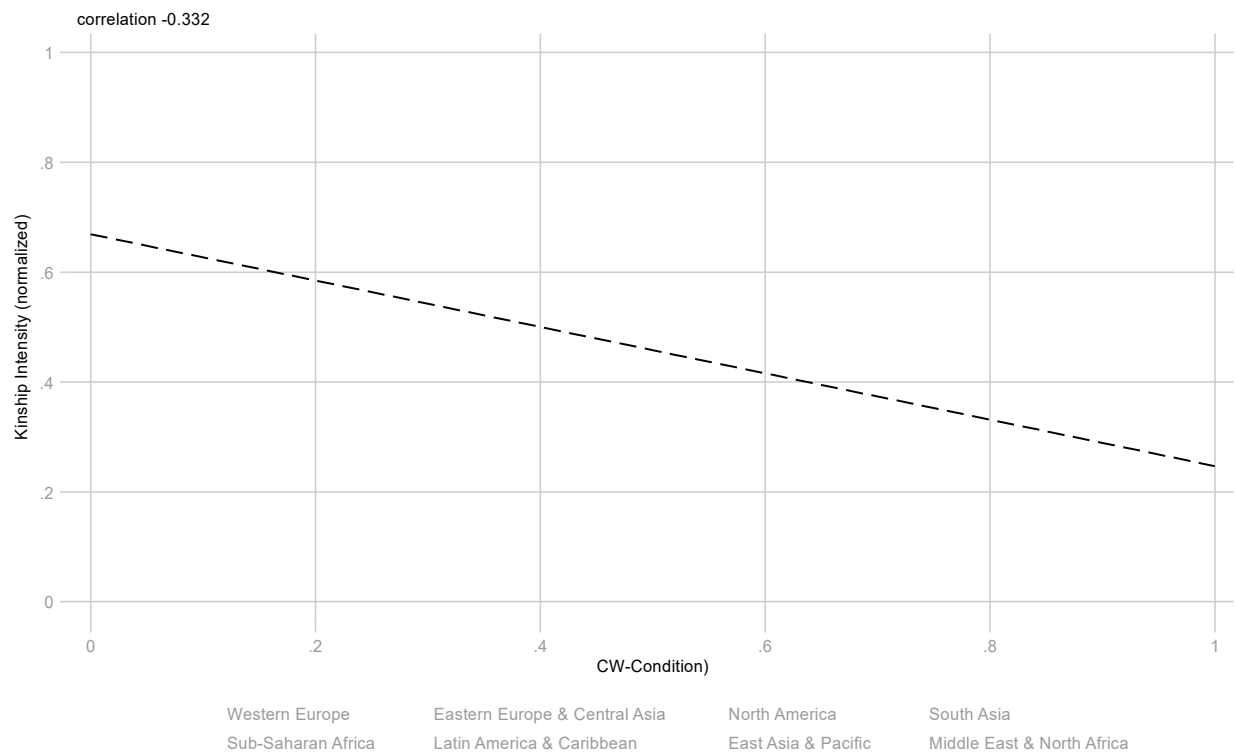


Source: Ethnographic Atlas (1850-1965).

milked. "Settlement" is measured on an ordinal scale ranging from nomadic to complex/permanent settlement. Population size associates significantly with greater kinship intensity, while foraging and plow usage associate with lower kinship intensity.

Against this backdrop, we argue that the emerging social order in CW-areas is less hierarchical, more pluralistic, and relies more on contractual arrangements rather than kinship ties compared to agrarian societies that depend on collectively coordinated irrigation. Thus, the particular geo-climatic condition under which Western civilization evolved shaped not only family formation but also the organization of work and political succession in a fashion that channeled the state-building process towards a contractual order, power-sharing arrangements, and self-organization.

SOM-Figure S10A.4-2. The Relationship between the CW-Condition and Kinship Intensity



SOM-Table S10A.4-1. The Effects of the CW-Condition on Kinship Intensity

	Kinship Intensity Index						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
CWC	-1.61*** (.24)	-1.55*** (.25)	-1.45*** (.26)	-1.47*** (.26)	-1.10*** (.27)	-1.46*** (.26)	-1.51*** (.26)
Agricultural dependence		.11 (.14)		-.31 (.21)	.28+ (.15)	.13 (.15)	-.08 (.20)
Foraging			-.28† (.15)	-.54* (.23)			
Plow use					-.50*** (.12)		
Dairy cattle						-.04 (.09)	
Settlement							.23 (.16)
Population (log-scale)	.09*** (.01)	.08*** (.02)	.07*** (.02)	.07*** (.02)	.10*** (.02)	.08*** (.02)	.08*** (.02)
Constant	-.78*** (.13)	-.73*** (.15)	-.50* (.20)	-.38+ (.22)	-.79*** (.15)	-.71*** (.16)	-.85*** (.19)
N	698	698	698	698	665	665	668
adj. R-sq	.17	.17	.18	.18	.19	.17	.17

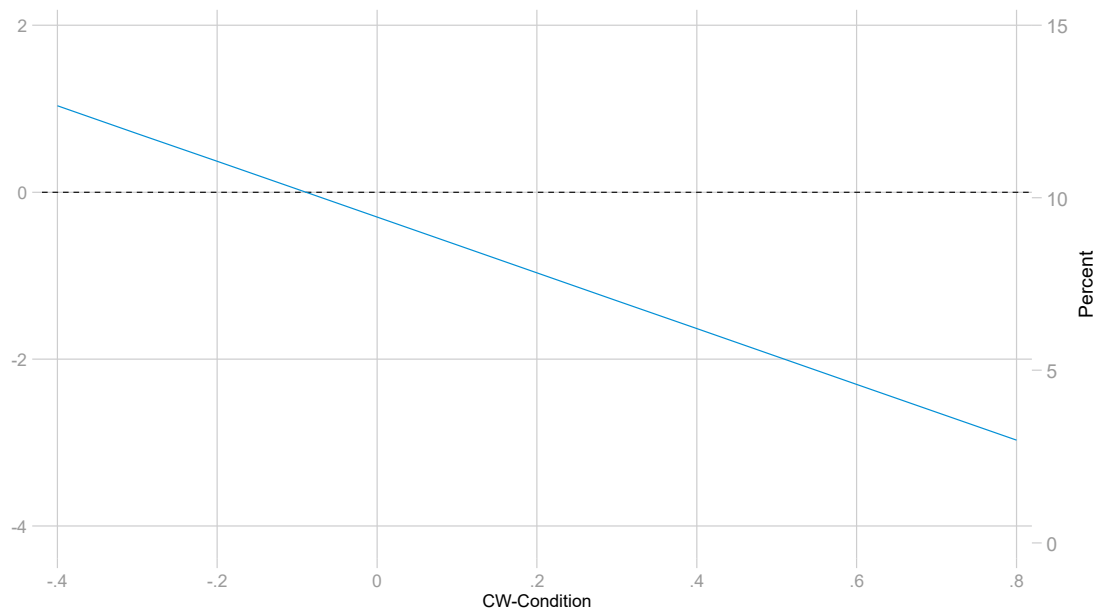
Notes: CW-Condition and agricultural dependence are mean-centered. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10A.4-2. The Interaction of the CW-Condition and Agricultural Intensity

	Kinship Intensity Index					
	(1)	(2)	(3)	(4)	(5)	(6)
CWC	-1.55*** (.25)	-2.01*** (.25)	-1.95*** (.25)	-1.46*** (.31)	-1.90*** (.27)	-1.95*** (.26)
Agricultural dependence	.11 (.14)	.24 (.14)	-.30 (.22)	.32* (.15)	.23 (.15)	.04 (.21)
CWC × Agric. intensity		-3.07*** (.74)	-3.34*** (.75)	-1.81* (.84)	-2.76*** (.78)	-2.78*** (.76)
Foraging			-.70** (.24)			
Plow use				-.40** (.13)		
Dairy cattle					.01 (.09)	
Settlement						.22 (.17)
Population (log-scale)	.08*** (.02)	.09*** (.01)	.07*** (.02)	.10*** (.01)	.09*** (.02)	.09*** (.01)
Constant	-.73*** (.15)	-.86*** (.14)	-.43* (.22)	-.86*** (.15)	-.82*** (.15)	-.97*** (.19)
N	698	698	698	665	665	668
adj. R-sq	.17	.20	.20	.20	.18	.19

Notes: CW-Condition (CWC) and Agricultural dependence are mean-centered. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Figure S10A.4-3. The CW-Condition and the Marginal Effect of Agricultural Intensity on Kinship Intensity



Notes: Figure shows the average marginal effect of agricultural intensity across various levels of the CW-Condition based on Model 3 of SOM-SOM-Table S10A.4-. Both Agricultural intensity and the CW-Condition are mean-centered.

In light of our evidence, it is clear that work organization and agricultural populations' demand for labor are inherently linked to environmental conditions. Of this condition, the CWC obviously captures a very impactful combination of geo-climatic features that embarked emerging agrarian communities on an abnormal path of state formation, in striking contrast to emerging agrarian societies outside the CWC. Again, the kind of agriculture most suitable under the CWC implies a lower demand for labor, including enslaved labor.¹⁶⁷ As a result, CW-areas were less likely to practice slavery even in the pre-industrial era, as visualized in SOM-Figure S10.4-4 (right-hand diagram). The point-biserial correlation between the CWC and the practice of slavery is significantly negative ($r = -.17, p < .001, N = 1,053$). Regarding contractual institutional arrangements, we use data on the traditional form of political succession and define a local community as having a tradition of "local democracy" if the appointment of the local headman was through either formal or informal consent rather than heredity or appointment from above. As shown in SOM-Figure S10.4-4 (left-hand diagram), pre-industrial populations with a more pronounced CWC have more often a tradition of political succession in which the local headman was elected through a democratic process based on formal or informal consent. The point-biserial correlation between the CWC and "local democracy" is significantly positive ($r = .20, p < .001, N = 769$).

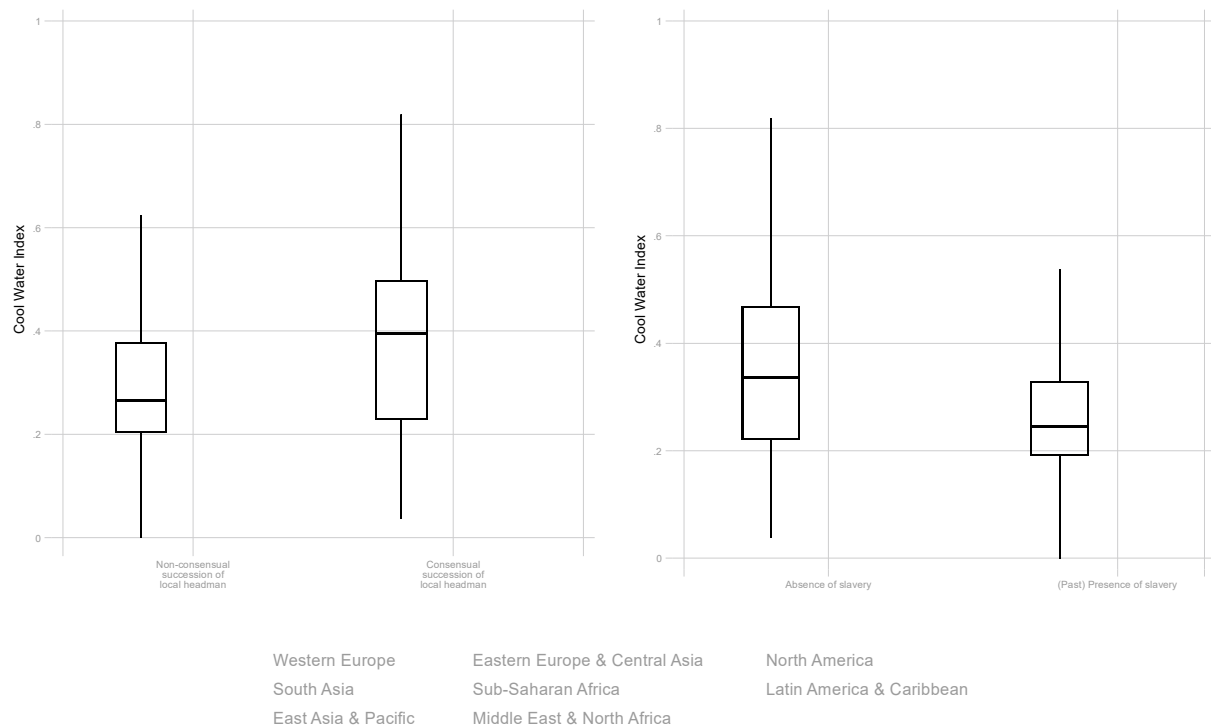
Also in line with all of this evidence, SOM-Figure S10.4-5 illustrates that pre-industrial local communities in CW-environments favored exogamous instead of endogamous as well as monogamous instead of polygamous marriages, neo-local instead of patri-local forms of residence and bilateral instead of unilateral descent—all features once described by Hajnal as

¹⁶⁷ To measure populations' exploitation of slaves, we use from the EA the variables "ea70" and "ea71," which code the absence (or near absence) of slavery as 0 and 1.0 otherwise.

elements of the “Western family pattern.”¹⁶⁸ In fact, however, these are more *generally* the features of a CW-conditioned family pattern, which exists and existed beyond the West—fully independent of the Western church’s medieval marriage policies.

Summing up, country-level evidence around the globe, multilevel evidence from individuals inhabiting Europe’s sub-national provinces as well as evidence from pre-industrial local communities all over the world all unequivocally confirm the predictions of the CW-Theory—and very strongly so. The WC-thesis, by contrast, offers no alternative to this evidence because the inclusion of the WC-thesis’s most championed variable, the WCE (Western Church Exposure), does nothing to invalidate the CW-Theory. Quite the contrary, under control of the CWC, the WCE turns into a surprisingly weak and often insignificant predictor of the features of Western cultural exceptionalism summarized under the term “WEIRD.”

SOM-Figure S10A.4-4. Linking the CW-Condition in Pre-industrial Communities with Local Democracy and Slavery

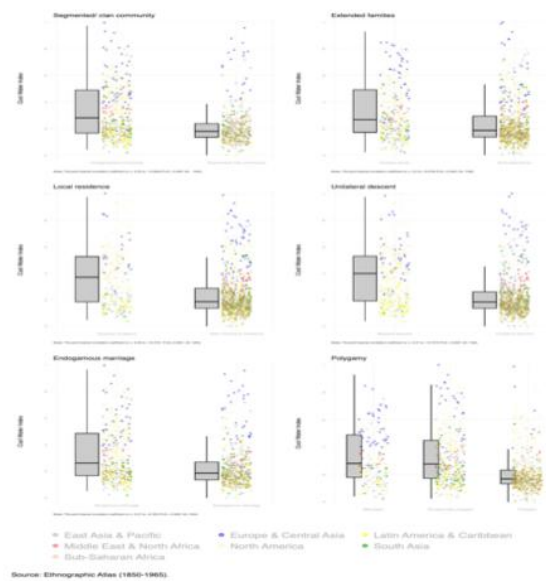


Source: Ethnographic Atlas (1850-1965).

¹⁶⁸ A. Macfarlane, 1979, *The Origins of English Individualism*, Oxford: Blackwell. J. Hajnal, 1982, “Two Kinds of Preindustrial Household Formation Systems,” *Population and Development Review* 8, 449–494. P. Laslett, 1989, “The European Family and Early Industrialization,” in J. Baechler, J.A. Hall and M. Mann (eds.), *Europe and the Rise of Capitalism*, Oxford: Blackwell, 234–242. E. Todd, 1987, *The Causes of Progress: Culture, Authority and Change*, Oxford: Blackwell. M.S. Hartman, 2004, *The Household and the Making of History: A Subversive View of the Western Past*, Cambridge: Cambridge University Press. See also Dilli (op. cit., footnote 1), Goody (op. cit., footnote 97) and van Zanden et al. (op. cit., footnote 97).

SOM-Table S10A.4-3. Descriptive Statistics - Pre-industrial Local Communities

	<i>N</i>	Mean	SD	Min	Max
CW-Condition	1,230	.32	.17	0	1
Extended family networks & clan-community	1,198	.60	.39	0	1
Segmented / clan communities	1,045	.46	.50	0	1
Extended family	1,184	.70	.46	0	1
Agricultural Dependence	1,205	.50	.30	0	1
Foraging (hunting, gathering, fishing)	1,205	.15	.13	0	.41
Dairy cattle	1,110	.32	.47	0	1
Plow use	1,110	.15	.36	0	1
Permanent settlement	1,115	.59	.32	0	1
Population (log)	897	9.56	2.75	3	18
Local democracy	769	.25	.43	0	1
Slavery	1,053	.53	0.50	0	1

SOM-Figure S10.4-5. The CW-Condition and FFS-Patterns among Pre-industrial Local Communities

Interpretation: Tribal populations in CW-habitats rely more frequently on neolocal residence, exogamous and monogamous marriage, nuclear families and bilateral descent.

S10B CW vs. WC - Part 2: The DETAILED Picture

In this section, we decompose the summary dependent variables used by Schulz et al. and focus on their more narrow single components as explanatory objects. We use the explained, explanatory and control variables exactly as documented, described and made available by Schulz et al. in their extensive Supplementary Online Materials, without re-narrating all measurement details here. The explained and explanatory variables can largely be divided into those indicating an emancipatory impetus (i.e., individual freedom from tight ingroup pressures) and those indicating the patriarchal opposite (i.e., individual susceptibility to tight in-group pressures). Some summary variables capture the patriarchal-vs-emancipatory polarity in total.

Beginning with the country level, we first report the results of the correlation analysis. Specifically, SOM-Table S10B.1-1 documents the bivariate relationships of the CWC, WCE, ECE and the historic patriarchy indicators, on the one hand, with the various outcome variables that measure individualism and independence, conformity and obedience as well as impersonal pro-sociality, on the other.

Second, we examine the effects on the same outcome variables under mutual control of the CWC, Church exposure and historic patriarchy (SOM-Table S10B.2-1), showing that only the CWC exhibits a robust significant effect on emancipatory psychological and behavioral outcomes. Next, we rerun our analyses for the various outcomes and additionally account for countries' historic and current levels of development (SOM-Tables S10B.2-2 and S10B.2-3). Moreover, we replicate our analyses for each outcome variable after adding a broad set of additional control variables as suggested by Schulz et al. The first set of control variables comprises geographic baseline indicators including a territory's ruggedness, distance to waterways, caloric suitability, and absolute latitude. As additional geographic indicators, we use parasite stress and tropical climate, irrigation potential, and caloric suitability for oats and rye. Following Schulz et al., we also account for the (ancestor adjusted) timing of the Neolithic Transformation and (ancestor adjusted) genetic heterogeneity. Furthermore, we account for the share of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist) and their religiousness. Lastly, we also account for continent fixed effects and report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure.

The results are reported separately for the aggregate Individualistic-Impersonal Pro-Sociality Psychology Scale as well as for each set of outcome variables including (1) individualism, creativity, and embeddedness, (2) obedience, tradition, and conformity, and (3) unpaid parking tickets, and nepotism as well as (4) blood donations and trust.

Then, we explore the relationship between the CWC, historic patriarchy and church exposure in further detail and find that the CWC is negatively associated with both kinship intensity and cousin marriage preference, and positively correlated with the WCE. This result strongly suggests that the psychological predispositions incentivized by the CWC have been the decisive selective force behind the Western Church's particular marriage policies. To close, we confirm

these insights with evidence from the level of European sub-national provinces as well as pre-industrial local communities from around the globe.

S10B.1 Correlation Results (the World's Countries)

SOM-Table S10B.1-1 reports the bivariate correlations of the CWC, the WCE and ECE and the two historic patriarchy measures (i.e., kinship intensity and cousin marriage) with the various measures of what Schulz et al. call the West's WEIRD psychology. Confirming the CW-Theory, we find that the CWC associates more tightly than the historic patriarchy measures and the WCE and ECE with most psychological and behavioral outcome variables. To be precise, the CWC correlates with all outcomes in the expected direction; that is, positively with individualism, creativity, analytical thinking, initial cooperation, cooperation after punishment, blood donation, and out-in-group trust; and negatively with embeddedness, conformity, tightness, obedience, tradition, conformist ("proper") behavior, dishonesty, unpaid parking tickets, nepotism, particularism. The correlations of the CWC with these outcomes are always significant, except for tradition and conformist ("proper") behavior. Furthermore, the CWC correlates strongest with those outcomes that are arguably among the most indicative ones, that is, individualism, embeddedness, analytical thinking, conformity, obedience, dishonesty, and particularism.

In the case of tightness, tradition, nepotism, cooperation after punishment, blood donation and out-in-group trust, the correlation of the CWC is trumped by the correlation of cousin marriage; yet in all these instances, the correlation with cousin marriage is only available for a considerably smaller number of countries, which reduces the comparability of the correlation strengths between cousin marriage and the CWC. In the case of nepotism, cooperation, blood donation and out-in-group trust, the CWC exhibits the second-strongest correlation. The strength of the correlation with WCE is usually inferior to the CWC, except for creativity, tradition, and out-group trust. It is worth noting that the CWC also explains psychological variation for those observations that have not been exposed to the medieval Church. To clarify, many countries of the global sample (N=146) had no exposure at all to the Western Church (47%) or the Eastern Church (68%). Therefore, the absent exposure to the medieval Church cannot explain psychological variation in these countries. Yet, the CWC keeps explaining a large part of the observed variation in countries without exposure to the medieval Church. The CWC also outperforms the correlations with kinship intensity with one exception, the case of initial cooperation. ECE tops the CWC's correlation strength in only a single instance, the tightness score. In summary, the CWC is undoubtedly the strongest correlate of individualistic and impersonally prosocial outcomes.

SOM-Table S10B.1-1: Spearman Correlations

	CWC		WCE		ECE		KII		Cousin Marriage	
	<i>Rho</i>	<i>p</i>	<i>Rho</i>	<i>p</i>	<i>Rho</i>	<i>p</i>	<i>Rho</i>	<i>p</i>	<i>Rho</i>	<i>p</i>
Individualism & independence										
Individualism	.65	.000	.61	.000	.25	.113	-.26	.011	-.47	.000
Creativity	.38	.001	.62	.000	-.03	.847	-.33	.004	-.58	.000
Embeddedness	-.82	.000	-.80	.000	-.47	.012	.68	.000	.59	.024
Analytic thinking	.75	.000	.70	.000	-.48	.225	-.03	.890	-.49	.045
Conformity & obedience										
Asch's conformity	-.75	.001	-.51	.062	.26	.742	.71	.003	.61	.009
Tightness score	-.43	.016	-.45	.017	-.68	.042	.12	.539	.53	.000
Obedience	-.56	.000	-.44	.000	-.38	.010	.25	.013	.45	.000
Tradition	-.18	.131	-.35	.009	.36	.027	.18	.123	.51	.679
Conformist behavior	-.01	.928	.00	.984	.10	.558	.00	.974	-.06	.015
Impersonal pro-sociality										
Dishonesty	-.68	.000	-.69	.000	-.10	.826	.63	.001	.61	.007
Unpaid parking tickets	-.45	.000	-.47	.000	-.36	.002	.38	.000	.33	.000
Nepotism	-.46	.000	-.43	.000	.43	.003	.22	.018	.51	.000
Particularism	-.79	.000	-.67	.000	-.02	.937	.22	.164	.63	.010
Initial cooperation	.55	.035	.56	.090	.34	.371	-.65	.009	-.83	.000
Cooperation w. punishment	.70	.004	.53	.114	-.32	.398	-.54	.040	-.98	.000
Blood donation	.53	.000	.54	.000	.34	.005	-.39	.000	-.57	.000
Out-in-group trust	.46	.000	.61	.000	.13	.429	-.39	.001	-.50	.000

Notes: Significant correlations are highlighted in bold.

S10B.2 Regression Analysis (the World's countries)

SOM-Table S10B.2-1 reports the effects of the CWC, WCE and ECE, and the two historic patriarchy measures on the various psychological and behavioral outcomes under mutual control. In line with the stated propositions, the CWC exhibits a strong significant effect on the different measures of individualism and independence, conformity and obedience as well as impartiality and cooperation with the expected sign, while the effects of the WCE and ECE turn insignificant or even change sign. Specifically, we see a positive correlation of the CWC with individualism, blood donations and out-group trust, and a negative correlation with embeddedness, obedience, and conformity as well as with the number of unpaid tickets (per UN diplomat) and nepotism. As a result, the CWC is also positively associated with IIP, which summarizes the different variables of individualism and impersonal pro-sociality. The semipartial correlation coefficient is $sr = .36$, suggesting that the CWC explains about 13.2 percent of the variation in IIP, under control of everything else.

By contrast, after accounting for the CWC, the WCE is associated with *higher* obedience, conformity and less prosocial (elite) behavior, while there is no significant relationship with individualism, creativity, embeddedness, tradition, nepotism or out-group trust. A similar pattern is found for the ECE and the two historic patriarchy measures after accounting for the CWC. In particular, there is no significant negative relationship of kinship intensity and cousin marriage with individualism, creativity, blood donations or out-group trust. There is no indication of a positive association between historical levels of patriarchy and obedience, tradition,

conformity, unsocial elite behavior, or nepotism (at conventional levels of statistical significance). By contrast, the CWC's correlation shows in almost all instances the expected sign.

To simultaneously control for countries' historic and current levels of development, SOM-Tables S10B.2-2 and S10B.2-3 additionally control for population density in the year 1 CE and the Gross Domestic Product per capita (log-scale) in recent times. The results indicate that the psychological and behavioral effects of the CWC are robust to the inclusion of historic and current levels of development, despite the fact that development is itself positively influenced by the CWC and absorbs, for this reason, part of the CWC's effects in simultaneous regressions. Still, the effects of the CWC continue to show the expected signs and are highly significant throughout most model specifications. In contrast, the coefficients of the WCE and ECE and the two historic patriarchy measures are either insignificant or only marginally significant. Yet, even where the WCE remains statistically significant with the expected sign, it turns negligible in effect size. For instance, the reported positive effect of the WCE on individualism in Model 2 (Table S10B.2-2) is based on a semipartial correlation of $sr = .10$, suggesting that the WCEe explains only about 1.1 percent of the variation in individualism. By contrast, the CWC accounts for about 9.4 percent of the variation in individualism.

SOM-Table S10B.2-1: The Effects of CWC, Church Exposure and Historic Patriarchy

	Individualism & independence				Conformity & obedience			Impersonal pro-sociality			
	IIP	Individual-ism	Creativity	Embedded-ness	Obedience	Tradition	Conform. (“proper”) behavior	Unpaid parking tickets	Nepotism	Blood donation	Out-in-group trust
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
WCE	.03 (.02)	.06 (.04)	.08 (.08)	-.05 (.04)	1.64† (.98)	-.13 (.08)	.18* (.07)	.16** (.05)	-.01 (.05)	1.54* (.67)	.08 (.05)
ECE	-.05 (.03)	-.08† (.04)	-.06 (.14)	.05 (.06)	.25 (1.38)	.20 (.14)	.22** (.08)	.20 (.14)	.17* (.07)	.99 (1.32)	-.08 (.06)
CWC	2.18*** (.27)	2.88*** (.44)	1.48 (1.14)	-3.04*** (.47)	-61.62*** (14.39)	.11 (.93)	-2.94** (.97)	-5.11*** (.71)	-2.67*** (.58)	4.69*** (7.90)	1.46† (.76)
N	146	92	67	68	91	67	67	136	103	134	66
adj. R ²	.625	.621	.300	.710	.391	.233	.177	.261	.425	.635	.366
KII	-.01 (.05)	.17† (.10)	-.10 (.13)	.39*** (.08)	.53 (1.85)	.05 (.13)	.08 (.14)	.25† (.15)	-.09 (.09)	1.22 (1.28)	-.21† (.12)
CWC	2.34*** (.20)	3.93*** (.41)	1.93*** (.49)	-2.75*** (.31)	-41.78*** (7.09)	-.97† (.50)	-.70 (.62)	-2.59*** (.53)	-2.92*** (.35)	59.91*** (5.50)	1.63*** (.43)
N	150	93	70	71	95	70	70	140	107	137	69
adj. R ²	.578	.619	.226	.751	.365	.024	.087	.245	.381	.611	.342
Cousin marriage	.02 (.05)	.13 (.10)	.03 (.12)	-.04 (.09)	.27 (1.67)	.07 (.10)	-.14 (.12)	-.01 (.16)	.03 (.10)	1.45 (1.45)	-.13 (.13)
CWC	2.71*** (.33)	4.36*** (.73)	2.64* (.99)	-3.62*** (.50)	-32.28* (13.39)	-1.37† (.68)	-1.96+ (1.06)	-3.34*** (.89)	-2.91*** (.69)	65.87*** (1.19)	1.83* (.81)
N	69	57	44	44	56	44	44	64	55	62	44
adj. R ²	.698	.578	.410	.680	.304	.376	.087	.186	.458	.650	.390

Notes: All models control for terrains' ruggedness and caloric suitability. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-2: The Effects of CWC, Church Exposure and Historic Patriarchy, controlling for Prosperity I

	Individualism		Creativity		Embeddedness		Obedience		Tradition		Conformity	
WCE	.00 (.04)	.07* (.03)	.10 (.09)	.11 (.08)	-.07 (.05)	-.09** (.03)	2.44† (1.25)	1.18 (.78)	-.07 (.09)	-.15* (.07)	.18† (.10)	.18* (.08)
ECE	-.15*** (.04)	-.08* (.03)	-.15 (.10)	-.01 (.15)	-.02 (.06)	-.03 (.06)	.18 (1.46)	-1.33 (1.04)	.33** (.11)	.15 (.11)	.33* (.14)	.27** (.09)
CWC	3.63*** (.47)	2.81*** (.45)	1.19 (1.32)	1.87 (1.16)	-2.80*** (.62)	-1.42* (.60)	-62.93*** (17.14)	-31.06* (12.01)	-.85 (1.10)	1.05 (.92)	-2.65† (1.48)	-2.13† (1.23)
Population density 1CE	.04* (.02)		-.03 (.03)		-.03 (.02)		-1.32** (.42)		-.05 (.03)		-.04 (.04)	
Log GDP per capita (2000)		-.02 (.08)		-.26† (.14)		-.35* (.14)		-6.96** (2.40)		-.21 (.16)		-.16 (.15)
Constant	-1.28*** (.14)	-.88 (.61)	-.49 (.35)	1.60 (1.19)	1.31*** (.16)	3.96*** (1.11)	59.11*** (4.33)	11.92*** (19.02)	.43† (.22)	1.77 (1.36)	.46 (.32)	1.58 (1.16)
N	83	97	58	69	64	70	82	95	58	69	58	69
adj. R ²	.652	.617	.287	.284	.679	.718	.361	.392	.271	.181	.047	.070
KII	.20* (.09)	.18* (.08)	-.17 (.14)	-.12 (.12)	.50*** (.09)	.34*** (.08)	1.46 (2.05)	.65 (1.69)	.11 (.14)	.07 (.12)	.11 (.18)	-.09 (.16)
CWC	4.17*** (.45)	3.69*** (.45)	1.66** (.54)	2.52*** (.62)	-2.29*** (.32)	-1.59** (.51)	-32.35*** (8.23)	-22.16* (9.51)	-1.09* (.53)	-.21 (.73)	-.14 (.82)	-.38 (.88)
Population density 1CE	.02 (.02)		.00 (.03)		-.05** (.02)		-.85* (.37)		-.08* (.03)		-.05 (.05)	
Log GDP per capita (2000)		.05 (.08)		-.22 (.15)		-.36** (.13)		-5.13* (2.41)		-.21 (.17)		-.14 (.17)
Constant	-1.38*** (.12)	-1.53* (.64)	-.62** (.23)	1.16 (1.20)	1.26*** (.11)	3.97*** (.99)	53.01*** (3.40)	92.91*** (19.22)	.67** (.21)	1.94 (1.42)	.25 (.24)	1.39 (1.31)
N	83	98	60	71	66	72	85	98	60	71	60	71
adj. R ²	.647	.612	.216	.237	.797	.778	.281	.319	.129	.043	-.018	-.011
Cousin marriage	.21* (.09)	.14 (.09)	-.02 (.18)	-.03 (.11)	.08 (.11)	.09 (.07)	1.50 (1.65)	1.60 (1.35)	.26* (.12)	.16† (.09)	-.10 (.21)	-.18 (.13)
CWC	5.01*** (.67)	4.12*** (.80)	2.47† (1.34)	3.38** (1.00)	-3.00*** (.59)	-2.03** (.73)	-22.98 (14.30)	-2.93 (14.14)	-.44 (.90)	-.48 (.82)	-1.38 (1.66)	-1.09 (1.26)
Population density 1CE	.03* (.02)		-.03 (.04)		-.03† (.02)		-1.04* (.45)		-.08* (.03)		-.00 (.05)	
Log GDP per capita (2000)		.11 (.10)		-.29† (.17)		-.32† (.19)		-6.79* (3.27)		-.16 (.18)		-.18 (.17)
Constant	-1.95*** (.37)	-2.40** (.86)	-.64 (.69)	1.62 (1.49)	1.08** (.33)	3.54* (1.51)	5.52*** (7.02)	101.45*** (27.34)	-.10 (.46)	1.30 (1.45)	.45 (.78)	2.07 (1.45)
N	54	59	41	46	44	45	53	59	41	46	41	46
adj. R ²	.643	.594	.339	.403	.646	.662	.293	.270	.349	.260	-.037	-.002

Notes: † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-3: The Effects of CWC, Church Exposure and Historic Patriarchy, controlling for Prosperity II

	Unpaid parking tickets		Nepotism		Blood donation		Out-in-group trust	
WCE	.10 (.07)	.15** (.05)	-.00 (.04)	.03 (.04)	.54 (.76)	1.32* (.56)	.15 [†] (.07)	.08 [†] (.05)
ECE	.15 (.19)	.17 (.14)	.20** (.07)	.22*** (.05)	-1.49 (1.03)	.82 (1.10)	.09 (.08)	-.04 (.07)
CWC	-4.39*** (.85)	-4.29*** (.78)	-2.93*** (.51)	-1.91*** (.47)	49.03*** (8.82)	25.86*** (6.91)	1.12 (.93)	1.20 (.73)
Population density 1CE	.05 (.04)		.01 (.03)		.92** (.29)		-.04 (.03)	
Log GDP per capita (2000)		-.16 (.15)		-.34*** (.10)		4.04*** (.82)		.07 (.18)
Constant	2.73*** (.20)	4.18*** (1.12)	.79*** (.16)	3.39*** (.80)	-.97 (1.37)	-28.56*** (5.88)	-.64* (.28)	-1.15 (1.47)
N	120	142	88	108	117	140	58	68
adj. R ²	.234	.256	.446	.473	.679	.675	.336	.248
KII	.23 (.15)	.26 [†] (.14)	-.09 (.10)	-.10 (.08)	-.74 (1.22)	-.41 (1.23)	-.35* (.15)	-.22 (.14)
CWC	-2.60*** (.61)	-1.70* (.78)	-3.16*** (.39)	-1.63*** (.47)	49.36*** (5.87)	35.75*** (6.81)	1.62** (.49)	1.41* (.66)
Population density 1CE	.06* (.03)		.02 (.02)		1.10*** (.23)		-.00 (.02)	
Log GDP per capita (2000)		-.19 (.15)		-.35*** (.10)		4.23*** (.94)		.06 (.19)
Constant	2.50*** (.19)	4.11*** (1.12)	.93*** (.15)	3.55*** (.77)	-2.20 (1.62)	-31.44*** (6.67)	-.68*** (.18)	-1.00 (1.50)
N	124	146	91	111	128	158	60	70
adj. R ²	.233	.249	.386	.411	.634	.596	.371	.255
Cousin marriage	-.07 (.16)	.02 (.14)	-.13 (.09)	.03 (.08)	.17 (1.23)	.21 (1.15)	-.30 [†] (.18)	-.16 (.13)
CWC	-3.79*** (.87)	-2.47* (1.17)	-3.84*** (.66)	-1.39 [†] (.71)	58.75*** (9.82)	46.74*** (1.37)	1.12 (1.07)	.90 (1.05)
Population density 1CE	.08* (.03)		.04 [†] (.02)		.96*** (.25)		.00 (.03)	
Log GDP per capita (2000)		-.19 (.28)		-.44** (.13)		3.92*** (.96)		.26 (.26)
Constant	2.88*** (.52)	4.34 [†] (2.22)	1.05** (.39)	4.24*** (1.12)	-3.06 (4.96)	-31.30*** (8.23)	-.06 (.58)	-2.48 (2.18)
N	61	66	51	58	59	64	41	46
adj. R ²	.256	.199	.481	.505	.694	.658	.389	.299

Notes: [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

THE CW-EFFECTS ON THE IIP SCALE

Schulz et al. summarize their seventeen psychological and behavioral outcomes into the Individualistic-Impersonal Pro-Sociality Psychology Scale (IIP). SOM-Table S10b.2-4 reports the results from regressing IIP on the CWC while accounting for church exposure and historic patriarchy. For replication purposes, the regressions include the same control variables as those used by Schulz et al. Consistent with the CW-Theory, the CWC predicts scores on IIP considerably better than do either the WCE or ECE as well as the two historic patriarchy measures. Indeed, the latter set of variables' previously remarkable effects drop entirely insignificant or weakly significant once the CWC.

It is worth noting that the CW-effects are robust even when latitude and waterway proximity are included, although both conceptually overlap with our measure of the CWC. The fact that the CW-effect nevertheless remains robust proves that the particular interactive combination of these components in the CW index is not redundant to their additional inclusion as independent main effects. Yet, out of a concern for over-controlling the reported models do not control for latitude and coastal proximity. Since IIP summarizes all seventeen psychological and behavioral outcomes, we consider the positive CW-results of this part of the replication as particularly conclusive.

