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The Survival of the Royals

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ABSTRACT

We study the effect of royal status—a historically rooted legal privilege enjoyed by hereditary monarchs and their families—on human longevity, a proxy of individuals' health capital. We disentangle the effect of royal status that encompassed serving as heads of state, and hence being subject to status, from that of other family members and compare it to their contemporary countrymen. We have constructed and exploited a dataset containing relevant demographic data and specifically the lifespan (age at death) of European royals and their families spanning the past three centuries (1669–2022) from the sixteen European countries. The dataset includes information records of 845 high-status nobility and alongside monarchs, which we compare to otherwise similar countrymen by adjusting for relevant confounders. We document robust evidence of a statistically significant longevity advantage, showing that monarchs live, on average, **5.2 to 7.1 years longer** than both other members of the royal family and the general population of their time. However, while such longevity advantage between royals and the population has narrowed, the advantage of ruling monarchs persists over time. These effects persist despite improvements in population health, and the role of major sociopolitical transformations including the emergence of both liberal democracy and the advent of Constitutional monarchies in Europe. The latter suggests that "power status" - and specifically the so-called eustress or positive stress - may be driving the longevity advantage of ruling monarchs.

JEL Classification: I18, N13, P00

> *The king is dead, long live the king!*

1 | Introduction

Social conditions, particularly those related to living, working and employment circumstances, can exert a significant impact on individuals' health, and especially in the development of disease to the point that they are the strongest predictors of a population's average life expectancy (Rosen 1979). Among them, social hierarchies, namely, individual differences in social status, are responsible for socio-economic health disparities in employment settings (Marmot 2013). However, it remains unclear whether the effects of social status can be generalized to other settings, or whether sources of social status beyond employment circumstances have similar effects.

The effect of social status on individuals health can result from several pathways, including access to networks and connections (Link and Phelan 1995) alongside differences in cognitive development and wealth in childhood and adolescence. Social status can be a side effect of a successful career choices involving an exceptional effort in the pursuit of an education, a side effect of business success, or at times, the payoff of positions involving leadership and responsibility which entail higher levels of responsibility and hence, stress. To isolate the health effects of status resulting from "positions of privilege", one can explore evidence from inherited status, such as that of royals status, involving the monarch and its family. This is the focus of the rest of the paper.

In the last two centuries, global life expectancy has relentlessly improved across the board, along with the expansion of social and political rights and the deepening of democratic governance which has lessened the social inequalities in many European countries (Besley and Kudamatsu 2006; Batinti et al. 2021; Batinti and Costa-Font 2023). This process provides a fertile ground where to examine status effects on individuals' health. This is possible by comparing the survival or longevity trajectories of ruling royals[1] and individuals who, more generally, enjoyed a higher and similar social status as royals such as the nobility to the general population. Royal status is not a social status that results from an individual choice. Instead, it results from strict inheritance rules. Typically, royals are appointed by specific succession laws that can differ across various countries' constitutions. Unless royals abdicate, are deposed, or are deemed unfit- which are all typically exceptional circumstances - often following a military conflict or an unexpected health shock, royal status is regarded as exogenous to individuals.[2] The exception being some appreciable effects of succession of salic laws, which would have privileged male over female members, and older over younger male siblings.[3]

Furthermore, evidence from royal status provides two additional advantages. First, royal status is comparable across countries. That is, cross-country comparisons can help answer disentangle whether ruling royals enjoy a longevity advantage, compared to both their close family and the general population. Second, given that the royal status effects on health can be partially driven by their dynastic status, one can examine (royal house) dynastic effects on age-at-death patterns of royals. Similarly, we can study whether time varying technology and standards of living exerted a difference in reducing the health gaps between royals and the rest of the population, namely their countrymen. This is a question we can answer drawing on data from European countries in the last centuries.

Europe has been exposed to improved hygiene, medical care, and lifestyle changes which have steadily increased life expectancy, especially at birth. For example, in 2022, the average person born in the United Kingdom can expect to live approximately 81 years (ONS 2024), a sharp contrast to the mere 28-year life expectancy registered in 1750 (Rosen 1979). Whereas life expectancy has steadily risen for non-royals (commoners), trends among the royalty, which include both ruling monarchs and high-ranking nobility, exhibit significant differences. In many monarchies, it is possible to observe an increase in age at death of the nobility that has been much slower than that of monarchs, often converging with the life expectancy at birth of the non-royals. This evidence raises questions about the role of social status alone in shaping life outcomes. Further to isolate the effect of holding political power - which can be source of distress at times - from other socio-economic circumstances, one can compare the age at death of monarchs to that of other royals, such as their siblings and spouses.[4] In this paper we inquires about the advantages that royal status confers on longevity, and how does one's specific royal status namely their position as king, queen, prince, or sibling—impact their lifespans.

Unlike aristocrats, who primarily benefit only from their elevated position, monarchs often face a unique source of (dis)stress, related to the public and representative duties that are uncommon among other high-ranking nobility, even though, such duties are often supported by a fortune of their own and transfers from the state they serve and represent. Psychosocial stress (distress) related to the increased responsibility of monarchs may potentially affect their longevity, especially before the set up of Constitutional monarchies. However, in addition to distress, monarchs might benefit from positive stress or eustress, which can induce positive longevity effects, and results from holding positions of authority that foster a greater sense of control (McGonigal 2016; Selye 1956).

This paper studies effect of royal status on the longevity of individuals. That is, we specifically examine the longevity advantage of royals status by examining the age at death of royals over time and , and subsequently, testing whether their longevity changes with the expansion of parliamentary democracies, where royals started taking over more symbolic roles shielding them from the consequences of institutional, social, and economic crises. Our data allows is to study how long a person taking up a royal status lived compared to the life expectancy of the population at that point in time. That is, the average number of years their countrymen lived based on current mortality rates. Life expectancy is skewed by child mortality as well as the social distribution of wealth across the population as wealthier families typically experienced lower child mortality rates due to better access to healthcare, nutrition, and living conditions compared to poorer families (Oeppen and Vaupel 2002).[5] Furthemore, in contemporary contexts, royals have increasingly become public figures, taking primarily the role of heads of state, influencing society much like nowadays celebrities and movie stars do, and more recently, steering further the values and principles of the constitutions of the countries they represent.

We have assembled a comprehensive dataset of royals in number of European countries to study how inherited privilege, and royal status more specifically, which is largely independent of effort or career choice, impacts longevity and longevity advantage. To our knowledge, this is the first study examining cross-country and temporal variation in royal status disparities on health outcomes (Rosen 1979; Marmot 2013). Our approach allows isolating the health effects of social status from other confounding factors by comparing monarchs—those royals who bear public responsibilities of general government, including inner and outer conflict resolution, and strive for self-preservation in power—to other comparable royal members who largely share the same genetic make up, upbringing, education and lifestyle but bear no responsabilities. By analyzing longevity trends across different political systems and historical periods, we shed light on the role of privilege, stress, and institutional change in shaping health outcomes, and specifically longevity.

The structure of the paper is as follows. The next section discusses where the paper fits considering the evidence of the effect of different types of social status on human longevity. Section 3 describes the data and methods employed. Section 4 reports the results, Section 5 discusses the evidence, Section 6 provides a discussion of the mechanisms, and a final section concludes.

2 | Social Status and Longevity

2.1 | Status and Health

2.1.1 | Caste and Racial Status

An approach to studying status effects is to examine societies with natural status differences such as in India's caste system rooted in historical and religious traditions. Vyas et al. (2022) examine life expectancy disparities based on caste, religion, and indigenous identity, and documents that lower-caste individuals (Adivasis) exhibit a life expectancy over 4 years shorter than higher-caste Hindus, and Muslims live about 1 year less than Hindus. Such differences are not driven by wealth alone, and compare to the Black–White racial gap found in studies for the United States (Varcoe et al. 2019; Williams et al. 2019).