SOM-Table S10B.2-4: The Effects of CWC, Church Exposure and Historic Patriarchy on the IIP

Individualistic-Impersonal Pro-Sociality Psychology (IIP) Scale											
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1											
WCE	.03+	.03	.03	.03+	.03	.02	.07**	.01	.04		
	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.02)	(.03)		
ECE	-.05	-.05	-.07+	-.04	-.06+	-.07+	-.08	-.08*	-.05		
	(.03)	(.03)	(.04)	(.03)	(.04)	(.04)	(.07)	(.04)	(.04)		
CWC	2.13***	2.18***	1.86***	2.06***	2.04***	2.29***	1.66***	2.15***	2.25***		
	(.27)	(.27)	(.33)	(.30)	(.30)	(.27)	(.30)	(.34)	(.38)		
N	146	146	146	146	146	146	146	90	146		
adj. R ²	.625	.625	.628	.628	.623	.631	.661	.749	.630		
Panel 2											
KII	-.00	-.01	-.01	.00	-.01	-.07	-.05	-.10+	-.07	-.10+	-.06
	(.05)	(.05)	(.05)	(.05)	(.05)	(.06)	(.06)	(.06)	(.06)	(.06)	(.06)
CWC	2.34***	2.34***	2.22***	2.30***	2.32***	2.27***	2.18***	1.86***	2.51***	1.31*	1.17+
	(.20)	(.20)	(.28)	(.20)	(.25)	(.22)	(.21)	(.28)	(.33)	(.65)	(.62)
N	150	150	150	150	150	150	150	94	150	87	87
adj. R ²	.579	.578	.575	.583	.574	.583	.629	.681	.579	.081	.094
Panel 3											
Cousin marriage	-.00	.02	.02	.05	.02	-.01	.06	.01	-.03	-.02	.06
	(.04)	(.05)	(.05)	(.05)	(.05)	(.06)	(.07)	(.05)	(.06)	(.06)	(.05)
CWC	2.57***	2.71***	2.49***	2.72***	2.68***	2.51***	2.50***	2.35***	2.89***	3.40*	3.00**
	(.31)	(.33)	(.48)	(.32)	(.44)	(.40)	(.33)	(.42)	(.44)	(1.27)	(.83)
N	69	69	69	69	69	69	69	55	69	34	34
adj. R ²	.690	.698	.694	.705	.689	.695	.729	.765	.700	.177	.345
Baseline geographic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & genetic	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of IIP on the CW-Condition, together with Western Church Exposure (WCE) and Eastern Church Exposure ECE (panel 1), Kinship intensity (KII) (panel 2), and Cousin marriage (panel 3). Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

THE CW-EFFECTS ON INDIVIDUALISM, CREATIVITY AND EMBEDDEDNESS

SOM-Table S10B.2-5 reports the findings from regressing individualism, creativity and embeddedness on the CWC while accounting for church exposure. Consistent with the CW-Theory, the CW-Condition shows a strong effect on individualism and embeddedness. In contrast, the WCE and ECE exhibit mostly insignificant effects upon inclusion of the CWC. In fact, once the CWC enters the model, the coefficient of the WCE even changes sign in several models. These findings are robust to the inclusion of additional covariates. A similar pattern holds for creativity as an outcome variable, although not all models reveal a significant CW- effect. Still, the CWC is the more impactful factor in explaining creativity compared to the WCE or ECE.

SOM-Table S10B.2-6 reports the effects of the CWC on individualism, creativity and embeddedness while accounting for kinship intensity. We see significant effects of the CWC on each of the three outcomes, while kinship intensity shows a significant effect only on embeddedness. Again, the effects are robust to the inclusion of additional control variables. By contrast, kinship intensity does not show robust positive effects on individualism and creativity, demonstrating the superiority of the CWC as a predictor. Likewise, the results of SOM-Table S10B.2-7 show once more significant effects of the CWC on individualism, creativity and embeddedness—this time controlling for cousin marriage, which turns out to be mostly insignificant when the CWC is included.

SOM-Table S10B.2-5: The Effects of CWC and Church Exposure on Individualism, Creativity and Embeddedness

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Individualism (std)									
WCE	.05 (.03)	.06 (.04)	.05 (.04)	.05 (.04)	.05 (.03)	.03 (.04)	.13** (.05)	.08* (.04)	.08* (.04)
ECE	-.10** (.03)	-.08† (.04)	-.12* (.05)	-.10* (.05)	-.11* (.05)	-.15** (.05)	-.12† (.06)	-.04 (.05)	-.02 (.07)
CWC	2.96*** (.40)	2.88*** (.44)	2.29*** (.53)	3.19*** (.52)	2.31*** (.49)	3.20*** (.43)	2.82*** (.57)	2.72*** (.68)	3.83*** (.61)
N	92	92	92	92	92	92	92	75	92
adj. R ²	.620	.621	.671	.624	.630	.705	.727	.637	.719
Panel 2: Creativity (std)									
WCE	.11 (.08)	.08 (.08)	.07 (.07)	.12† (.07)	.04 (.07)	.10 (.07)	.09 (.08)	.06 (.07)	.03 (.08)
ECE	-.00 (.13)	-.06 (.14)	.04 (.12)	-.01 (.13)	.03 (.08)	-.01 (.14)	.26 (.27)	-.06 (.12)	-.05 (.13)
CWC	1.09 (1.11)	1.48 (1.14)	3.08* (1.26)	.20 (1.03)	2.90** (1.09)	1.36 (1.01)	-.43 (1.26)	2.56* (1.27)	2.00† (1.10)
N	67	67	67	67	67	67	67	67	67
adj. R ²	.259	.300	.408	.446	.487	.377	.454	.332	.354
Panel 3: Embeddedness (std)									
WCE	-.09* (.04)	-.05 (.04)	-.05 (.04)	-.07† (.04)	-.04 (.04)	-.07† (.03)	-.07† (.04)	-.06† (.03)	-.05 (.05)
ECE	-.03 (.06)	.05 (.06)	.04 (.07)	.03 (.07)	.05 (.07)	.02 (.07)	-.04 (.13)	.04 (.06)	.04 (.07)
CWC	-2.50*** (.44)	-3.04*** (.47)	-3.26*** (.68)	-2.62*** (.55)	-3.40*** (.62)	-2.94*** (.46)	-2.25*** (.58)	-1.91*** (.48)	-3.08*** (.68)
N	68	68	68	68	68	68	68	60	68
adj. R ²	.682	.710	.705	.725	.715	.724	.735	.737	.712
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—
Neolithic transitions and genetic heterogeneity	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of individualism (panel 1), creativity (panel 2), and embeddedness (panel 3) on Western Church Exposure (WCE), Eastern Church Exposure (ECE), and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-6: The Effects of CWC and Kinship Intensity on Individualism, Creativity and Embeddedness

	Full sample									Non-MFP-sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Individualism (std)											
KII	.19*	.17 [†]	.09	.15	.15	-.07	-.05	.11	-.07	.06	.12
	(.09)	(.10)	(.10)	(.10)	(.10)	(.11)	(.13)	(.12)	(.09)	(.10)	(.09)
CWC	3.93***	3.93***	3.39***	3.97***	3.50***	3.33***	4.13***	3.99***	4.74***	.40	-.05
	(.39)	(.41)	(.61)	(.42)	(.57)	(.44)	(.40)	(.62)	(.52)	(1.21)	(1.23)
N	93	93	93	93	93	93	93	76	93	42	42
adj. R ²	.620	.619	.641	.617	.617	.670	.687	.621	.700	-.042	.163
Panel 2: Creativity (std)											
KII	-.13	-.10	.05	.09	.03	-.09	-.22	-.12	-.08	-.30	.03
	(.12)	(.13)	(.14)	(.13)	(.13)	(.17)	(.14)	(.13)	(.16)	(.20)	(.24)
CWC	1.81***	1.93***	4.09***	1.61***	3.49***	2.07***	.09	2.57**	1.97*	-1.80	-2.56
	(.47)	(.49)	(.81)	(.45)	(.62)	(.49)	(.61)	(.78)	(.82)	(2.68)	(2.36)
N	70	70	70	70	70	70	70	70	70	35	35
adj. R ²	.228	.226	.360	.369	.446	.300	.430	.238	.313	-.001	.224
Panel 3: Embeddedness (std)											
KII	.41***	.39***	.42***	.38***	.38***	.39***	.40**	.37***	.44***	.32**	.17 [†]
	(.08)	(.08)	(.09)	(.09)	(.09)	(.11)	(.13)	(.07)	(.11)	(.11)	(.09)
CWC	-2.67***	-2.75***	-2.53***	-2.73***	-2.71***	-2.73***	-2.49***	-1.86***	-3.32***	-5.16***	-5.08***
	(.30)	(.31)	(.56)	(.32)	(.51)	(.38)	(.36)	(.33)	(.51)	(1.01)	(.99)
N	71	71	71	71	71	71	71	63	71	24	24
adj. R ²	.744	.751	.745	.748	.749	.747	.775	.772	.744	.572	.679
Baseline geographic con-	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropi-	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions &	—	—	—	—	—	yes	—	—	—	—	—
genetic heterogen.	—	—	—	—	—	—	—	—	—	—	—
% of adherence to reli-	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of individualism (panel 1), creativity (panel 2), and embeddedness (panel 3) on kinship intensity and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-7: The Effects of CWC and cousin marriage on Individualism, Creativity and Embeddedness

	Full sample								Non-MFP-sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Individualism (std)											
Cousin marriage	.14 (.09)	.13 (.10)	.04 (.11)	.09 (.10)	.13 (.11)	-.02 (.11)	.03 (.11)	.09 (.10)	-.04 (.09)	.04 (.08)	.09 (.08)
CWC	4.40*** (.68)	4.36*** (.73)	3.05** (.89)	4.33*** (.73)	3.95*** (.93)	3.25*** (.75)	4.14*** (.73)	4.21*** (.89)	4.76*** (.73)	2.13 (1.66)	1.23 (1.59)
N	57	57	57	57	57	57	57	50	57	24	24
adj. R ²	.593	.578	.615	.580	.587	.660	.708	.563	.683	-.024	.072
Panel 2: Creativity (std)											
Cousin marriage	-.05 (.11)	.03 (.12)	.17 (.12)	.19 (.12)	.19 (.13)	.22 (.15)	.47* (.22)	.00 (.11)	.08 (.14)	-.03 (.17)	.21 (.18)
CWC	2.42* (.92)	2.64* (.99)	5.36*** (1.08)	2.82** (.84)	4.89*** (1.15)	3.76** (1.20)	2.39† (1.24)	3.46** (1.23)	3.11** (1.14)	2.83 (4.46)	1.92 (3.75)
N	44	44	44	44	44	44	44	44	44	24	24
adj. R ²	.380	.410	.562	.553	.559	.471	.557	.428	.407	-.044	.384
Panel 3: Embeddedness (std)											
Cousin marriage	.07 (.08)	-.04 (.09)	-.09 (.11)	-.11 (.09)	-.04 (.10)	-.12 (.11)	-.25† (.12)	-.06 (.10)	-.14 (.10)	.17* (.06)	.04 (.05)
CWC	-3.11*** (.46)	-3.62*** (.50)	-4.29*** (.97)	-3.63*** (.51)	-3.93*** (.89)	-4.31*** (.62)	-3.63*** (.60)	-2.55*** (.59)	-3.72*** (.78)	-6.60*** (1.14)	-5.05** (1.36)
N	44	44	44	44	44	44	44	40	44	15	15
adj. R ²	.635	.680	.676	.717	.714	.706	.742	.746	.696	.511	.760
Baseline geogr. controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress & trop. area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye & oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & ge- netic hete.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of individualism (panel 1), creativity (panel 2), and embeddedness (panel 3) on cousin marriage and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

THE CW- EFFECTS ON OBEDIENCE, TRADITION AND CONFORMISM

SOM-Table S10B.2-8 reports results from regressing obedience, tradition and conformism on the CWC and the WCE and ECE. Likewise, SOM-Table S10B.2-9 accounts for kinship intensity, while SOM-Table S10B.2-10 controls for cousin marriage. Consistent with the CW-Theory, the CWC negatively and significantly predicts obedience and conformism in SOM-Table S10B.2-8. These effects are robust to the inclusion of various sets of additional covariates and are independent of whether the WCE or ECE are included. The impact of the latter two variables is mostly insignificant or marginally significant. As we have already seen in the bivariate correlations in SOM-Table S10B.1-1, the CWC shows no significant effect on tradition, but neither does the WCE nor the ECE. This pattern largely repeats itself upon inclusion of either of the two patriarchy variables, although neither of the patriarchy measures significantly affects tradition either (see SOM-Tables S10B.2-9 and S10B.2-10). When either of the two patriarchy variables is included, the CW-effect on conformism also becomes insignificant, although again neither patriarchy measure affects conformism. Thus, tradition and conformism, as measured by Schulz et al., turn out to be less well explained by historic variables in general.

SOM-Table S10B.2-8: The Effects of CWC and Church Exposure on Obedience, Tradition, and Conformity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Obedience (%)									
WCE	.86 (.89)	1.64 [†] (.98)	1.97** (.73)	1.91* (.95)	1.65* (.78)	1.91* (.95)	.49 (.92)	1.37 [†] (.71)	.72 (.82)
ECE	-1.30 (1.04)	.25 (1.38)	2.00 (1.20)	.67 (1.33)	1.60 (1.15)	.88 (1.39)	4.70** (1.65)	-.04 (1.10)	-.77 (1.31)
CWC	-51.77*** (12.56)	-61.62*** (14.39)	-3.07* (13.41)	-69.39*** (14.73)	-41.28** (12.46)	-62.99*** (13.77)	-64.69*** (14.97)	-28.90* (11.94)	-62.91*** (12.46)
N	91	91	91	91	91	91	91	90	91
adj. R ²	.340	.391	.548	.399	.523	.438	.567	.527	.558
Panel 2: Tradition (std)									
WCE	-.16* (.08)	-.13 (.08)	-.13 (.09)	-.16 [†] (.09)	-.10 (.08)	-.15 [†] (.08)	-.13 (.10)	-.14 [†] (.08)	-.13 (.08)
ECE	.13 (.13)	.20 (.14)	.15 (.15)	.16 (.14)	.18 (.12)	.15 (.15)	-.25 (.21)	.20 (.15)	.16 (.14)
CWC	.45 (.94)	.11 (.93)	-.77 (.94)	1.04 (1.10)	-.41 (.88)	.26 (.92)	1.14 (1.26)	.76 (1.02)	-.42 (1.16)
N	67	67	67	67	67	67	67	67	67
adj. R ²	.185	.233	.248	.311	.300	.266	.421	.237	.215
Panel 3: Conformist ("proper") behavior (std)									
WCE	.17* (.08)	.18* (.07)	.18* (.07)	.16* (.07)	.18* (.07)	.18* (.07)	.19* (.09)	.18* (.07)	.16 [†] (.08)
ECE	.25** (.09)	.22** (.08)	.18* (.08)	.20* (.07)	.19* (.08)	.23** (.08)	-.14 (.24)	.22** (.08)	.17 (.14)
CWC	-2.63* (1.12)	-2.94** (.97)	-3.69** (1.20)	-2.47* (1.00)	-3.34** (1.01)	-2.96** (1.02)	-2.86* (1.29)	-3.00* (1.22)	-3.28** (1.19)
N	67	67	67	67	67	67	67	67	67
adj. R ²	.081	.177	.184	.188	.164	.156	.177	.164	.144
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress & tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye & oats	—	—	—	—	yes	—	—	—	—
Neolithic transition & gen. heterogeneity	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of obedience (panel 1), tradition (panel 2), and conformism (panel 3) on Western Church Exposure (WCE), Eastern Church Exposure (ECE), and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-9: The Effects of the CWC and kinship intensity on Obedience, Tradition, and Conformity

	Full sample					Non-MFP-sample					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Obedience (%)											
KII	1.05 (1.80)	.53 (1.85)	3.87* (1.81)	1.37 (2.08)	2.99 (1.87)	.74 (2.46)	4.95* (2.14)	.58 (1.69)	3.69† (1.91)	5.46 (3.34)	5.40 (4.21)
CWC	-39.45*** (7.05)	-41.78*** (7.09)	1.30 (9.44)	-43.70*** (7.11)	-13.32 (8.56)	-39.36*** (7.68)	-46.33*** (7.19)	-13.43 (8.16)	-47.71*** (9.87)	-95.56* (44.80)	-92.88* (41.95)
N	95	95	95	95	95	95	95	94	95	40	40
adj. R ²	.299	.365	.521	.369	.510	.398	.565	.490	.555	.221	.272
Panel 2: Tradition (std)											
KII	.08 (.12)	.05 (.13)	-.07 (.14)	-.10 (.14)	-.04 (.13)	-.10 (.17)	-.03 (.17)	.03 (.12)	.16 (.19)	.30 (.18)	-.04 (.16)
CWC	-.89† (.49)	-.97† (.50)	-2.80*** (.75)	-.72 (.57)	-1.84** (.64)	-1.42* (.61)	-.18 (.69)	-.34 (.72)	-1.50 (.94)	-.41 (2.42)	.37 (2.06)
N	70	70	70	70	70	70	70	70	70	35	35
adj. R ²	.043	.024	.109	.108	.167	.085	.390	.033	.052	.002	.226
Panel 3: Conformist ("proper") behavior (std)											
KII	-.05 (.15)	.08 (.14)	.06 (.14)	-.02 (.15)	.03 (.14)	.04 (.19)	.21 (.21)	.07 (.14)	.14 (.18)	.03 (.23)	.09 (.24)
CWC	-.84 (.67)	-.70 (.62)	-1.74† (.87)	-.53 (.59)	-1.44† (.83)	-.80 (.70)	-.12 (.68)	-.48 (.84)	-1.32 (.92)	-1.33 (2.43)	-1.50 (2.21)
N	70	70	70	70	70	70	70	70	70	35	35
adj. R ²	-.000	.087	.116	.122	.089	.060	.149	.076	.059	-.048	-.005
Baseline geographic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & genetic hete.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of obedience (panel 1), tradition (panel 2), and conformism (panel 3) on kinship intensity and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-10: The Effects of the CWC and cousin marriage on Obedience, Tradition, and Conformity

	Full sample									Non-MFP-sample	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Obedience (%)											
Cousin marriage	1.37 (1.41)	.27 (1.67)	.85 (1.72)	-.00 (1.90)	.29 (1.79)	1.23 (2.23)	5.51* (2.08)	-.21 (1.38)	3.51 [†] (1.78)	4.20 (3.10)	2.52 (3.60)
CWC	-25.94* (11.70)	-32.28* (13.39)	-1.89 (15.09)	-32.21* (13.65)	-23.38 (16.97)	-26.55 (16.02)	-21.65* (1.46)	-2.94 (11.68)	-5.09*** (13.86)	-113.03 (67.60)	-9.39 (71.14)
N	56	56	56	56	56	56	56	55	56	26	26
adj. R ²	.238	.304	.415	.293	.325	.298	.578	.471	.476	.251	.299
Panel 2: Tradition (std)											
Cousin marriage	.16 [†] (.09)	.07 (.10)	.06 (.12)	.02 (.10)	.15 (.12)	.05 (.15)	-.13 (.17)	.05 (.10)	.11 (.12)	.12 (.11)	-.04 (.10)
CWC	-1.10 [†] (.63)	-1.37 [†] (.68)	-1.58 (1.06)	-1.43* (.68)	-.52 (1.14)	-1.50 (.97)	-1.66 [†] (.88)	-.68 (1.07)	-1.17 (1.02)	-4.35 (2.65)	-3.27* (1.55)
N	44	44	44	44	44	44	44	44	44	24	24
adj. R ²	.308	.376	.344	.384	.376	.345	.359	.392	.354	.118	.389
Panel 3: Conformist ("proper") behavior (std)											
Cousin marriage	-.16 (.12)	-.14 (.12)	-.16 (.14)	-.23 [†] (.13)	-.25 (.16)	-.21 (.18)	-.35 (.25)	-.14 (.11)	-.12 (.17)	-.27 [†] (.14)	-.35* (.13)
CWC	-1.71 (1.11)	-1.96 [†] (1.06)	-3.20 [†] (1.65)	-2.07* (1.00)	-3.32* (1.56)	-2.42 [†] (1.38)	-1.66 (1.36)	-1.95 (1.54)	-2.87* (1.40)	-6.82* (3.22)	-6.00 (3.55)
N	44	44	44	44	44	44	44	44	44	24	24
adj. R ²	.016	.087	.102	.126	.084	.049	.131	.063	.028	.134	.112
Baseline geographic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & gen. hete.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of obedience (panel 1), tradition (panel 2), and conformism (panel 3) on cousin marriage and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

THE CW-EFFECTS ON UNPAID PARKING TICKETS AND NEPOTISM

SOM-Tables S10B.2-11 to S10B.2-13 show the results from regressing two measures of impersonal pro-sociality, i.e. the number of unpaid parking tickets of United Nations diplomats in New York City and nepotism, on the CWC, church exposure and the historic patriarchy measures. The results show that the CWC outperforms the other variables in predicting unpaid parking tickets and nepotism. The CWC has a significantly negative effect on the number of unpaid parking tickets and nepotism, consistent with the CW-Theory. The results are robust to a number of different specifications. By contrast, the effects of the WCE and ECE as well as historic patriarchy are highly inconsistent. In fact, our results reveal that the effects of the WCE become positive once we add the CWC to the models. In addition, the effects of the two patriarchy measures are mostly insignificant after accounting for the CWC.

SOM-Table S10B.2-11: The Effects of CWC and Church Exposure on Unpaid Parking Tickets and Nepotism

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Unpaid parking tickets (log)									
WCE	.15** (.05)	.16** (.05)	.15** (.06)	.16** (.06)	.15** (.05)	.15* (.06)	.17** (.06)	.22*** (.06)	.14† (.08)
ECE	.17 (.14)	.20 (.14)	.17 (.15)	.19 (.14)	.17 (.15)	.18 (.15)	.35 (.25)	.28† (.15)	.12 (.13)
CWC	-4.94*** (.69)	-5.11*** (.71)	-4.50*** (.81)	-4.96*** (.86)	-5.75*** (.72)	-4.81*** (.69)	-4.39*** (.95)	-6.17*** (1.02)	-4.83*** (1.21)
N	136	136	136	136	136	136	136	86	136
adj. R ²	.278	.289	.340	.291	.302	.308	.317	.351	.343
Panel 2: Nepotism									
WCE	.00 (.04)	-.01 (.05)	-.01 (.05)	-.03 (.05)	-.01 (.05)	-.01 (.05)	-.08 (.05)	-.01 (.05)	-.03 (.05)
ECE	.21*** (.06)	.17* (.07)	.17* (.08)	.15† (.08)	.17* (.07)	.18* (.08)	.07 (.07)	.19* (.07)	.12 (.08)
CWC	-2.80*** (.51)	-2.67*** (.58)	-3.01*** (.58)	-2.40** (.73)	-2.60*** (.63)	-2.86*** (.57)	-1.93** (.64)	-2.30*** (.58)	-3.72*** (.75)
N	103	103	103	103	103	103	103	79	103
adj. R ²	.418	.425	.422	.425	.413	.471	.574	.481	.489
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress & tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—
Neolithic transitions & genetic heter.	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of unpaid parking tickets (panel 1), and nepotism (panel 2) on Western Church Exposure (WCE), Eastern Church Exposure (ECE), and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses. † $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-12: The Effects of the CWC and Kinship Intensity on Unpaid Parking Tickets and Nepotism

	Full sample								Non-MFP-sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Unpaid parking tickets (log)											
KII	.23 (.14)	.25 [†] (.15)	.16 (.14)	.24 [†] (.14)	.21 (.14)	.08 (.17)	.31 (.20)	.41* (.18)	.08 (.16)	.21 (.19)	.15 (.18)
CWC	-2.59*** (.53)	-2.59*** (.53)	-2.46** (.77)	-2.54*** (.54)	-3.64*** (.70)	-2.97*** (.60)	-2.04** (.61)	-2.49*** (.71)	-3.51*** (.98)	-5.65** (1.81)	-5.35** (1.81)
N	140	140	140	140	140	140	140	90	140	81	81
adj. R ²	.257	.266	.319	.269	.282	.282	.294	.314	.321	.137	.152
Panel 2: Nepotism											
KII	-.13 (.09)	-.09 (.09)	-.13 (.09)	-.13 (.09)	-.11 (.09)	-.01 (.12)	.05 (.10)	.07 (.11)	.11 (.11)	.07 (.13)	.04 (.14)
CWC	-2.93*** (.38)	-2.92*** (.35)	-3.74*** (.50)	-2.76*** (.38)	-3.32*** (.45)	-2.98*** (.40)	-2.65*** (.35)	-2.12*** (.56)	-4.10*** (.63)	-1.05 (1.51)	-.57 (1.42)
N	107	107	107	107	107	107	107	83	107	47	47
adj. R ²	.339	.381	.386	.393	.376	.416	.570	.410	.444	-.022	.002
Baseline geo-graphic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & genetic hete.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of unpaid parking tickets (panel 1), and nepotism (panel 2) on kinship intensity and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-13: The effects of the CWC and Cousin Marriage on Unpaid Parking Tickets and Nepotism

	Full sample								Non-MFP-sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Unpaid parking tickets (log)											
Cousin marriage	-0.01 (0.14)	-0.01 (0.16)	-0.12 (0.14)	-0.10 (0.16)	-0.12 (0.16)	-0.26 [†] (0.15)	-0.15 (0.20)	-0.08 (0.17)	-0.05 (0.19)	0.09 (0.19)	-0.03 (0.21)
CWC	- (0.81)	- (0.89)	-4.41** (1.33)	- (0.82)	- (1.05)	- (0.85)	-2.74* (1.06)	-3.32** (1.14)	-4.73** (1.57)	-5.79 (3.57)	-4.12 (3.31)
N	64	64	64	64	64	64	64	52	64	31	31
adj. R ²	0.223	0.238	0.293	0.276	0.279	0.331	0.333	0.293	0.337	0.073	0.156
Panel 2: Nepotism											
Cousin marriage	-0.04 (0.09)	0.03 (0.10)	0.04 (0.11)	-0.00 (0.10)	0.00 (0.12)	0.08 (0.13)	-0.01 (0.13)	0.07 (0.10)	0.18 (0.11)	0.12 [†] (0.06)	0.07 (0.09)
CWC	- (0.65)	- (0.69)	- (0.82)	- (0.69)	-2.88** (0.87)	-2.44** (0.81)	- (0.71)	-1.90* (0.85)	- (0.83)	-2.44 (3.53)	-2.27 (3.24)
N	55	55	55	55	55	55	55	47	55	21	21
adj. R ²	0.444	0.458	0.441	0.453	0.457	0.461	0.562	0.495	0.496	0.030	-0.053
Baseline geographic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions & genetic heterog.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of unpaid parking tickets (panel 1), and nepotism (panel 2) on cousin marriage and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

THE CW-EFFECTS ON BLOOD DONATIONS AND OUT-IN-GROUP TRUST

SOM-Tables S10B.2-14 to S10B.2-16 demonstrate the CWC's significantly positive effect on blood donations and out-in-group trust. The effects are robust to the inclusion of additional covariates. Consistent with the previous findings, the original effects of the WCE, kinship intensity and cousin marriage reported by Schulz et al. mostly disappear upon inclusion of the CWC. Although the effect of the WCE on blood donations remains significantly positive (SOM-Table S10B.2-14, panel 1) its semipartial correlation is always smaller than the semipartial correlation between the CWC and blood donations. Only in Model 7 both the CWC and the WCE show an equally strong semipartial correlation with blood donations of $r = .2$. These results support the CW-Theory in its proposition that the CWC better predicts impersonal co-operation and trust compared to the WCE and historic patriarchy.

SOM-Table S10B.2-14: The Effects of CWC and Church Exposure on Blood Donations and Out-in-group Trust

	Full sample								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: Blood donations (per 1000 inhabitants)									
WCE	1.55*	1.54*	1.43*	1.44*	1.33*	1.09	2.63***	1.25 [†]	1.90***
	(.63)	(.67)	(.64)	(.68)	(.65)	(.69)	(.62)	(.75)	(.54)
ECE	1.03	.99	.15	.83	.03	-.17	.31	.40	.64
	(1.26)	(1.32)	(1.47)	(1.38)	(1.52)	(1.41)	(2.67)	(1.57)	(.85)
CWC	4.50***	4.69***	23.86**	42.95***	28.12***	43.77***	32.45***	35.04***	39.90***
	(7.62)	(7.90)	(7.45)	(8.49)	(7.56)	(8.34)	(7.62)	(8.89)	(8.07)
N	134	134	134	134	134	134	134	81	134
adj. R ²	.640	.635	.668	.635	.671	.667	.667	.586	.734
Panel 2: Out-in-group trust									
WCE	.09*	.08	.08	.11*	.08	.09	.11 [†]	.07	.04
	(.04)	(.05)	(.05)	(.05)	(.06)	(.06)	(.06)	(.06)	(.07)
ECE	-.02	-.08	-.01	-.04	.01	-.04	-.12	-.08	-.13
	(.06)	(.06)	(.07)	(.06)	(.08)	(.08)	(.14)	(.06)	(.13)
CWC	1.43*	1.46 [†]	2.16*	.52	2.46**	1.35 [†]	-.67	1.69 [†]	1.09
	(.62)	(.76)	(.94)	(.78)	(.80)	(.74)	(.93)	(1.01)	(1.00)
N	66	66	66	66	66	66	66	66	66
adj. R ²	.317	.366	.417	.442	.444	.380	.582	.357	.358
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—
Neolithic transitions and genetic heter.	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of blood donations (panel 1), and out-group trust (panel 2) on Western Church Exposure (WCE), Eastern Church Exposure (ECE), and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-15: The Effects of the CWC and Kinship Intensity on Blood Donations and Out-in-group Trust

	Full sample								Non-MFP-sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Blood donations (per 1000 inhabitants)											
KII	1.16	1.22	.60	1.03	.53	-.61	-.16	1.57	-1.17	-2.25	-2.28
	(1.24)	(1.28)	(1.27)	(1.30)	(1.20)	(1.53)	(1.80)	(1.78)	(1.21)	(1.75)	(1.79)
CWC	59.81***	59.91***	41.86***	6.62***	44.12***	52.84***	59.94***	5.82***	51.98***	23.70 [†]	23.69 [†]
	(5.39)	(5.50)	(6.82)	(5.49)	(6.68)	(5.76)	(6.16)	(8.28)	(6.92)	(14.14)	(13.90)
N	137	137	137	137	137	137	137	84	137	78	78
adj. R ²	.617	.611	.635	.612	.638	.636	.616	.572	.687	.108	.084
Panel 2: Out-in-group trust											
KII	-.27*	-.21 [†]	-.09	-.10	-.12	-.28 [†]	-.20	-.22 [†]	-.16	-.37 [†]	-.07
	(.13)	(.12)	(.13)	(.13)	(.12)	(.16)	(.14)	(.12)	(.16)	(.21)	(.19)
CWC	1.59***	1.63***	2.92***	1.46**	2.98***	1.57**	.14	1.91**	1.62*	-1.37	-2.11
	(.39)	(.43)	(.79)	(.44)	(.57)	(.46)	(.52)	(.61)	(.77)	(2.21)	(1.75)
N	69	69	69	69	69	69	69	69	69	34	34
adj. R ²	.329	.342	.397	.390	.438	.369	.574	.337	.335	.029	.301
Baseline geographic	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions and genetic heterog.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of blood donations (panel 1), and out-group trust (panel 2) on kinship intensity and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.2-16: The Effects of the CWC and Cousin Marriage on Blood Donations and Out-in-group Trust

	Full sample								Non-MFP-sample		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Panel 1: Blood donations (per 1000 inhabitants)											
Cousin marriage	.41	1.45	.20	.89	1.16	-1.57	-2.00	.99	-.09	.91	1.24
	(1.14)	(1.45)	(1.31)	(1.47)	(1.11)	(1.37)	(1.83)	(1.55)	(1.26)	(1.10)	(1.43)
CWC	61.40***	65.87***	31.44**	65.47***	51.75***	45.34***	6.22***	53.48***	45.52***	58.68*	56.68*
	(9.57)	(1.19)	(1.18)	(1.17)	(9.77)	(9.65)	(1.86)	(13.29)	(9.84)	(23.38)	(22.23)
N	62	62	62	62	62	62	62	50	62	28	28
adj. R ²	.635	.650	.732	.655	.719	.727	.687	.655	.754	.102	.042
Panel 2: Out-in-group trust											
Cousin marriage	-.19	-.13	-.01	-.00	.03	-.07	.46**	-.15	-.05	-.08	.13
	(.12)	(.13)	(.15)	(.14)	(.14)	(.17)	(.16)	(.13)	(.16)	(.15)	(.17)
CWC	1.76*	1.83*	3.71***	1.99**	4.09***	2.20*	1.50*	2.37*	1.65	-1.32	-2.05
	(.69)	(.81)	(1.00)	(.70)	(.87)	(1.00)	(.73)	(.98)	(1.28)	(3.51)	(3.00)
N	44	44	44	44	44	44	44	44	44	23	23
adj. R ²	.388	.390	.433	.461	.504	.366	.674	.387	.356	-.088	.207
Baseline geo-graphic controls	—	yes	yes	yes	yes	yes	yes	yes	yes	—	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—	—	—
Neolithic transitions and genetic heterog.	—	—	—	—	—	yes	—	—	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—	—	—
Religiosity	—	—	—	—	—	—	—	yes	—	—	—
Continent FE	—	—	—	—	—	—	—	—	yes	—	—

Notes: Country-level regression of blood donations (panel 1), and out-group trust (panel 2) on cousin marriage preference and the CW-Condition. Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; Column 9 adds continent fixed effects; and Columns 10 and 11 report on the sub-sample that only contains countries where ancestors on average experienced no more than 120 years of Church exposure. Robust standard errors are reported in parentheses. [†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

LINKING THE CW-CONDITION, CHURCH EXPOSURE AND HISTORIC PATRIARCHY

The following section further explores the interdependent relationships between the CW-Condition, church exposure and historic patriarchy. Specifically, we regress the WCE and ECE as well as kinship intensity and cousin marriage preference on the CWC, under the inclusion of additional controls. This model specification builds upon the assumption that the geo-climatic features embodied in the CW-Condition are beyond doubt temporally prior to the influence of the church and levels of patriarchy as suggested by Schulz et al.

SOM-Table S10B.2-17 reports the results from regressing kinship intensity (panel 1), cousin marriage (panel 2), the WCE (panel 3) and the ECE (panel 4) on the CWC. We use the same covariates as used in our previous analyses. As predicted by the CW-Theory, the results reveal that the CWC exerts a significantly negative effect on both historic patriarchy measures. The estimates are robust to the inclusion of additional covariates. Moreover, the CWC shows a significant and strongly positive effect on the WCE, while the CWC's effect on the ECE is considerably weaker, albeit still positive and significant. Since the CWC depicts geo-climatic conditions temporally prior to the WCE, this result strongly suggests that the psychological predispositions incentivized by the CW-Condition have been the decisive selective force behind the Western Church's particular marriage policies.

Supporting this interpretation, SOM-Table S10B.2-17 also shows that the strong negative CW-effect on kinship intensity and cousin marriage preference renders the effect of the WCE and ECE on historic patriarchy substantially insignificant. In fact, the ECE's effect on both historic patriarchy measures is rendered entirely insignificant (except for models 6 and 7). The same applies to the WCE once we account for countries' religiousness and adherence to religions or include continent fixed effects.

SOM-Table S10B.2-17: The Effects of the CWC on the Two Historic Patriarchy Measures, WCE and ECE

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Panel 1: KII									
WCE	-.08*	-.07 [†]	-.08*	-.08*	-.08*	-.12***	-.02	-.05	-.06
	(.04)	(.04)	(.04)	(.04)	(.04)	(.03)	(.03)	(.03)	(.04)
ECE	-.09	-.04	-.10	-.07	-.09 [†]	-.16**	.17**	-.02	-.01
	(.05)	(.06)	(.06)	(.06)	(.06)	(.06)	(.05)	(.06)	(.06)
CWC	-2.16***	-2.23***	-2.64***	-1.86***	-2.87***	-1.52***	-1.79***	-1.95***	-.79
	(.49)	(.45)	(.54)	(.49)	(.56)	(.44)	(.45)	(.53)	(.59)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.446	.467	.512	.486	.487	.668	.688	.446	.611
Panel 2: Log % cousin marriage									
WCE	-.21**	-.11	-.16*	-.17*	-.16*	-.19*	-.02	-.09	.05
	(.07)	(.08)	(.08)	(.08)	(.07)	(.07)	(.06)	(.08)	(.09)
ECE	-.34	.56	-.93	-.48	.51	-2.40	-2.00	.16	-.68
	(2.17)	(2.30)	(2.36)	(2.36)	(2.28)	(2.06)	(2.02)	(2.34)	(1.59)
CWC	-4.02***	-4.66***	-4.94***	-3.31**	-5.41***	-3.81***	-2.75**	-3.95***	-3.13**
	(.79)	(.87)	(1.07)	(1.05)	(.91)	(.78)	(.94)	(1.11)	(1.11)
N	69	69	69	69	69	69	69	55	69
adj. R ²	.655	.692	.726	.726	.745	.785	.821	.682	.763
Panel 3: Western Church Exposure (WCE)									
CWC	9.85***	9.85***	1.59***	9.94***	1.11***	9.90***	1.21***	1.81***	1.40***
	(.77)	(.78)	(1.06)	(.78)	(.94)	(.86)	(.84)	(1.43)	(1.19)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.651	.646	.644	.644	.646	.642	.770	.608	.648
Sample 4: Eastern Church Exposure (ECE)									
CWC	.92*	.80*	-.84*	1.02**	-.52	.47 [†]	.14	.47	-3.37***
	(.35)	(.31)	(.39)	(.36)	(.36)	(.26)	(.20)	(.93)	(.74)
N	145	145	145	145	145	145	145	90	145
adj. R ²	.022	.070	.134	.081	.151	.148	.817	.087	.313
Baseline geo. controls	—	yes	yes	yes	yes	yes	yes	yes	yes
Parasite stress and tropical area	—	—	yes	—	—	—	—	—	—
Irrigation potential	—	—	—	yes	—	—	—	—	—
Suitability for rye and oats	—	—	—	—	yes	—	—	—	—
Neolithic transitions and genetic heter.	—	—	—	—	—	yes	—	—	—
% of adherence to religion	—	—	—	—	—	—	yes	—	—
Religiosity	—	—	—	—	—	—	—	yes	—
Continent FE	—	—	—	—	—	—	—	—	yes

Notes: Country-level regression of kinship intensity (panel 1), cousin marriage preference (panel 2), Western Church Exposure (panel 3) and Eastern Church Exposure (panel 4) on the CW-Condition and Western Church Exposure (WCE) and Eastern Church Exposure (ECE). Regressions in Columns 2-9 control for the geographic baseline (ruggedness, and caloric suitability); Column 3 adds parasite stress and tropical area as control variable; Column 4 adds irrigation potential; Column 5 adds caloric suitability for oats and rye; Column 6 adds ancestor adjusted timing of the Neolithic Transformation and ancestor adjusted genetic heterogeneity; Column 7 adds the fractions of people adhering to major religions (Catholic, Protestant, Orthodox, other Christian, Muslim, Hindu, Buddhist); Column 8 adds religiousness; and Column 9 adds continent fixed effects. Robust standard errors are reported in parentheses.