In the United States, disparities in mortality between Black and White Americans have persisted for decades, reflecting deep-rooted social and economic inequalities (Varcoe et al. 2019; Williams et al. 2019). Although racial differences in health outcomes are well documented, these disparities are partially confounded by other determinants of health, such as access to healthcare, income levels, environmental exposures, and historical patterns of discrimination.

2.1.2 | Status in Academia and Awards

Another setting where it is possible to examine the effect of individual differences in status is in academia, and especially after the reception of significant awards which qualify as a type of windfall change in social status. A study using Swedish data reveals that individuals that have earned a Ph.D. exhibit a longer life expectancy than those with a master's degree or a professional qualification, who, in turn, outlive those with a bachelor's degree (Erikson 2001). However, in interpreting such evidence, it is worth mentioning that educational attainment may be endogenous, as cognitive ability, socioeconomic background, and health behaviors could confound both study choices and genetics.[6] Relatedly, one can examine a source of status that results from the relative assessment of the academic performance and creativity of academics, which provides for a unique form of "distinction", namely the reception of a Nobel prize. The recognition of a Nobel Prize qualifies as an exogenous boost to an individual's status—one that remains relatively fixed over the life course following the award. Consistently, Redelmeier and Singh (2001) document evidence of an extra three years of life gained after winning the Nobel Prize compared to just being nominated, and Rablen and Oswald (2008) in a more extensive analysis, and document a similar though smaller effect of about 1–2 years of extra years of life. However, again, the evidence might be confounded by individuals' effort and early life effects. Furthermore, the time at which individuals receive the prize, and the stage in their careers matters. The effect is likely to be smaller later in their career when such individuals have already acquired a certain status independently of the actual recognition. Finally, Sasaki et al. (2019) examining the effect of literary prizes in Japan, documents that the reception of a prize by a previously unknown novelist increases life expectancy by 1.7 years, whilst a prize for established novelist is associated with a reduction in longevity by 5.3 years. That is, the prolonging effect of a literary prize is limited to individuals that had lower social status before the prize. These results are consistent with the idea that established novelists have already faced a personal cost in terms of effort to achieve their status as established novelists.

The closest study to our work is Stelter et al. (2021), which examines life expectancy among European scholars during the Holy Roman Empire, suggesting that status-based health disadvantages began to decline by the early 20th century.

2.1.3 | Status in the Civil Service and the Military

Another source of evidence of the effects of status change comes from the hierarchies in the civil service. As mentioned earlier, a landmark study on the relationship between social status and health is the Whitehall study I and II, conducted in the United Kingdom. This pair of cohort studies followed British civil servants and revealed substantial differences in life expectancy based even on relatively small differences of their employment grade levels which was defined as "status syndrome" (Marmot 2013). That is, higher status individuals experienced significantly lower mortality rates and better overall and cardiovascular health compared to their lower-grade counterparts (Marmot 2013). This finding persisted even after controlling for variables such as age and baseline health status, revealing the powerful role that psychosocial factors—like sense of control in the job's position and social standing conducive to chronic stress—play in shaping health outcomes of individuals (Marmot et al. 1984; Wilkinson and Pickett 2006). Subsequent research has reinforced these findings, suggesting that occupational hierarchies contribute to pronounced health disparities, even within relatively homogeneous populations (Adler et al. 1994; Marmot 2006). However, together, these studies are still affected by selection and effort bias, which might confound the effect of status on health.

Alternative evidence does exist on the role of well-defined hierarchies in influencing the health of individuals in the military, where ranks define authority and responsibility. Suandi (2022) examined the health of individuals who were among promoted US submarine personnel during World War II, finding an average life expectancy increase of 2.4 years compared to their other peers. In contrast, to the effects of academic awards, which confer not only significant status but also substantial economic rewards,[7] military promotions offer smaller rewards and encompass status changes in a highly hierarchical setting. However, just like in the Whitehall study, status acquired through a working career might be affected by the associated responsibilities, stress, and personal sacrifices, which might deplete individuals' health. For example, unlike royals who enjoy inherited status without the daily pressures of high-stakes professional roles, individuals who climb the career ladder to the very top may endure chronic stress and other health risks.

2.1.4 | Stress From Corporate and Electoral Contests

Another sources of stress results from the corporate hierarchies and the pressures associated with holding a political office.

Nicholas (2023) used information about white collar at General Electric employees in the 1930 cohort that had access to a corporate health and welfare programs, and document that senior managers and executive experienced a 3- to 5-year reduction in lifespan outcomes relative to those in lower levels. In contrast, the largest mortality increase was experienced by managers in the second level of the corporate ladder. Hence, it is far from clear from Nicholas (2023) that corporate status always is beneficial to one's health, and instead, one ought to account for the influence of contextual stressors such as periods of recession. Consistently, Borgschulte et al. (2021) document that managerial stress—especially stemming from industry crises—can accelerate aging and increase mortality among CEOs of large US companies, with an estimated reduction in life expectancy of about 1 year following an industry distress shock. In contrast, evidence from holding elected positions of power reveals beneficial effects on health in the form of positive stress or eustress. Borgschulte and Vogler (2019) show that winning a close election in the United States is associated with a life expectancy gain of more than 1 year compared to losing candidates. These findings suggest that acute stressors and subsequent relief, or the boost of achieving a high-status position, have measurable effects on longevity. However, it is important to note that these studies refer to white-collar professionals, such as CEOs and elected officials, who are a specifically selected sample.[8] In contrast, our specific setting, focusing on royals, allows for testing this effect by comparing high nobility with rulers.

2.1.5 | Status and Sports Competition

Finally, another possible setting where to study the effect of status is by examining the changes in status that result from sports competitions. Some studies challenge the straightforward association between higher achievement and better health outcomes. For example, Leive (2018) found that Olympic track and field silver medalists from 1896 to 1948 lived on average, about 1 year longer than their gold medal-winning counterparts. This counterintuitive result suggests that the relationship between status or achievement and longevity may be influenced by distress generating factors such as the pressures of maintaining top performance, the distress of being at the pinnacle which might exceed the effect of eustress, as well as the resulting differences in post-competition lifestyles. Such findings underscore the need to critically examine how various dimensions of status impact long-term health outcomes.

2.1.6 | Our Contribution

A major limitation in previous studies lies in the challenge of selection into positions of status, which can result from different underlying mechanisms, including the possibility of health selection, where better health could lead to higher social status rather than the reverse. [9] Access into a specific social role is influenced by individual attitudes, non-cognitive abilities, risk and time preferences, investment in physical appearance, and patterns of social interactions—which can confound the relationship between social status and health. Such sources of selection are of less concern in our setting as we study royal status within a sample of hereditary monarchies, where the order of succession is largely predetermined by birth. This exogenous assignment of status means that, aside from potential genetic confounders, which we control by looking at siblings and household fixed effects, the association between status and longevity is not influenced by individual effort or post-birth social mobility. However, it is worth mentioning that to undertake an ideal causal analysis of such effect, we would still need an analysis of twins where one was a monarch, for which we do not have a large enough sample.

2.2 | Psychosocial Stress

A potential explanation for the relationship between status and health is *psychosocial stress*. Sapolsky (2005) study of baboon populations, shows that baboons at the top of a *stable* hierarchy are often shielded from stress, whereas lower-ranking members experience heightened stress that negatively affects their health. This concept has been extended to humans, with research highlighting the role of psychosocial stress in shaping health disparities (Cutler et al. 2006; Lazarus and Folkman 1984; McGonigal 2016; Selye 1956). Overall, these studies suggest that higher-status individuals tend to be more insulated from negative stress (distress) and that status influences both the type of stress experienced, as those in higher positions may be more exposed to positive stress (eustress) and might be endowed with higher resources to cope with and appraise stressful experiences.