[†] $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$.

S10B.3 Mediation Results (the World's Countries)

After we have shown that the psychological predispositions incentivized by the CW-Condition have been the decisive selective force behind the Western Church's particular marriage policies, this section investigates through which historic pathways the CW-Condition affects the contemporary individualistic and impersonally prosocial psychology. In doing so, we replicate and extend Schulz et al.'s mediation analyses and further scrutinize the role of the WCE. According to Schulz et al., countries with longer exposure to the Western Church tend to have less intensive kinship ties and, as a consequence, tend to be more individualistic and impersonally prosocial in their populations' psychology today. Thus, kinship intensity is proposed to mediate (part of) the effect of the WCE on individualism and impersonal pro-sociality. By contrast, we argue that the CWC precedes the Western Church's influence and propose that the CW-Condition induced psychological orientations that then became the main determinant of the legitimacy of the Western Church's marriage policies. In particular, according to our theory, the effect of the CWC is most strongly mediated by a specific family formation pattern that channeled the state-building process towards a contractual order, power-sharing arrangements and self-organization. Consequently, the Western Church's marriage regime was embraced by communities that have already evolved more individualistic, less conforming, and more impersonally prosocial for ecological reasons.

With the emergence of agriculture, the CW-Condition allowed households to work large stretches of land autonomously, lowering the demand for child labor and kinship support. This, in turn, decreased fertility pressures and fostered the emergence of the nuclear type of family formation in areas with a pronounced CW-Condition. As a result, the decentralized nature of settlement in CW-regions and the abundance of "open-access" resources shaped a less centralized and less hierarchical social order that built more strongly on contractual arrangements than in agrarian settings based on collectively coordinated and centralized irrigation. CW-induced contractual institutional arrangements shaped meritocratic recruitment, long-term rewarding remuneration, and standardized, impartial procedures which together influenced the development of individualistic and impersonally prosocial psychological orientations.

We test these propositions at the country level in two steps. We first demonstrate that there is no indication that the effect of the WCE is mediated via kinship ties as argued by Schulz et al. Instead, we provide evidence that the WCE and kinship intensity mediate the effects of the CWC. And second, we show that nuclear family patterns and contractual state orders sequentially mediate the effects of the CW-Condition.

To capture the prevalence of nuclear families in the early-mid 19th century and the associated settlement pattern, we combine historical measures of nuclear family systems with levels of total fertility, infant mortality, and average years of schooling into an index of Nuclear Family Pattern (NFP), as described in detail in SOM-Section S8 under "female (reproductive) autonomy."

Furthermore, we use the Kinship Intensity Index (KII) for replication purposes. To cover the extent of contractual arrangements in the state-building process, we combine countries' pre-industrial levels of democracy based on Giuliano and Nunn's Local Democracy Index with

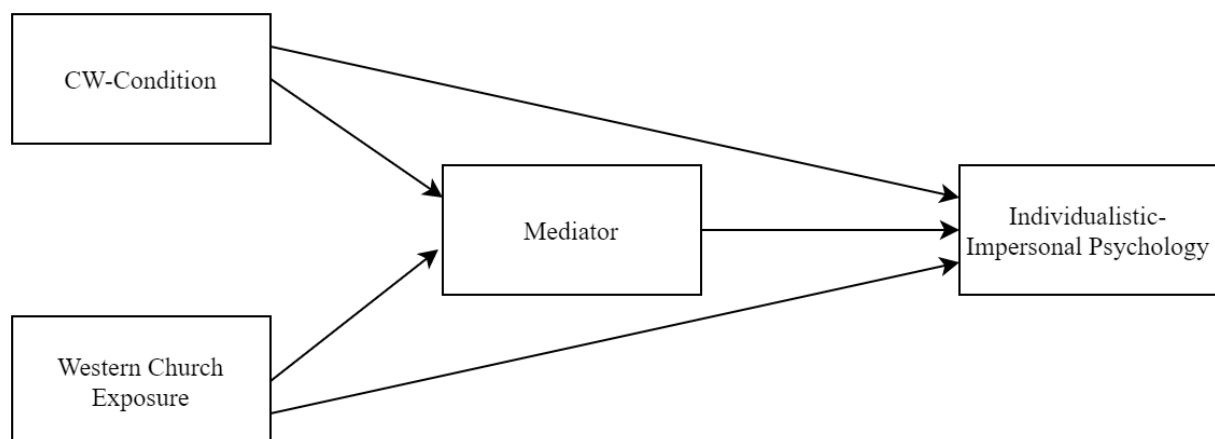
levels of regime corruption and the quality of liberal democracy over the period 1850-1914 using data from the V-Dem project. The three items are combined based on an exploratory factor analysis. The Bartlett test of sphericity is significant at $p < .001$ indicating a significant intercorrelation of the selected concepts. We label this variable Contractual State Order (CSO). As control variables, we account for the influence of terrain ruggedness and caloric suitability. To measure individualism and impersonal pro-sociality, we use the IIP scale as the dependent variable.

We test whether the effects of the CW-Condition operate via the suggested mediators using Structural Equation Modeling (SEM). All models are fitted using Stata's SEM framework with robust full information maximum likelihood (FIML) estimation. Indirect (mediation) effects are then assessed based on two methods: the Adjusted Baron and Kenny's approach and the Zhao, Lynch and Chen's approach using the "medsem" postestimation command. Yet, although we consider the model results as a plausible piece of evidence that lends additional credibility to the CW-Theory they should be interpreted with caution given the relatively small sample size.

THE MEDIATING EFFECTS OF KINSHIP INTENSITY AND NUCLEAR FAMILY PATTERN

SOM-Figure S10B.3-1 visualizes the structure of our mediation model to test whether the effect of the WCE on IIP is mediated via kinship ties. We test the proposed mediation effects of the WCE using two different mediators. In Model M1 we use the Kinship Intensity Index (KII) as a mediating variable, and in Model M2 we specify the Nuclear Family Pattern (NFP) as the mediator. We estimate each of the two models (*a*) without and (*b*) with the control of the CWC as an independent variable in addition to the ECE and WCE.

SOM-Figure S10B.3-1: CW-Condition and Western Church Exposure as Parallel Predictors



Notes: All models also include the exogenous variables' covariances, unexplained error variances, as well as control for the influence of terrain ruggedness and caloric suitability.

SOM-Tables S10B.3-1 and S10B.3-2 summarize the results. Thus, Model 1a suggests that kinship intensity does *not* mediate the effect of the WCE on IIP. This null result does not depend on the inclusion of the CWC as a control variable (Model 1b). Although the estimated regression coefficients have the expected sign, they are insignificant at conventional levels of statistical significance. Yet, there is an indication that the effect of the WCE—though not of the ECE—is mediated by the NFP (Model 2a). However, after controlling for the CWC, which is

itself significantly associated with NFP, the effect of the WCE on the NFP disappears and the mediation effect turns insignificant (Model 2b). By contrast, the effect of the CWC is fully mediated by the NFP (Model 2b). The full mediation (Model 2b) implies that the effects of the CWC on IIP operate mainly via the CWC's positive effect on the NFP. We find additional support for the proposed mediated effects of the CWC via nuclear family pattern for conformity and obedience.

SOM-Table S10B.3-1: The Mediating Effects of KII and NFP on IIP

	Model 1		Model 2	
	(1a)	(1b)	(2a)	(2b)
DV (Mediator)	KII	KII	NFP	NFP
CWC		-.380*** (.092)		.760*** (.151)
WCE	-.577*** (.045)	-.239* (.094)	.769*** (.068)	.141 (.168)
ECE	-.194** (.061)	-.061 (.071)	.250*** (.074)	.023 (.068)
Constant	.704*** (.126)	.959*** (.134)	.948*** (.208)	.116 (.187)
DV (Outcome)	IIP	IIP	IIP	IIP
CWC		.514*** (.097)		.235 (.208)
WCE	.633*** (.054)	.182* (.083)	.161 (.083)	.118 (.097)
ECE	.094 (.050)	-.086 (.068)	-.059 (.069)	-.099 (.071)
KII	-.11 (.067)	-.084 (.064)		
NFP			.700*** (.081)	.436* (.204)
Constant	-.448** (.162)	-.820** (.194)	-1.197*** (.197)	-.959*** (.179)
AIC	1832.504	1561.226	1331.994	1047.681
BIC	1919.013	1673.366	1418.502	1159.821
CD	.595	.62	.614	.808
N	182	182	182	182

Notes: All regressions control for terrain ruggedness and caloric suitability. Robust standard errors are reported in parentheses. AIC = Akaike information criterion, BIC = Bayesian information criterion, CD = Coefficient of Determination * $p < .05$, ** $p < .01$, *** $p < .001$.

SOM-Table S10B.3-2: The Mediating Roles of KII and NFP

Model	X	M	Y	Indirect Effect		Direct Effect X-->Y	Total Effect	Summary
				Sobel	Monte-Carlo			
(1a)	WCE	KII	IIP	.064 (.039)	.064 (.039)	.633*** (.054)	.696*** (.051)	No mediation
(2a)		NFP		.538*** (.078)	.537*** (.079)	.161† (.083)	.699*** (.051)	Full mediation
(1b)	WCE	KII		.020 (.017)	.020 (.018)	.182* (.083)	.202* (.081)	Direct only
(2b)		NFP		.062 (.079)	.061 (.086)	.118 (.097)	.179* (.079)	No mediation
(1b)	CWC	KII		.032 (.025)	.032 (.026)	.514*** (.097)	.546*** (.092)	Direct only
(2b)		NFP		.331* (.169)	.331† (.171)	.235 (.208)	.566*** (.090)	Full mediation

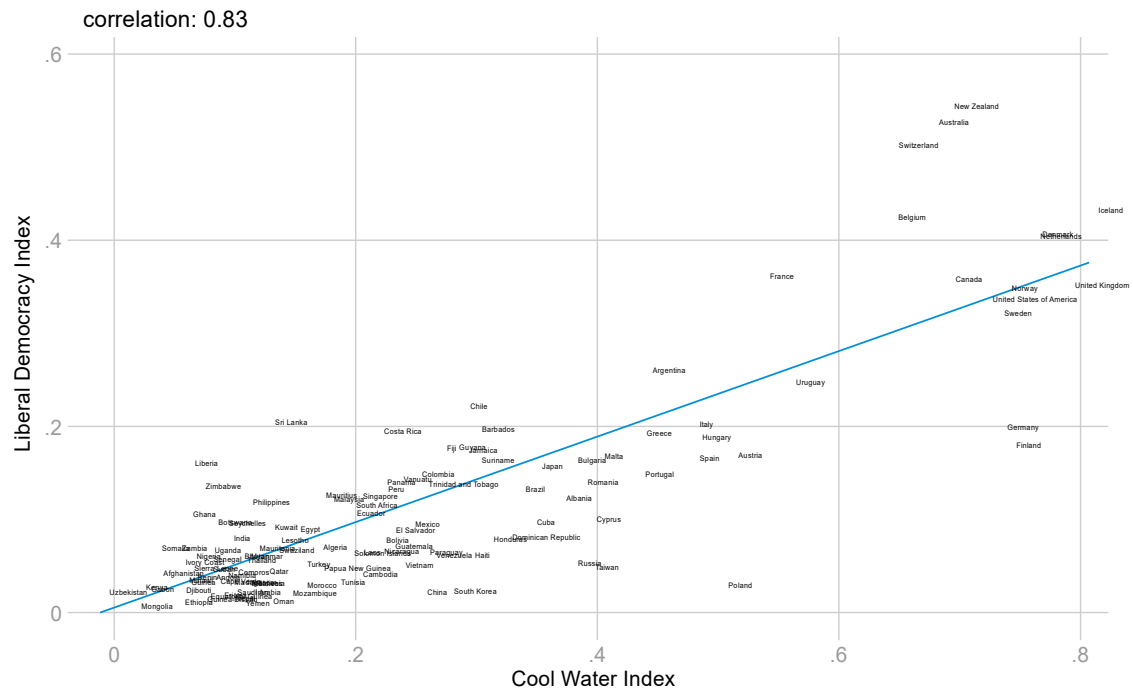
Notes: Monte-Carlo simulations with 10,000 iterations. Standard Errors in parentheses. Standardized coefficients. † $p < .10$ * $p < .05$, ** $p < .01$, *** $p < .001$.

FURTHER MODEL REFINEMENTS

So far, we have demonstrated that the effects of the CWC on IIP operate mainly via the NFP, rather than the WCE. We further refine our model and allow the CWC to affect the contemporary IIP via the historic prevalence of the NFP and the subsequent emergence of CSOs in a sequential mediation model. According to the CW-theory, the decentralized nature of the nuclear family and settlement pattern in CW-regions shaped a less centralized and less hierarchical social order that channeled the state-building process towards contractual institutional arrangements (CIA) with considerable degrees of local self-organization. These CW-induced CIAs further strengthened the development of today's IIP. Consequently, both the NFP and CIAs are expected to sequentially mediate the CWC effects on IIP.

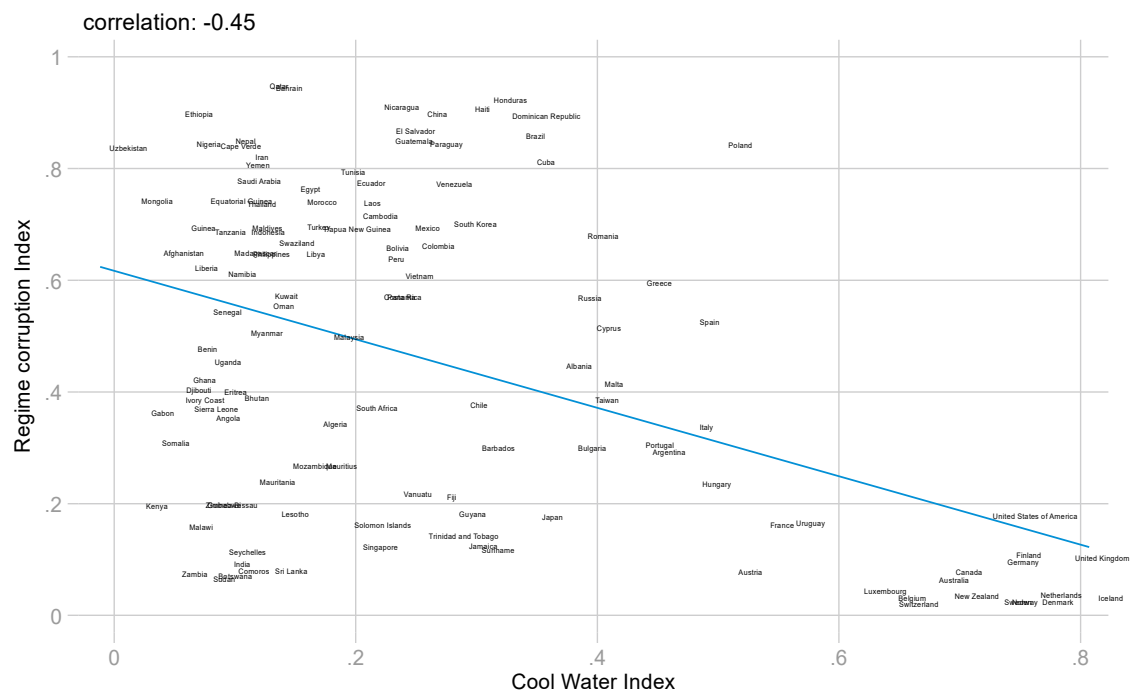
The relationship between the CWC and CIAs is evident in a strong association between the CWC and historic measures of coercive-vs-contractual institutions and patrimonial-vs-impartial government, as visualized by the indicators in SOM-Figures S10B.3-2 and S10B.3-3. Specifically, the CWC accounts for 69 percent of the variation in historic measures of coercive-vs-contractual institutions (averaged across the period 1850 till 1914). Likewise, the CWC's correlation with various historic measures of patrimonial-vs-impartial government ranges from $r = -.40$ to $r = -.66$ (SOM-Table S10B.3-3).

SOM-Figure S10B.3-2: The CWC and Coercive-vs-Contractual Institutions 1850-1914



Source: Varieties of Democracy (V-Dem) Project (op. cit., footnote 4).

SOM-Figure S10B.3-3: The CWC and Patrimonial-vs-Impartial Government 1850-1914



Source: Varieties of Democracy (V-Dem) Project (op. cit., footnote 4).

SOM-Table S10B.3-3: Correlations between the CWC and Various Historic Measures of Contractual/Impartial Governance

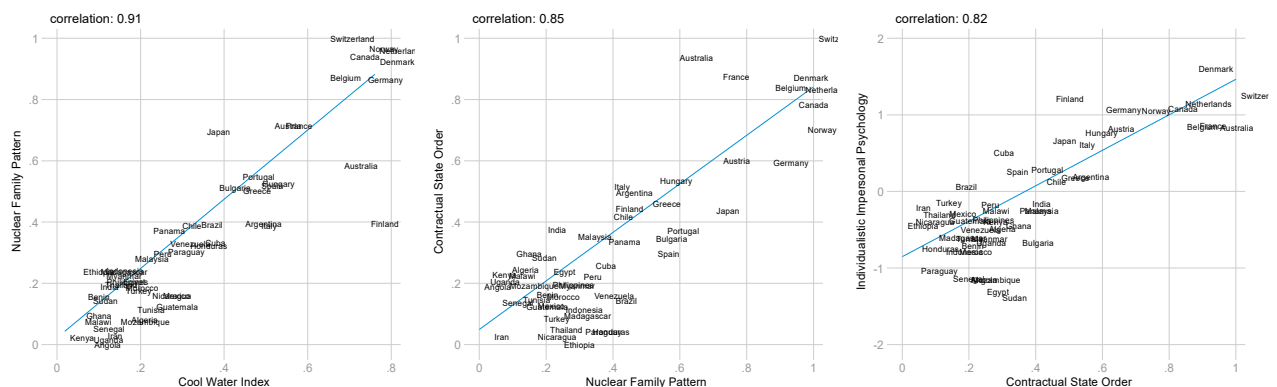
	Correlation (<i>r</i>) with CWC
Electoral democracy index	.82***
Liberal democracy index	.83***
Participatory democracy index	.79***
Neopatrimonial rule index	-.66***
Regime corruption	-.45***
Executive corruption index	-.46***
Public sector corruption index	-.40***
Rule of law index	.62***
<i>N</i>	181

Notes: * $p < .05$, ** $p < .01$, *** $p < .001$. Data on levels of democracy and corruption are averaged over the period 1850-1914.

Against this backdrop, we specify pre-industrial NFPs as the first mediator and industrial-era CIAs as the second mediator of the CWC's effect on contemporary IIP, following Hayes' (op. cit., footnote 184) method of sequential mediation analysis (which uses maximum likelihood estimation with bootstrapped confidence intervals, as available in MPlus' structural equation modelling environment). SOM-Figure S10B.3-4 visualizes the serial bivariate steps included in the sequential mediation model. Though this graphical display contains fewer observations ($N = 53$), we see the strong linear relationships that we observe here as preliminary evidence for the validity of our sequential model.

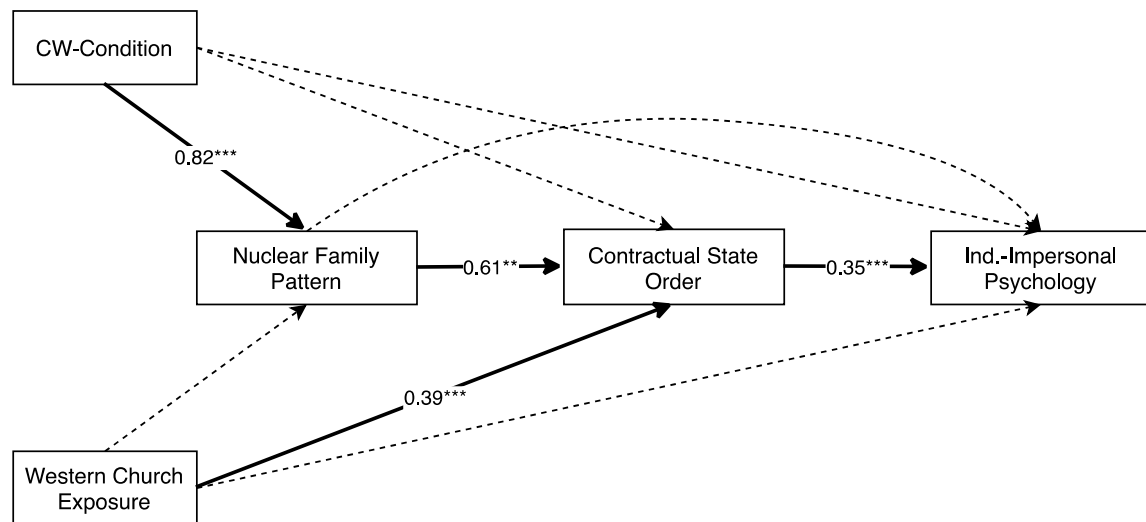
SOM-Figure S10B.3-5 depicts the structure of the full sequential mediation model. To simultaneously account for the potential impact of religious norms, we control the WCE and ECE as well as terrain ruggedness and caloric suitability.

SOM-Figure S10B.3-4: Bivariate Relationships Underlying the Sequential Mediation Model



Notes: The number of observations is reduced to $N = 53$ due to listwise deletion.

SOM-Figure S10B.3-5: Sequential Mediation Model-Structure and Results



Notes: Controls for ECE, terrain ruggedness and caloric suitability. Exogenous variables' covariances included. Dashed paths indicate non-significance below a 5% confidence level. Stars indicate significance levels of bootstrapped (10.000 repetitions) results (***) significance on 1% confidence level. ** significance on 5% confidence level.)

The bootstrapped estimates and their confidence intervals are reported in SOM-Table S10B.3-4. We find strong support for the proposed sequential mediation. While the indirect effect of the CWC via the NFP and CIA on IIP is significant, the indirect effect of the WCE is insignificant. These results convey a straightforward message. Indeed, the decisive mediation of the CWC's powerful impact on contemporary IIP runs via the CWC's effect on pre-industrial NFPs and via their effect on industrial-era CIAs. Vice versa, the seemingly mediating role of the WCE with regard to the CWC's effect on IIP turns out to be elusive.

SOM-Table S10B.3-4: Bootstrapped Confidence Intervals (CI) of Sequential Mediation Model

	Estimate (<<< 95% CI >>>)
INDIRECT EFFECTS	
from CWC to IIP (CWC → NFP → CIA → IIP)	.02 <<< .18 >>> .60
from WCE to IIP (WCE → NFP → CIA → IIP)	-.05 <<< .02 >>> .14
TOTAL EFFECTS	
from CWC to IIP	.48 <<< .65 >>> .80
from WCE to IIP	.01 <<< .15 >>> .30
DIRECT EFFECTS	
NFP regressed on:	
CWC	.45 <<< .82 >>> 1.12
WCE	-.20 <<< .08 >>> .44
CIA regressed on:	
NFP	.13 <<< .61 >>> 1.11
CWC	-.65 <<< -.08 >>> .31
WCE	.14 <<< .39 >>> .61

IIP regressed on:	
CIA	.02 <<< .35 >>> .70
NFP	-.84 <<< .05 >>> .72
CWC	-.11 <<< .46 >>> .98
WCE	-.01 <<< -.23 >>> .24
Intercepts	
Individualistic-Impersonal Psychology (IIP)	-1.20 <<< -1.61 >>> -.75
Contractual Institutional Arrangements (CIA)	.25 <<< .63 >>> 1.06
Nuclear Family Pattern (NFP)	-.51 <<< -.09 >>> .26
Residual	
Individualistic-Impersonal Psychology (IIP)	.28 <<< .36 >>> .51
Contractual Institutional Arrangements (CIA)	.18 <<< .26 >>> .40
Nuclear Family Pattern (NFP)	.11 <<< .18 >>> .31

Notes: Bootstrap replications (10,000). Maximum Likelihood Estimation. Sequential Mediation Model is estimated using Mplus' "Model Indirect" command controlling for Eastern Church Exposure, terrain ruggedness and caloric suitability. $N = 154$. Proportion Mediated from CWI to IIP: 26.8%

Interestingly, if we replace the industrial-era “contractual institutional arrangement” (CIA) measure used in this mediation analysis with the “cognitive (lifetime) investment” (CII) measure used in the path analysis of SOM-Section S8, we obtain almost identical results. That is, we can use both the CIA or the CII (which both are temporally located in the same layer of the early industrialization era around 1900 CE), and specify either of them as the second sequential mediator after the NFP—and the results won’t change. We just cannot use the CIA and CII simultaneously because they are (not only temporally) but also statistically so strongly overlapping that they cannot be disentangled. In other words, contractual institutional arrangements and cognitive lifetime investments are almost perfect surrogates of each other in any sequential mediation model running from the timeless CWC via the pre-industrial NFP to the contemporary IIP (same result when replacing the IIP with the HEI as the final outcome variable in the mediation sequence).

This result is intriguing insofar as the CIA and CII are historic societal variables of a categorically different type—or at least it seems so at first glance. Indeed, while the CIA measures meta-structures at the governmental setup of societies top-down, the CII measures mass patterns of demographic behavior bottom-up.

So, how can the two be so inter-changeable? It really seems like a far fetch. But not so in light of the CW-Theory! The section in Chapter 8 of the book manuscript titled “Consent and Command as Co-axial Principles” elaborates on precisely this issue. The basic idea is that there is a continuum of co-axial organizational principles from which societies cannot escape. The next idea is that this continuum ranges from “command” at one polar end to “consent” at the opposite end of how to organize social alliances. The third idea, eventually, is that the way in which societies organize their alliances and proceedings at the top (i.e., states) and at the bottom (i.e., families) must be minimally congruent to create a viable equilibrium. Seen in this theoretical light, the tight CIA-CII association is all but surprising. It is instead quite illuminating, showing that patriarchal structures at the floor of societies coincide with coercive structures at the ceiling (i.e., the co-axial principle of “command”), as much as egalitarian structures in families correspond with contractual states (i.e., the principle of “consent”). The CII-CIA correlation documents this co-axial link, while the CW-Theory explains it.

S10B.4 Province-level Results (Sub-national, Europe)

This section uses province-level data to investigate the effect of the CWC and church exposure on individuals' (1) generalized fairness, (2) generalized trust, (3) conformity-obedience and (4) individualism-independence. In principle, our analysis is identical to that of Schulz et al. with the exception that we employ multilevel modeling because it is the only method that adequately takes into account the nested spatial structure of the data: individuals situated inside sub-national provinces. When individuals are nested in spatial units, ignoring the inter-dependence between individual-level and context-level characteristics leads to inefficient estimations and biased standard errors, which may result in artificially significant effects. The intraclass correlation ranges from .06 for conformity to .18 for trust, indicating that multilevel modeling is indeed the appropriate method to analyze these data. Accordingly, we estimate random intercept multilevel models to predict individual-level psychological outcomes by both the individual-level characteristics as well as characteristics of the sub-national context. Additionally, we control for wave-specific fixed effects.

To compare the effects of the WCE versus those of the CWC, we follow Schulz et al. and use the same sample of sub-national provinces covered by the European Social Survey (ESS). In addition, we analyze in a separate step a smaller sample of sub-national ESS-provinces for which weather-station data are available that allow us to construct a more nuanced, information-rich and valid measure of the CWC.

Following Schulz et al., we use the same set of outcome variables and the same set of control variables. The latter include province territories' ruggedness, elevation, precipitation, temperature, rivers and lakes, irrigation potential and caloric suitability for rye and oat. Further controls include the provinces' integration into the Roman Empire (based on Roman roads), the presence of medieval universities and monasteries, population density in 500 CE and incorporation within either the Carolingian Empire (814 CE) or the Soviet Bloc (1948 CE). At the individual level, we control for respondents' religiosity and socio-economic characteristics, including education, income, employment status, and whether individuals live in rather urban or rural areas.

FULL SAMPLE OF EUROPEAN PROVINCES

The results of the multilevel analyses are displayed in SOM-Tables S10B.4-1 to S10B.4-5. The evidence documents a robust relationship between the CWC and the various psychological outcomes. All regressions paint a consistent picture: a stronger CWC enhances respondents' levels of generalized trust, fairness and individualism, and diminishes levels of conformity and obedience. Consistent with the CW-Theory, the CWC predicts each outcome variable considerably better than the WCE, while accounting for respondents' religiosity and socio-economic background (including education, income, and employment status, as well as residential environment). Moreover, the findings are robust to the inclusion of province territories' ruggedness and caloric suitability. Importantly, the relationships with the CWC remain strong and significant, even after controlling for these additional geographical conditions.¹⁶⁹ The effects of the CWC are also robust to controlling for provincial territories historic integration into the Roman Empire, the Carolingian Empire or the Soviet Bloc. Furthermore, controlling for the presence of medieval universities and monasteries, and the density of the population in 500 CE does not alter the results.

¹⁶⁹ Yet, given that the CW-Condition is itself a geo-climatic variable based on latitude and coastal proximity, it is not surprising that the inclusion of several of its components as separate controls dampens the CW-effect somewhat.

SOM-Table S10B.4-1: Descriptive Statistics for Europe's Sub-national Provinces I

	<i>N</i>	Mean	<i>SD</i>	Min	Max
LEVEL 2 (Province-level characteristics)					
Distance to coast (km)	440	163.8	172.5	0.3	1113.3
Absolute latitude	440	49.01	7.07	28.34	68.84
Ruggedness (100m)	440	1.17	1.34	0.01	7.44
Caloric suitability	440	1578	630	0	2791
Length of Roman roads (in km) per area (in km ²)	440	.02	.03	0	.2
Socialist exposure	440	.43	.5	0	1
Carolingian empire (% of region part of)	440	.28	.45	0	1
Medieval Exposure to Premonstratensians monastic house	440	.36	.41	0	1
Medieval Exposure to Franciscan monastic house	440	.54	.44	0	1
Medieval Exposure to Dominican monastic house	440	.52	.42	0	1
Medieval Exposure to Cluny monastic house	440	.07	.21	0	1
Medieval Exposure to Cistercians monastic house	440	.44	.43	0	1
Medieval University exposure	440	.39	.80	0	4.5
Medieval bishopric density	440	.0001	.0002	0	.002
Population density 500 AD	440	1426	8466	.83	174,256
Western Church exposure	440	4.26	3.73	0	10
CW-Condition	440	.59	.13	.35	.93
LEVEL 1 (Individual-level characteristics)					
Generalized fairness	228,274	.01	1	-2.31	1.93
Generalized trust	229,741	.01	1	-1.94	2.07
Conformity-obedience	209,255	.02	1	-4.70	4.16
Individualism-independence	209,255	.00	1	-5.43	4.06
Age	229,669	48.37	18.69	14	110
Age squared	229,669	2688.39	1870.76	196	12100
Female	230,363	.54	.5	0	1
Education	230,489	1.17	.64	0	2
Income	230,489	1.08	.75	0	2
Unemployed (actively looking for job, last 7 days)	230,489	.05	.21	0	1
Unemployed (not actively looking, last 7 days)	230,489	.02	.15	0	1
Religiousness (how religious are you?)	230,489	4.69	3.02	0	10
City size/ Residential environment (urban vs. rural)	230,489	2.93	1.21	1	5

SOM-Table S10B.4-2: The Effects of the CWC and WCE on Individuals' Generalized Fairness

		Generalized fairness									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	.04*** (.003)	.04*** (.003)	.05*** (.003)	.05*** (.003)	.04*** (.004)	.04*** (.003)	.03*** (.005)	.05*** (.003)	.04*** (.003)	.04*** (.003)
	CWC	2.11*** (.093)	.88*** (.114)	.54*** (.141)	.90*** (.114)	.91*** (.112)	.87*** (.113)	1.00*** (.115)	.93*** (.114)	.76*** (.113)	.89*** (.113)
LEVEL 1	Age	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)	-.01*** (.001)
	Age squared	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)
	Female	.05*** (.004)	.05*** (.004)	.05*** (.004)	.05*** (.004)	.05*** (.004)	.05*** (.004)	.05*** (.004)	.04*** (.004)	.06*** (.004)	.05*** (.004)
	Constant	.10*** (.020)	.13*** (.018)	.15*** (.024)	.13*** (.018)	.12*** (.018)	.13*** (.018)	.13*** (.018)	.14*** (.018)	.26*** (.018)	.13*** (.018)
	Individuals	227,388	227,388	226,187	227,388	227,388	227,388	227,388	227,388	227,388	227,388
	Regions	440	440	436	440	440	440	440	440	440	440
	chi2	16647	12174	10187	11859	10716	12001	11515	12162	12276	12161
	Variance RI	.083	.054	.049	.054	.052	.053	.052	.055	.054	.054
	Variance residual	.848	.848	.847	.848	.848	.848	.848	.847	.837	.848
	R ² _SB_L1	.095	.124	.128	.124	.125	.124	.126	.125	.134	.124
	R ² _SB_L2	.517	.678	.703	.681	.688	.682	.692	.676	.678	.679
CONTROLS											
LEVEL 2	Ruggedness & Caloric suitability	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include precipitation, temperature, presence of rivers and lakes, elevation, caloric suitability for rye and oat, and irrigation potential. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscans, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .10$, ** $p < .05$, *** $p < .01$.

SOM-Table S10B.4-3: The Effects of the CWC and WCE on Individuals' Generalized Trust

		Generalized trust									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	.03*** (.004)	.04*** (.003)	.04*** (.004)	.04*** (.004)	.04*** (.004)	.03*** (.003)	.02*** (.006)	.04*** (.003)	.03*** (.003)	.04*** (.003)
	CWC	2.36*** (.099)	1.23*** (.129)	.59*** (.159)	1.22*** (.130)	1.23*** (.130)	1.21*** (.128)	1.28*** (.131)	1.29*** (.130)	1.06*** (.127)	1.25*** (.129)
LEVEL 1	Age	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.00*** (.001)	-.01*** (.001)	-.00*** (.001)
	Age squared	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00*** (.000)	.00 (.000)
	Female	-.03*** (.004)	-.03*** (.004)	-.03*** (.004)	-.03*** (.004)	-.03*** (.004)	-.03*** (.004)	-.03*** (.004)	-.05*** (.004)	-.03*** (.004)	-.03*** (.004)
	Constant	.06*** (.021)	.09*** (.019)	.12*** (.026)	.09*** (.019)	.09*** (.020)	.09*** (.019)	.10*** (.019)	.11*** (.019)	.24*** (.019)	.09*** (.019)
	Individuals	228,844	228,844	227,639	228,844	228,844	228,844	228,844	228,844	228,844	228,844
	Regions	440	440	436	440	440	440	440	440	440	440
	chi2	18229	14767	12192	14736	13995	14376	14136	14776	14894	14706
	Variance RI	.0993	.0742	.0636	.0743	.0742	.0721	.0702	.0755	.0712	.0738
	Variance residual	.841	.841	.841	.841	.841	.841	.841	.839	.827	.841
	R ² SB_L1	.0863	.111	.120	.111	.111	.113	.115	.111	.128	.111
	R ² SB_L2	.447	.582	.636	.581	.582	.593	.603	.575	.598	.584
CONTROLS											
LEVEL 2	Ruggedness & Caloric suitability	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include precipitation, temperature, presence of rivers and lakes, elevation, caloric suitability for rye and oat, and irrigation potential. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscan, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .1$, ** $p < .05$, *** $p < .01$.