Borgschulte et al. (2021) document that managerial stress—triggered by industry crises—accelerates aging and increases mortality among chief executive officers of large US companies, estimating that an industry shock can reduce life expectancy by approximately 1 year, along with producing visible signs of accelerated aging. Similarly, using data from close elections in the United States, Borgschulte and Vogler (2019) report that winning a tightly contested election is associated with a life expectancy gain of over 1 year, possibly reflecting the relief of distress and the boost in social status that comes with electoral victory. However, higher electoral status exposes individuals to higher stress. So, it is unclear whether the stress transition dynamic (from distress to eustress) as individuals move up into the ladder that drives the effect.

3 | Data and Empirical Strategy and Descriptive Statistics

3.1 | The Data

Our dataset contains individual records on high nobility and ruling royals, a comprehensively hand-collected resource using and comparing various publicly available sources with biographical information (e.g., the Roglo database, the Encyclopaedia Britannica, and other trusted sources used to collect historical information). The dataset has birth and death records of monarchs, including their age of accession to the throne and time in power, as well as family relationships. The descriptive statistics of the main variables of interest are shown in Table 1, in Panels A–D. Specifically, we show both descriptives based on the overall sample for all the nobility (A), the population life expectancy

TABLE 1 | Descriptive statistics.

Descriptive statistics	N	Mean	SD	Min	Max	N	Mean	SD	Min	Max
Variable	**(A) Whole sample—individual level**					**(B) Sample 14 or older—individual level**				
Ruler	845	0.14	0.35	0	1	702	0.17	0.38	0	1
Age at death	841	50.29	28.75	0	101	698	60.21	20.35	14	101
Birth year	845	1802	63.31	1635	1956	702	1807	64.41	1635	1956
Death year	841	1853	76.04	1679	2022	698	1867	71.72	1683	2022
Power start	243	1843	67.41	1643	1993	243	1843	67.41	1643	1993
Power end	243	1864	69.63	1683	2022	243	1864	69.63	1683	2022
Female	844	0.56	0.5	0	1	702	0.59	0.49	0	1
Variable	**(C) Whole sample—country level**					**(D) Sample 14 or older—country level**				
Ruler	257	0.17	0.38	0	1	247	0.18	0.38	0	1
Age at death	254	62.99	22.15	0	101	244	65.44	18.9	15	101
Birth year	257	1825	57.54	1705	1956	247	1826	57.26	1705	1956
Death year	254	1887	64.51	1733	2022	244	1890	62.45	1758	2022
Power start	86	1871	56.13	1751	1993	86	1871	56.13	1751	1993
Power end	86	1895	60.14	1771	2022	86	1895	60.14	1771	2022
Female	257	0.56	0.5	0	1	247	0.57	0.5	0	1
GDP per capita (average lifespan)	257	4852	4587	1433	25,954	247	4908	4654	1433	25,954
Population life expectancy (average lifespan)	257	46.48	10.32	29.5	76.2	247	46.8	10.36	29.5	76.2

Note: Panel A reports descriptive statistics of the main variables collected. Panel B adds country-level variables (i) GDP per capita and (ii) population life expectancy at birth. Both variables are averages of the data available throughout the lifetime of the Royal. The smaller sample is due to data availability concerning especially the life expectancy indicator.

at birth (C), and the respective samples when including observations of people that died at 14 years or older. Overall, we have collected information for 844 *combinations* of high-status nobility and monarchies of 17 European countries (see also Table 2), which are Austria (AUT), Belgium (BEL), Bulgaria (BGR), Germany (DEU), Denmark (DNK), Spain (ESP), France (FRA), Great Britain (GBR), Greece (GRC), Italy (ITA), Liechtenstein (LIE), Monaco (MCO), the Netherlands (NLD), Norway (NOR), Portugal (PRT), Romania (ROU), and Sweden (SWE). For each monarchy, we collected also information on spouses and siblings and grouped them in *household groups*. More specifically, we also coded the type of relationship between the ruler and the other members of the household. Table 3 displays both the breakdown of the within royal households' roles by gender (Panel A) and the frequency distribution. We find that co-ruling is seldom experienced as form of government, whereas the most frequent relationships are being ruler consort and sibling. We also coded cases of spousal but not relationships that did not granted the title of ruler's consort as well as relationships that were not spousal at all.

Our focus is on a period that captures the most profound transformations of European societies—from preindustrial to modern—and the accompanying shifts in economic, political, and technological conditions that have shaped public health outcomes. For example, our period of analysis encompasses the Industrial Revolution, the unification and formation of the main modern nation-states, and the concomitant end of the *ancient regime* where monarchs gave up most of their political power. The period includes as well significant advancements in medicine, sanitation interventions, and relevant changes in the overall living standards of the population, all of which have contributed to dramatic increases in life expectancy. Overall, the timeframe from the earliest birth to the latest death spans from 1635 to 2022 (Table 4) and provides a unique opportunity to study how ascribed social status, such as that of European royals, has interacted with evolving societal structures. By spanning several centuries, we capture the effects of changes in inherited privilege from contemporary selection biases and observe how long-term structural changes have influenced health disparities. Finally, it is worth mentioning that inevitably, contemporary data are more available especially for country-level variables such as population life expectancy at birth and per capita GDP.

The period chosen allows us to identify the presence of trends in the country and the Royal Houses chosen. Our data span a large historical breadth—starting from 1669, when Archduchess Maria Antonia of Austria (sister of Joseph I, Holy Roman Emperor) and Infanta Isabel Luísa of Portugal (sister of John V of Portugal) were born, to very recent times, notably marked by the death of Queen Elizabeth II in 2022, who reigned for 70 years and celebrated her *Platinum Jubilee*, a monarch who to a large

TABLE 2 | Countries and observations by country.

iso3c	Freq.	Percent	Cum.
AUT	85	10.06	10.06
BEL	41	4.850	14.91
BGR	19	2.250	17.16
DEU	32	3.790	20.95
DNK	64	7.570	28.52
ESP	76	8.990	37.51
FRA	45	5.440	42.96
GBR	68	8.050	51.01
GRC	29	3.430	54.44
ITA	23	2.720	57.16
LIE	65	7.690	64.85
MCO	29	3.430	68.28
NLD	30	3.550	71.83
NOR	59	6.980	78.82
PRT	99	11.72	90.53
ROU	24	2.840	93.37
SWE	56	6.630	100
Total	844	100	

Note: Breakdown of countries available. Panel A of Table 1 reports also the breakdown of the different royal families that have been recorded in the dataset.

TABLE 3 | Breakdown of frequencies household role.

Panel A: Gender breakdown	Male	Female	Total
Co-ruler	1	1	2
Ruler	113	9	122
Ruler consort	6	62	68
Sibling	227	254	481
Spouse	1	78	79
Non-spousal relationship	1	46	47
Total	349	450	799
Panel B: Roles' frequency distribution	**Freq.**	**Percent**	**Cumulative**
Co-ruler	2	0.24	0.24
Half-sibling	42	4.99	5.23
Ruler	122	14.49	19.71
Ruler consort	68	8.08	27.79
Sibling	482	57.24	85.04
Spouse	79	9.38	94.42
Non spousal relationship	47	5.58	100
Total	842	100	

Note: We distinguished 7 within household roles. Rulers are those royals who became kings, queens, emperors or princes whenever this is the title conferring ruling power. Co-rulers are usually spouses with official attributes of the title and roles of formal power. We included in this category also spouses that became titled after the marriage date. Rulers' consorts are official spouses with formal attribution of the title but not formal attribution of power within the crown. Spouses included usually individuals who contracted forma marriage with the ruler but were not attributed the official title of the rulers' consort. Non-marital/spousal relationships include all informal unions from which we were able to collect information. These are usually non-formalized relationships.

extent represented a symbolic figure of the contemporary era of European royalty.

3.2 | Empirical Strategy

3.2.1 | Estimating the Lifespan of Monarchs With Respect to Their Peers

Our specification of interest estimates the effect of being a ruling monarch on the age at death of an individual. Equation (1) presents our preferred specification (Table 5 below in Section 5, Columns 1–4):

$$\Delta_{ik}^{j} = \beta_0 + \beta_1 Ruler_{ik} + \beta_2 Female_{ik} + \beta_3 Year\ of\ Birth_{ik} + \beta_4 Year\ of\ Birth_{ik}^2 + \alpha_{cy} + \gamma_{rh} + \varepsilon_{ik} \quad (1)$$

The dependent variable is the difference in age at death, estimated as $\Delta_{ik}^{j} = \left(a_i - \frac{1}{n_{kj}} \sum_{kj} a_{hk}\right)$. This variable shows that high-nobility member i in household k might or might not be in the h-set depending on the criteria j used for computing the household average (see Table 5 and Table S2 with the set of alternative estimations). $Ruler_{ik}$ refers to a dummy variable defining the ruling status of i (=1 if ruling); $Female_{ik}$ refers to a dummy equal to 1 for being female; we then use a quadratic formulation of the year of birth in some specifications to capture dynamic effects; α_{cy} is a set of combined country-period fixed effects; γ_{rh} are Royal House (rh) fixed effects; and ε_{ik} is the error term. The dependent variables in the same specification in Columns 5–7 of Table 5 below, refers to the effect on the age at death of an individual (Equation 2).

$$a_{ik} = \sigma_0 + \sigma_1 Ruler_{ik} + \sigma_2 Female_{ik} + \sigma_3 Year\ of\ Birth_{ik} + \sigma_4 Year\ of\ Birth_{ik}^2 + + \alpha_{cy} + \gamma_{rh} + f_k + \varepsilon_{ik} \quad (2)$$

Labels carry the same definition, except the additional use of f_k, which refers to household (family) kth fixed effects, which allows a *within family estimator* by removing between household variation due to families' fixed characteristics. The introduction of these fixed effects is expected to produce similar results than using directly the difference Δ_{ik}^{j} because we are technically mean differencing within households.

3.2.2 | Estimating the Lifespan Advantage of Ruling Status With Respect to Population

The specification in Equation (3) (see Table 6 for results) is used to test the relationship between ruling status and the longevity advantage of a ruler as compared to the advantage of a high-status

TABLE 4 | Sample: Temporal coverage.

Country	Obs.	Latest birth date	Latest death date	Earliest birth date	Latest death date
AUT	85	1895	1989	1669	1679
BEL	41	1956	2014	1778	1782
BGR	19	1921	2015	1844	1889
DEU	32	1892	1980	1794	1794
DNK	64	1910	2000	1720	1724
ESP	76	1887	1970	1707	1709
FRA	46	1782	1882	1635	1683
GBR	68	1930	2022	1732	1733
GRC	29	1913	2007	1811	1817
ITA	23	1914	2001	1820	1827
LIE	65	1921	2011	1690	1724
MCO	29	1929	2011	1717	1718
NLD	30	1947	2019	1769	1769
NOR	59	1930	2012	1706	1745
PRT	99	1890	1966	1683	1688
ROU	24	1923	2017	1835	1859
SWE	56	1889	1979	1705	1713

Note: Observations by country, with earliest and latest year of birth and death by country.

member of the nobility. That is, this estimate tests the effect of ruling status advantage on more general high-status advantage with respect to the general population.

$$\Delta pop_i^{cy} = \gamma_0 + \gamma_1 Ruler_{ik} + \gamma_2 Female_{ik} + \gamma_3 PCGDP_{icy} + \gamma_4 Year\ of\ Birth_{ik} + \\ + \gamma_5 Year\ of\ Birth_{ik}^2 + + \alpha_{cy} + \gamma_{rh} + f_k + \varepsilon_{ik} \quad (3)$$

where $\Delta \mathrm{pop}_i^{cy} = \mathrm{a_i} - \overline{\mathrm{e_0}}\left[\mathrm{b_i}, \mathrm{d_i}\right]_c$ and $\overline{\mathrm{e_0}}\left[\mathrm{b_i}, \mathrm{d_i}\right]_c$ refers to the average life expectancy at birth (LEB) of the population of the monarchy c calculated as: $\overline{\mathrm{e_0}}\left[\mathrm{b_i}, \mathrm{d_i}\right]_c = \frac{1}{\mathrm{a_i}} \sum_{\mathrm{ybirth_i}}^{\mathrm{ydeath_i}} \mathrm{e_0^c}$. In other terms, it is the average of all period-life expectancies at birth available from the date of birth to the date of death of the *i* observation. We use also the same methodology for per Capita GDP, $PCGDP_{icy} = \overline{pcgdp_{cy}}\left[b_i, d_i\right]_c$.

We use the lifespan average rather than the simple (period) LEB because the latter would underestimate the life expectancy of the population used to compare with the age at death of the nobles and rulers. In contrast, the LEB measured at the date of death overestimates the LEB to be compared to the age at death of high nobility and rulers, and underestimate the difference between the age at death and the LEB. The lifespan average allows us to limit both estimation errors. The lifespan average limits (probably poses stricter than necessary limits in several cases) the source of upward bias and provides a more consistent comparator regarding life expectancy of the general population. In short, this is done at the cost of systematically *reducing* the royal–population gap in life outcomes, which needs to be accounted for when illustrating our findings.[10] Similar reasoning applies for the *GDPPC* measure, which accounts for the notable increase in life standards during the lifetime of many royals and high nobility, especially among those who lived around the first and second industrial revolutions, during which life standards sharply moved upwards with unprecedented momentum. However, it is worth noting that subtracting a life expectancy measure (an *expectation* in each population) from an age at death measure (viz., the *realized* longevity outcome concerning a specific individual) stresses the relative survival advantage or social health disparities using empirical population benchmarks of life expectancy. For interpretation, our methodology is thus very close to computing a measure of Years of Life Lost (or gained) YLL, but with respect to the empirical (and not standardized) population benchmarks of life expectancy.[11] Although we do not measure a life expectancy gap, we can interpret our measure as a *realized longevity differential*. Taking the average from birth to death allows capturing a net cumulative survival advantage, a metric that is useful to gain insight into historical disparities in health and longevity.

3.3 | Descriptive Statistics

Table 1 provides the descriptive statistics of the variables used in the analysis. Panel A presents the main variables collected for a total sample of royals including their age at death, birth year, death year, and, for those who became rulers, the years they began and ended their reign. It displays an average age at death of 50.29 years and an average birth and death year of 1802 and 1853, respectively. Looking at power tenure for those in the subsample of ruling monarchs, the starting and ending years for being in power for royals involved in the panel are, respectively, of 1843 and 1864. The proportion of female observations in this sample is 56%. Panel B panel adds GDP per capita and population life expectancy at birth as additional variables. The average age at death for this subset is 63 years, with an average birth and death year rounded to 1825 and 1887, respectively. The average lifespan of these royals is longer than in Panel A, reflecting a difference caused by the selection towards more recent royals in the dataset.

Finally, the average GDP per capita over the lifetime of the royals is $4852 with a standard deviation of 4587, and the average population life expectancy at birth across the lifetime of these royals is 46.48 years. The smaller sample size in Panel B is due to limitations in data availability, particularly for the life expectancy at birth for the population indicator at the country level.