SOM-Table S10B.4-4: The Effects of the CWC and WCE on Individuals' Conformity-obedience

		Conformity-obedience									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	-.03*** (.003)	-.03*** (.003)	-.03*** (.003)	-.03*** (.003)	-.02*** (.003)	-.03*** (.003)	-.02*** (.005)	-.03*** (.003)	-.03*** (.003)	-.03*** (.003)
	CWC	-.82*** (.074)	-.54*** (.105)	-.23* (.132)	-.51*** (.105)	-.56*** (.104)	-.53*** (.105)	-.68*** (.103)	-.36*** (.104)	-.43*** (.105)	-.58*** (.105)
LEVEL 1	Age	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.03*** (.001)	.02*** (.001)
	Age squared	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	.00 (.000)	-.00*** (.000)	-.00*** (.000)	.00 (.000)
	Female	.13*** (.004)	.13*** (.004)	.13*** (.004)	.13*** (.004)	.13*** (.004)	.13*** (.004)	.13*** (.004)	.07*** (.004)	.12*** (.004)	.13*** (.004)
	Constant	-1.04*** (.018)	-1.04*** (.018)	-1.07*** (.023)	-1.04*** (.018)	-1.04*** (.018)	-1.04*** (.018)	-1.04*** (.017)	-.98*** (.017)	-1.15*** (.018)	-1.03*** (.018)
	Individuals	208,587	208,587	207,505	208,587	208,587	208,587	208,587	208,587	208,587	208,587
	Regions	440	440	436	440	440	440	440	440	440	440
	chi2	10779	10710	10429	10223	9402	10003	9313	10955	10869	10569
	Variance RI	.0467	.0449	.0422	.0441	.0432	.0443	.0395	.0440	.0446	.0446
	Variance residual	.770	.770	.771	.770	.770	.770	.770	.747	.760	.766
	R ² SB_L1	.179	.181	.184	.182	.183	.182	.186	.205	.191	.185
	R ² SB_L2	.158	.187	.235	.201	.215	.197	.277	.205	.193	.192
CONTROLS											
LEVEL 2	Ruggedness & Caloric suitability	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include precipitation, temperature, presence of rivers and lakes, elevation, caloric suitability for rye and oat, and irrigation potential. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscans, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

SOM-Table S10B.4-5: The Effects of the CWC and WCE on Individuals' Individualism-independence

		Individualism-independence									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	.04*** (.003)	.04*** (.002)	.04*** (.003)	.04*** (.002)	.03*** (.003)	.04*** (.002)	.02*** (.004)	.04*** (.002)	.04*** (.002)	.04*** (.002)
	CWC	1.06*** (.073)	.31*** (.092)	.04 (.115)	.32*** (.093)	.32*** (.091)	.24*** (.090)	.45*** (.088)	.24*** (.092)	.20** (.093)	.33*** (.092)
LEVEL 1	Age	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.00*** (.001)	.01*** (.001)
	Age squared	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)
	Female	-.10*** (.004)	-.10*** (.004)	-.10*** (.004)	-.10*** (.004)	-.10*** (.004)	-.10*** (.004)	-.10*** (.004)	-.07*** (.004)	-.10*** (.004)	-.10*** (.004)
	Constant	.00 (.018)	.02 (.018)	.04* (.022)	.02 (.018)	.01 (.018)	.02 (.018)	.03 (.018)	-.01 (.018)	.15*** (.018)	.01 (.018)
	Individuals	208,587	208,587	207,505	208,587	208,587	208,587	208,587	208,587	208,587	208,587
	Regions	440	440	436	440	440	440	440	440	440	440
	chi2	6222	5211	4836	5201	4676	4886	3997	5273	5327	5147
	Variance RI	.0424	.0317	.0300	.0316	.0303	.0290	.0252	.0317	.0319	.0314
	Variance residual	.920	.920	.921	.920	.920	.920	.920	.915	.905	.919
	R ² SB_L1	.0569	.0674	.0692	.0675	.0688	.0701	.0738	.0729	.0817	.0688
	R ² SB_L2	.479	.597	.617	.599	.613	.627	.669	.597	.597	.601
CONTROLS											
LEVEL 2	Ruggedness & Caloric suitability	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include precipitation, temperature, presence of rivers and lakes, elevation, caloric suitability for rye and oat, and irrigation potential. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscans, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

SUB-SAMPLE OF EUROPEAN PROVINCES

The results of the second set of multilevel analyses are documented in SOM-Tables S10B.4-6 to S10B.4-10. As before, yet based on a more nuanced measure of the CWC, the prediction of the four psychological and behavioral outcomes (i.e., generalized fairness, generalized trust, conformity-obedience and individualism-independence) improve considerably. Strengthening the findings of the previous section, we find powerfully positive effects of the CWC on generalized fairness, generalized trust and individualism-independence, and a similarly powerful negative effect of the CWC on conformity-obedience. The results are robust to a number of different model specifications. By contrast, after controlling for the CWCondition, the effect of the WCE on fairness and trust turns insignificant or negative. Similarly, the effect of the WCE on conformity-obedience and individualism-independence turns insignificant in some specification. All the while, the effects of the CWC are statistically significant in every model specification.

SOM-Table S10B.4-6: Descriptive Statistics (Sub-national Provinces II)

		<i>N</i>	<i>Mean</i>	<i>SD</i>	<i>Min</i>	<i>Max</i>
LEVEL 2 (Regional-level characteristics)	Elevation (100m)	185	2.18	2.59	-.03	17.38
	Ruggedness (100m)	185	.67	.93	.01	6.66
	Caloric suitability for rye (rain-fed)	185	9623	2891	157	12884
	Caloric suitability for oat (rain-fed)	185	6145	1652	131	7644
	Roman roads (Length in km) per area (in km ²)	185	.02	.03	0	.20
	Socialist exposure	185	.25	.43	0	1
	Carolingian empire (% of region part of)	185	.33	.46	0	1
	Medieval Exposure to Premonstratensians monastic house	185	.45	.41	0	1
	Medieval Exposure to Franciscan monastic house	185	.63	.42	0	1
	Medieval Exposure to Dominican monastic house	185	.62	.39	0	1
	Medieval Exposure to Cluny monastic house	185	.10	.25	0	1
	Medieval Exposure to Cistercians monastic house	185	.57	.41	0	1
	Medieval University exposure	185	.50	.83	0	3.5
	Medieval bishopric density	185	.00	.00	0	.00
	Population density 500AD	185	836	1044	1.90	9857
	Western Church Exposure	185	5.19	3.48	0	1.00
	CW-Condition	185	.54	.18	.18	.87
LEVEL 1 (Individual-level characteristics)	Generalized fairness	108,961	.15	.93	-2.31	1.93
	Generalized trust	109,504	.15	.94	-1.94	2.07
	Conformity-obedience	102,093	-.05	1.02	-4.7	4.16
	Individualism-independence	102,093	.10	1.01	-5.18	4.06
	Age	109,396	49.03	18.66	14	103
	Age squared	109,396	2751.64	1882.92	196	10609
	Female	109,747	.53	.50	0	1
	Education	109,809	.60	.32	0	1
	Income	109,809	.56	.38	0	1
	Unemployed (actively looking for job, last 7 days)	109,809	.04	.21	0	1
	Unemployed (not actively looking, last 7 days)	109,809	.02	.14	0	1
	Religiousness (How religious are you)	109,809	.44	.30	0	1
	City size/ Residential environment (urban vs. rural)	109,809	.50	.30	0	1

SOM-Table S10B.4-7: The Effects of the CWC and WCE on Individuals' Generalized Fairness

		Generalized fairness									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	-.01*	-.01	.01	-.00	-.02***	-.03***	-.00	-.01	-.01	-.01
	CWC	2.14***	2.07***	1.57***	1.97***	1.96***	1.05***	1.84***	2.07***	2.04***	2.09***
		(.005)	(.005)	(.006)	(.006)	(.006)	(.004)	(.009)	(.005)	(.005)	(.006)
		(.220)	(.234)	(.234)	(.239)	(.225)	(.200)	(.246)	(.234)	(.232)	(.239)
LEVEL 1	Age	-.01***	-.01***	-.01***	-.01***	-.01***	-.01***	-.01***	-.01***	-.02***	-.01***
	Age squared	.00***	.00***	.00***	.00***	.00***	.00***	.00***	.00***	.00***	.00***
	Female	.05***	.05***	.05***	.05***	.05***	.05***	.05***	.04***	.06***	.05***
	Constant	.24***	.24***	.24***	.24***	.22***	.22***	.27***	.26***	.40***	.24***
		(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)	(.001)
		(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)	(.000)
		(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)	(.005)
		(.038)	(.038)	(.035)	(.038)	(.037)	(.031)	(.038)	(.038)	(.038)	(.038)
	Individuals	108,522	108,522	108,522	108,522	108,522	108,522	108,522	108,522	108,522	108,522
	Regions	185	185	185	185	185	185	185	185	185	185
	chi2	6929	6837	6102	6690	6287	4733	6007	6851	6850	6767
	Variance RI	.0547	.0544	.0438	.0536	.0496	.0311	.0492	.0545	.0535	.0543
	Variance residual	.781	.781	.781	.781	.781	.781	.781	.779	.767	.781
	R ² SB L1	.0461	.0464	.0585	.0474	.0519	.0731	.0524	.0482	.0633	.0466
	R ² SB L2	.400	.402	.512	.411	.452	.645	.456	.402	.412	.403
CONTROLS											
LEVEL 2	Ruggedness	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, empl	—	—	—	—	—	—	—	—	yes	—
	City size & pop. density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include elevation as well as caloric suitability for rye and oat. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscan, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .1$, ** $p < .05$, *** $p < .01$.

SOM-Table S10B.4-8: The Effects of the CWC and WCE on Individuals' Generalized Trust

		Generalized Trust									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	-.03*** (.006)	-.03*** (.006)	-.02** (.006)	-.03*** (.007)	-.04*** (.007)	-.05*** (.005)	-.01 (.009)	-.03*** (.006)	-.03*** (.006)	-.03*** (.006)
	CW-Condition	1.79*** (.233)	1.73*** (.247)	1.16*** (.245)	1.69*** (.255)	1.70*** (.248)	.68*** (.214)	1.54*** (.257)	1.73*** (.247)	1.70*** (.246)	1.70*** (.253)
LEVEL 1	Age	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.00 (.001)	-.01*** (.001)	-.00 (.001)
	Age squared	-.00 (.000)	-.00 (.000)	-.00 (.000)	-.00 (.000)	-.00 (.000)	-.00 (.000)	-.00 (.000)	-.00* (.000)	.00*** (.000)	-.00 (.000)
	Female	-.03*** (.005)	-.03*** (.005)	-.03*** (.005)	-.03*** (.005)	-.03*** (.005)	-.03*** (.005)	-.03*** (.005)	-.04*** (.005)	-.02*** (.005)	-.03*** (.005)
	Constant	.21*** (.039)	.20*** (.040)	.21*** (.036)	.20*** (.040)	.20*** (.040)	.19*** (.033)	.24*** (.039)	.23*** (.040)	.39*** (.039)	.20*** (.040)
	Individuals	109,060	109,060	109,060	109,060	109,060	109,060	109,060	109,060	109,060	109,060
LEVEL 1	Regions	185	185	185	185	185	185	185	185	185	185
	chi2	7521	7460	5943	7458	7458	4591	6348	7491	7510	7459
	Variance RI	.0614	.0612	.0481	.0611	.0609	.0357	.0538	.0613	.0604	.0612
	Variance residual	.788	.788	.788	.788	.788	.788	.788	.785	.770	.788
	R ² SB_L1	.0536	.0538	.0685	.0539	.0543	.0823	.0621	.0568	.0753	.0544
	R ² SB_L2	.421	.423	.541	.424	.427	.652	.490	.423	.432	.424
CONTROLS											
LEVEL 2	Ruggedness	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
LEVEL 1	Monastic presence	—	—	—	—	—	—	yes	—	—	—
	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, empl.	—	—	—	—	—	—	—	—	yes	—
	City size & pop. density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include elevation as well as caloric suitability for rye and oat. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscan, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .1$, ** $p < .05$, *** $p < .01$.

SOM-Table S10B.4-9: The Effects of the CWC and WCE on Individuals' Conformity-obedience

		Conformity-obedience									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	-.01*** (.005)	-.02*** (.005)	-.03*** (.006)	-.01* (.006)	-.01 (.006)	-.01*** (.005)	-.00 (.007)	-.02*** (.005)	-.02*** (.005)	-.01** (.005)
	CWC	-.65*** (.195)	-.52** (.206)	-.74*** (.218)	-.61*** (.210)	-.44** (.200)	-.33 (.227)	-.37* (.209)	-.51** (.206)	-.52** (.207)	-.65*** (.205)
LEVEL 1	Age	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.02*** (.001)	.03*** (.001)	.02*** (.001)
	Age squared	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00*** (.000)	.00 (.000)	-.00*** (.000)	.00*** (.000)
	Female	.09*** (.006)	.09*** (.006)	.09*** (.006)	.09*** (.006)	.09*** (.006)	.09*** (.006)	.09*** (.006)	.04*** (.006)	.09*** (.006)	.09*** (.006)
	Constant	-1.11*** (.035)	-1.10*** (.035)	-1.10*** (.034)	-1.11*** (.035)	-1.09*** (.034)	-1.10*** (.035)	-1.10*** (.034)	-1.01*** (.035)	-1.22*** (.035)	-1.09*** (.034)
	Individuals	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731
CONTROLS	Regions	185	185	185	185	185	185	185	185	185	185
	chi2	5537	5344	4794	5093	4467	4991	3946	5518	5448	4476
	Variance RI	.0420	.0412	.0369	.0404	.0381	.0403	.0343	.0411	.0416	.0389
	Variance residual	.813	.813	.813	.813	.813	.813	.813	.788	.804	.810
	R ² SB_L1	.170	.171	.175	.172	.174	.172	.178	.196	.180	.177
	R ² SB_L2	.0504	.0673	.157	.0831	.131	.0855	.211	.0706	.0592	.115
LEVEL 2	Ruggedness	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include elevation as well as caloric suitability for rye and oat. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscans, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .1$, ** $p < .05$, *** $p < .01$.

SOM-Table S10B.4-10: The Effects of the CWC and WCE on Individuals' Individualism-independence

		Individualism-independence									
		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
LEVEL 2	WCE	.01*** (.004)	.01*** (.004)	.02*** (.005)	.02*** (.005)	.00 (.005)	.00 (.004)	-.00 (.006)	.01*** (.004)	.01*** (.004)	.01** (.004)
	CWC	1.11*** (.161)	1.12*** (.171)	1.05*** (.186)	1.09*** (.176)	1.04*** (.163)	.47*** (.160)	1.15*** (.182)	1.12*** (.171)	1.11*** (.171)	1.25*** (.169)
LEVEL 1	Age	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.01*** (.001)	.00*** (.001)	.01*** (.001)
	Age squared	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)	-.00*** (.000)
	Female	-.06*** (.006)	-.06*** (.006)	-.06*** (.006)	-.06*** (.006)	-.06*** (.006)	-.06*** (.006)	-.06*** (.006)	-.03*** (.006)	-.06*** (.006)	-.06*** (.006)
	Constant	.01 (.032)	.01 (.032)	.01 (.031)	.01 (.032)	-.00 (.031)	.00 (.029)	.00 (.032)	-.03 (.032)	.14*** (.032)	.01 (.031)
	Individuals	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731	101,731
LEVEL 1	Regions	185	185	185	185	185	185	185	185	185	185
	chi2	2365	2324	2227	2325	1962	1722	2031	2354	2370	1888
	Variance RI	.0271	.0271	.0254	.0270	.0239	.0181	.0246	.0272	.0272	.0249
	Variance residual	.965	.965	.965	.965	.965	.965	.965	.960	.953	.965
	R ² SB_L1	.0211	.0211	.0228	.0212	.0243	.0301	.0236	.0267	.0334	.0236
	R ² SB_L2	.296	.296	.334	.297	.369	.500	.352	.295	.295	.346
CONTROLS											
LEVEL 2	Ruggedness	—	yes	yes	yes	yes	yes	yes	yes	yes	yes
	Geographic controls	—	—	yes	—	—	—	—	—	—	—
	Roman roads	—	—	—	yes	—	—	—	—	—	—
	Carolingian Empire	—	—	—	—	yes	—	—	—	—	—
	Socialist	—	—	—	—	—	yes	—	—	—	—
	Monastic presence	—	—	—	—	—	—	yes	—	—	—
LEVEL 1	Religiosity	—	—	—	—	—	—	—	yes	—	—
	Education, income, employment	—	—	—	—	—	—	—	—	yes	—
	City size & population density	—	—	—	—	—	—	—	—	—	yes
	Wave FE	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes: Geographic controls include elevation as well as caloric suitability for rye and oat. Monastic presence is controlled by including Medieval Exposure to Premonstratensians, Franciscan, Dominican, Cluny, and Cistercians monastic house, as well as Medieval university exposure, and Medieval Bishopric density. LEVEL 1 = Individual-level characteristics, LEVEL 2 = Regional-level characteristics. * $p < .1$, ** $p < .05$, *** $p < .01$.

S11 A Strictly Consistent CW-Measure

The analyses in SOM-Section S10 operate with different operationalizations of the CWC, depending which information is available on which domain of evidence (i.e., the world's countries, Europe's sub-national provinces, pre-industrial local communities around the globe). Functionally speaking, the different CW-measures are synonymous in that higher scores on either version of the CWC always mean cooler seasons (especially cooler summers) and more steady rainfall across the seasons on a decently high base level. Still, the operationalizations differ in detail.

This can be seen as a strength or a weakness. For one, the fact that the emancipatory effects of the CWC show up on different domains of evidence with different operationalizations of the CWC should lend credibility to the conclusion that—no matter how in detail one operationalizes the CWC—its emancipatory results are real. On the other hand, some critics might suspect that we tailor the measurement of the CWC to achieve optimal results and that we use on each domain of evidence whatever version of the CWC that yields the desired outcomes.

Against this suspicion, this SOM section presents a strictly consistent CWC measure that only combines information (following the exact same recipe) available on all three domains of evidence. This consistent CWC measure is suboptimal because it incorporates less information in less theoretical sophistication than our original country-level CWC measure. Nevertheless, across all three domains of evidence, even this sub-optimal (yet domain-consistent) CWC measure replicates the results shown in SOM-Section S10: The CWC associates with the expected emancipatory outcomes with respect to strengthening the nuclear family pattern (NFP) and weakening kinship intensity indicators (KII). This section presents the evidence.

S11.1 The CW-Measure Re-Operationalized

To create a consistent measure of the CW-Condition's gradual absence-vs-presence across the three domains of evidence, we invert each observation unit's (i.e., countries, provinces, localities) average annual temperature and multiply it by its standard deviation. The multiplication by the standard deviation ascertains that we do not maximize permanency in coldness but allow for seasonal change that at least includes mildly warm summers.¹⁷⁰

To capture steady rainfall, we multiply each unit's annual mean level of precipitation with its *inverted* standard deviation. The multiplication by the inverse standard deviation downgrades average rainfall for seasonal discontinuity.

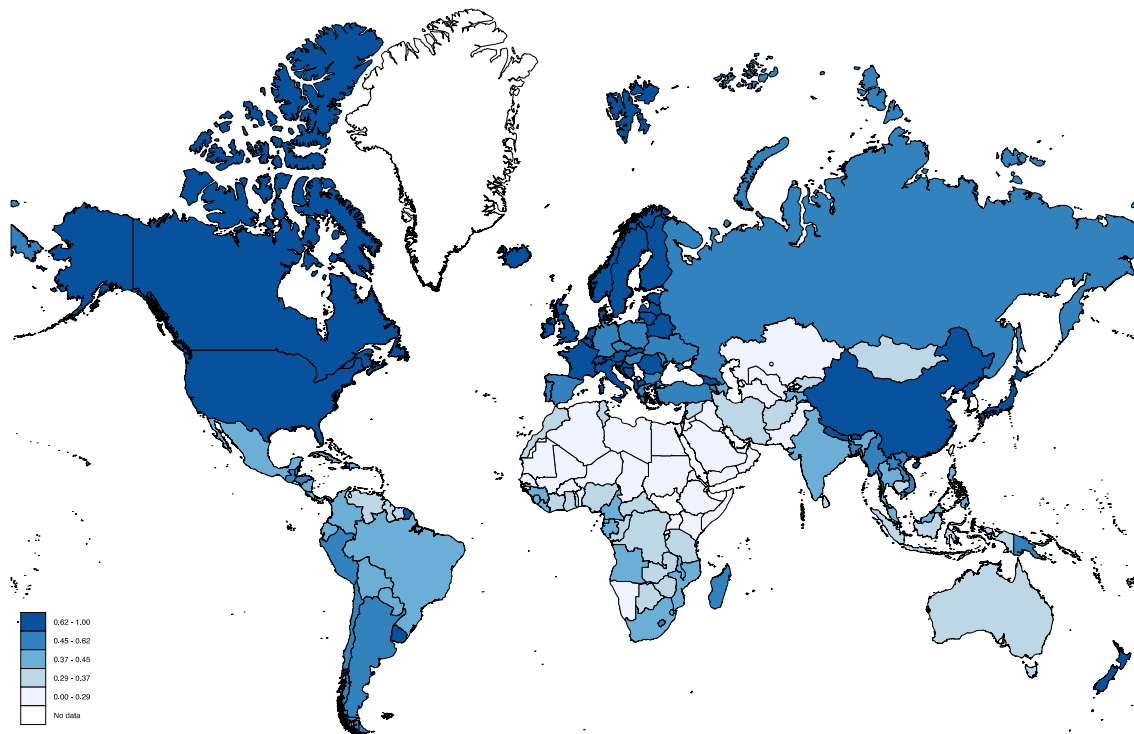
To cover coastal proximity, we invert our units' centroid distance to the nearest coastline in kilometers and normalize the inverse (as we do with all measures) between a minimum of 0

¹⁷⁰ Both measures are square root-transformed to reduce skewness.

and maximum of 1.0, with decimal fractions between 0 and 1 indicating all kinds of intermediate situations.

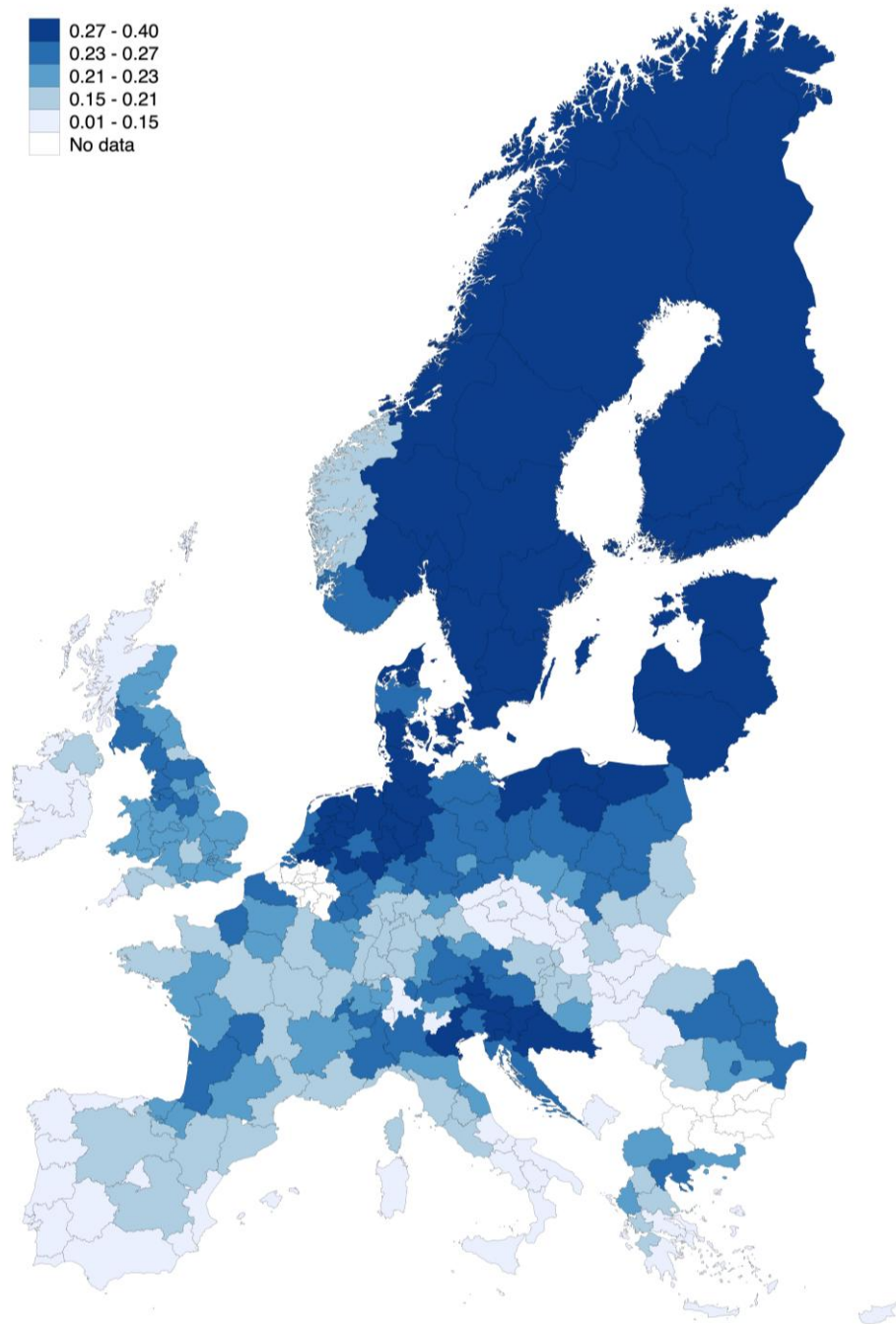
To create the overall CW-index, we multiply the three subcomponents and take the cubic root of the multiplied scores, thus representing their geometric mean. SOM-Figure S11.1-1 maps the variation in the CW-Condition across countries. Noteworthy, at the country level our sub-optimal CW-index correlates positively and at significant strength with our optimized version used throughout the book manuscript ($r = .70, p < .001, N = 177$).

SOM- Figure S11.1-1. Mapping the CW-Condition I (countries)



On the domain of European sub-national provinces, we rely on precipitation and temperature data from weather stations over the period 1950-2017.¹⁷¹ We use a day's mean temperature measured at each weather station within a region and calculate the annual average over all months. We apply the same approach to calculate the yearly minimum, mean and maximum precipitation. Then we average data on temperature and precipitation across weather stations within the same region, employing the same aggregation logic as on the country level.

¹⁷¹ We use annual data of temperature and precipitation from Harris et al. (op. cit., footnote 159) as well as C. J. Willmott, K. Matsuura, 2001, "Terrestrial Air Temperature and Precipitation: Monthly and Annual Time Series 1950 - 1999," (available at AidData.org). The correlation over time between the different indicators of (yearly) mean temperature is very strong and varies between $r = .86$ and $r = .95$. The correlation over time between the different indicators of (yearly) mean precipitation is on average $r = .73$.

SOM-Figure S11.1-1. Mapping the CW-Condition II (NUTS-II provinces in the EU)

To examine the effects of the CW-Condition among pre-industrial local communities, we use the Standard Cross-Cultural Sample (SCCS) and the Ethnographic Atlas (EA).¹⁷² These data cover a total of 186 mostly pre-industrial local communities across the world in the case of the SCCS and 1,291 communities in case of the EA.¹⁷³

¹⁷² Murdock and White, Murdock et al., Divale (op. cit., footnotes 137 and 138).

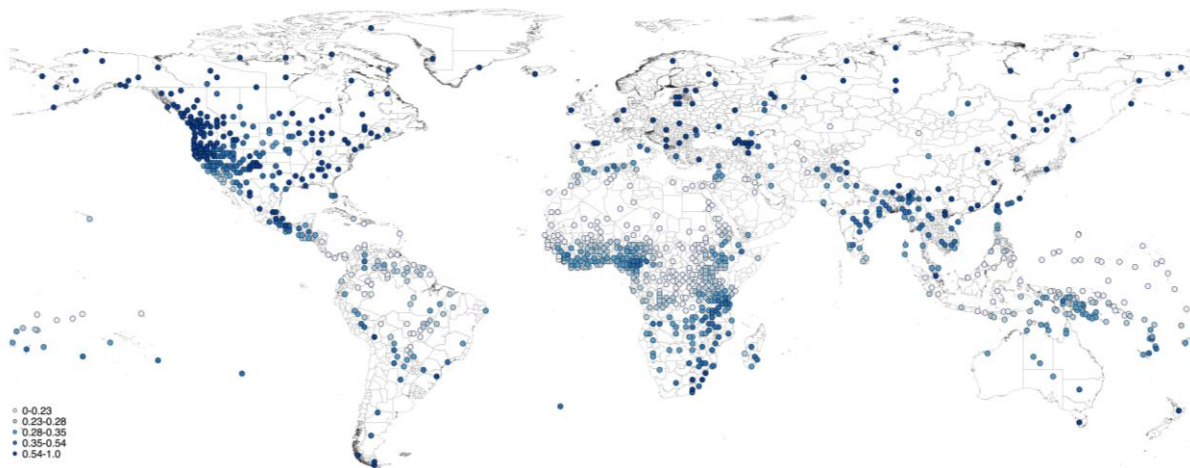
¹⁷³ We access data via the Database of Places, Language, Culture and Environment (D-PLACE) which combines information on the geography, language, culture, and the environment of over 1,400 human societies. K. Kirby, S. Greenhill and R. Forkel (eds), 2018, *D-PLACE*. Jena: Max Planck Institute for the Science of Human History. <https://d-place.org/>. K. Kirby, R. D. Gray, S.J. Greenhill, F.M. Jordan, S. Gomes-Ng, H.-J. Bibiko, D.E. Blasi et al., 2016, "D-PLACE: A Global Database of Cultural, Linguistic and Environmental Diversity." *PLoS ONE* 11.

The time period to which the ethnographic data refers ranges from before 1800 CE (for 3%), the 19th century (25%), between 1900 and 1950 (69%), and after 1950 (2%). The geographic coverage of the SCCS and EA is global, although local communities from North America and Africa are over-sampled. As for the CW-relevant indicators, we use the geo-coded information from the SCCS and EA together with data from the “ecoClimate” database.¹⁷⁴

The maps below show the location of the pre-industrial local communities included in the EA (SOM-Figure S11.1-3) and the SCCS (SOM-Figure S11.1-4) and their CW-Condition. The maps demonstrate that the CW-Condition is highest in (a) higher latitudes and (b) areas closer to the sea. By contrast, CW-scores are lowest in a territorial band stretching from Sub-Saharan Africa over the MENA-region to South and Southeast Asia.

As of note, scholars call this territorial *Africa-Middle East-South Asia* connection the “arch of instability.”¹⁷⁵ The term reflects the fact that the populations inhabiting these (CW-poor) regions stick out in literally all existing indicators of human *ill-being*. The list of negative indicators includes collective violence (e.g., civil war, organized crime, terrorism), human fatalities, political oppression, all forms of (sexual, racial, religious) group discrimination, child and maternal mortalities, corruption, nepotism, electoral fraud, economic inequality and, of course, illiteracy and poverty.

SOM-Figure S11.1-2. Mapping the CW-Condition III (pre-industrial local groups: EA)

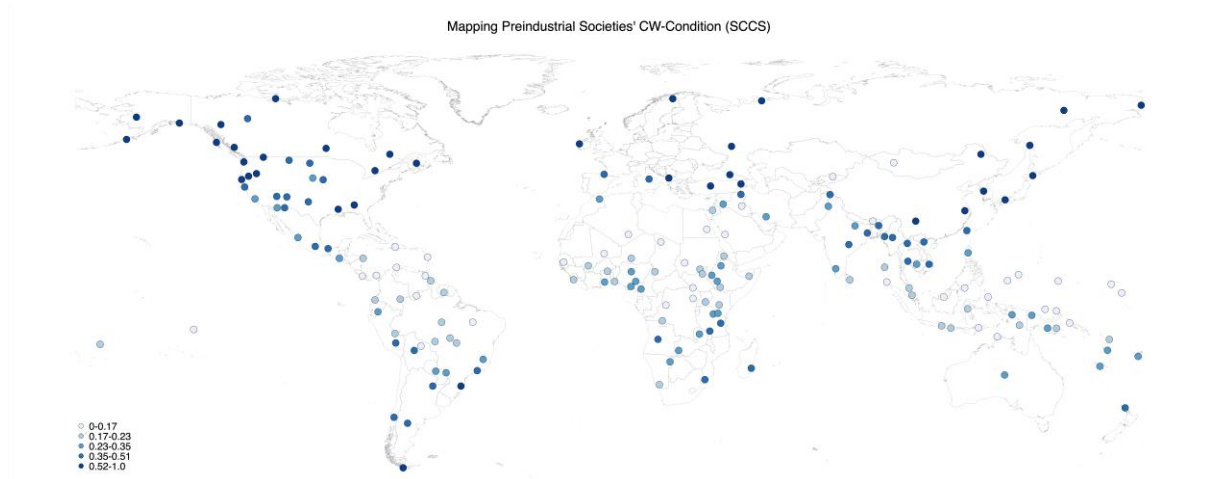


Note: Map shows the location of pre-industrial local communities and the CW-Condition. Darker markers indicate a higher CW-score.

¹⁷⁴ Climate data estimates refer to the period 1900-1950 and are taken from the Baseline Historical of the CCSM ecoClimate model. M.S. Lima-Ribeiro, 2015, “EcoClimate: A Database of Climate Data from Multiple Models for Past, Present, and Future for Macroecologists and Biogeographers,” *Biodiversity Informatics* 10. M.S. Lima-Ribeiro et al., 2015, “ecoClimate: a Database of Climate Data from Multiple Models for Past, Present and Future for Macroecologists and Biogeographers,” *Biodiversity Informatics* 10, 1-21.

¹⁷⁵ I. Morris, 2011, *Why the West Rules – For Now: The Patterns of History and What They Reveal about the Future*, New York: Profile Books.

SOM-Figure S11.1-3. Mapping the CW-Condition IV (pre-industrial local groups: SCCS)



Note: Map shows the location of the (mostly) pre-industrial local communities included in the SCCS and the respective level of the CW-Condition. Darker markers indicate a higher CW-Condition score.

S11.2 Sequence Stations

We retest the CW-Theory in four steps, showing *first* the impact of the CW-Condition (CWC) on the Nuclear Family Pattern (NFP), *second* the impact of NFP on Individual-Impersonal Pro-Sociality (IIP)¹⁷⁶ and *third* the impact of IIP on Contractual Institutional Arrangements (CIA). Fourth and finally, we tie this series of sequential influences together in an integrated centennial mediation path diagram, employing structural equation models to document the extent to which NFP and IIP mediate the effect of the CWC on CIA. SOM-Figure 11.2-1 illustrates the logic of our modelled step sequence.

SOM-Figure S11.2-1. The Sequence of Emancipatory Outcomes



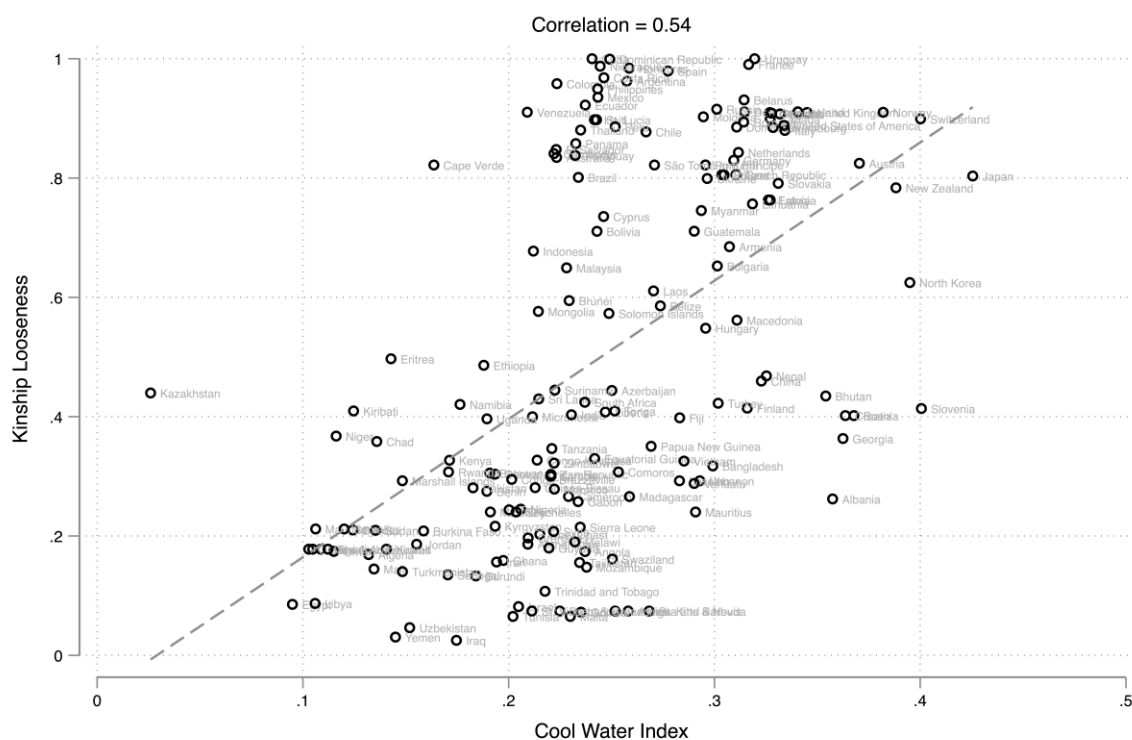
FROM CWC TO NFP

The CW-Theory assumes that countries with a more pronounced CWC exhibit loose kinship patterns, with monogamous nuclear households, late marriages, bilateral rules of descent and neolocal residence. The organizational core of the loose kinship pattern is the nuclear household in which spouses are relatively free from obligations to the wider family circle and from the authority of the elderly.

¹⁷⁶ See Schulz et al., op cit. (footnote 17).