Table 2 reports the countries and observations by country in the sample. The sample has 844 observations ranging from 19 for Bulgaria to 99 for Portugal. The countries in our sample have been chosen based on the continuity and general stability of their monarchies and the comparability of similar trends. This allows for a better understanding of how age at death may differ between those with social status without having to consider what internal conflicts may have played a role in the lifespans of specific monarchs. We define high-nobility status as monarchs, their spouse and siblings. To compare age at

TABLE 5 | Ruling Royal Status, Relative Lifespan and Age at Death.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent variable is:	**(i) Diff with family average**		**(ii) Diff with family average only male**		**(iii) Age at death**		
Age at death Sample selection	**(A) Individuals 14 or older**						**(B) full sample**
Ruler (dummy)	5.366**	5.252**	7.124***	6.971***	10.10***	10.89***	24.26***
	(2.102)	(2.106)	(2.212)	(2.215)	(2.158)	(2.148)	(2.394)
Female (dummy)	5.850***	5.456***	8.505***	7.882***	5.937***	5.908***	12.51***
	(1.890)	(1.930)	(2.326)	(2.342)	(2.149)	(2.158)	(2.583)
Year of birth		2.162**		3.887**		−1.679	0.513
		(0.918)		(1.572)		(4.080)	(4.771)
Year of birth squared		−0.000596**		−0.00108**		0.000542	−2.47e-05
		(0.000256)		(0.000436)		(0.00113)	(0.00131)
Observations	639	639	614	614	629	629	760
R-squared	0.143	0.148	0.226	0.237	0.377	0.383	0.399
Royal House FE (20)	✓	✓	✓	✓	✓	✓	✓
Country-birth FE (18)	✓	✓	✓	✓	✓	✓	✓
Royal families FE (42)	×	×	×	×	✓	✓	✓

Note: All regressions are clustered within rulers' families where a family includes (i) the ruler, individuals related to the rulers as (ii) co-rulers, rulers consorts, spouses, and people recorded as having had informal relationships with the ruler; and (ii) siblings and half-siblings. Sample included all royals with age at death > = 14 years; ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Dependent variables in: Columns 1 and 2 is the difference between ruler's age at death and rulers' family average age at death. Columns 3 and 4 use a similar dependent variable as in Columns 1 and 2, but the difference is between the ruler's age at death and the average of only the male population of the family of the ruler. This is done as in the sample only 9 cases of the 122 rulers in the sample are female. Columns 5–7 use age at death as dependent variable and control for royal families FE, which should provide similar mean-demeaned estimates than the ones from 1 to 4. In all regressions 1–6, only individuals with 14 or more years are included, whereas regression 7 uses all the observations in the sample.

death among royals to that of the general population, we draw on period-life expectancy at birth data from available public databases.

Table 3 provides a breakdown of household roles among royals, distinguishing between different positions within royal families. Panel A categorizes individuals by gender and role, showing that most rulers were male (113 out of 122), whereas most ruler consorts and spouses were female (62 out of 68 ruler consorts and 78 out of 79 spouses). The largest category overall is made of siblings, comprising 481 individuals (227 males and 254 females). Panel B presents the frequency and percentage distribution of these roles. Siblings account for the largest share (57.24%), followed by rulers (14.49%), spouses (9.38%), and ruler consorts (8.08%). Less common roles include individuals in non-marital relationships (5.58%), half-siblings (4.99%), and co-rulers (0.24%). The cumulative percentage column indicates that siblings, rulers, and their consorts together make up over 85% of the dataset.

Table 4 provides an overview of the temporal coverage of the sample across different countries, and specifically the number of observations and the range of birth and death years for royals in each nation. The table captures data from 17 countries, with Austria (AUT) exhibiting the earliest recorded birth date (1669) and the United Kingdom (GBR) having the most recently recorded death (2022). As noted, when describing Table 2, the number of observations varies by country, with Portugal (PRT) displaying the largest sample (99 individuals) and Romania (ROU) the smallest (24 individuals). The birth years range from 1782 (France) to 1956 (Belgium), whereas the latest death years extend to the 21st century for most countries, with notable recent cases such as the United Kingdom (2022) and Greece (2007). This temporal distribution highlights the long historical span covered in the dataset, allowing for an analysis of life expectancy trends among royals over several centuries.

4 | Descriptive Evidence

Figure 1 displays the distribution of ages at death of the royal family members where the red line refers to the Gaussian fitting of the distribution. The data reveals distinct distributions with the modal age at death between 40 and 60 years. The overall distribution is right-skewed, with some royals living exceptionally long lives and others dying at earlier points in life, particularly

TABLE 6 | Regression results. Dependent variable: difference between age at death of a royal and average life expectancy at birth of the population of their country.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ruler (dummy)	6.082**	5.380*	5.196**	7.238***	4.807**	4.674**	5.959**
	(2.380)	(2.855)	(2.231)	(2.549)	(2.072)	(2.113)	(2.625)
Female (dummy)	4.856*	1.834	3.759*	4.155*	3.399**	3.386*	3.424
	(2.477)	(2.905)	(1.962)	(2.417)	(1.664)	(1.696)	(2.117)
GDP per capita (Maddison)	0.00208***	0.00333***	0.00488***	0.00540***	0.00900***	0.00910***	0.00917***
	(0.000637)	(0.000955)	(0.00107)	(0.00179)	(0.00147)	(0.00150)	(0.00164)
Year of birth	7.453***	9.717***	12.66***	14.56***	5.068	10.13**	14.87***
	(2.111)	(2.102)	(3.256)	(4.476)	(3.810)	(3.828)	(4.948)
Year of birth (Squared)	−0.00209***	−0.00274***	−0.00359***	−0.00411***	−0.00155	−0.00293***	−0.00423***
	(0.000583)	(0.000582)	(0.000895)	(0.00123)	(0.00105)	(0.00106)	(0.00136)
Observations	230	215	230	215	224	224	207
R-squared	0.166	0.290	0.338	0.422	0.572	0.593	0.651
Royal house FE (20)	×	✓	×	✓	×	×	✓
Country-birth period FE (18)	×	×	✓	✓	×	✓	✓
Royal families FE (42)	×	×	×	×	✓	✓	✓

Note: All regressions are clustered within rulers' families where a family includes (i) the ruler, individuals related to the rulers as (ii) co-rulers, rulers consorts, spouses, and people recorded as having had informal relationships with the ruler; (ii) siblings and half-siblings. Sample included all royals with age at death $>=14$ years; $^{***}p<0.01$, $^{**}p<0.05$, $^{*}p<0.1$. In all regressions, the dependent variable is the difference between age at death of the royal and the average of the kingdom's population life expectancy at birth calculated throughout each royal's lifespan according to the data available.

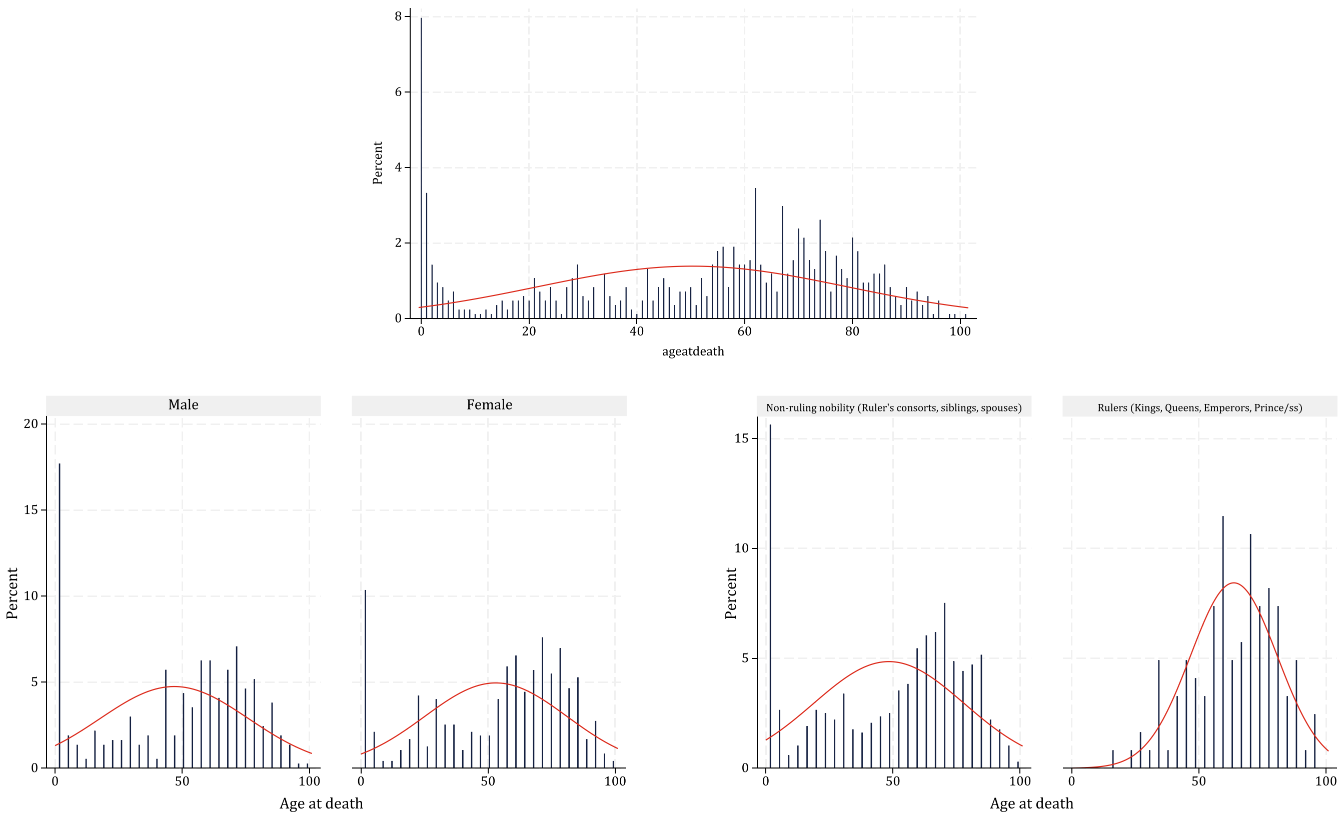

FIGURE 1 | Distributions of age at death. (A) Overall, (B) by gender, and (C) by ruling status. *Note:* Distribution of ages at death of the royal member of the family according to the full sample (577). The red line refers to a Gaussian fitting. [Colour figure can be viewed at wileyonlinelibrary.com]

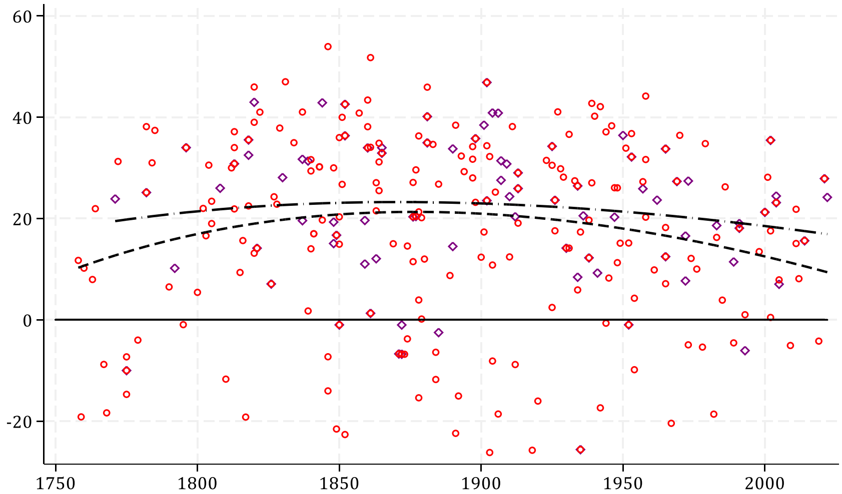

FIGURE 2 | Scatter between age at death of a royal and population life expectancy at birth (royal longevity advantage). *Note:* (i) y-axis: Difference between age at death and the lifetime average life expectancy at birth of the population. (ii) x-axis royal member year of death. Horizontal line is the 0 line along which the difference along the y-axis shows equal age at death and average life expectancy. Possible inverse-U shaped relationship with difference increasing to top around the end of the 1800s and then inverting trend coming closer to 0. The portion of negative difference identifies early deaths (mostly royals not in power). [Colour figure can be viewed at wileyonlinelibrary.com]

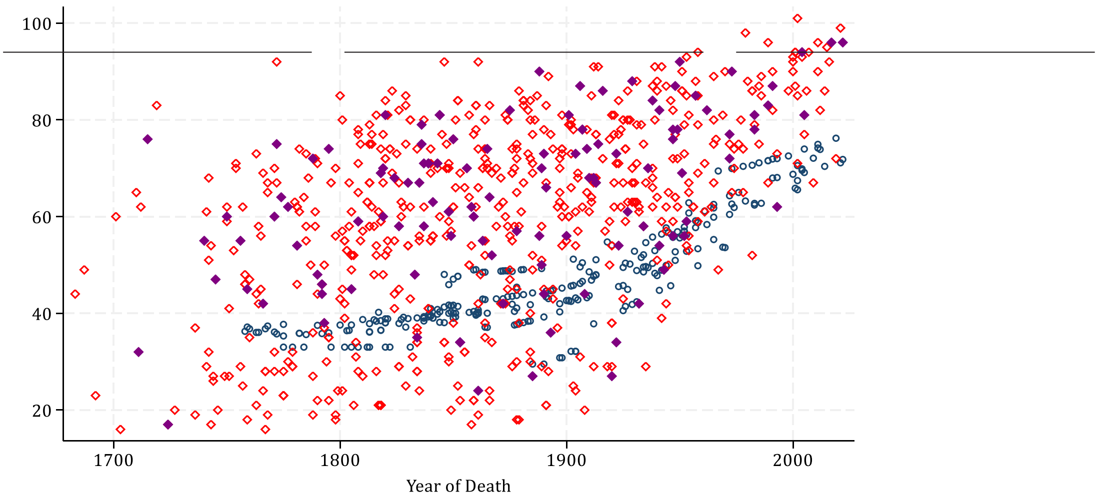

FIGURE 3 | Relationship between year of death and age at death. *Note:* Red hollow diamonds are scatter plots combining the year of death and average life expectancy of the population during the lifetime of the member of the royal family not in power. Full purple diamonds are the subset of kings and queens with royal power. Hollow blue circles are the population–level life expectancies at the year of death of the royal member. [Colour figure can be viewed at wileyonlinelibrary.com]

in middle age and other sample of individuals that did not survive to their adolescence or early life (infants or childhood), most likely due to disease, conflict, or other historical events. When broken down by gender, we find broadly similar patterns of male and female mortality. Additionally, distinguishing between ruling monarchs and non-ruling royals allows for an examination of whether leadership responsibilities, stress, or other factors influence longevity. As expected, we document that the distribution for ruling royals is centered at about 60–70 ages, whereas that of non-ruling royals is more uniform and more right skewed.