To measure the extent of NFP, we invert Schulz et al.'s "kinship intensity index" (KII), which combines several elements of kin-based organization, such as endogamy, polygamy, co-residence of extended families and clan organization. SOM-Figure S11.2-1 shows the positive and significant relationship between the CWC and NFP across the world's countries, while SOM-Figure S11.2-2 illustrates the association of the CWC with historic marital fertility in Europe.¹⁷⁷ The negative correlation indicates that historic marital fertility was lower in European regions with a more pronounced CWC. As Mary Hartman states, "women in northwestern Europe typically married ten years later than women in most other agricultural societies around the world."¹⁷⁸

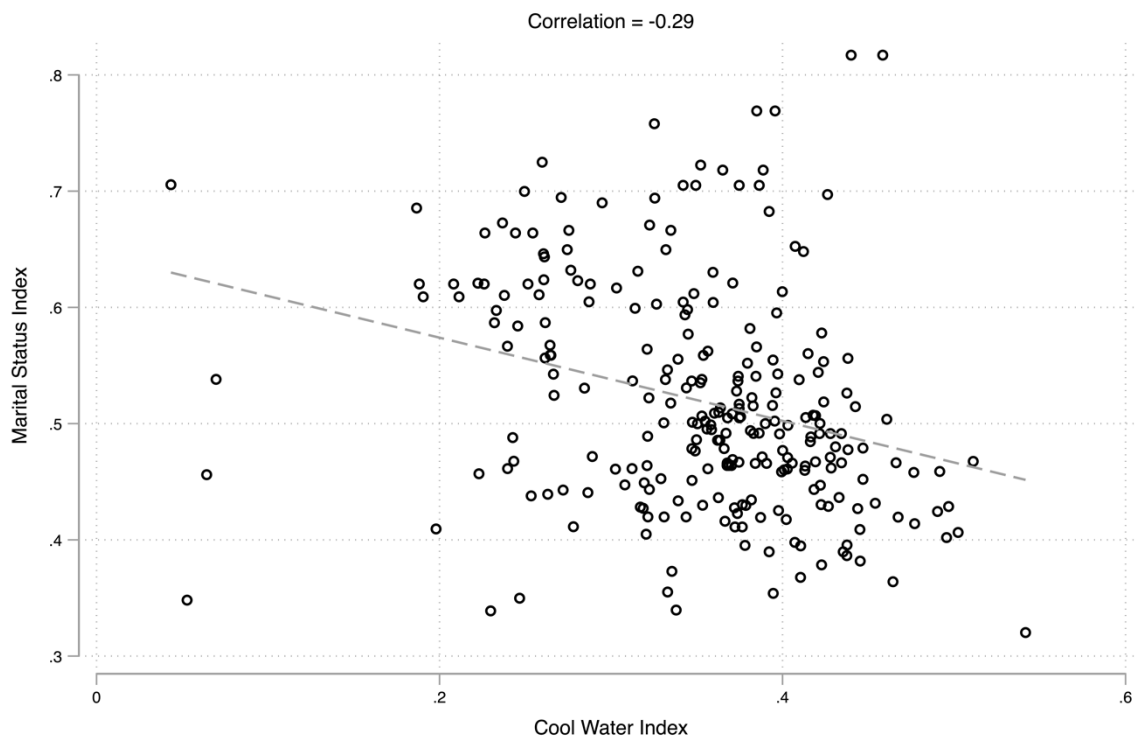
SOM-Figure S11.2-1. The CW-Condition and Kinship Looseness (world's countries)



¹⁷⁷ The diagram uses the “marital status index” from the Princeton European Fertility Project. A. Coale and S.C. Watkins (eds.), 1986, *The Decline of Fertility in Europe*, Princeton: Princeton University Press.

178 Hartman (op. cit., footnote 168) p. 10-11.

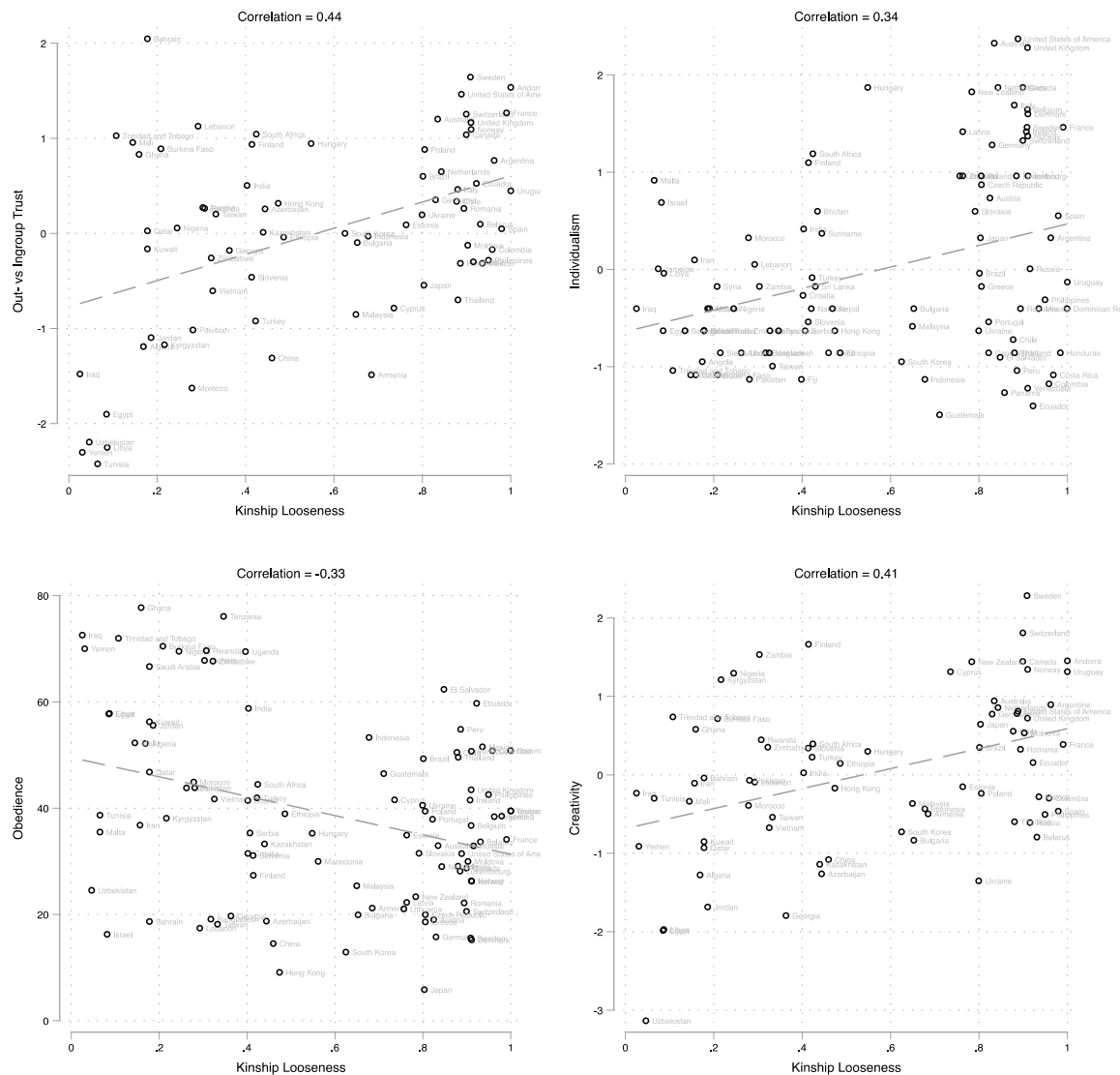
SOM-Figure S11.2-2. The CW-Condition and Late Marriage Ages (European provinces)



Note: The “marital status index” measures the ratio of the number of births married women would experience if subject to the maximum age-specific fertility schedule to the number of births all women would experience if subject to that same maximum fertility schedule. This is an index of the extent to which the marital status distribution would contribute to the attainment of maximum fertility in a population in which all births were to married women. Source: Princeton Historic Fertility Data.

FROM NFP TO IIP

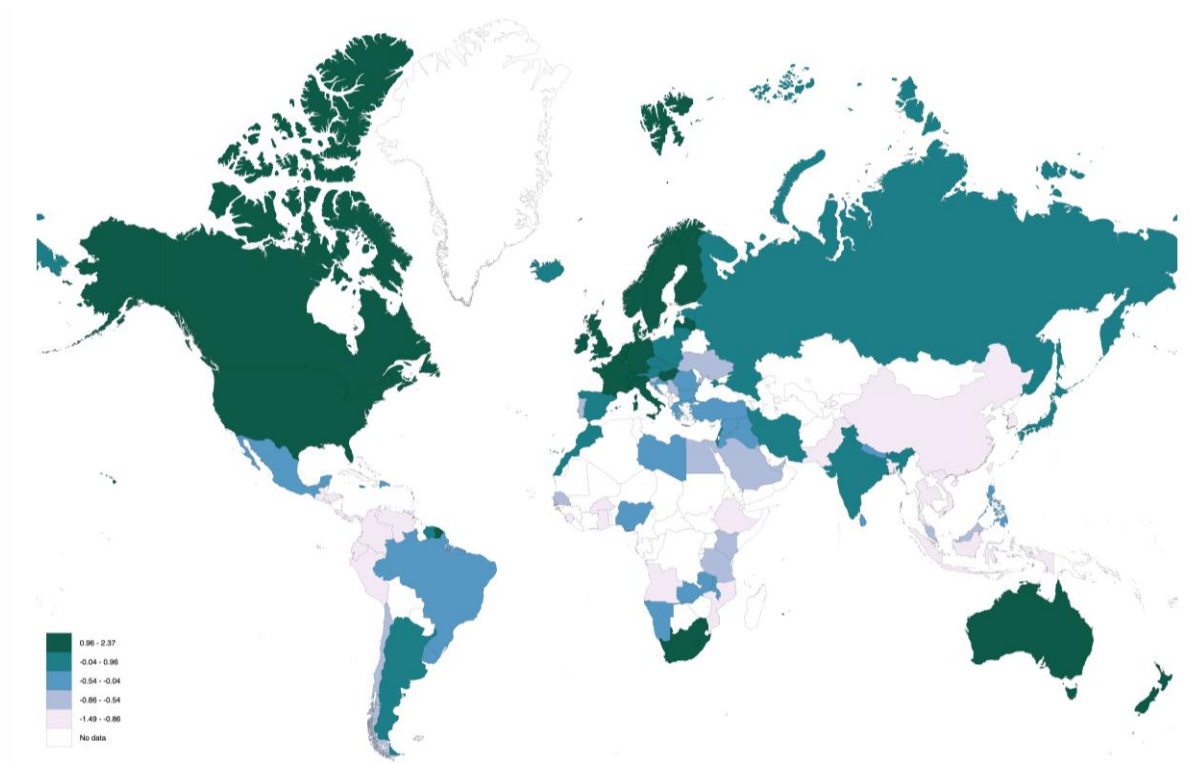
SOM-Figure S11.2-3 demonstrates that kinship looseness associates positively across countries with out-group trust and individualism. Similarly, individualism and out-group trust go together with greater cooperation among strangers and more openness to change and tolerance of social diversity, as well as lower levels of conformity and obedience.



We combine indicators of individualism, independence and impersonal cooperation with inverse indicators of conformity and obedience into an overall index of IIP, following the operationalization of Schulz et al.¹⁷⁹ SOM-Figure S11.2-4 maps the variation in IIP across countries, demonstrating that Western societies exhibit higher levels of IIP.

¹⁷⁹ Schulz et al. (op. cit., footnote 17).

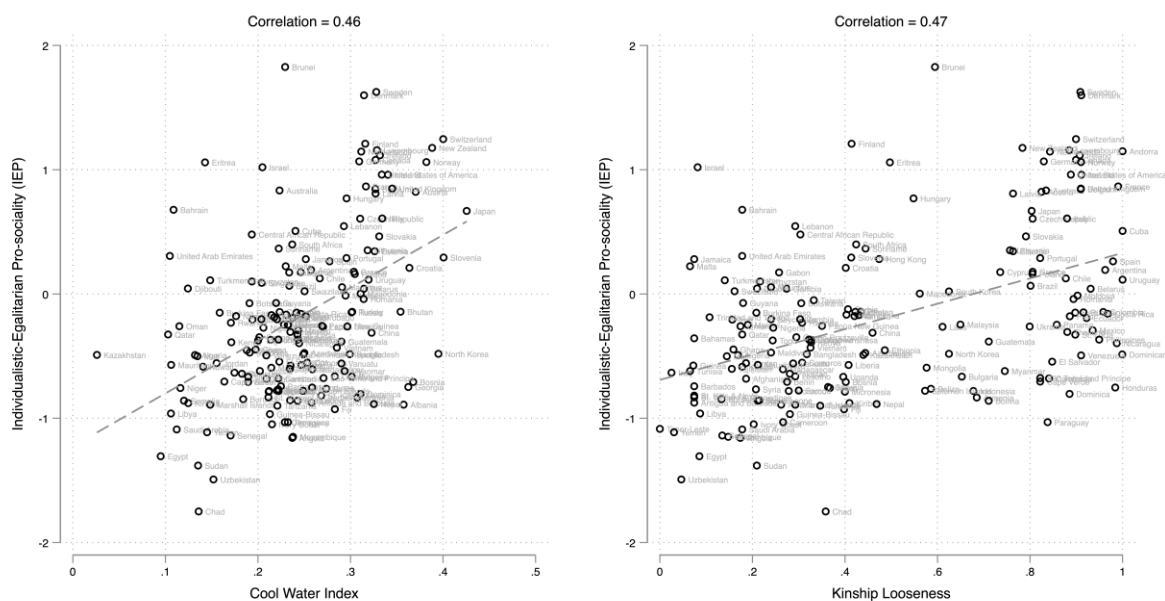
SOM-Figure S11.2-4. Mapping Individualistic-Impersonal Pro-Sociality (IIP) around the world



Note: The map shows the “individualistic-impersonal pro-sociality psychology (IIP)” scale developed by Schulz/Henrich et al. (2019, op. cit., footnote ____).

SOM-Figure S11.2-5 demonstrates that IIP is more widespread in societies with a more pronounced NFP and a more pronounced CWC.

SOM-Figure S11.2-5. CWC, NFP and IIP (countries)

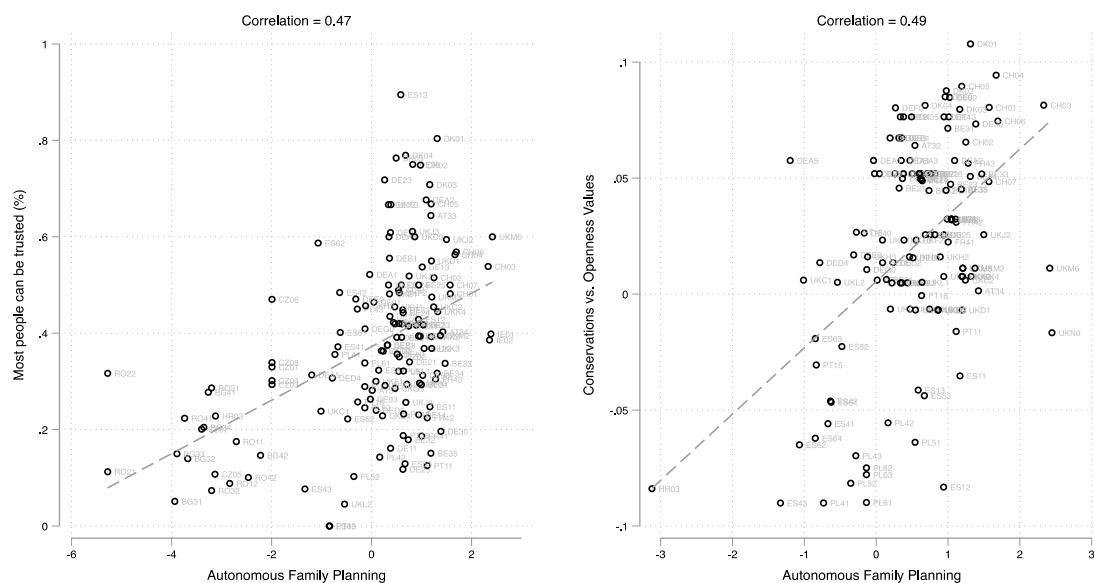


Using data for sub-national European NUTS-II provinces, we find similar evidence. Societies with a more pronounced NFP, which tend to be more common in areas with a pronounced

CWC, are more trusting, more open to change, and show higher levels of fairness, thus exhibiting higher degrees of IIP. To measure NFP in European sub-national provinces, we use the Princeton Family Dataset to combine the (inverted) total fertility rate, the marital status index (which reflects the role that marriage plays in reaching peak fertility) and the share of women unmarried before the age of twenty-four into a factor score labeled “autonomous family planning” in SOM-Figure S11.2-6. The factor score, thus, measures NFP by the absence of male control over female sexuality and fertility and the non-obligatoriness of marriage. We only use observations that relate to the period before World War I.

The results in SOM-Figure S11.2-6 support those of the cross-country analysis. That is, regions with a more pronounced NFP are more open to out-group interactions and generally more open for change, hence exhibiting higher degrees of IIP. The size of the correlations shows moderate-to-strong relationships between NFP and IIP. Approximately a hundred years lie between these two measures.

SOM-Figure S11.2-6. Correlations of Nuclear Family Patterns with Out-group Trust and Openness at the Province Level



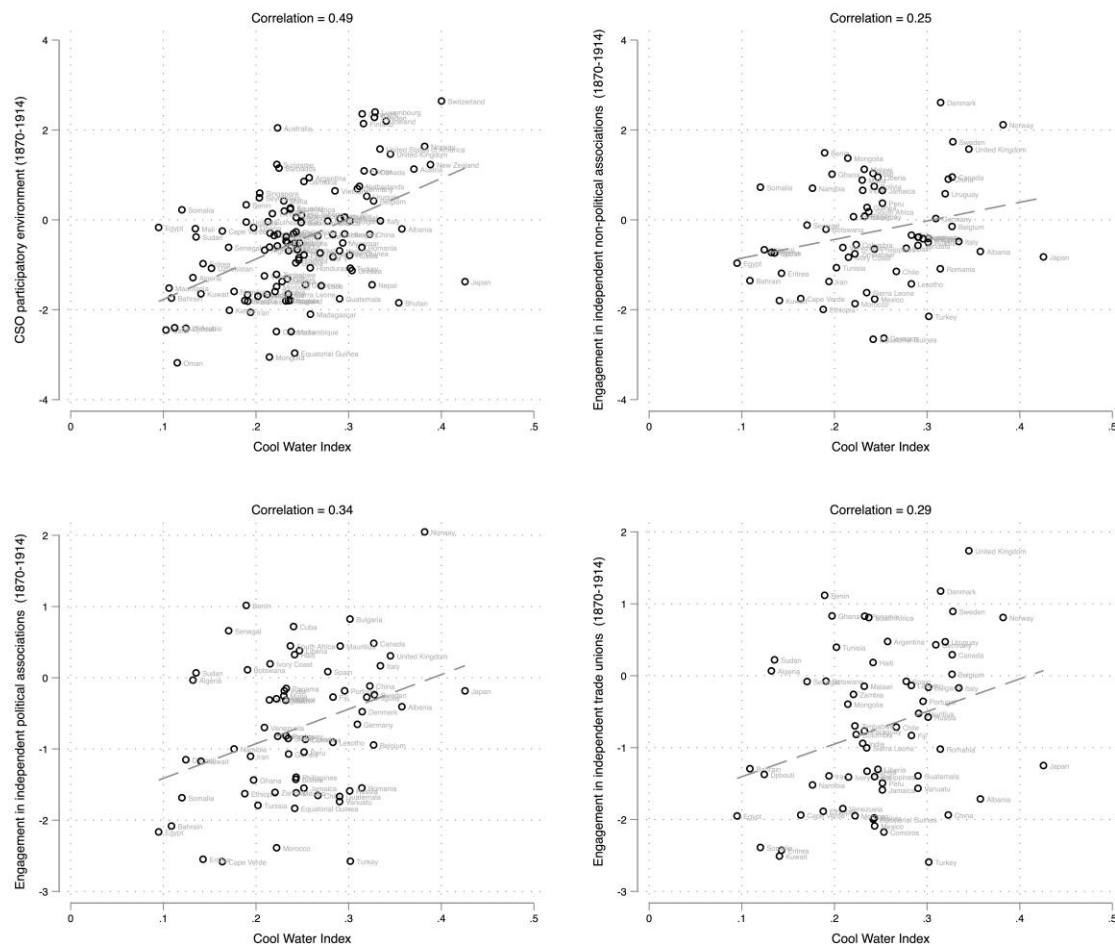
These findings show that our argument also holds in a rather small, albeit ecologically varied, subset of the world, reaching from the dry Mediterranean climate to arctic conditions in Northern Scandinavia. Even across the small European continent, the CWC and the theoretical sequence that we describe are visible and manifest in NFP in terms of less patriarchal control over female sexuality in high CW-areas and a subsequent IIP that is highly individualistic and egalitarian in nature.

Similarly, a more pronounced NFP and the choice subcomponent of the emancipative values index correlate significantly across Europe's sub-national provinces (SOM-Figure S11.2-7). Choice values refer to populations' openness towards homosexuality, abortion and divorce. As such, choice values represent an approximation of egalitarian individualism because these values measure the degree to which people consider sexuality as a matter of each individual's self-determination, free from patriarchal impositions. Again, we see a cross-centennial link between early 20th century NFP and contemporary respect for individual rights in sexuality matters and, thus, IIP.

[illegible]

SOM-Figure S11.2-8 illustrates the positive cross-country correlation between the CWC and voluntary engagement in civil society organizations (CSOs) during the period from 1870 till 1914. Furthermore, the diagram shows a moderately strong correlation of the CWC with the overall CSO environment.

SOM-Figure S11.2-8. The CWC and Civic Engagement

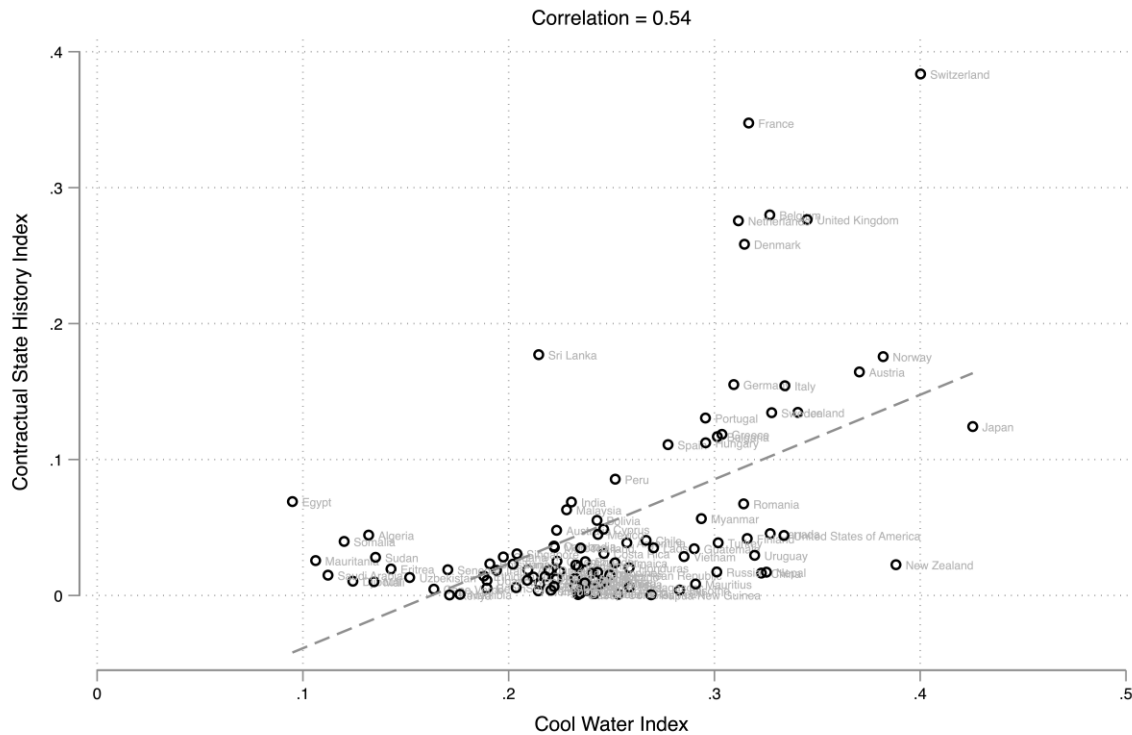


SOM-Figure S11.2-9 provides further support demonstrating that the CWC correlates positively with a longer contractual state history. To measure countries' contractual state history, we multiply V-Dem's "liberal democracy index" in 1900 with Luis Putterman and his co-authors' "extended state history index."¹⁸⁰ Higher scores on the product of the two measures indicate a longer history of a contractual state, thus documenting that contractual institutional arrangements (CIAs) have been present for longer in CW-areas.

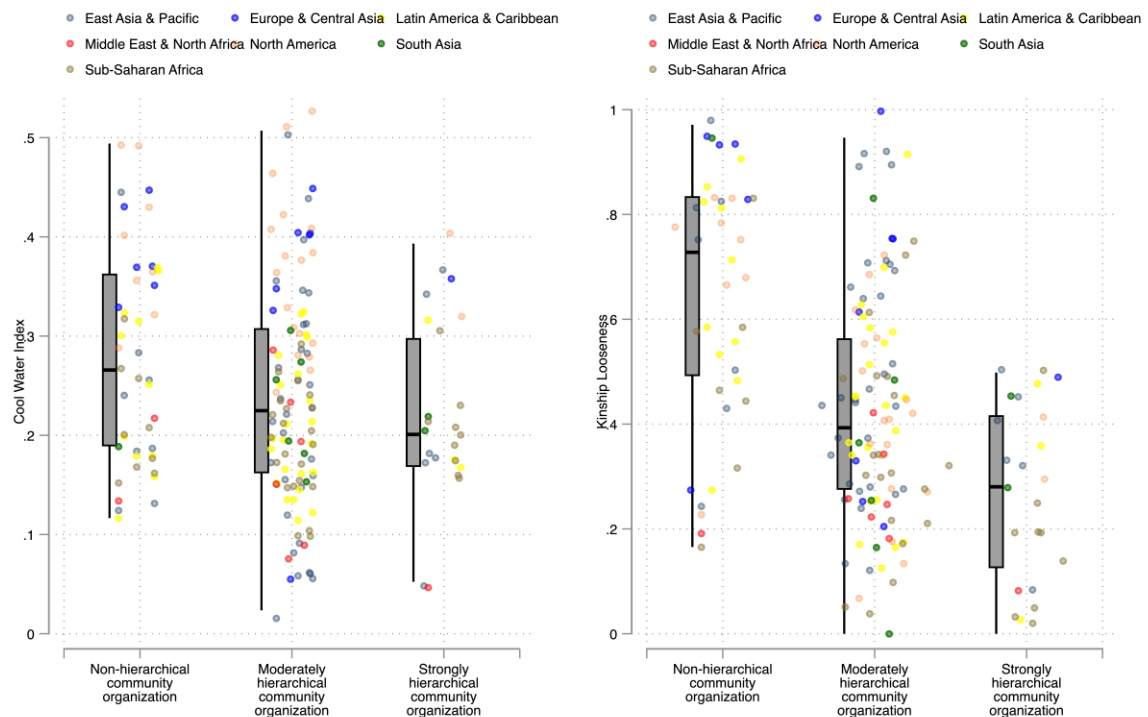
The same pattern emerges when looking at evidence from pre-industrial local communities. Using SCCS data we measure state presence by a multiplicative index that captures the existence of a government above the tribal level, its degree of autonomy and its territorial influence. The evidence in SOM-Figure S11.2-10 suggests that in regions where the CWC is more pronounced, communities are less hierarchically organized (left-hand boxplot) and have less intensive kinship structures (right-hand boxplot).

¹⁸⁰ O. Borcan, O. Olsson and L. Putterman, 2018, "State History and Economic Development: Evidence from Six Millennia," *Journal of Economic Growth* 23, 1-40. The "extended state history index" measures the cumulative years of state endurance over 110 intervals of 50-years covering the period from 3500 BCE to 2000 CE.

SOM-Figure S11.2-9. The CWC and Contractual State History



SOM-Figure S11.2-10. The CWC, Kinship Looseness and Community Organization among Pre-industrial Local Communities (SCCS)



Lending further support to this evidence, SOM-Table S11.2-1 shows that at the beginning of the twentieth century (1900), CW-areas exhibit higher levels of liberal and electoral democracy and greater social and gender equality in civil rights and political opportunities.¹⁸¹ The positive correlations of the CWC with all these elements of CIAs repeat themselves when using data from 1800 (for a smaller sample).¹⁸² Again, the evidence with the sub-optimal CW-index is weaker than that shown with the optimized CW-index in SOM-Section S10. Yet, the evidence even surfaces with the second-best measure of the CWC—which is a key point of this SOM section.

SOM-Table S11.2-1. Correlations of CIAs with the CWC, IIP and CSO

	Cool Water Condition (CWC)	Individual-Impersonal Pro-Sociality (IIP)	Civil Society Organization (CSO) in 1900		
			Participatory environment	Engagement in independent non-political associations	Engagement in independent trade unions
Contractual Institutional Arrangements (CIA) in 1900					
Social class equality in respect for civil liberty	.39*** (121)	.50*** (123)	.59*** (123)	.28* (67)	.40*** (67)
Social group equality in respect for civil liberties	.39*** (121)	.37*** (123)	.45*** (123)	.27* (67)	.35** (67)
Political group equality in respect for civil liberties	.37*** (115)	.52*** (117)	.67*** (118)	.49*** (67)	.52*** (67)
Urban-rural location equality in respect for civil liberties	.45*** (115)	.60*** (117)	.65*** (118)	.37** (67)	.43*** (67)
Property rights for women	.46*** (121)	.46*** (123)	.52*** (123)	.12 (67)	.20 (67)
Access to justice for women	.48*** (121)	.66*** (123)	.69*** (123)	.32** (67)	.33** (67)
Freedom of discussion for women	.53*** (121)	.59*** (123)	.66*** (123)	.49*** (67)	.43*** (67)
Liberal democracy index	.61*** (117)	.75*** (119)	.74*** (120)	.49*** (65)	.56*** (65)
Electoral democracy index	.62*** (119)	.70*** (121)	.72*** (121)	.50*** (66)	.56*** (66)
Slavery was illegal (=1) in 1900	.29* (59)	.33** (61)	.37** (61)	.18 (34)	.36* (35)
Freedom from forced labor for men	.48*** (121)	.50*** (123)	.60*** (123)	.34** (67)	.39** (67)
Freedom from forced labor for women	.41*** (121)	.49*** (123)	.60*** (123)	.38** (67)	.43*** (67)
Freedom of domestic movement for men	.36*** (121)	.43*** (123)	.49*** (123)	.33** (67)	.28* (67)
Freedom of domestic movement for women	.39*** (121)	.48*** (123)	.55*** (123)	.46*** (67)	.37** (67)
Liberal State History (1-1950) (1% discount)*(Lib. demo1900)			.53*** (108)	.36** (61)	.43*** (62)

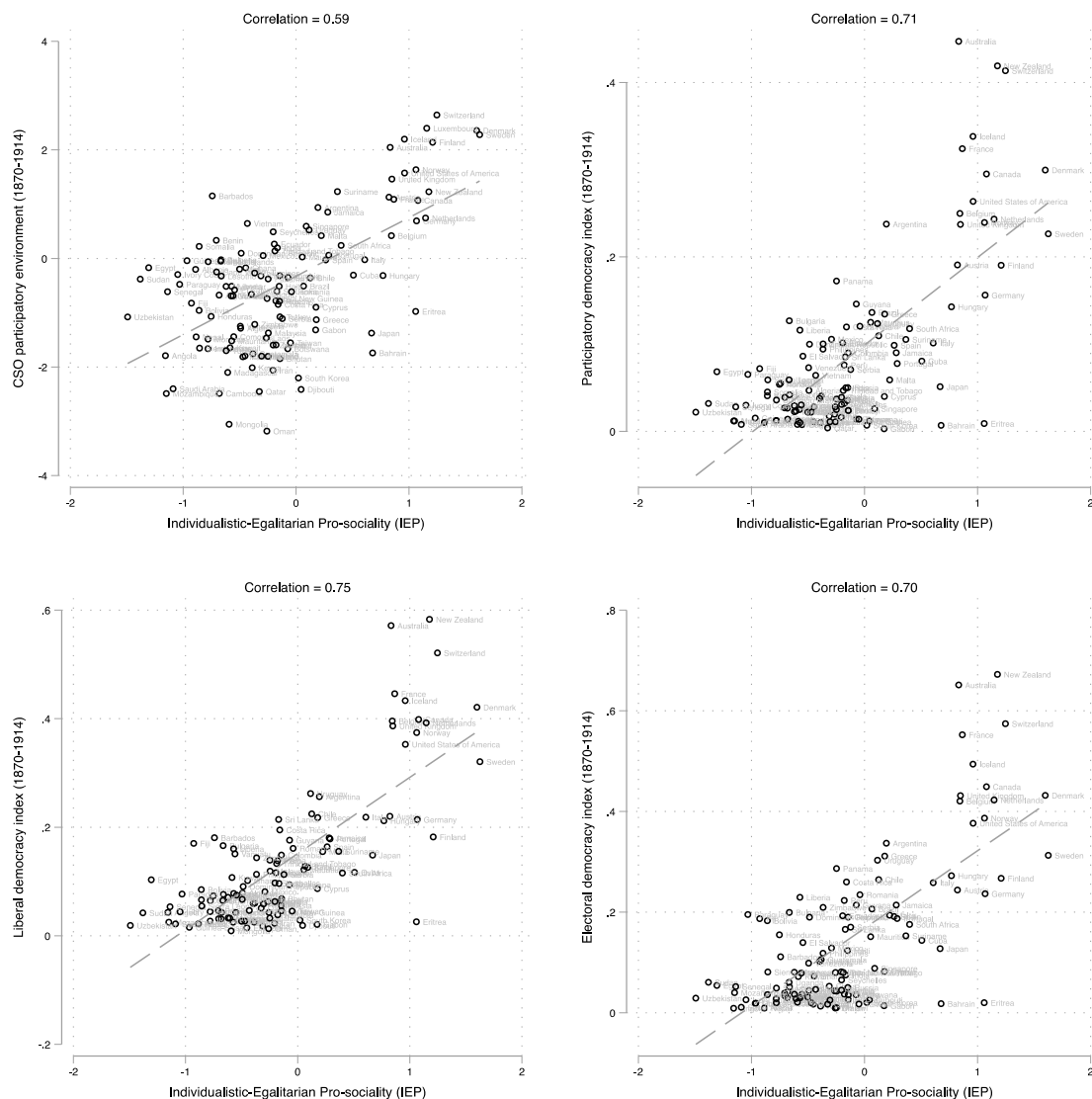
¹⁸¹ Lindberg et al. (op. cit., footnote 4).

¹⁸² The sub-optimal CWC-index correlates significantly and at positive strength with the following political order variables in 1800 CE: social class equality in respect for civil liberty ($r = .32^*$, $N = 50$); access to justice for women ($r = .37^*$, $N = 50$); freedom of discussion for women ($r = .36^*$, $N = 50$); liberal democracy index ($r = .46^*$, $N = 35$); electoral democracy index ($r = .39^*$, $N = 42$); slavery was illegal (=1) in the year 1800 (dummy) ($r = .63^*$, $N = 44$); freedom from forced labor for men ($r = .31^*$, $N = 50$); freedom from forced labor for women ($r = .29^*$, $N = 50$); freedom of domestic movement for women ($r = .36^*$, $N = 50$). Scores are averaged over the period 1789-1810. As of note, these correlations with the CWC are based on our sub-optimal measure of this condition used exclusively for the mediation analyses in this SOM-Section here. Using instead our optimized measure reported throughout the book manuscript, the correlations reported in this footnote keep their sign and are by a factor of 2 to 3 larger in size.

Note: Number of observations in parentheses. * $p < .05$ ** $p < .01$ *** $p < .001$ Correlation of CSO with historical levels of equality in civil liberties across marginalized groups, liberal democracy and electoral democracy in 1900 (scores are averaged over the period 1870-1914). Liberal State history index multiplies V-Dem's Liberal Democracy Index (in 1900) with the Extended State History Index (1-1950/ 2000). The Extended State History Index measures the cumulative years of state presence over 110 periods of 50-years covering the period from 3500 BC to 2000 AD. State presence is measured by a multiplicative index that captures the existence of a government above the tribal level, its degree of autonomy, and its territorial influence. Source: Borcan, Olsson & Putterman (2018).

At the same time, SOM-Table S11.2-1 reveals that populations with stronger CIAs show higher degrees of IIP and more vibrant CSOs. Together, these results support our argument that the CWC is linked to CIAs via people's IIP and their willingness to cooperate with strangers in voluntary associations.

SOM-Figure S11.2-10. Individual-Impersonal Pro-Sociality (IIP) and Civil Society Organization (CSO) in 1900



Note: Individual-Impersonal Pro-sociality (IIP) is positively correlated with the participatory democracy index ($r = .71^{***}$, $N = 120$, $p < .001$) and the CSO participatory environment ($r = .59^{***}$, $N = 122$, $p < .001$).

CIAs associate significantly with higher degrees of IIP. SOM-Figure S11.2-10 illustrates the underlying relationships based on the correlation between IIP, on one hand, and participatory democracy ($r = .71^{***}$, $N = 120$, $p < .001$) as well as the vibrancy of the CSO environment, on the other ($r = .59^{***}$, $N = 122$, $p < .001$). Similar evidence exists for people's engagement

in trade unions ($r = .39^{***}$, $N = 66$, $p < .001$) and the extent of women's participation in civil society organizations ($r = .32^{***}$, $N = 123$, $p < .001$).

In sum, the reported evidence suggests that contractual institutional arrangements ultimately originate in the CW-Condition and its tendency to equip people with (*a*) the civic *skill* that *enables* and (*b*) the corresponding civic *spirit* that encourages ordinary people to join forces, organize themselves and act together in self-initiated fashion for a common purpose. This is what the term *civil society* essentially means.