Figure 2 shows a scatterplot where the y-axis refers to the royal and population lifespan gap (longevity advantage) measured as the difference between the age at death of a royal and the lifespan average life expectancy of the general population. The x-axis simply indicates the year of death. A horizontal line at zero serves as a reference point, where dots above the line signify royals outliving the general population's life expectancy and those below indicate shorter-than-expected lives. The scatterplot suggests an inverse-U shape, where the longevity advantage of royals increased up until the late 19th century before declining, eventually converging towards zero. Purple hollow diamonds refer to the subsample made of kings and queens (actual reigning monarchs), whereas hollow-red scatters refer to the rest of the high-nobility population. A quadratic interpolation shows evidence of an inverse U-shaped relationship, which tops around the end of the 1800s, followed by an inverting trend coming closer to the 0-threshold. As expected, most of the sample (including both monarchs and high-end nobility) appears above the 0-threshold, but there are some cases where scatters lay below the line, mostly due to premature deaths. Finally, the negative difference identifies early deaths (mostly royals not in power).

The observed pattern implies that, although members of the royal families historically enjoyed a significant survival advantage, their relative longevity compared to the average countrymen declined over time, potentially due to improvements in public health interventions, medical advancements, and social changes. However, we note that the inverse U-shaped relationship is not very stark, which suggest that the difference between rulers and population is much more stable across the centuries explored.

Figure 3 displays the relationship between the year of death and age at death, distinguishing between different an individual royal status and the general population (measured by the average life expectancy). The red hollow diamonds depict royals who did not hold ruling power, whereas the full purple diamonds indicate monarchs (kings and queens) who exercised royal authority. The hollow circles refer to the general population's average life expectancy at the corresponding year of death of each royal. The figure *suggests that monarchs and non-ruling royals historically outlived the general population*, particularly in earlier centuries. However, as in we already highlighted in Figure 2, the gap appears to narrow over time, reflecting overall improvements in public health and longevity. The longevity heterogeneity among royals—some living well beyond the population average, whereas others dying earlier—also indicates that royal status alone did not guarantee an extended lifespan. Hence, distinguishing between ruling and non-ruling royals provides further insight into whether holding power had an additional effect on longevity.

Our descriptive data reveals a clear and statistically significant gap in life expectancy between the general population and royals. In 1750, for countries with available data, royals outlived the average individual by approximately 20–30 years. However, this gap gradually narrows over time, likely due to advancements in sanitation, medical knowledge, and the broader diffusion of health technologies across nations. Our findings indicate that monarchs tend to live longer than other members of the royal family, suggesting that holding the throne may confer certain advantages and exposes rulers to some positive stressors. This challenges the expectation that the (di)stress of ruling monarchs would reduce longevity compared to royals who enjoy privilege without governance responsibilities, and suggests that being higher in the social status ladder enlarges the health gap. However, further exploration is needed to understand the factors driving these differences in life expectancy among various royal statuses.

5 | Results

5.1 | Being in Power Compared to Peers

Table 5 examines how ruling status, controlling for gender, and other factors influence life expectancy of royals. Columns 1–4 examine the effect of ruling status on the difference between a ruler's age at death and their royal family's average; and specifically, Columns 1 and 2 show the effect of ruling royal on the difference between rulers and all the components of the royal households (spouses and siblings, male and female), whereas Columns 3 and 4 focus on the difference with only the average age at death measures on the subsample of only male members of the royal household. Finally, Columns 5–7 reports the effects on age at death as the dependent variable, but include Royal family fixed effects, so in practice it mean differenciates the royal family average age at death. Column 7 report results for the full sample, including royals prematurely dying before the 14th year of life. Overall, Table 5 shows evidence of a robust positive effect of ruling status on relative longevity. We estimate that royals live **5.4–7.1 years longer** than the average life expectancy of their country's population, and **10–11 additional years** at death after controlling for fixed effects within the royal family. Estimates differ when the years in power are controlled in a linear and nonlinear fashion alongside the age at death of royals. Consistently with previous estimates, we find evidence of a significant life expectancy advantage of ruling royals compared to their non-ruling family members. Female royals also exhibit a clear longevity advantage, living 5.5–12.5 years longer than their male counterparts, but the effect of ruling females' cannot be estimated due to lack of sufficient observations. Additionally, birth year effects suggest an overall upward trend in life expectancy over time, though this effect is not consistently significant. The inclusion of fixed effects for royal families, country–birth periods adjusting for dynamic temporal effects, and Royal houses fixed effects throughout, helps accounting for several factors of unobserved heterogeneity, reinforcing the robustness of our original findings. Notably, the main results persist even after restricting the sample to individuals who lived at least 14 years, confirming that the longevity differences are not merely due to early childhood mortality.

As a robustness test, we also estimate our main results using alternative measures and samples as reported in Table A2 in the Appendix. A first group of estimates (1–6) is retrieved by restricting the sample to only individuals who died at or after 14 years of age (Columns 1–6). More specifically, Column 1 focuses on the average age at death of the whole household, regression in Column 2 reports the estimates for the male population and Column 3 excludes half siblings. Next, Column 4 excludes in the average the age of the ruler. Next, Column 5, draws on estimates using only siblings in the household, and Column 6 instead excludes them. A second set of regressions still in Table A2 (Columns 7–12) replicates the same regressions but using the whole sample. Finally, Table A3 shows that increasing the threshold for the age at death from 14 to 18 produces similar results.

5.2 | Comparing Royals and Royals in Power to "Commoners"

Table 6 reports regression results examining the longevity advantage of ruling and non-ruling royals and the general population; accounting for GDP per capita to account for changes in general life conditions. We follow the same methodology as in Table 5, yet the main dependent variable is the difference between age at death of the royal and, this time, the royal's life average of the period life expectancy at birth among the kingdom's population. Controls include the ruling status (Ruler dummy), its gender (Female dummy), GDP per capita, and year of birth (both using linear and squared terms). Consistently with the results in Table 5, the Ruler dummy reveals a consistently positive and significant coefficient, suggesting that rulers' lifes span gap with respect to both other royals, and with the general population is of about 5.2–7.1 years. As expected from the visual exploration of Figures 2 and 3, we find evidence of a negative quadratic time trend that suggest that age differences between royals and their subjects decline over time. The Female dummy indicates that, consistent with Table 5, female royals generally have a higher life expectancy compared to their male counterparts, though this effect is not always statistically significant and cannot be controlled for lack of sample size for ruling females. Additionally, controlling for GDP per capita does not eliminate the large and significant difference in life expectancy, supporting the idea that economic prosperity is not driving the longer lifespans for royals, just like broader population trends. Next, we progressively introduce different fixed effects to control for potential confounding factors. Columns 2, 4, and 7 include Royal House fixed effects, capturing family-level variations, whereas Columns 3, 4, 6, and 7 adjust for country–birth period fixed effects, which account for regional and temporal differences. Finally, Columns 5, 6, and 7 also introduce royal family fixed effects, isolating the impact of the royal family structure. Overall, the results suggest that ruling status, gender, and economic conditions play significant roles in determining the life expectancy advantage for royals relative to the general population.

6 | Mechanisms

6.1 | Ruling Royals and Their Peers

In the introduction, we suggested that the disparity in age at death between monarchs and their close peers within the same family may stem from the exposure to either eustressors or reduced exposure to distressors associated with their prominent social positions of power. Below, we uncover some of the factors could account for this phenomenon.

6.1.1 | Succession Rule

First, agnatic primogeniture is—where the firstborn heir is automatically designated ruler—the dominant process for ranking high nobility and assigning royal succession. Agnatic primogeniture can significantly reduce competitive stress. Unlike meritocratic or elective systems, primogeniture removes the need to prove fitness, which the literature shows can be psychologically protective. Male primogeniture helps mitigate sibling rivalry by assigning roles based on birthright rather than performance (Sulloway 1996). As a result, firstborn monarchs benefited from a clearly defined and stable role, reducing the need for competition and lowering exposure to chronic stress through decreased strategic risk-taking (Sapolsky 2005). In contrast, younger siblings—despite sharing similar genetics and upbringing—often face greater uncertainty and pressure to prove themselves, which can lead to heightened stress, increased career risk-taking, and, ultimately, elevated long-term mortality risk.