S11.3 Mediated Effects of CWC on CIA

In the following, we present sequential mediation models that trace the CWC's impact on CIAs via its effect on NFPs and the IIP.¹⁸³ We test our propositions following Hayes'¹⁸⁴ approach of sequential mediation analysis. Sequential mediation analysis relies on maximum likelihood estimation with bootstrapped confidence intervals. We implement this type of mediation analysis using the MPlus-software's structural equation modelling tool.

SOM-Figure S11.3-1 depicts the structure of the country-level sequential mediation model in which we specify NFPs (proxied via kinship looseness) as the first mediator and the IIP as the second mediator. Based on the CW-Theory we, *first*, specify that the CWC influences NFPs directly or indirectly via (lower) agrarian labor demands. *Second*, we allow NFPs to directly or indirectly shape populations' IIP. NFP's indirect effect is specified to influence IIP through populations' degree of urbanization in 1900 (more advanced urbanization supposed to favor IIP, given the greater anonymity of city life). *Third*, we estimate the direct and indirect effects of the IIP on populations' CIAs. The indirect effect of IIP on CIAs is mediated by a vibrant CSO in 1900. At the country level, we measure CIAs by the extent of liberal democracy in the year 2000 or, alternatively, by states' accumulated historic experience with CIAs.

We simultaneously account for a large set of control variables including the level of parasite stress, countries' share of land surface that is characterized by a tropical climate, average terrain ruggedness and the importance of religion in a country. In additional robustness checks, we account for a country's exposure to the influence of the Western Church.

SOM-Table S11.3-1 reports the bootstrapped estimates of the country-level mediation analysis. The proportion of the mediated effect of the CWC on CIAs ranges from 42 percent of variance to 78 percent.

¹⁸³ While the CWC is measured in strict consistency across all three domains of evidence (i.e., the world's countries, Europe's sub-national provinces, pre-industrial local communities), NFP, IIP and CIAs are measured via different proxies, depending on the variables available at each of the three domains.

¹⁸⁴ A.F. Hayes, 2022, *Introduction to Mediation, Moderation and Conditional Process Analysis: A Regression-based Approach*, 3rd edition, London: Taylor & Francis.

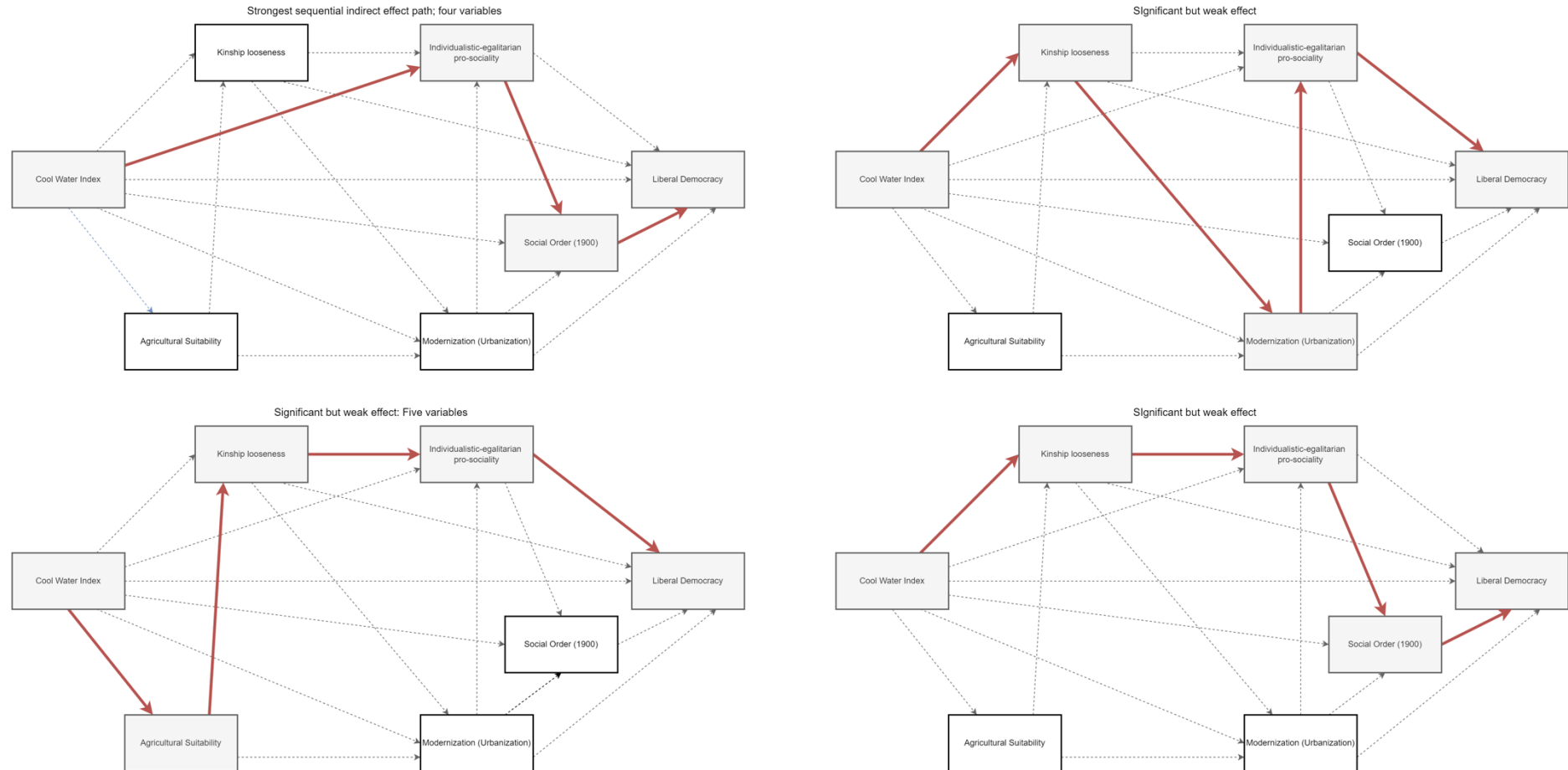
SOM-Table S11.3-1. Sequential Mediation Analysis I (the world's countries)

	<i>Dependent Variable (DV)</i>					
	Liberal Democracy		Contractual State History		CSO Participatory Environment	
	(1)	(2)	(3)	(4)	(5)	(6)
Total Effect CWC	.546 (.418; .649)	.601 (.446; .726)	.497 (.324; .642)	.523 (.211; .725)	.469 (.274; .619)	.518 (.223; .726)
(Total) Direct Effect CWC	.179 (.010; .338)	.175 (-.032; .374)	.227 (.023; .403)	.303 (-.072; .657)	.231 (-.029; .45)	.115 (-.301; .479)
(Total) Indirect Effect CWC	.367 (.245; .496)	.426 (.251; .622)	.271 (.150; .399)	.22 (-.017; .460)	.237 (.102; .4)	.404 (.184; .674)
Specific Indirect Effects CWC						
A) CWC→IIP→SO→DV	.053 (.021; .114)	.067 ^a (-.005; .178)	.032 (.007; .085)	.044 (n.s.)		
B) CWC→KL→URBAN→IIP→DV	.011 (.002; .03)	.014 (.001; .047)	.012 (.003; .033)	.012 ^a (.000; .051)	.018 (.005; .044)	.020 (.002; .056)
C) CWC→AGRIC→KL→IIP→DV	.007 (.002; .020)	.013 (.003; .050)	.008 (.002; .024)	.010 (.001; .056)	.012 (.003; .031)	.018 (.003; .062)
D) CWC→KL→IIP→CSO→DV	0.013 (0.004; 0.036)	0.009 ^a (0.000; 0.040)	0.008 (0.001; 0.027)	0.005 (n.s.)		
Basic Controls	No	Yes	No	Yes	No	Yes
N	179	98	179	98	179	98

Notes: CWC = Cool Water Condition, KL= Kinship Looseness, IIP = Individualistic-Impersonal Pro-sociality scale, Liberal Democracy is measured by VDem's Liberal Democracy index; The contractual state history index multiplies V-Dem's Liberal democracy index in 1900 with the Extended State history index introduced by Borcan, Ols-son, and Putterman (2018). SO=Social order (CSO Participatory Environment), Urban=Urbanization in 1900, AGRI=Agricultural suitability. Basic control variables include Parasite stress, % Tropical, Ruggedness, Religiosity. 95% clustered bootstrapped confidence intervals are reported in brackets. a = significant at the 90% level. Including Western Church Exposure (Schulz et al.) as a control variable for Kinship Looseness does not lead to substantially different results.

SOM-Figure S11.3-1. Sequential Mediation Analysis (countries)

We can identify many significant indirect paths: CWI works through the theoretical sequence and all variable play (more or less) a role. Here are some noteworthy sequences which visualize our theoretical argument very well.



Due to SOM-Table S11.3-1, the indirect effect of the CWC on CIAs via IIP is significant regardless of whether we specify NFPs to affect IIP via urbanization rates or whether we specify the effect of IIP on CIAs to run through a vibrant CSO. The indirect effects of the CWC on CIAs are statistically significant and robust to including any controls. Allowing the CWC to influence NFP via (lower) agrarian labor demands replicates these results. This finding holds for the effects on CIAs and CSOs. Thus, all effects tested indicate a robust indirect effect of the CWC on CIAs. The evidence supports the proposition that NFPs and IIP sequentially mediate the effects of the CWC on CIAs, such that CWC-induced NFPs shape more IIP-inclined communities and, in doing so, favor contemporary CIAs.

We replicate this mediation analysis at the sub-national level using data from NUTS-II provinces in the European Union. Similar to the previous analysis, we model that the CWC influences NFPs indirectly via (low) agrarian labor demands. We allow NFPs to directly or indirectly favor provinces' CIAs. The indirect effect influences the quality of regional governments through IIP (proxied by Schwartz's conservation-vs-openness values, with the positive openness pole reflecting emancipatory pro-sociality orientations). At the provincial level, we proxy CIAs by the Impartial Government Index (IGI), which captures the publicly perceived quality of government in each sub-national province of the European Union (as portrayed in Chapter 9.2 of our book).

SOM-Table S11.3-2. Sequential Mediation Analysis II (Europe's sub-national provinces)

DV: Impartial Governance Index (IGI)	
Total CWC Effect:	.35
Direct Effect:	.16 (n.s.)
Indirect Effect:	.19
Indirect Effect <i>Paths</i> :	
(A) CWC → FOR → NFP → IGI	.10
(B) CWC → FOR → NFP → IIP → IGI	.03
<i>N</i>	264

Note: CWC = Cool Water Condition; FOR = Foraging endurance (agricultural recency); NFP = Nuclear Family Patterns; IIP = Individual-Impersonal Pro-Sociality (proxied by Schwartz' "openness to change" values), IGI = Impartial Governance Index.

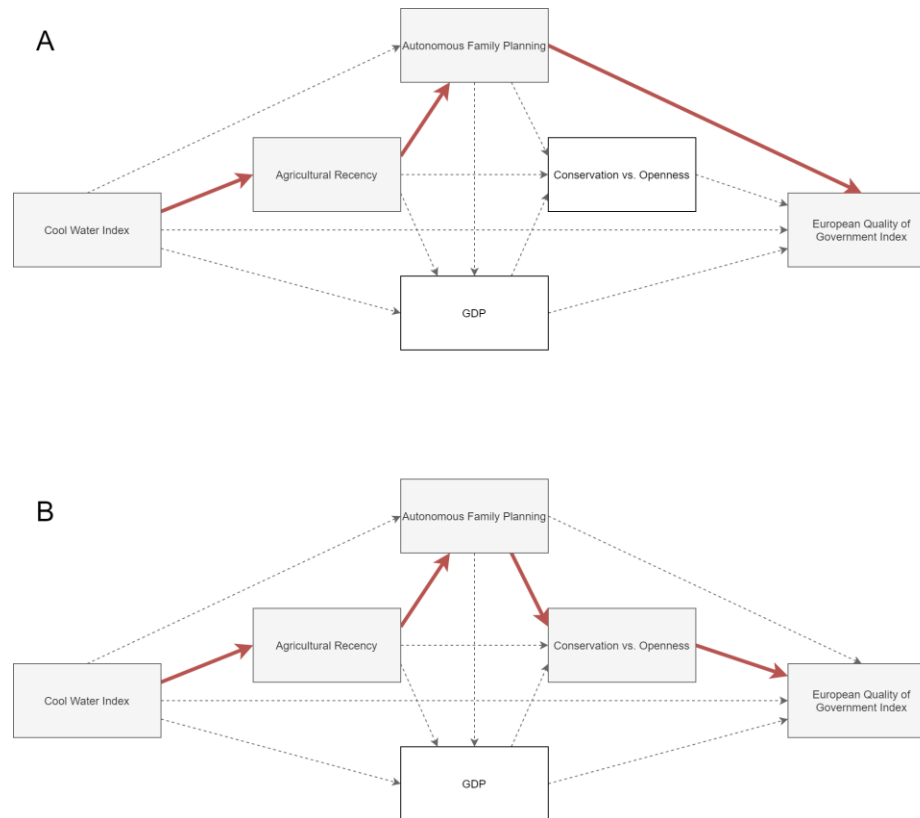
SOM-Table S11.3-2 reports the province-level mediation analysis. The mediated proportion of the total effect of the CWC on CIA amounts to 46 percent. The indirect effect of the CWC via NFPs and IIP on CIAs is significant, regardless of whether we specify NFP to directly affect CIAs or via communities' IIP. In either case, proxies for NFPs and IIP mediate the effects of the CWC on CIAs today.

The findings for pre-industrial local communities in SOM-Figure S11.3-3 and SOM-Table S11.3-3 confirm the previous results, showing a significant CWC effect on CIAs via the proxy for NFPs.

Summing up, the main takeaway of our extensive mediation analysis boils down to a key conclusion: Even using a sub-optimal measure of the CW-Condition that underestimates the CW-Condition's impact, we find strong evidence of the CW-Condition's role in initiating

emancipatory civilizational dynamics leading to contractual institutional arrangements via kinship-loose and largely autonomous nuclear family patterns (NFPs) and an individualistic-egalitarian (i.e., emancipatory) psychology in organizing pro-sociality (IIP). It is astonishing that we can replicate these findings on three different levels of analysis using a wide range of conceptual proxies. The explanatory power of this CW-Theory holds across varying levels of analysis and follows the same pathways independent of the used samples' variability.

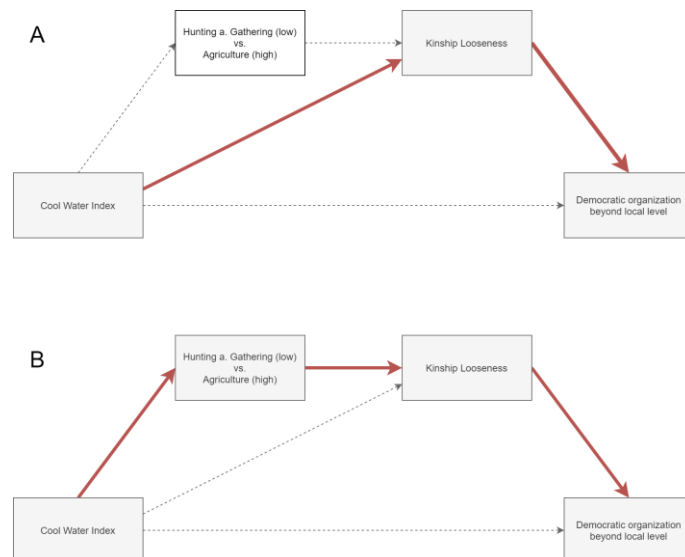
SOM-Figure S11.3-2. Sequential Mediation Analysis (EU NUTS-II provinces)



SOM-Table S11.3-3. Sequential Mediation Analysis III (pre-industrial locations around the globe)

DV: Contractual Institutional Arrangements (CIS)	
Total CWC Effect:	.17
Direct Effect:	.10
Indirect Effect:	.07
Indirect Effect Paths :	
(A) CWC → NFP → CIS	.05
(B) CWC → AGR → NFP → CIS	.012
<i>N</i>	1,265

Note: CWC - Cool Water Condition, AGR - (low) agrarian labor demands (proxied by reliance on foraging), NFP - Nuclear Family Pattern (proxied by kinship looseness), CIS - Contractual Institutional Arrangements (proxied via combining the variables “local democracy” and “jurisdictional complexity” by multiplication).

SOM-Figure S11.3-3. Sequential Mediation Analysis (pre-industrial local communities)

SOM-Table S11.3-4. Cross-country Correlations between Nuclear Family Patterns (NFP) and Contractual Institutional Arrangements (CIA)*

	Correlation with Kinship Looseness		
	<i>r</i>	<i>p</i>	<i>N</i>
CIA: Political			
Social class equality in respect for civil liberty (1900)	.26**	.00	123
Urban-rural location equality in respect for civil liberties (1900)	.28**	.00	117
Property rights for women (1900)	.37***	.00	123
Access to justice for women (1900)	.44***	.00	123
Freedom of discussion for women (1900)	.43***	.00	123
Liberal democracy index (1900)	.50***	.00	119
Electoral democracy index (1900)	.59***	.00	121
Slavery was illegal 1900	.49***	.00	61
Freedom from forced labor for men (1900)	.35***	.00	123
Freedom from forced labor for women (1900)	.31***	.00	123
Freedom of domestic movement for men (1900)	.36***	.00	123
Freedom of domestic movement for women (1900)	.40***	.00	123
Liberal democracy index (1800)	.43**	.01	36
Electoral democracy index (1800)	.36*	.02	43
Serfdom was (de jure) illegal (1800)	.59*	.03	13
Slavery was illegal (1800)	.32*	.03	45
CIA: Social			
CSO participatory environment	.39***	.00	122
CSO women's participation	.27**	.00	123
Engagement in independent trade unions	.28*	.02	67
Participatory democracy index	.53***	.00	120

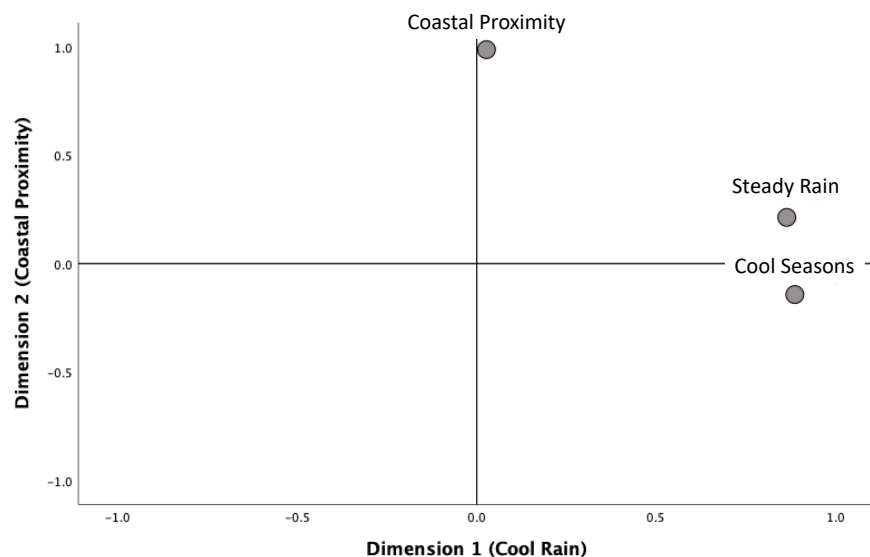
Note: Correlation of NFP with historical levels of equality in civil liberties across marginalized groups, liberal democracy and electoral democracy in 1800 and 1900. Values for the years 1800 and 1900 are averaged over the period 1789-1810 and 1870-1914, respectively.

*Proxied by Kinship Looseness Index.

S12 A Simple CW-Index

Our country-level findings do not depend on the incorporation of culture zone information into countries' scoring on our final CW-index. Instead, results remain similar when basing countries' scoring on the CW-index only on local information of countries' capital cities. As the factor loading plot in SOM-Figure S12-1 shows, the three ingredients of the CW-Condition—cool seasons, steady rain and coastal proximity—are bi-dimensional, with coastal proximity reflecting a factor of its own while cool seasons and steady rain reflect another factor on which both ingredients load jointly.

SOM-Figure S12-1. Factor Component Plot ($N = 184$ countries)



This dimensional pattern justifies combining cool seasons and steady rain additively while factoring in coastal proximity multiplicatively in creating the overall CW-index, as depicted in SOM-Figure S12-2.

SOM-Figure S12-2. Scheme of Combination to Generate the Simpler Overall CW-Index

$$\frac{(\text{Cool Seasons}_{\text{(stress-optimized)}} + \text{Steady Rain})}{2} * \text{Coastal Proximity}_{\text{(squared)}}$$

COOL WATER INDEX

SOM-Table S12-1 demonstrates that the multiplicative element in the creation of the CW-index is appropriate because—in explaining human empowerment—the multiplicative two-way interaction term is highly significant, while the two additive main terms drop insignificant. Thus,

the CW-Condition's developmental impact resides in the interaction of coastal proximity with cool and rainy seasons.

SOM-Table S12-1. Regressing Human Empowerment on Additive-vs-Interactive Combinations of the CW-Index's Components

	OUTCOME: Human Empowerment Index 2018	
	Model 1	Model 2
PREDICTORS ^{a)} :		
Cool Rain ^{b)}	.72 (15.0)***	.20 (0.9) ^{n.s.}
Coastal Proximity	.20 (4.2)***	.06 (0.8) ^{n.s.}
2-Way Interaction ^{c)}		.57 (2.5)***
Adj. R ²	.58	.59
N (countries)	184	184

Notes: Results from ordinary least squares regressions. Entries are standardized regression coefficients (betas) with their T-values in parentheses. Significance levels: *** $p < .005$, ** $p < .050$, * $p < .100$, n.s. (not significant) $p > .100$.

^{a)} All capital city measures, without culture zones.

^{b)} Cool Rain = (Cool Seasons + Steady rain) / 2.

^{c)} Cool Rain * Coastal Proximity.

Finally, the regression models in SOM-Table S12-2 demonstrate that the CW-Condition's impact on countries' human empowerment is not an artifact of designing the CW-Condition in such fashion that it most perfectly captures the geo-climatic uniqueness of Northwestern Europe (Model 3). Nor is the developmental impact a mere reflection of the "lucky latitude" effect (Model 5).

SOM-Table S12-2. Regressing Human Empowerment on the CW-Index and Its Components

	OUTCOME: Human Empowerment Index 2018 (SOM-Section S4)					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
PREDICTORS:						
Cool Seasons ^{a)}	.43 (7.5)***					
Steady Rain ^{a)}	.40 (6.8)***					
Coastal Prox. ^{a)}	.22 (4.4)***					
CW-Condition ^{a)}		.77 (16.4)***	.76 (12.4)***	.51 (7.2)***	.80 (11.1)***	.78 (16.6)***
NW Europe			.02 (0.3) ^{n.s.}			
Western Church				.39 (5.9)***		
Latitude ^{a)}					-.03 (-0.4) ^{n.s.}	
Longitude ^{a)}						0.8 (1.7) ^{n.s.}
Adj. R ²	.58	.59	.58	.68	.58	.60
N (countries)	184	184	184	157	184	184

Notes: Results from ordinary least squares regressions. Entries are standardized regression coefficients (betas) with their T-values in parentheses. Diagnostics for multicollinearity (VIFs), heteroskedasticity (White-test) and outlying/leverage cases (DFFITs) indicate no violation of linearity assumptions. Significance levels: *** $p < .005$, ** $p < .050$, * $p < .100$, n.s. (not significant) $p > .100$.

^{a)} Capital city measures only, without culture zone averages.

S13 CW vs. WC – Part 3: Final SHOWDOWN

Our various path analyses in SOM-Sections S8, S10B and S11 differ in some details. Apart from the fact that the three analyses use slightly different operationalizations of the CW-Condition, they also differ in the final outcome variable. The variations are three-fold, and for good reasons.

First, pursuing our own theorizing inspired by Welzel's (op. cit., footnote 2) "evolutionary theory of emancipation," we consider the "human empowerment index" (HEI) as the most telling outcome variable in indicating today's societies' human progress (SOM-Section S8). Second, leaving our own theoretical framework and adopting instead the widely acclaimed narrative of Schulz et al. (op. cit., footnote 17), we consider their "individualistic-impersonal pro-sociality" psychology measure (IIP) as the final *outcome variable* to indicate today's populations humanistic progress (SOM-Section S10B). This temporal treatment is legitimate in light of the fact that the various components flowing into IIP are contemporary in time rather than being taken back from history. Third, we change perspective and treat IIP as the central mediator on the West's pathway to its contractual institutional arrangements of today (SOM-Section S11). This temporal treatment appears justified insofar as Schulz et al. themselves argue that IIP (despite its contemporary measurement) is supposed to reach much farther back in time.

In spite of all these variations in pathway specification, some central insights remain the same. No matter what operationalization of the CW-Condition we use, and no matter what we define as the ultimate outcome variable to indicate emancipatory human progress, it always turns out that (1) the timeless CW-Condition is the most powerful first difference and that (2) female reproductive autonomies embodied in the nuclear family pattern (NFP) of the pre-industrial era are the key mediator on populations' progression towards developmental outcomes with an emancipatory signature—no matter whether the latter are measured in terms of IIP or the HEI.

This result is robust against variation in specifying the second-order (i.e., early industrial-era) mediator as "cognitive (lifetime) investments" (SOM-Section S8) or as "contractual institutional arrangements" (SOM-Section S10B). As outlined earlier, these two variables are interchangeable substitutes of each other, as they both indicate overall societal configurations based on *consent* rather than *coercion* (so, it does not matter whether one measures such configurations from "below," as with cognitive lifetime investments, or from "above," as with contractual institutional arrangements"). This commonality in conclusion should overshadow the many variations in our historic path analyses.

Still, the arsenal of robustness checks we used to consolidate this key insight might leave readers with a certain sense of dizziness about what—in the most condensed terms—the quintessential core of evidence is to pinpoint the Cool Water-Theory's explanatory superiority over the prominent Western Church-thesis. So, let us close the case and put the core on the table. To do so, we present the two causal narratives in their most condensed version of how history led to today's cross-national differences in developmental outcomes with an emancipatory signature—or what Schulz et al. call the "weird" signature of Western culture.

To start with the WC-thesis, the beginning of the story is populations' past exposure to the Western Church's medieval marriage policy (WCE). Upon intervention of the church's marriage regime, a forthfollowing weakening of communities' supposedly primordial "kinship intensity" resulted, measured via a "kinship intensity index" (KII) taken from pre-industrial ethnographic data and attributed via Putterman and Weil's migration matrix to today's countries. Finally, this KII from the pre-industrial era explains today's cross-country differences in populations' enculturation of an "individualistic-impersonal pro-sociality" (IIP). In a nutshell, we have a causal sequence from Medieval WCE to pre-industrial KII, ending up in today's IIP:

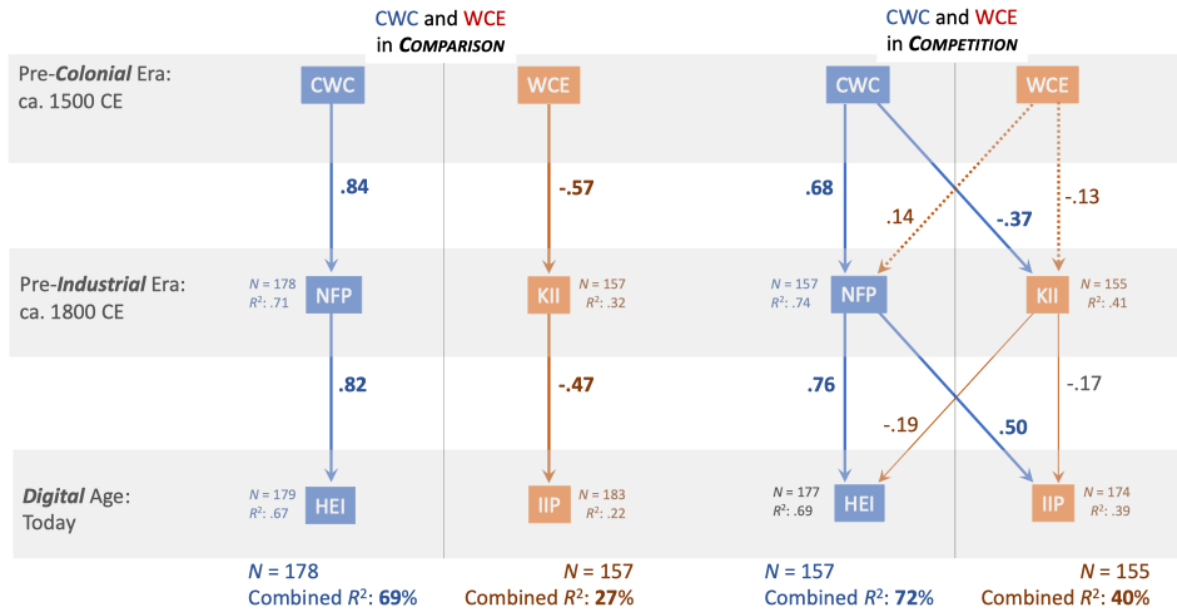
WCE → KII → IIP

The CW-Theory boils down to a similar three-step sequence. First, the local autonomies embodied in the cool water condition (CWC) favor a nuclear family pattern (NFP) in pre-industrial times, which guides the subsequent state building process towards contractual institutional arrangements. Under these arrangements, societies finally end up in individually empowering societal configurations—manifest in the human empowerment index (HEI): a composite measure of individuals' action resources, emancipative values and civic entitlements. Thus, we face an equally structured, albeit alternate, causal narrative from timeless CWCs to pre-industrial NFPs to today's HEI:

CWC → NFP → HEI

Given the isomorphism of these two narration frameworks, it is easy to test them against each other in terms of (*a*) their *internal* explanatory performance and (*b*) their *added value* for the other framework. Thus, the first question is to ask how strong the explanatory power from WCE to KII to IIP is relative to that of CWC to NFP to HEI. The left-hand diagram in SOM-Figure S13-1 displays the result. And it is unequivocal: The CW-framework is internally more powerful than the WC-framework. The second question is what the two frameworks add to each other. The answer is obvious from the cross-lagged regressions in the right-hand diagram of SOM-Figure S13-1: While the CW-framework elevates the explained variance of both the mediating variable and the outcome variable in the WC-framework, the latter adds practically nothing to the former.

SOM-Figure S13-1. Contesting the CW- and WC-Frameworks in Explaining Western Exceptionalism



Notes: Coefficients are standardized regression coefficients derived from bivariate lagged regressions in the left-hand panel and multiple cross-lagged regressions in the right-hand panel.

Abbreviations:

- CWC: Cool Water Condition
- WCE: Western Church Exposure
- NFP: Nuclear Family Pattern (labelled “female autonomy” in SOM-S8)
- KII: Kinship Intensity Index
- HEI: Human Empowerment Index
- IIP: Individualistic Impersonal Pro-sociality

In explaining the emancipatory features of Western exceptionalism, the CWC-framework outperforms the WCE-framework. This is true in both statistical and epistemological terms.

Statistically, the measures of the CWC-framework cover more countries (178 under list-wise deletion compared to 157) than does the WCE-framework. The empirical scope of the CWC-framework is also broader than that of the WCE when looking at the final outcome variable. Indeed, unlike IIP in the WCE-framework, the HEI in the CWC-framework does not only cover the psychological aspects of emancipatory civilizational achievements (i.e., individuals’ “emancipative values”) but also the existential dimension (i.e., individuals’ “action resources”) and the institutional domain (i.e., individuals’ “civic entitlements”). Therefore, the CWC provides a more comprehensive explanation of emancipatory progress—and one that is theoretically solidly grounded in the broader concept of human empowerment and its anthropological-philosophical foundations. Not surprising in the face of these credentials, the CWC-framework towers the explanatory power of the WCE-framework already in mere quantitative terms by a considerable margin (69 to 27% overall).

Equally important, and this is the greatest contrast to the WCE-framework, the CWC-framework provides a causally more complete explanation of developmental differences. The reason is that the CWC-framework offers a true *first difference* explanation by addressing causal origins for which no prior exists. Judged against this yardstick, causal explanations that fail to identify the first difference from which subsequently emerging developmental differences began to take shape are fundamentally incomplete. Second- and third-difference explanations mistake intermediate stages in a causal step chain with the very origination of such a chain. Failing to identify the first difference misspecifies causality by confusing the mediators within a causal flow with the origination of this flow.

Despite the temporal isomorphism of the CW- and WC-frameworks and in spite of the fact that they are not incompatible with each other in narration, the CW-framework identifies the epistemologically more basic initial variable as well as the nomologically more powerful mediator variable and final outcome variable.

S14 The CW-Areas' Agrarian Delay

According to the CW-Theory, CW-areas experienced a delayed transition to agriculture. To test this proposition, we estimate the effects of the CW-Condition on the timing of the Neolithic Revolution, using ancestry-adjusted years since the Neolithic Revolution from Louis Putterman and his co-authors.¹⁸⁵ The timing of the Neolithic Revolution indicates how early the people in an area have been exposed to the freedom-curtailling tendencies and the related conformity pressures emerging from the rise of intensive agriculture and coercive states.

SOM-Table S14-1. The CW-Condition and the Timing of Neolithic Revolution

	DV: Timing of Neolithic Revolution		
	1	2	3
CW-Condition	2.129*** (632)	-1.587** (592)	-1.296* (620)
Genetic distance coordinate 1		-3.739*** (505)	-4.710*** (512)
Genetic distance coordinate 2		-5.175*** (974)	-3.591*** (823)
Geographic distance coordinate 1		.09*** (0.03)	
Geographic distance coordinate 2		.17** (.06)	
Constant	4.737*** (262)	9.133*** (496)	9.205*** (524)
<i>N</i>	155	151	151

Notes: We use genetic distance as a proxy for the timing of divergence between different societies. It accounts for population movements after the year 1500, which led to large geographic distances between some culturally and genetically related individuals. Schulz/Henrich et al. approximate a Euclidean plane using genetic distance between all country pairs (population-adjusted) based on data provided by Spolaore and Wacziarg (op. cit, footnote 17).

The CW-Theory posits that the existential autonomies embodied in the CW-Condition nurture in people a resistance against conformity-inducing developments, which suggests that—all else equal—people in CW-areas withstood the conformity-inducing tendency of agriculture simply by avoiding its adoption, until demographic pressures from neighboring agriculturalists enforce this step. The CW-Condition should, therefore, correlate with a later adoption of agriculture.

Interestingly, as Model 1 in SOM-Table S13-1 shows, this does not seem to hold true—at least not in the bivariate case. Instead, while the world on average adopted agriculture some 4,700 years ago, CW-areas tended to adopt agriculture about 2,100 years ago, which is 2,600 years *earlier* than average—in apparent contradiction to the delay thesis. However, this evidence is deceptive because it ignores that the CW-areas are naturally very well-suited to agriculture and tend to adopt them earlier for this reason alone. Taking this fact into account by controlling the CW-effect for agrarian suitability and a couple of other relevant covariates, the

¹⁸⁵ Borcan, Olsson and Putterman (op. cit., footnote 179).

CW-effect switches sign in Models 2 and 3, which exhibits that—under proper controls—the CW-Condition now on average delays the adoption of agriculture by a remarkable 1,300 to 1,600 years (thus, turning the simple bivariate evidence upside down). Put differently, among areas with the same agrarian suitability, those with a stronger CW-Condition adopted agriculture significantly later.

SOM-Figure S13-1 visualizes the striking switch in the direction of the CW-Condition's agrarian impact from the uncontrolled to the controlled condition. The story behind this pattern is that the CW-areas in Eurasia have not been among the original inventors of agriculture, in stark contrast to the early agrarian centers in the Middle East, India and China where agriculture has been invented independently. In the Northwest European CW-areas, however, intensive forms of agriculture have not evolved autonomously from inside. Instead, agriculture diffused from outside into the CW-areas, namely from the Middle East and the Mediterranean. Likewise, agriculture has not evolved autonomously from within the Japanese and Korean CW-areas but diffused into these areas from outside, namely from China.

SOM-Figure S14-1. The CW-Condition and the Timing of the Neolithic Revolution

Diagram A: Before Controlling Agrarian Pioneer Potential

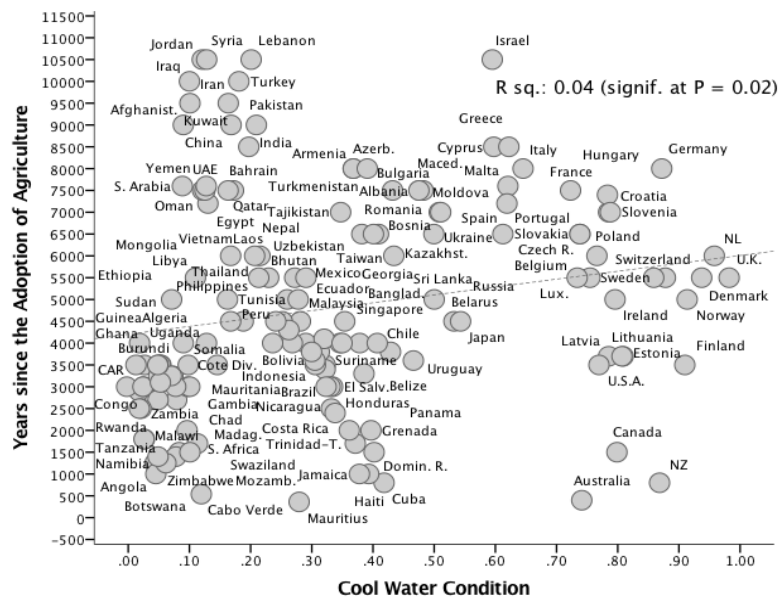
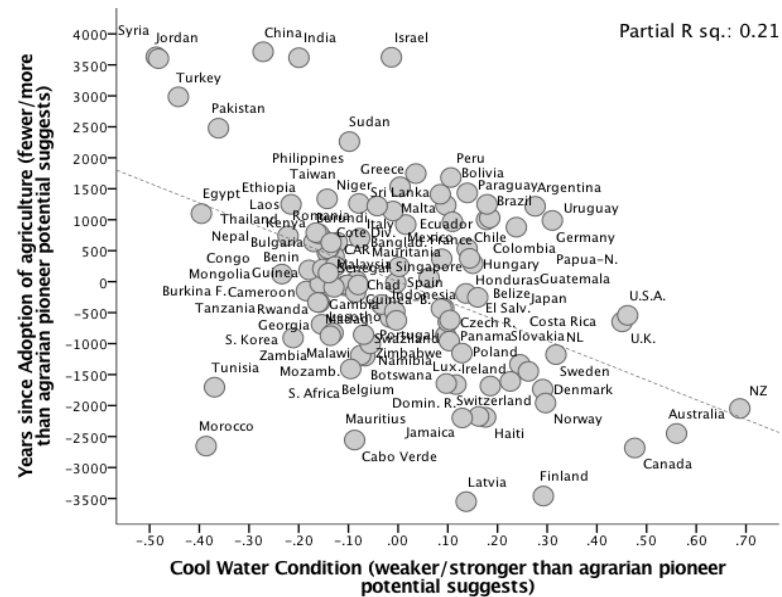


Diagram B: After Controlling Agrarian Pioneer Potential



S15 Discussion Points

In this SOM-Section we report the feedback that we received from four excellent reviews of our book when it was still in the proposal stage. We also report how we took advantage of the reviewers' points in order to improve the manuscript. Readers might enjoy this section as a dialogical stimulation and as further food for thought. If so, this section might help readers better appreciate the sheer number and the quality of points we considered in making the CW-argument theoretically more plausible and empirically more compelling.

Before we jump right into the discussion, we wish to thank Palgrave-MacMillan for getting back to our book proposal within a short time. We are also grateful to the four reviewers, not only for the enthusiasm they express but also for their suggestions, which we think are all well-taken and—importantly—proved relatively easy to implement with only modest effort. In the following, we address the recommendations point by point in the order of their appearance in the reviews. The points raised by the reviewers are marked in red.

REVIEWER 1 (R1)

We are glad to read R1's opinion that this manuscript should be published even without consideration of her/his proposals, which s/he explicitly characterizes as possible points of consideration rather than mandatory revisions. Fortunately, the points raised are very instructive and relatively easy to execute, requiring a few changes in the draft manuscript.

The first remark refers to William McNeill's classic *Plagues and Peoples* (1976 [1998], New York: Anchor), which the reviewer thinks we might cite earlier and more frequently. We do so in the final manuscript and cite this work earlier and in the same passage where we also mention McNeill's *The Rise of the West: A History of the Human Community* (1963 [1991], Chicago: Chicago University Press). More generally, we cite *Plagues and Peoples* in all sections in which we address the role of the Black Death in contributing to Western exceptionalism.

Relatedly, R1 wonders about the scarcity of references to the Thirty-Years War. This is an excellent point, which comes in conveniently to our favor: Thus far, we mention several times the Black Death (1348-49 CE) as an event tilting the ratio of production factors to the effect that "labor" became scarce relative to "land" and "capital." What we do not mention in the manuscript but do so in the final manuscript is that the Thirty-Years War had the exact same effect (albeit smaller in scale), which is reminiscent of a more principled point made by Eric Jones in *The European Miracle: Environments, Economics and Geopolitics in the History of Europe and Asia* (1981 [2003], New York: Cambridge University Press) following Mark Elvin's *The Pattern of the Chinese Past* (1973, London: Eyren Methuen). As these works postulate, unlike most of Asia, Northwestern Europe was relatively safe from land- and capital-damaging disasters, including monsoon-like floods, tropical storms, droughts and earthquakes.

In other words, the disaster pattern typical of the CW-areas (i.e., reduced to epidemics and wars) recurrently made labor scarce relative to land and capital, thus creating an inherent incentive to deploy labor-productive technologies in manufacture and trade. In *The Lever of Riches: Technological Creativity and Economic Progress* (Oxford: Oxford University Press, 1992) and in *Why Europe? The Rise of the West in World History 1500-1850* (Seattle: McGraw Hill, 2008), Joel Mokyr and Jack Goldstone, respectively, reach similar conclusions.

R1 acknowledges our discussion of “Cool Water-pockets” outside Eurasia in the New World and how their much later peopling by modern humans as well as their isolation from major agrarian empires explains the absence of intensive agriculture and mature states in these out-of-Eurasia CW-areas before the colonial age. Indeed, upon the colonial confrontation with settlers from Northwestern Europe's CW-area, the peoples of the CW-areas outside Eurasia were at a dramatic disadvantage. Still, R1 suggests that another advantage of Northwestern Europe's CW-area (somewhat similar to Japan) might have been their better geographical protection from foreign conquest by despotic empires—an advantage that other Eurasian “CW-pockets” (like Northwestern Russia around the St. Petersburg area and Northeastern China around the Dalian area) have been lacking. This point of view complements our argumentation almost in perfection and we actually do mention it already in the draft version of the manuscript.

R1 asks for a more elaborate engagement with the role of the CW-areas' heavy clay soils and with the necessity of the heavy iron plow to cultivate these soils. The point echoes David S. Landes' *The Wealth and Poverty of Nations: Why Some are So Rich and Some so Poor* (1999, New York: W.W. Norton). As Landes explains, the originally densely forested territories of Northwestern Europe (and other CW-areas in the world) embodied a high entry barrier into intensive forms of agriculture for two reasons. First, to start crop cultivation and cattle herding, serious landscaping efforts (e.g., forest clearing and swamp draining) were necessary. Second, the heavy clay soils laid open after these landscaping projects could not be worked with a light wooden plow but required the heavy iron plow whose production in turn demanded advanced metallurgic knowhow—hence, the later emergence of intensive agriculture and statehood in Northwestern Europe compared to the pristine civilizations alongside Eurasia's East-West belt reaching from the Mediterranean to China. Another significant point about the heavy iron plow is that its use did not exclude women from outdoor fieldwork given females' lower body strength—the reason: The heavy iron plow must be pulled by draft animals (i.e., oxen or horses) which also women could command. This fact exempted Northwestern Europe from Alberto Alesina's argument that plow agriculture usually increased gender inequality in terms of the indoor/outdoor division of activities (Santos Silva et al. 2022, “The Roots of Female Emancipation: The Initializing Role of Cool Water.” *Journal of Comparative Economics* 50: 1-27).

R1 remarks that, even though our approach elevates geo-climatic arguments to a whole new level worth being widely noticed, it is perhaps not as unique as we suggest. In response to this intervention, the final manuscript extends the sections in which we review what earlier advocates of geo-climatic influences have proposed—of course, reviewing the seminal works of Jared Diamond, Jeffrey Sachs and many others and going all the way back to Montesquieu and even Thucydides. In so doing we hold our ground, however, clarifying more explicitly that previous contributions discussed particular geo-climatic influences—namely, cold seasons, steady rain and coastal proximity—in isolation but not in their characteristic combination that constitutes the very CW-Condition. In that sense, our emphasis on the CW-Condition is genuinely new.

R1 criticizes that the manuscript is sort of repetitive at stages and could be tightened up a bit more. We acknowledge this criticism. In fact, we wrote the manuscript fully aware of the fact that the main point repeats itself, albeit in different versions. This was done to avoid the risk of getting the main point lost in a treatise as detailed as ours'. Still, the final manuscript is largely streamlined and by 50,000 words shorter than the original draft. We were able to implement the respective cuts by outsourcing some chapters into the Supplementary Online Materials (SOM, accessible at www.coolwatereffect.com).

R1 remarks that s/he thought that the discussion in Ch. 11 about the role of genetically anchored population differences in IQs goes into a racist direction until s/he realized (apparently with relief) that we only built up the argument to eventually debunk it. This is a serious point. In the final manuscript, we make it clear up-front what our actual intention is in this context: namely, to disqualify racist interpretations of developmental differences.

Finally, R1 wishes to see the global map of the CW-Condition across countries much earlier in the manuscript. Following this suggestion, the final manuscript places the global map up-front in the Introduction (Figure 1-1).

REVIEWER 2 (R2)

Like R1, R2 is convinced of our work and recommends to publish the manuscript as it stands. Still, s/he suspects that our CW-measure might be tailored too deliberately to capture Northwestern Europe's geo-climatic uniqueness, which would make it inescapable to find a strong relationship between every unique civilizational achievement of Northwestern Europe with its geo-climatic singularity. In response to this criticism, the final manuscript points out in the introductory and concluding chapters that, even though the CW-Condition is particularly pronounced in Northwestern Europe, it is not unique to it. Moreover, the supposed developmental effects of the CW-Condition are also observed beyond Northwestern Europe, in direct proportion to the degree of the CW-Condition's absence-vs-presence in given territories. Moreover, we relate readers to a model in SOM-Section S12 (SOM-Table S12-2) where we introduce a "dummy variable" representing Northwestern Europe. This model operates like a "fixed effects" analysis in which every possible uniqueness of Northwestern Europe—including even such ones of which are unaware—is controlled for. As it turns out, this model leaves the expected developmental effects of the CW-Condition undiminished. In conclusion, the gradual absence-vs-presence of the CW-Condition does not appear to be artificially impactive simply because we tailored the measure of this condition towards capturing Northwestern Europe's uniqueness. We are confident that this part of the revision effectively resolves R2's slight concern.

REVIEWER 3 (R3)

After two exciting reviews, we are glad to have received a third positive review. We note that all three reviews are enthusiastic in their *overall* judgement of our manuscript and that each of them praises in particular our comprehensive quantitative analyses in support of the global Cool Water (CW-)Theory. Indeed, these quantitative analyses of historic and contemporary data and their graphical presentation constitute the empirical core of our work. We chose on purpose a quantitative instead of a purely historiographic approach because quantification urges researchers to include all observations with available data, instead of cherry-picking cases—a selection problem from which historiography cannot escape. Again, since all three reviewers unanimously appreciate our main empirical contribution, no revisions are required in the quantitative core of our work.

Having said that, the two reservations raised by R3 (see below) are limited in scope. They solely target certain shortcomings in our historical excursions, while these excursions—as the reviewer her-/himself correctly surmises in the closing statement—only serve the purpose of supplementing an illustrative narrative to our statistical evidence. Even so, the final manuscript rectifies our historical excursions, as this document will explicate point by point further below. Against this backdrop, the third reviewer’s overall judgement in the introductory statement reads as follows:

“On this basis, I will start by emphasizing that *this is a fascinating book manuscript* [emphasis added]. It presents a *novel geographical-climatic explanation* [emphasis added] for what has been termed the Rise of Europe and connects this with the subsequent spread of modernization processes beyond the West [...] The book deduces a number of different observable implications of this argument, from nuclear family structures and individualism to state-building and economic development, and it shows how these can be corroborated by cross-national statistical data. *The book is bound to be noticed and referred to when it is published* [emphasis added]. *It does a very good job of situating its contribution in the literature and showing that this is a novel take* [emphasis added], at least when the argument is considered in total [...] and it does make what is sometimes quite dense material more accessible. Similarly, the use of easily interpretable figures is bound to appeal to a broad range of readers. For these reasons, *I genuinely believe the book will leave its mark on the literature* [emphasis added]. [...] *it will certainly be widely discussed* [emphasis added].”

Obviously, this entry passage expresses a strong *overall* endorsement, especially with the summary statement “*The book is bound to be noticed and referred to when it is published.*” Of course, as the reviewer goes on to delve deeper into specific historic details, certain concerns with respect to literature coverage and factual interpretation arise. Yet, these are smaller-scope concerns *that should be measured in proportion to the reviewer’s overall judgment* just quoted. This is even more true as the reviewer’s closing statement echoes her/his overall positive assessment at the beginning: “[...] *I think the book generally succeeds. As said, there is a clear contribution to the literature here* [emphasis added].”

Be that it is, in the detailed discussion the reviewer raises two sets of reservation. The first one could be labelled the “one modernity problem.” Accordingly, the modernization process was kicked-off just once and since there is no experimental control over history, any attempt to explain the phenomenon inevitably can only provide just a one-case explanation, “*even if the authors do a very good job with the one case they have* [emphasis added].”

The final manuscript addresses this point heads-on. As we argue, taking the “one-case” concern truly serious means to effectively invalidate any causal claims ever raised in historiography

about the origins of the Industrial Revolution or modernization writ large. The reviewer her-/himself implicitly admits the apodictic nature of this conviction when introducing her/his reflections on the “one-case” problem by saying that raising this issue “*is almost a bit unfair*” [emphasis added]. Apart from the epistemological rigidity lurking inside the “one-case” concern, the issue is exaggerated for a couple of reasons, as the text box “*Debunking the ‘ONE TOSS’ Idea*” in Chapter 5 of the final manuscript explicates.

For one, even though the Industrial Revolution has been kicked-off in one country (i.e., England), the other nations in Northwestern Europe followed suit, while the Eastern and Southern European nations joined much later and then way slower than a pure spatial contagion/imitation model would suggest. Hence, even within Europe the West-East/North-South gradients in the CW-Condition explain powerfully (a) the sequence of time points when different nations entered industrialization and (b) how pervasively they fueled the process after its initiation. The exact same holds true for other aspects of the modernization process, like the fertility drop, educational expansion and democratization: The CW-gradient explains (a) the sequence along which European nations entered modernization and (b) how speedily they advanced once they were on track. So, the CW-Theory offers definitely more than a “one-case” explanation—even within the confines of Europe.

Across the globe, this dictum becomes even clearer. Our quantitative analyses demonstrate that cross-national differences in scores of modernization indicators (e.g., material prosperity, life expectancy, school attendance, physical security, state capacity, human rights, electoral integrity, political representation, gender equality, interpersonal trust, liberal tolerance, subjective wellbeing etc.) all correlate tightly with the strength of the CW-Condition in countries’ major urban centers—ever since the first such differences emerged. Consequently, the CW-Condition explains the differences in the intercepts and slopes of progression along which today’s roughly two-hundred countries navigate through the global modernization process. In our most comprehensive model, the CW-Condition alone explains fully seventy-three percent of the total global variation in countries’ modernization rates and levels. Clearly, these analyses and the related explanations are not entrapped in a “one-case” dilemma.

Finally, as outlined above, we include into our regression models a dummy variable categorizing countries for whether they belong to Northwestern Europe (1: yes, 0: no). If the “one-case” concern would be justified or if the CW-Condition omits other characteristics that, too, are unique to Northwestern Europe, then the CW-Condition should show no more effect on modernizing outcomes under inclusion of the Northwestern Europe region dummy. But the contrary is true: The modernizing effects of the CW-Condition do not disappear under inclusion of the Northwestern Europe region dummy. These considerations, which the revision places prominently in the introductory and concluding chapters, should greatly diminish the “one-case” concern.

The second reservation claims a mismatch between the high quality of our extensive statistical evidence and our reading of the historical record. The criticism focuses on two points in our reading of history: (a) reliance on a partly dated literature and (b) factual interpretations that the reviewer finds too controversial in their sweepingness. The reviewer illustrates these two reservations with a couple of examples, which we address point by point in the second sub-section.

Before doing so, we wish to draw attention to the reviewer’s concluding statement, which provides an overall evaluation of the detailed discussion in the preceding paragraphs. Indeed, the reviewer concludes:

“But one way to look at the book is that the narrative historical evidence is basically of an illustrative nature and that the key aim is to present the new argument and provide some circumstantial evidence [...]. *If this is the case, I think the book generally succeeds. As said, there is a clear contribution to the literature here* [emphasis added]. One solution might be *to make it clear that the use of narrative historical literature is simply for purposes of illustration* [...] [emphasis added].”

The final manuscript clarifies that our reading of the historical record in support of the CW-Theory is fully on purpose limited to the comparative *Why the West* literature, including both the classics of this literature as well as more recent work, like Goldstone (2009), Ferguson (2010), Morris (2011), Siedentop (2014), Mitterauer (2016), van Zanden et al. (2019), Henrich (2020), Gerring et al. (2022) or Galor (2022). We add to these works a comprehensive review of the entire *Why the West* literature by Daly (2015) and another recent contribution to this *oeuvre* by Hoffman (2015). Beyond reasonable doubt, this literature establishes that—among the world’s mature agrarian civilizations—Northwestern Europe’s emerging Medieval culture was unique (apart from some parallels in Japan) in sustaining nuclear family patterns and in giving rise to contractual state institutions.

R3 complains several times about the sweepingness of our comparative statements when juxtaposing Northwestern Europe to the other agrarian civilizations in the world. The final manuscript recognizes this point and, accordingly, systematically turns down the sweeping tone at the passages where it occurs. Yet, in the decisive point we hold our ground, which is solidly backed by the *Why the West* literature (whether old or new): Northwestern Europe’s emerging Medieval civilization was exceptional in sustaining nuclear families and giving rise to contractual states.

To bring home the point that Northwestern Europe differed from the other civilizations in the world in its family patterns and state structures, it is unnecessary to go into the more case-specific literature in an attempt to re-narrate in all detail the history of every other agrarian civilization in the world, be it the Middle East, India, China or Meso-America. As the reviewer her-/himself openly admits: “*At the end of the day, understanding the finer contours of historical developments and contexts is not what this book aims for. It is almost impossible given its breadth* [emphasis added].” Hence, whenever we comment on the civilizational singularities of Northwestern Europe, our point of reference are the cross-cultural comparisons of the *Why the West* literature—not the myriad of detail-oriented single-case studies, which actually have no claim to our main point of departure.

In the following we comment on the specific historic examples that the reviewer chose to pick and how we use her/his remarks to revise the manuscript. We address the reviewer’s comments in the order of their appearance.

“In the parts I have read, the best example is probably the use of the literature on family structures where they show how our knowledge has evolved and use more recent historical findings to criticize older and outdated (e.g. p. 162). But this is an exception and even here the criticism of the Hajnal thesis could have deserved more recognition and discussion.”

The final manuscript still refers to the Hajnal-thesis but cites newer and quite recent literature by van Zanden et al. (2019) from Utrecht University’s comparative social history research unit. Despite earlier criticism, the massive data that this group has collected largely confirm

Hajnal's original ideas about the Western family pattern and its geographic distribution. Other new literature from the Max-Planck Institute's Europe-wide "Mosaic" Project (Szoltyszek et al. 2022) point into exactly the same direction. The final manuscript clarifies this.

"There is very little attempt to read up on the more recent literature by historians and archaeologists. Again and again, the reader encounters a very sweeping use of clearly outdated and itself sweeping historical work (see e.g. references 30-34 and 48-55). For instance, in a book that does so much to understand what happened economically and politically in medieval Europe, the absence of the work of Chris Wickham is glaring! But this is part of a pattern: there are almost no recent works by medieval historians in the references."

This criticism is a an overstatement. The draft version of the manuscript cites in the endnotes 30-35 the works of Mann (2012), Solomon (2012), Davis (2014), Bentzen et al. (2017), Scott (2017), Buggle (2020) and Gerring (2022). And in endnotes 48-55, we cite Maddison (2007), Morris (2011) and Downing (2020). Throughout the book, we rely frequently on the work of Mitterauer (2016), van Zanden et al. (2019) and Galor (2022). Our revision amends these works by the books of Daly (2015) and Hoffman (2015). These studies are anything but outdated. The fact that, besides this newer literature, we also cite the classics of the *Why the West* literature should rather be seen as a strength because it shows that we are not oblivious of the pioneers in the field of comparative history and how newer studies build on their work. The latter aspect is all the more important because the newer comparative work confirms the *Why the West* classics in the one central point already mentioned: Among the world's major agrarian civilizations, Northwestern Europe's emerging Medieval culture has been unique in sustaining nuclear family patterns and in giving rise to contractual state institutions. Again, to establish this point, we limit ourselves to the comparative *Why the West* literature and deliberately abstain from reviewing the case-specific, non-comparative literature, simply because the detailedness of this literature does not help us to further establish the more general point of Western exceptionalism.

"I will give some more specific examples. First, here are some instances where very sweeping and sometimes outdated evidence is used: The description of the Wittfogel thesis, which the authors return to a number of times. The extensive criticism of Wittfogel is merely mentioned in a sentence here and there and then dismissed. Instead, a couple of recent analyses by historically oriented economists are made to justify the core of this very disputed thesis."

The final manuscript emphasizes the controversial status of the Wittfogel-thesis. But we stick to our argument in an essential aspect: During state formation, irrigation dependence exerts an autocratic tendency towards coercive institutions. This conclusion has been convincingly demonstrated in a systematic cross-national study by Danish economists Bentzen et al. (2017). As the final manuscript points out, the problem is that—among historians—both supporters and critics of the Wittfogel-thesis have cherry-picked their cases (which is a general problem in historiography compared to a quantitative approach). The statistical analyses by Bentzen et al., however, do not cherry-pick cases but look at the full global evidence, demonstrating that countries whose agriculture is more irrigation-dependent are significantly more likely to be autocratic—back in the past and still today (with and without proper controls). We find this evidence rather conclusive.

“The description of agrarian empires is extremely crude: “Slavery, serfdom, bondage, forced labor and oppression were the norm for the bulk of the population in all agrarian empires in human history—without exception” (p. 5). Historians have shown so much nuance and differences when it comes to agrarian empires, both across space and across time. Just to give an example, medieval historians have shown how an economy such of that of medieval Egypt was commercialized and very complex and how even peasants were able to engage in it. No such nuances are found in this book. Instead, the book makes a residual category out of agrarian coercive empires, which are described as basically similar. The following sentences, for instance, will be extremely provoking people working on some or more of these cases: “... all of the agrarian empires turned out to be evolutionary dead-ends. Their coercive orders entrapped them in recurrent cycles of decay and rebuilding, until they went extinct upon confrontation with European colonial powers in the aftermath of 1500 CE.” (159).”

The final manuscript tones down the sweepingness of our characterization and admits explicitly that the agrarian empires differed in nuance in manifold ways. Still, we maintain that the agrarian empires represented a generic type of political order that had one thing in common, in striking contrast to the emerging contractual states in Northwestern Europe: centralized control over vast territories by top-down coercive institutions, plus the non-occurrence of an Industrial Revolution in spite of millennia of imperial history. Hence, the agrarian empires’ enormous presence in space and time over civilized history underlines the significance of their in-built incapacity to launch an industrial-democratic take-off. We base this statement on newer literature, especially Hoffman (2015), Scott (2017) and Galor (2022). To defend this view, reviewing the comparative historic literature suffices.

“The old literature on feudalism, both in the case of medieval Europe and Japan, is recapitulated without discussing the devastating criticism of this literature by Susan Reynolds and many others. The main argument made in this connection by the authors is that once the feudal economies of medieval Europe started to commercialize, the CW-condition meant that the contractual state was the results. But the description of feudalism, including in Japan, is seriously dated. And the description of the “contractual state” that followed is extremely sweeping. The authors are very open about the fact that they rely on a historical literature that most historians would today consider both too sweeping and clearly outdated. For instance, this is the case for all the authorities invoked in this sentence: “In this context, it is interesting to note that Marc Bloch, William McNeill, Fernand Braudel, Eric Jones and John Powelson attribute some of the contractual features of Northwestern Europe’s feudal organization also to Japan. In the words of Samuel Finer...” (133).”

The final manuscript continues to cite the classics on European Medieval feudalism and its “contractarian” distinction from more “coercive” forms of feudalism in the world’s major agrarian empires. But the revision relies more heavily on newer work in support of the classics. On the topic of feudalism, we rely especially on Mitterauer’s *Why Europe* (2016)—a formidable (recently passed away) expert on Medieval feudalism in global comparison. This work is newer than Susan Reynolds’ *The Middle Ages without Feudalism* (2012), which Mitterauer cites, yet not very favorably overall—in line with the highly controversial status of her work. If anything, Reynolds’ thesis that European feudalism did not exist in the rigidly hierarchical form as many scholars stated is actually supporting our argument of a more reciprocal and less oppressive

lord-peasant relationship in Medieval Europe than in most of the agrarian empires in human history.

“The authors argue that the CW-Condition explains where the Reformation was successful and where it was not (while the Counter-reformation was successful). As I understand the point, it has to do with how predisposed individuals were (and hence how willing they were to fight for reformation ideas). But when reading historians, we often get explanations that emphasize elite actors, especially the royal Reformations in Northern Europe and the Habsburg support of the Counter-Reformation. This is not discussed. And what are we to make of Catholic Belgium and Ireland and the major protestant areas in Switzerland, Hungary, and Romania? It is not that these things invalidate the general pattern the authors are presenting. But they are simply not discussed. Later on, the authors note that “It is indeed too obvious to overlook that the first industrial economies and the first modern democracies all were predominantly Protestant in composition” (170). This, too, is very sweeping. What are we to make of e.g. the French Revolution as well as Belgium’s early industrialization?”

We agree that the draft manuscript’s assertions to this point are two sweeping. Accordingly, the final manuscript argues in a more nuanced manner. Specifically, we openly admit that decisions by dynastic elites finally determined whether a Christian province remained Catholic or turned Protestant. Such decisionist idiosyncracies also explain the existence of Catholic enclaves in predominantly Protestant areas of Europe and vice versa. Dynastic rule also explains why Belgium remained a Catholic enclave in Europe’s predominantly Protestant Northwest: At the time of the Reformation, Belgium was part of the Spanish Netherlands ruled by the Catholic Habsburgs.

However, such a purely decisionist explanation of the spatial distribution of Protestantism has its limits. It cannot explain the clear geographical pattern in the distribution of Protestantism-vs-Catholicism over Europe and why dynastic elites in Northwestern Europe have been so much more prone to turn to Protestantism than those in the South and East of Europe. This obvious geographical pattern lends plausibility to our argument. Due to it, the decentral forms of water, land and labor management that prevail under the CW-Condition infused into people’s mindsets an individualistic-egalitarian pre-disposition. As a consequence, people found appeal in the Protestant doctrine’s emphasis on individualism and egalitarianism. This attraction factor, however, varied alongside the CW-Condition’s geographic gradient, fading away as one moves further South or East from the European Northwest. Hence, dynastic decisions were more likely to be pro-Protestant in the European Northwest than in the South and East. Besides, the fact that the French Revolution and Belgium’s early industrialization happened in Northwestern Europe’s Catholic enclaves does not contradict the CW-Theory. These observations only show that the CW-Condition’s inherent emancipatory potential took effect even in the absence of Protestantism. In other words, this potential was conducive to Protestantism but did not need the presence of Protestantism to unfold.

“[...] there are many places where the very abstract argument is used to provide very specific historical explanation. Take the case of England, the first to transition to the industrial level according to the authors: “...as soon as England met the critical density level for the first time, namely in 1750 (!), it actually started to industrialize almost immediately...” (153). So,

we are basically told that the extremely deep CW-conditions, which otherwise works at a glacial speed, kicked in overnight in 1750.”

The final manuscript clarifies this issue. The point is that the constant presence of the CW-Condition operated slowly to get the areas with this condition to the mature pre-industrial stage of agriculture but, once this stage was reached, the CW-Condition quickly triggered the industrial-democratic double take-off thereafter. The significance of this observation is underlined by the recurrent contrasting experience of all of the world’s agrarian empires in non-CW areas (i.e., Middle East, India, China, Meso-America). They all reached the mature pre-industrial stage of agriculture earlier and persisted on it for much longer but without any of them ever breaking through the ceiling of industrialization. For the credibility of the CW-Theory, the observation that the agrarian empires in the world’s non-CW areas covered so much space and time in civilized history and still did not launch the industrial take-off is just as important as the observation that the first civilization to reach maturity in a CW-area almost instantaneously triggered the industrial take-off.

There is a more principled issue in this context. Developmental processes result from the presence of certain potentials and their subsequent germination. Importantly, potentials and their germination differ categorically in their temporality. Potentials, such as those embodied in environmental conditions and their inherent challenges and opportunities, lack temporality in the sense that the potential is permanent as long as it is in place. The germination of the potential, by contrast, is the result of a maturation process that will see its competition at a specific point in time that appears sudden. Hence, the presence of a potential is time-invariant, while its germination is time-specific. Where liquid water exists under habitable conditions, it permanently embodies the potential to generate life. But the germination of this potential will happen at a particular point in time, namely when the genesis of life is completed. For this reason, the fact that the presence of a potential cannot be dated in time while its germination can be dated is no contradiction. By the same token, the fact that the industrializing potential embodied in the CW-Condition cannot be dated because this potential was constantly in place since the end of the last Ice Age, while its first germination can be dated with England’s industrial take-off around 1760-70, is also no contradiction. To demonstrate an existing link between potential and germination, one must show a significant covariation between one’s measure of the potential (e.g., some environmental feature and the strength of its spatial presence) with (a) the temporal sequence in the emergence of the germination variable (e.g., some modernization feature and its gradual strength) as well as (b) with the spatial variation in the germination variable. To clarify this epistemological issue, there is a text box under the title “Understanding Potentials” in SOM-Section S8.3 (p. 120) of this document.

“That Russia did not conform to its CW-condition is explained with the Mongol legacy and the fact that the Russian CW-areas became part of a larger agrarian empire (169). This kind of conditional explanation obviously begs a lot of questions. To take only the most general one: Had the Roman Empire succeeded in unifying Europe in the way the Chinese empire unified China, would there have been no CW-story to tell after all? If the geographical-climatic explanation is conditional on these kinds of political factors, then this sits very uneasily with the categorical way it is pitched in the book in general.”

The final manuscript emphasizes from the outset that every social theory only works under certain scope conditions. The CW-Theory is no exception from this rule. To identify the CW-

Theory's scope conditions, a deliberate search for counter-factuals against a pure and fully deterministic version of the CW-Theory is instrumental. Russia is one such counter-factual because the country developed on a less prosperous and less democratic trajectory than its CW-Condition would otherwise suggest. Our discussion of the Russian case indeed identifies an important scope condition of CW-environments: For CW-areas to unfold their emancipatory potential, these areas must remain free from conquest and from coercive imperial structures imposed from elsewhere. If we follow the reviewer's thought experiment, this conditionality indeed implies that the emancipatory potential inherent in Northwestern Europe's CW-Condition might have germinated less powerfully, had the Roman Empire persisted for much longer and expanded territorially over all of Europe or had the attempted invasions into Europe by the Moors, Huns, Mongols and Ottomans been successful. In fact, however, the migrating Germanic tribes tore down the West Roman Empire and Europe effectively stopped all attempted invasions in history. Likewise, the few attempts to unify the small European continent under a monolithic empire (Habsburgs, Napoleon, Hitler) were strikingly short-lived. Not even Northwestern Europe has ever been unified under a single hegemon.

We argue that the original reason for the endurance of Europe's pluralistic power structure resides in the CW-Condition. Indeed, the fact that the CW-Condition enforces decentral forms of water, land and labor management infuses autonomies into the social fabric that are too manifold and too strong to allow for a persistent imperial unification from inside. The final manuscript presents these considerations.

"The German *Sonderweg* is explained with reference to the failed 1848 revolution: "Had the liberal revolution of 1848 succeeded, from which it was only a breath away, the resulting German state would have been on a democratic trajectory and would have turned into a closely allied soulmate of the other liberal powers of the West, which would have saved humankind from two world wars and the Holocaust" (173). However, the 1848 revolution of course failed almost everywhere, as for instance Kurt Weyland has demonstrated in his work. So, why did the failures of 1848 derail the CW-effect only in Germany? And why with the broad CW-theory do the authors even feel the need to explain that Germany did not conform to some of the expected political developments for a period of around one human life span. Is the theory really expected to predict such short-term variations (even if they are of very big historical importance in this particular case)?"

The final manuscript clarifies that the German *Sonderweg* is the other critical counter-factual speaking against a pure version of the CW-Theory and that this counter-factual as well offers insight into our theory's scope conditions. And it's the same kind of scope condition to which also the Russian case relates, albeit in a different way. It is about geo-political power constellations outside the control of the populations inhabiting CW-areas. The point is not that the 1848 revolution has been crushed down (as in other countries) but that this happened in a country that was not nationally unified by then (the German Federation was indeed only a loose federation, not a nation state). As a consequence, the initiative to unify the country was taken away from the liberal movement and laid into the hands of Prussia's militarism. Accordingly, in the aftermath of 1848 Germany witnessed a brain drain of liberals into the US and other Western countries, which weakened the liberal forces—with devastating long-term consequences. In conclusion, specific historic circumstances outside the range of predictability can lead to power constellations that suffocate a CW-area's liberalizing potential. For a non-

deterministic theory, this should be an acceptable qualification. Besides, we are grateful for the hint to the work of Kurt Weyland. We cite his 2009 article in *International Organization* “The Diffusion of Revolution: 1848 in Europe and Latin America.”

“Later, the authors note that “It is probably also no coincidence in this context that successful liberal revolutions (like the Dutch, Swiss, English, American and French revolutions) and also some failed liberal revolutions (like the March Revolution of 1848 in Germany) all happened in CW-areas, thus testifying to these areas’ inherent emancipatory drive towards freedoms” (174). The point about the successful revolution makes some sense though this also depends on how the 19th century revolutions in Latin America are categorized. But failed liberal revolutions happened all over Europe. And again, can the CW-theory really explain where 19th century liberal revolutions were attempted but failed?”

The final manuscript clarifies that—more than other regions in the world—Northwestern Europe and its settler colonies were a continuous source of rights struggles (no matter how successful) and continue to be so, visible in the uninterrupted series of emancipatory movements from the *Abolitionists* to the *Suffragists* to the working class and civil rights movements to the *Black Lives Matter*, *Me To* and *LGBTQ+* movements of today. Non-outdated writings by Grayling (2007), Pinker (2017) and Henrich (2020) evidence this fact. Our emphasis is no longer whether these rights struggles are successful or not. The point is their sheer existence as well as their geographic concentration in the world’s CW-areas since the dawn of the modern era.

“[...] there is a mismatch between the general argument and the way it is treated in the narrative parts of the book. *I want to emphasize that I am not sure if this is a big problem. At the end of the day, understanding the finer contours of historical developments and the historical context is not what this book aims for. It is almost impossible given its breadth* [emphasis added]. Of course, it means that historians and historically minded social scientists will be able to find a lot of faults with the book – and they will probably also be provoked by many observations, interpretations, and arguments. But *one way to look at the book is that the narrative historical evidence is basically of an illustrative nature and that the key aim is to present the new argument and provide some circumstantial evidence* [emphasis added] [...].”

This passage reveals that the reviewer develops, after all, a better understanding of the purpose of our historic excursions. S/he actually offers this understanding as a formula to resolve her/his own concerns raised in the historic detail section of the review. Indeed, our historic excursions serve merely as an illustrative narrative to supplement the extensive statistical evidence of Western exceptionalism. Presumably, the fact that the reviewer suggests this solution so lately in the review reveals a gross misunderstanding that must have settled in at the beginning of the reading of our manuscript. This misunderstanding could have been avoided easily by explicating our approach to the historic record more prominently from the start. The final manuscript now does.

The major core of our work consists in extensive quantitative analyses, including both historic and contemporary data, which have been praised for their excellence and persuasiveness by the reviews. Indeed, none of the reviews criticizes measurement, data and the modelling of our statistical evidence, so the empirical core of our work seems safe.

As concerns the historic narratives that we provide, this is just a supplement that serves first and foremost illustrative purposes, rather than being intended as a proof of our statistical evidence. Penultimate proof of causality is anyways an illusory goal in historiography, which will always remain a matter of interpretation. Even historians with the same material at hand frequently differ in their interpretation of the facts. Therefore, our own interpretation is not—and cannot—meant to be an uncontroversial proof of facticity. Instead, our historic interpretation is to be seen as the debatable offer of a possible and plausible reading of the historic record, in line with both classic and recent writings especially in the comparative *Why the West* literature. Put differently, our historic excursions are not meant to validate our statistical evidence. Rather the other way around, our statistical evidence serves as a judgemental standard to evaluate which among alternative readings of the historical record is most compatible with the quantitative data that we present.

Again, we deliberately limit ourselves to the *comparative* literature that describes the emergence and maturation of Western civilization in explicit juxtaposition to the other major civilizations of the world, thus painting a picture of Western exceptionalism. In the light of this updated *Why the West* literature, the key claims of our original manuscript remain essentially intact, namely: Family formation in the world's CW-areas (including those in the New World) and state building in Northwestern Europe's CW-area differed from the non-CW areas of the world in which highly organized civilizations emerged—the difference boiling down to the enculturation of *nuclear* rather than *patriarchal* family structures and *contractual* rather than *coercive* state institutions.

Reviewing in addition all the case-specific historic literature that focuses on the details of single civilizations does not help to further validate the point of Western exceptionalism, simply because this literature is not concerned with the comparative contrast. Reviewing it nevertheless would simply be *(a)* a diluting distraction from our main point and *(b)* an unnecessary and ineffective extension of an already lengthy manuscript. Hence, we stick to our refusal to engage in this elusive exercise, in line with the reviewer's own assertion that “**It is almost impossible.**”

Besides, emphasizing Western exceptionalism is normatively speaking neither to praise Western culture nor to bash it. It is simply stating its difference, or WEIRDness as Henrich (2020) has coined it. Avoidance of a normative undertone in either the appreciative or accusatory direction is inherent to our *first difference* approach, which locates the origin of the West's evolved singularities in its specific geo-climatic features, for which Western populations are neither to congratulate nor to accuse.

REVIEWER 4 (R4)

“**The social sciences have a dearth of evidence-based causal theories. The proposed book contributes to filling this gap. The cool water theory has been introduced in a few books by Christian Welzel. The proposed book is expanding and elaborating on this theory, which is welcomed.**”

We appreciate the praise.

“However, it looks like the book is overstating its claim. The claim that “the CW-Condition operates as the connecting source of all of these prime movers” may give the reader the impression that a single theory can explain everything. Since the book is intended for a broad readership, we cannot expect all readers to be familiar with alternative theories. Considering the important lesson that correlation does not prove causation, we must be sceptical to the claim that a single factor explains many phenomena just because it is correlated. Almost all cultural variables are correlated with each other anyway. We must look at other theories as well if we want to explain differences between human societies in different geographical environments.”

The final manuscript does not postulate that the CW-Theory explains everything, nor that the CW-Condition is the *only* source of Western exceptionalism. Instead, it claims that the CW-Condition is the *first difference* from which Western exceptionalism started to take shape. From this point of departure, we then test empirically how far the explanatory scope of the CW-Condition is reaching. And we do so in explicit juxtaposition to two dozen alternative influences (including all those mentioned below by R4), championed as “remote drivers” of history by the *Deep Roots* literature (which we review extensively in Chapter 8). As it turns out, the CW-Condition is connected in the expected direction with each of the supposed remote drivers, while being temporally prior to all of them. The certainty about the CW-Condition’s temporal primacy does infuse a causal direction into the existing correlations. To address the causality problem, the final manuscript’s conclusion incorporates a longer passage cited at the end of this SOM-Section.

“I will now list a number of other theories that may be relevant for explaining geographic differences in human societies. These theories may or may not have been mentioned in the part of the draft manuscript that I don’t have access to. Relational mobility theory: Independence of irrigation is important in the cool water condition. Dependence on centrally controlled irrigation can lead to low relational mobility which explains many aspects of East Asian culture. See www.relationalmobility.org.”

We test the CW-Theory against irrigation dependence, with and without controls. The CW-Condition withstands these tests easily and the final manuscript refers repeatedly to this evidence.

“The resource curse. The presence of defensible valuable resources may lead to endless conflicts. Such resources include oil, precious metals, precious stones, valuable minerals, fertile land, water, as well as geopolitically important ports, waterways, travel routes, etc. (see e.g.: Ross, M.: *The oil curse: How petroleum wealth shapes the development of nations*, 2012). The cool water condition involves distributed resources that are difficult to defend, thus avoiding the resource curse.”

This argument does not contradict but is, on the contrary, perfectly compatible with our line of reasoning, which focuses squarely on the diffuseness and de-centrality (i.e., non-concentration) of vital resources, thus pinpointing a constellation that escapes the “resource curse” trap.

“Resource conflicts may lead to war, failed states, and general insecurity. The level of security is an important explanatory factor correlating with North-South differences, while the relational mobility helps explaining East-West differences (Fog, A.: “Two-Dimensional

Models of Cultural Differences: Statistical and Theoretical Analysis.” *Cross-Cultural Research*, 57(2–3), 115–165, 2022).”

The final manuscript shows that the CW-Condition offers more secure environments when it comes to violence, including human fatalities in war, civil war, terrorism, organized crime, political oppression and even traffic and work.

“Violent conflicts prevent democratization according to the territorial peace theory (Gibler, Douglas M.; Owsiak, Andrew: “*Democracy and the Settlement of International Borders*.” 1919-2001. *Journal of Conflict Resolution*. 62 (9): 1847–1875, 2017).”

See above: The argument about violence-vs-security is compatible with, not contradictory to, the CW-Theory, especially the CW-Condition’s tendency to favor contractual institutional arrangements.

“Health. The manuscript explains the difference between extraction colonialism and settlement colonialism by the cool water condition. A possibly more precise explanation of the differences in colonization pattern is the level of infectious diseases (Hruschka, D. J., & Henrich, J.: “Institutions, Parasites and the Persistence of In-group Preferences.” *PLOS ONE*, 8(5), e63642, 2013).”

The models in the final manuscript test explicitly for the historic prevalence of diseases and it turns out that CW-areas are less disease-prone.

“Education. Wealth, security, and industrialization are connected with a high level of education. This favours the demographic transition to avoid overpopulation, as well as economic and political security, and democracy.”

The models in the final manuscript demonstrate a powerfully positive impact of the CW-Condition on lower fertilities and greater cognitive long-term investments. In fact, lower fertilities and cognitive investments are among the key mediators through which the CW-Condition affects contemporary emancipatory outcomes. So again, all of this is compatible with, and does not question, the CW-Theory.

“While geographic factors can explain historical differences, these factors are less influential today, as the book correctly states. But path-dependence has locked different countries into different stages of development and different political and economic roles in the world system. Rich western countries have a strong economic interest in continuing a neo-colonial policy that keeps countries in the global South trapped in the role of suppliers of cheap resources and consumers of industrial products from the North (Hickel, J.: *The Divide: A Brief Guide to Global Inequality and its Solutions*, 2017).”

True but the CW-Condition is still the *first difference* through which Western countries entered a trajectory of beneficial developmental outcomes that then lifted their power to a level on which it became possible to colonize the rest of the world. Hence, the CW-Condition describes the geo-climatic origin of the historic colonizer/colony division, which lingers until this day in the economic world order.

“My assessment: The book makes an important contribution to advancing the theoretic understanding of causes of geographic differences in culture. However, the book seems to

overstate the importance of a single factor. I would recommend editing the manuscript to better include other causal factors, including those mentioned above.”

The final manuscript follows this advice, as a result of which we can conclude that we do *not* overstate the role of the CW-Condition. Instead, we quantify the proportion of the CW-Condition’s impact, which amounts to up to 70% explained variance with respect to country differences in emancipatory developmental outcomes.

Here follows the new passage in the Concluding chapter of the book manuscript, in an attempt to address the causality question:

Of course, there is no experimental control over history. Therefore, the four lurking threats to causal identification in non-experimental studies need to be addressed. These threats include reverse causality, endogeneity, omitted variable bias and unit mis-specification.

Reverse causality, to begin with, is of no concern in our setting. The simple reason is the strict temporal ordering of our variables along a far-reaching sequence of consecutive and clearly distinct historic epochs, extending over the (a)-to-(d) serial order from (a) the timeless CW-Condition to (b) pre-industrial female autonomies to (c) industrial-era cognitive investments to (d) post-industrial human empowerment—and all of that under the framework conditions of *nuclear family patterns* and *contractual institutional arrangements*.

With respect to *endogeneity*, one might suspect that the CW-Condition is insufficiently separable and, thus, non-exogenous to its supposed emancipatory outcomes today. Against this suspicion, it needs to be emphasized that the CW-Condition and its supposed emancipatory outcomes are conceptually and empirically clearly distinct because their measures include no overlapping elements and because they are temporally far apart, with the CW-Condition indicating geo-climatic conditions that reach centuries back into the past. Given the CW-Condition’s endurance back in time, it can impossibly be endogenous to its posterior developmental outcomes. Simply put, endogeneity is a non-issue in our study.

As concerns *omitted variable bias*, the usual concern is that the effect of an original treatment *X* on its supposed outcome *Y* is a statistical artifact of an overlooked confounding treatment *Z*. If so, the original treatment’s effect would be absorbed by the relevant confounder upon the latter’s inclusion into the equation. Usually, to interpret the absorption of the original treatment’s effect by the rivaling treatment as confounding informs the conclusion that the original treatment *X* is causally irrelevant for the outcome *Y*. However, interpreting the absorption of the original treatment *X* by the alternate treatment *Z* as confounding is justified, if—and only if—the absorbing treatment *Z* is temporally isochronic with the original treatment *X*. Only simultaneously operating treatments are rival treatments. Hence, only in the case of temporal simultaneity can the absorption of one treatment’s effect by the other be considered as a confounding that renders the absorbed treatment causally irrelevant. If, by contrast, the treatments are not contemporaneous but operate sequentially, with the alternate treatment *Z* being posterior to the original treatment *X*, then absorption of the latter by the former does not indicate *confounding*. Instead, effect absorption in the case of sequentially ordered treatments indicates something else: *mediation*. The difference is crucial because *confounding* would indeed disqualify the original treatment *X* as causally irrelevant to its supposed outcome *Y*. In stark contrast, *mediation* does not at all indicate the causal irrelevance of *X*. Quite the contrary, *mediation* highlights the original treatment’s *indirect* causal role, exhibiting that *X*’s seemingly direct effect

on Y is transmitted through X 's influence on the intermediate treatment Z ($X \rightarrow Z \rightarrow Y$). This kind of absorption among predictor variables is not a story about one rendering the other causally irrelevant; it is about shedding light on the sequence in causal chains.

The temporal principles of causality are crucial for the interpretation of our results. The CW-Condition addresses geo-climatic features that reach back to the beginning at which the world's developmental differentiation of today began to take shape. In other words, the CW-Condition is temporally prior to literally every developmental outcome that followed. Therefore, none of the remote drivers of societal development championed in the deep roots literature rivals the causal role of the CW-Condition. The reason is straightforward: All of the suggested remote drivers are temporally located *in between* the CW-Condition and its emancipatory outcomes of today. Therefore, any evidence of an absorption of the CW-Condition's emancipatory effects by a remote driver must be interpreted as evidence for *mediation*, yet *not* (!) for *confounding*. Consequently, omitted variable bias is a non-issue when it comes to the hypothetical confounding of the CW-Condition's emancipatory effects.

Significantly, we find hardly any evidence for a mediation of the CW-Condition's emancipatory effects by any of the suggested remote drivers. In fact, the CW-Condition turns out to be the connecting source of all the other suggested remote drivers. For the strength and direction of a remote driver's statistical impact on societies' progression in human empowerment today is a strictly linear function of the strength and direction by which the respective remote driver is itself affected by the CW-Condition (see Table 8-1 and Figures 8-1 to 8-3, pp. 238-240). This conclusion holds true for two dozen remote drivers championed by the deep roots literature.

Only two variables mediate the CW-Condition's direct effect on human empowerment today, namely pre-industrial female autonomies and industrial-era cognitive investments, thus establishing the historic sequence from (*a*)-to-(*d*) mentioned above. Insofar, we have indeed identified the *first difference* from which the West's emancipatory dynamic took off, including the stations over which it evolved, although we have also discovered that globalization slowly but steadily dissociates emancipatory aspirations from their origination in the West's CW-Condition.

To address the issue of unit mis-specification, Manuel Santos Silva and his co-authors use an "ancestry-adjusted" version of countries' CW-scores, based on the post-1500 "world migration matrix" by Louis Putterman and David Weil. Doing so changes the unit of analysis in such fashion that populations obtain the CW-scores of their countries of origin, rather than their countries of residence. But this exercise fully reproduces all of our own results. Hence, it is safe to conclude that these results are not an artifact of mis-specification as concerns the unit of analysis.

Moreover, Santos Silva et al. show that, in the US at the turn of the twentieth century, female immigrants from countries of origin with higher CW-scores exhibit significantly lower marriage rates and higher marriage ages, long after their immigration. Because immigrants living in the US face the same institutional setting, this finding further alleviates the concern that omitted institutional factors might be driving the cross-country evidence. Besides, Chapter 9 and SOM-Sections 9 to 11 present plenty of evidence beyond countries, demonstrating that the emancipatory effects of the CW-Condition operate on various different levels of spatial disaggregation and even within the narrower scope conditions of single countries.

To repeat it, our main contribution is to identify the CW-Condition as the *first difference* from which Northwestern Europe's nuclear family pattern with its greater degree of female

reproductive autonomy began to take shape, visible in older female marriage ages and lower fertilities already in the pre-industrial era.

Against the CW-Condition, there are two alternative explanations for Northwestern Europe's nuclear family pattern. Nico Voigtländer and Hans-Joachim Voth argue that the decimation of the workforce by the mid-fourteenth century Black Death caused a shift in agriculture from more labor-intense crop cultivation to less labor-intense animal husbandry. This shift led to a shrinkage in labor demand, thus causing lower fertility pressures on women to sustain the workforce. As a response, women postponed marriage and child birth. Against this backdrop, the study by Santos Silva et al. shows that the CW-effect on late pre-industrial marriages is not simply capturing a Northwestern European idiosyncrasy as the Black Death explanation posits (see SOM-Table S13-2). Instead, the CW-effect is robust to excluding Northwestern Europe as well as controlling the salience of animal husbandry for pre-industrial subsistence.

The second explanation posits that the emergence of Northwestern Europe's marriage pattern was the consequence of the Catholic Church's family policy. John Goody, followed by Francis Fukuyama and Jan Luiten van Zanden, was the first to formulate this suggestion. Recently, Jonathan Schulz and his co-authors as well as Joseph Henrich repeat this claim and try to defend it with a measure indicating the temporal length of countries' exposure to the Catholic church. As we have seen, our findings are robust to the inclusion of the length of exposure to the Catholic church as measured by Schulz et al. In addition, SOM-Section S9.2 replicates the CW-effects across the oblasts of the Russian Empire where the Orthodox church did not pursue the Catholic marriage policy. More generally, the analyses in SOM-Section S10 establish that kinship-loose family and household structures characterized all of the world's CW-areas already at tribal times, in both the Old and the New World, long before any exposure to the Catholic family regime.

Our monograph relates to several strands of literature. A key consent is the growing recognition that pre-industrial female autonomies and industrial-era cognitive investments explain a whole bunch of beneficial societal outcomes today, from economic prosperity, to distributional justice, physical security, generalized trust, impartial government, effective democracy and other aspects of general life quality, national wellbeing and human empowerment. A number of studies also stress the role of pre-industrial female autonomy for the initiation and speed of the industrial-era fertility decline and its subsequent projection into the cognitive investments that drove the industrial-democratic Double Revolution of the modern era.

S16 Select Bibliography

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S17 Command Syntax and Do-Files

S17.1 Syntax to Create the Cool Water Index (CWI)

```

***opening the dataset***
GET
FILE='/Users/christianwelzel 1/Dropbox/Chris_Lap/DATA/Datasets/CWclim_x.sav'.

***normalizing latitude into a 0-to-1 range (68 is the highest latitude for a country centroid
on earth: Iceland)***
compute nLatitCit = LatitCit / 68.

***normalizing rain lows and highs into a 0-to-1 range (1350 is Guinea's rain high)***
compute nlowRcit = lowRcit / 1350.
compute nhigRcit = highRcit / 1350.

***calculating steady rainfall***
compute ratioRcit = nlowRcit / nhigRcit.

***normalizing seasonal temperature lows and highs into a 0-to-1 range***
compute nlowTcit = (lowTcit -- 50) / (50 -- 50).
compute nhigTcit = (highTcit -- 50) / (50 -- 50).

***calculating seasonality in temperature***
compute difTcit = nhigTcit - nlowTcit.

***regressing seasonality on latitude to isolate the residual seasonality***
REGRESSION
/MISSING LISTWISE
/STATISTICS COEFF OUTS R ANOVA
/CRITERIA=PIN(.05) POUT(.10)
/NOORIGIN
/DEPENDENT difTcit
/METHOD=ENTER nLatitCit
/SAVE RESID.
compute resTdificit = RES_1.

***calculating seasonality adjusted latitude: cool seasons***
compute LatSeasadjcit = nLatitcit - resTdificit.

***normalizing seasonality-minimized latitude into 1 0-to-1 scale range***
compute nLatSeasadjcit = (LatSeasadjcit -- .11) / (1.50 -- .11).

***inverting coastal distance into coastal proximity (2,906 km is the largest coastal distance
of a capital city: Astana)***

```

```
compute CoastProxCit = 2906 - CoastDistCit.
```

```
***normalizing coastal proximity into a 0-to-1 scale range***
compute nCoastProxCit = CoastProxCit / 2906.
```

```
***squaring coastal proximity***
compute sqCoastProxCit = nCoastProxCit**2.
```

```
***normalizing country area size into a 0-to-1 scale range (division by Russia's area size in
square km)***
compute nAreaCtr = AreaCtr / 17075400.
```

```
***turning normalized area size into a weight variable that does not change the overall N: ba-
sically a country's proportional area size in the world relative to the total area of all 184
countries covered***
compute AreaWeigh = nAreaCtr * 23.96.
```

```
***relabeling original culture zone scheme, using new culture zone names***
compute CZ12r = CZ12.
val lab CZ12r 1"Germanic West" 2"English West" 3"Roman West" 4"Slavic West" 5"Slavic
East"
6"Turkic East" 7"Indic East" 8"Arab East" 9"Sinic East" 10"Latin America" 11"Sub-Saharan
Africa" 12"South Pacific".
```

```
***recoding culture zones in descending order of their cool water features***
recode CZ12r (1 = 1) (2 = 2) (4 = 3) (3 = 4) (5 = 5) (12 = 6) (10 = 7) (9 = 8) (7 = 9) (8 = 10)
(11 = 11) (6 = 12) into
CZ12cwi.
var lab CZ12cwi "Global Culture Zones".
val lab CZ12cwi 1"Germanic West" 2"English West" 3"Slavic West" 4"Romance West"
5"Slavic East" 6"South Pacific"
7"Latin America" 8"Sinic East" 9"Indic East" 10"Arabic East" 11"Sub-Saharan Africa"
12"Turkic East".
exec.
```

```
***calculating an N-variable that assigns each culture zone its number of countries after
weighting countries for their area size using "AreaWeigh"***
If (cz12cwi = 1) N_cz12cwiw = 3.
Exec.
If (cz12cwi = 2) N_cz12cwiw = 38.
Exec.
If (cz12cwi = 3) N_cz12cwiw = 1.
Exec.
If (cz12cwi = 4) N_cz12cwiw = 2.
Exec.
If (cz12cwi = 5) N_cz12cwiw = 26.
Exec.
If (cz12cwi = 6) N_cz12cwiw = 1.
Exec.
If (cz12cwi = 7) N_cz12cwiw = 29.
```

Exec.

If (cz12cwi = 8) N_cz12cwiw = 15.

Exec.

If (cz12cwi = 9) N_cz12cwiw = 12.

Exec.

If (cz12cwi = 10) N_cz12cwiw = 24.

Exec.

If (cz12cwi = 11) N_cz12cwiw = 24.

Exec.

If (cz12cwi = 12) N_cz12cwiw = 10.

Exec.

calculating area-weighted culture zone country-N when own country is out due to its weight

compute N_cz12cwiwEx = N_cz12cwiw - AreaWeigh.

assigning each country the cool seasons average of its culture zone ("cooltempCZcit") due to area weights and under exclusion of own country's area-weighted ("AreaWeigh") cool seasons score ("nlatseasadjcit")

If (cz12cwi = 1) cooltempCZcit = (.6292 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 2) cooltempCZcit = (.4053 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 3) cooltempCZcit = (.5461 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 4) cooltempCZcit = (.4763 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 5) cooltempCZcit = (.5511 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 6) cooltempCZcit = (.1693 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 7) cooltempCZcit = (.2791 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 8) cooltempCZcit = (.2894 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 9) cooltempCZcit = (.2328 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 10) cooltempCZcit = (.2820 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) / N_cz12cwiwEx.

Exec.

If (cz12cwi = 11) cooltempCZcit = (.1774 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 12) cooltempCZcit = (.4121 * N_cz12cwiw - AreaWeigh * nlatseasadjcit) /
N_cz12cwiwEx.

Exec.

***assigning each country the steady rain average of its culture zone (“constrainCZcit”) due to area weights and under exclusion of own country’s area-weighted (“AreaWeigh”) steady rain score (“ratioRcit1”)**

If (cz12cwi = 1) constrainCZcit = (.4622 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 2) constrainCZcit = (.6014 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 3) constrainCZcit = (.3659 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 4) constrainCZcit = (.3627 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 5) constrainCZcit = (.3740 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 6) constrainCZcit = (.1422 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 7) constrainCZcit = (.2725 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 8) constrainCZcit = (.2215 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 9) constrainCZcit = (.0633 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 10) constrainCZcit = (.0079 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 11) constrainCZcit = (.0426 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 12) constrainCZcit = (.1321 * N_cz12cwiw - AreaWeigh * ratioRcit1) /
N_cz12cwiwEx.

Exec.

***assigning each country the coastal proximity average of its culture (“coastproxCZcit”) zone due to area weights and under exclusion of own country’s area-weighted (“AreaWeigh”) coastal proximity score (“sqcoastproxcit”)**

If (cz12cwi = 1) coastproxCZcit = (.9617 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 2) coastproxCZcit = (.9414 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 3) coastproxCZcit = (.8312 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 4) coastproxCZcit = (.8947 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 5) coastproxCZcit = (.5309 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 6) coastproxCZcit = (1 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 7) coastproxCZcit = (.9454 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 8) coastproxCZcit = (.9894 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 9) coastproxCZcit = (.7129 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 10) coastproxCZcit = (.7898 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 11) coastproxCZcit = (.8328 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

If (cz12cwi = 12) coastproxCZcit = (.2463 * N_cz12cwiw - AreaWeigh * sqcoastproxcit) /
N_cz12cwiwEx.

Exec.

***factor analysis of local and neighborly measures of cool seasons, steady rain and coastal
proximity and saving the factor score variables***

FACTOR

/VARIABLES cooltempCZcit constrainCZcit nLatSeasadjcit ratioRcit coastproxCZcit
sqcoastproxcit

/MISSING LISTWISE

/ANALYSIS cooltempCZcit constrainCZcit nLatSeasadjcit ratioRcit coastproxCZcit
sqcoastproxcit

/PRINT INITIAL CORRELATION EXTRACTION ROTATION FSCORE

/CRITERIA MINEIGEN(1) ITERATE(25)

/EXTRACTION PC

/CRITERIA ITERATE(25)

/ROTATION VARIMAX

```
/SAVE REG(ALL)
/METHOD=CORRELATION.
```

```
***normalizing scores on the first extracted factor (on which the two cool seasons and steady
rain variables load) into 0-to-1 scale range***
compute coldrain_fn = (fac1_1 -- 1.37) / (2.26 -- 1.37).
```

```
***normalizing scores on the second extracted factor (on which the two coastal proximity
variables load) into 0-to-1 scale range***
compute watprox_fn = (fac2_1 -- 3.76) / (1.79 -- 3.76).
```

```
***calculating the final Cool Water Index***
compute cTw = coldrain_fn * watprox_fn.
```

S17.2 Syntax to Create Emancipative Values

The following SPSS command syntax creates the EMANCIPATIVE VALUES INDEX using the country-pooled individual-level data from World Values Survey rounds one (1981-83) to seven (2017-20). See Inglehart, R., C. Haerpfer, A. Moreno and C. Welzel (et al.), 2020, World Values Survey, Time Series 1981-2020 (version 1.1). Madrid: JDS Systems.

```
GET
```

```
FILE='/Users/christianwelzel 1/Dropbox/Chris_Lap/DATA/WVS 1 to 7/Ver-
sion_280720/VS_TimeSeries_1981_2020_v1_2.sav'.
```

```
***Sub-Index 1 (3 items): AUTONOMY***
```

```
*** Question Wording:
```

“Here is a list of qualities that children can be encouraged to learn at home. Which, if any, do you consider to be especially important?”

	Mentioned	Not mentioned
A029 Independence	1	2
A034 Imagination	1	2
A042 Obedience	1	2”

```
***
```

```
recode A029 (0=0) (1=1) into indep.
```

```
recode indep (sysmiss=-99).
```

```
mis val indep (-99).
```

```
var lab indep "independ as kid qual".
```

```
recode A034 (0=0) (1=1) into imagin.
```

```
recode imagin (sysmiss=-99).
```

```
mis val imagin (-99).
```

```
var lab imagin "imagin as kid qual".
```



```

recode A042 (0=1) (1=0) into nonobed.
recode nonobed (sysmiss=-99).
mis val nonobed (-99).
var lab nonobed "obedience not kid qual".

```

The following procedure creates the autonomy sub-index index in such a way that whenever all three of its components are available, it is the average of these three, whereas when one component is missing it is a linear transformation of the available two components. The formula for the linear transformation (constant and component coefficients) is obtained from regressing the three component average on the two specific components in question. Since there are three possibilities of which combination of two components is available, this procedure has to be performed separately for each combination. All this is done to avoid losing observations when just one of the three components is missing.

```

mis val indep imagin nonobed ().
exec.
if (indep ne -99) and (imagin ne -99) and (nonobed ne -99) autonomy=(indep+imagin+nonobed)/3.
exec.
if (indep ne -99) and (imagin ne -99) and (nonobed=-99) autonomy=.183+.395*indep+.359*imagin.
exec.
if (indep ne -99) and (imagin=-99) and (nonobed ne -99) autonomy=.042+.362*indep+.353*nonobed.
exec.
if (indep=-99) and (imagin ne -99) and (nonobed ne -99) autonomy=.104+.376*imagin+.401*nonobed.
exec.

recode autonomy (sysmiss=-99).
mis val indep imagin nonobed autonomy (-99).
var lab autonomy "autonomy subindex".

```

Sub-Index 2 (3 items): EQUALITY

***Question Wording:

C001 "Do you agree, disagree or neither agree nor disagree with the following statements? When jobs are scarce, men should have more right to a job than women."

1	2	3
Agree	Disagree	Neither, nor

“For each of the following statements I read out, can you tell me how strongly you agree or disagree with each. Do you strongly agree, agree, disagree, or strongly disagree?”

D059 On the whole, men make better political leaders than women do.

D060 A university education is more important for a boy than for a girl.”

1	2	3	4
Strongly agree	Agree	Disagree	Strongly disagree

recode C001 (1=0) (2=1) (3=.5) into womjob.

recode womjob (sysmiss=-99).

mis val womjob (-99).

var lab womjob "gend equal: job".

recode D059 (1=0) (2=.33) (3=.66) (4=1) into wompol.

recode wompol (sysmiss=-99).

mis val wompol (-99).

var lab wompol "gend equal: politics".

recode D060 (1=0) (2=.33) (3=.66) (4=1) into womedu.

recode womedu (sysmiss=-99).

mis val womedu (-99).

var lab womedu "gend equal: education".

exec.

The following procedure creates the equality sub-index index in such a way that whenever all three of its components are available, it is the average of these three, whereas when one component is missing it is a linear transformation of the available two components. The formula for the linear transformation (constant and component coefficients) is obtained from regressing the three component average on the two available components. Since there are three possibilities of which combination of two components is available, this procedure has to be performed separately for each combination. All this is done to avoid losing observations when just one of the three components is missing.

mis val wompol womedu womjob ().

exec.

if (wompol ne -99) and (womedu ne -99) and (womjob ne -99) equality=(wompol+womedu+womjob)/3.

exec.

if (wompol = -99) and (womedu ne -99) and (womjob ne -99) equality=.048+.454*womedu+.409*womjob.

exec.

if (wompol ne -99) and (womedu = -99) and (womjob ne -99) equality=.141+.446*wompol+.376*womjob.

exec.

if (wompol ne -99) and (womedu ne -99) and (womjob = -99) equality=.034+.492*wom-
pol+.430*womedu.

exec.

recode equality (sysmiss=-99).

var lab equality "equality sub-index".

mis val wompol womedu womjob equality (-99).

exec.

Sub-Index 3 (3 items): CHOICE

***Question Wording:

“Please tell me for each of the following actions whether you think it can always be justified, never be justified, or something in between using this card (10-point scale):

F118 Homosexuality	1	2	3	4	5	6	7	8	9	10
F120 Abortion	1	2	3	4	5	6	7	8	9	10
F121 Divorce	1	2	3	4	5	6	7	8	9	10
	Never								Always	
	Justifiable								Justifiable”	

compute homolib=(F118-1)/(10-1).

recode homolib (sysmiss=-99).

mis val homolib (-99).

var lab homolib "homosex acceptable".

compute abortlib=(F120-1)/(10-1).

recode abortlib (sysmiss=-99).

mis val abortlib (-99).

var lab abortlib "abortion acceptable".

compute divorlib=(F121-1)/(10-1).

recode divorlib (sysmiss=-99).

mis val divorlib (-99).

var lab divorlib "divorce acceptable".

***The following procedure creates the choice sub-index index in such a way that whenever all three of its components are available, it is the average of these three, whereas when one component is missing it is a linear transformation of the available two components. The formula for the linear transformation (constant and component coefficients) is obtained from regressing the three component average on the two available components. Since there are three possibilities of which combination of two components is available, this procedure has to be

performed separately for each combination. All this is done to avoid losing observations when just one of the three components is missing.***

```

mis val homolib abortlib divorlib ().
exec.
if (homolib ne -99) and (abortlib ne -99) and (divorlib ne -99) choice=(homolib+abortlib+divorlib)/3.
exec.
if (homolib = -99) and (abortlib ne -99) and (divorlib ne -99)
choice=.007+.452*abortlib+.446*divorlib.
exec.
if (homolib ne -99) and (abortlib = -99) and (divorlib ne -99)
choice=.010+.417*homolib+.493*divorlib.
exec.
if (homolib ne -99) and (abortlib ne -99) and (divorlib = -99)
choice=.069+.420*homolib+.505*abortlib.
exec.
recode choice (sysmiss=-99).
var lab choice "choice sub-index".
mis val homolib abortlib divorlib choice (-99).
exec.

```

Sub-Index 4 (3 items): VOICE

***Question Wording:

People sometimes talk about what the aims of this country should be for the next ten years. On this 'card' are listed some of the goals which different people would give top priority. Would you please say which one of these you, yourself, consider the most important? (*Code one answer only under "first choice"*):

And which would be the next most important? (*Code one answer only under "second choice"*)

	E001	E002
	1st choice	2nd choice
A high level of economic growth	1	1
Making sure this country has strong defense forces	2	2
Seeing that people have more say about how things are done at their jobs and in their communities	3	3
Trying to make our cities and countryside more beautiful	4	4

If you had to choose, which one of the things on this card would you say is most important? (*Code one answer only under "first choice"*):

And which would be the next most important? (Code one answer only under "second choice"):

	E003	E004
	1st choice	2nd choice
Maintaining order in the nation	1	1
Giving people more say in important government decisions	2	2
Fighting rising prices	3	3
Protecting freedom of speech	4	4

```
if ((E003=2 and E004=4) or (E003=4 and E004=2)) voice1=1.
```

```
exec.
```

```
if ((E003=2 and E004 ne 4) or (E003=4 and E004 ne 2)) voice1=.66.
```

```
exec.
```

```
if ((E003 ne 2 and E004=4) or (E003 ne 4 and E004=2)) voice1=.33.
```

```
exec.
```

```
if ((E003 ne 2) and (E003 ne 4) and (E004 ne 2) and (E004 ne 4)) voice1=0.
```

```
exec.
```

```
recode voice1 (sysmiss=-99).
```

```
mis val voice1 (-99).
```

```
var lab voice1 "voice 1".
```

```
exec.
```

```
if (E001=3) voice2=1.
```

```
exec.
```

```
if (E002=3) voice2=.5.
```

```
exec.
```

```
if ((E001 ne 3) and (E002 ne 3)) voice2=0.
```

```
exec.
```

```
recode voice2 (sysmiss=-99).
```

```
mis val voice2 (-99).
```

```
var lab voice2 "voice 2".
```

```
exec.
```

The following procedure creates auxiliary versions of voice indices for the situation that both voice1 and voice2 or only one of them are available.

```
compute voi2_00=(voice1+voice2)/2.
```

```
recode voi2_00 (sysmiss=-99).
```

```
mis val voi2_00 (-99).
```

```
exec.
```

```
compute voi1_01=voice1.
```

```
recode voi1_01 (sysmiss=-99).
```

```
mis val voi1_01 (-99).
```

exec.

```
compute voi1_02=voice2.
recode voi1_02 (sysmiss=-99).
mis val voi1_02 (-99).
exec.
```

```
mis val voi2_00 voi1_01 voi1_02 ().
exec.
```

The following procedure creates the final index of voice in such a way that whenever voice1 and voice2 are available, the index is the average of the two. However, when (as in wave 1), the voice2 index is not available, the final voice index is a linear transformation of the voice1 index only. The formula for the linear transformation is obtained by regressing the combined voice1 and voice2 index on the voice1 index.

```
if (voi2_00 ne -99) voice=voi2_00.
exec.
if (voi2_00=-99) and (voi1_01 ne -99) voice=.654*voi1_01+.132.
exec.
if (voi2_00=-99) and (voi1_02 ne -99) voice=.609*voi1_02+.145.
exec.
mis val voi2_00 voi1_01 voi1_02 (-99).
recode voice (sysmiss=-99).
mis val voice (-99).
var lab voice "voice sub-index".
exec.
```

Overall EMANCIPATIVE VALUES INDEX (long version): EVI.

The following procedure creates the long version of the overall index of emancipative values in such a way that whenever all four of its components are available, it is the average of these four, whereas when one component is missing it is a linear transformation of the available three components. The formula for the linear transformation (constant and component coefficients) is obtained from regressing the four component average on the three available components. Since there are four possibilities of which combination of three components is available, this procedure has to be performed for each of these possibilities separately. All this is done to avoid losing observations when just one of the four components is missing.

```
mis val autonomy equality choice voice ().
exec.
```

```
if (autonomy ne -99) and (equality ne -99) and (choice ne -99) and (voice ne -99) EVI=(autonomy+equality+choice+voice)/4.
```

```
exec.
```

```
if (autonomy ne -99) and (equality = -99) and (choice ne -99) and (voice ne -99) EVI=.099+.263*autonomy+.327*choice+.286*voice.
```

```
exec.
```

```
if (autonomy = -99) and (equality ne -99) and (choice ne -99) and (voice ne -99) EVI=.080+.267*equality+.303*choice+.263*voice.
```

```
exec.
```

```
if (autonomy ne -99) and (equality ne -99) and (choice = -99) and (voice ne -99) EVI=.001+.292*autonomy+.332*equality+.291*voice.
```

```
exec.
```

```
if (autonomy ne -99) and (equality ne -99) and (choice ne -99) and (voice = -99) EVI=.051+.261*autonomy+.290*equality+.293*choice.
```

```
exec.
```

```
recode EVI (sysmiss=-99).
```

```
var lab EVI "emanc vals".
```

```
mis val autonomy equality choice voice EVI (-99).
```

```
exec.
```

S17.3 Backward Estimations of EV

S17.3.1 PRELIMINARY REMARK

It is an established insight that people reach a stable setpoint in their value orientations once their formative socialization is completed (which happens around the age of 25 years). Therefore, value change advances through generational replacement, which also means that current cohort differences in value orientations show the footprints of value change in the past. This allows one to transpose cohort differences in emancipative values from a recent national survey into a time series of annual measures by projecting the average emancipative values of people from the same birth year into the year in which these people were of a certain age (see Ruck et al., 2019, for a similar procedure: full citation in endnote 32 of the main text).

Here I choose the age of 35 as the projection year. For instance, Swedes surveyed in 2010 and born in 1960 have been 35 years of age in 1995. Accordingly, I project the average emancipative values score of Swedes born in 1960 into the year 1995 and treat this as the Swedish population's mean emphasis on emancipative values in 1995. Performing this projection separately for all birth cohorts in each country covered once by the World Values Surveys provides estimated emancipative values for 108 countries and a time series of 80 years from 1935 till 2015, which produces a total 5,042 country-year observations (the full temporal coverage is not available for all countries) with 30 or more observations. I choose the age of 35 as the

projection base because 35 is close to the modal and median age in most surveyed populations. Moreover, it is certain that, at the age of 35 years, people have finalized their formative phase of socialization and, hence, have reached the setpoint in their value orientations.

However, this base projection ignores that values do not only change via generational replacement but also follow a time trend by which each cohort continues to become a bit more emancipatory as time goes by. Consequently, my backward projections overestimate the populations' emancipative values in the past and this inflationary tendency is the stronger, the further backward in time the projection goes. To correct this inflationary tendency, I employ a trend deflation that subtracts a score of .002 for each year that the projection reaches back into the past. I chose .002 because this is the average annual increase in emancipative values calculated from countries with repeated observations.

Yet, even the trend-adjusted backward projection still embodies a flaw because it assumes that the trend has been uniform across all countries. This is demonstrably false because countries on a very low base level of emancipative values today (i.e., Middle Eastern and South Asian countries) obviously cannot have experienced a strong emancipatory trend. Vice versa, countries for which the World Values Surveys document the most pronounced emancipatory trend (i.e., the Scandinavian countries), have the highest base levels in emancipative values today. Accordingly, the strength of the emancipatory trend varies in proportion to today's base level in these values. To account for this fact, I weight the trend deflation in proportion to today's base level by equating an emancipative values score of .60 (i.e., the Western average) with 1 and all other scores in proportion to 1. Then I multiply the trend deflation with this weight. Since this backward projection applies a stronger trend deflation to more progressive countries, the projection simulates a reality in which countries have been more similarly conservative in the past. This is highly plausible because issues determining the emancipatory agenda of today, like same-sex marriage, have not been on the agenda even in the most progressive countries thirty or forty years back in time. Besides, I have experimented with changing the parameters of the backward projection by varying both the target age of the projection and the magnitude of the trend deflation. The current version, however, performs best in terms of nomological validity.

Below follows the SPSS-command syntax to create the backward estimates.

S17.3.2 SYNTAX

GET

FILE='Users/christianwelzel 1/Dropbox/Chris_Lap/DATA/WVS 1 to 7/Version_280720/VS_TimeSeries_1981_2020_v1_2.sav'.

compute EVIn=EVI/.60.

compute birthyear=X002.

compute age=X003.

compute year35 = (birthyear + 35).

compute agepass35 = age - 35.


```
compute trenddisc35_002 = agepass35 * .002.  
compute EVI35_002a = EVI - trenddisc35_002 * EVIn.  
  
compute ctryear35 = ctrnum * 10000 + year35.  
  
SORT CASES BY ctryear35.  
AGGREGATE  
  /OUTFILE='/Users/christianwelzel 1/Dropbox/Chris_Lap/DATA/Datasets/EVIbackward35.sav'  
  /PRESORTED  
  /BREAK=ctryear35  
  /EVI35_002a=Mean(EVI35_002a)  
  /N_BREAK35=N.  
Exec.  
  
GET  
  FILE='/Users/christianwelzel 1/Dropbox/Chris_Lap/DATA/Datasets/EVIbackward35.sav'.  
Exec.  
  
Compute ctryear=ctryear35.  
  
recode N_BREAK35 (sysmiss=0).
```

END of DOCUMENT