6.1.2 | Perceived Control, Self-Agency, and Efficacy

A substantial body of literature provides strong empirical support for the idea that higher status—particularly when tied to decision-making authority—reduces perceived uncertainty, fosters autonomy, and, most importantly, enhances individuals' sense of control over their destiny and potential for achievement. These factors closely align with the elevated perceived control often experienced by rulers, which has been shown to reduce distress and significantly improve health outcomes, lower mortality risk, and extend lifespan (Rodin 1986; Heckhausen and Schulz 1995; Gale et al. 2008; Infurna et al. 2013; Cerino et al. 2024). Perceived control functions both as a mediating and moderating factor in the stress–health relationship. As emphasized by Lazarus and Folkman (1984) and Selye (1956), when higher status positively shapes exposure to eustress over distress, perceived control may provide the psychological and cognitive resources necessary to amplify the beneficial effects of positive stressors while also mitigating the impact of negative ones through cognitive appraisal and subjective interpretation. Moreover, psychological research (Ryff and Singer 1998; Becchetti et al. 2023) shows that individuals with a greater sense of purpose (eudamonic well-being) tend to have better health outcomes and live longer. A ruler's responsibilities and symbolic importance may reinforce this. The rulers experience a stronger sense of purpose derived from a defined leading role in society, and play a central role in extending their lifespan.

6.1.3 | Birth Order Effects

A strand of literature suggests that firstborns tend to live longer than their siblings (Modin 2002; Barclay and Kolk 2015). In the context of hereditary succession—where the ruling role is typically assigned to the firstborn—this alone could offer a straightforward explanation for differences in average age at death between monarchs and their family members. However, the existing empirical evidence does not fully apply to our case. First, the longevity advantage is primarily observed when the firstborn is female (Barclay and Kolk 2015), whereas our sample consists almost entirely of male monarchs, with only two exceptions. Second, the birth-order effect tends to diminish by adulthood and disappears when controlling for the siblings' shared socioeconomic background (Modin 2002).

Consistent with the mechanisms discussed earlier, a more plausible interpretation is that birth order becomes consequential when paired with formal rules that assign power and confer high-status roles—such as those found in systems of agnatic primogeniture. In this context, the combination of low chronic distress, high perceived control, and social role stability emerges as a potent set of protective factors, helping explain why firstborn rulers may enjoy longer lifespans than their siblings.

6.2 | Royals and their Countrymen

The effect of royal status—specifically, the advantages conferred by higher social status—can be attributed to a range of mechanisms, several of which are well documented in the literature. These include better access to stable and nutritious diets, reduced exposure to poverty-related risks such as crowded living conditions and communicable diseases, and distinct patterns in health-related behaviors. Conversely, other factors such as increased exposure to conflict, political violence, and criminal targeting may offset some of these advantages, particularly in historical periods marked by instability or military engagement.

6.2.1 | Dietary Differences and Socioeconomic Status

Another possible explanation relates to the distinct diets of royals, which often differed significantly from those of the general population. Although some studies argue that the working-class diet in mid-Victorian Britain resembled a nutritionally robust version of the Mediterranean diet (Clayton and Rowbotham 2008), poorer populations generally consumed less meat and had more limited access to high-quality food (Walton 2003). However, the role of socioeconomic status in shaping survival outcomes is contested. Several studies have identified a U-shaped relationship between mortality and socioeconomic status in early childhood during the early 19th century, suggesting that both the poorest and the wealthiest experienced elevated mortality risks (Jaadla et al. 2020). That said, wealth and nutrition did not uniformly protect against infectious disease. For many communicable diseases, improved nutrition conferred little survival advantage—with the notable exception of tuberculosis. In this case, better nutrition significantly reduced mortality, and this effect is evident in historical records showing lower death rates from tuberculosis among royals (Greaves 2018).

6.2.2 | Health Behavior and Medical Technologies

Royals, due to their more restricted exposure to environmental and occupational risks, may have engaged in different health-related behaviors compared to their subjects. Patterns of alcohol and tobacco consumption are one notable distinction: Royals typically consumed wine, whereas the working class primarily drank beer. Furthermore, the widespread adoption of industrially produced cigarettes in the late 19th century led to a sharp increase in smoking among the general population (Clayton and Rowbotham 2008). Physical exertion also played a role in health disparities—children engaged in long hours of strenuous labor required higher caloric intake, and when nutritional needs were unmet, this imbalance contributed to poorer health outcomes (Sharpe 2012). Similarly, another important source of advantage for royals and other elites was better access to medical care. However, it is important to note that until the 20th century, the overall efficacy of medical interventions remained limited, as major scientific advances in medicine were still in their infancy.

6.2.3 | Conflict, Accidents, and Military Casualties

Deaths resulting from accidents, violent conflict, and military engagements were significantly less common among members of royal families and elite groups, primarily because their elevated status typically shielded them from direct exposure to combat and hazardous conditions. Although some royals held military titles or formal roles, these positions were often ceremonial or strategic in nature, involving limited participation in frontline combat and thus reducing their risk of injury or death. In contrast, ordinary soldiers and lower-ranking officers were far more likely to experience direct combat and battlefield dangers, with studies showing higher injury-related mortality among deployed military personnel (Knapik et al. 2009). Additionally, psychological stressors such as post-traumatic stress disorder (PTSD) have been found to disproportionately affect lower-ranking or less-prepared troops compared to elite officers (Hoge et al. 2007). These disparities highlight the need to interpret elite mortality data with caution, as it likely underrepresents deaths from war-related and accidental causes—an important consideration when comparing life expectancy across social strata (Roelfs et al. 2010).

6.2.4 | Crowded Living and Access to Heating

One significant difference between individuals of higher and lower social status—such as royals and their subjects—in historical contexts was access to private, heated living spaces. Wealthier individuals, including royals, typically resided in larger, better-insulated, and regularly heated accommodations, which not only provided greater physical comfort but also reduced exposure to cold-related illnesses. In contrast, lower-status individuals were often confined to overcrowded and poorly heated dwellings. Although communal living in single-room or shared spaces offered certain economic efficiencies—such as shared heating and food preparation—these advantages came with serious health trade-offs. Densely populated and poorly ventilated environments significantly increased the risk of communicable diseases, particularly respiratory infections. Historical evidence indicates that these structural differences in housing quality and access to heating played a substantial role in shaping disparities in morbidity and mortality across social classes (Woods 2000; Fogel 2004).

6.2.5 | Sanitation and Exposure to Communicable Diseases

Finally, an important distinction between royal populations and the general populace in historical contexts was their priviledged access to better sanitation. Royal households typically benefited from cleaner water sources, more controlled waste disposal, and better-maintained hygiene practices—often made possible by dedicated servants and superior infrastructure. In contrast, much of the general population, particularly in urban areas, lived in overcrowded and unsanitary conditions with limited access to clean water and effective sewage systems. These disparities had profound health consequences, especially in relation to gastrointestinal infections, which were among the leading causes of death in pre-modern societies. As McKeown and Record (1962) demonstrated, improvements in sanitation played a critical role in reducing mortality from diseases such as cholera and dysentery, well before the advent of antibiotics or widespread vaccination.

7 | Discussion

A well-established body of literature has documented the influence of social status on health outcomes. Studies examining various organizations and socioeconomic groups—such as the British civil service—consistently find that social status is associated with better health, lower mortality, and longer life expectancy (Marmot 2006, 2013). A natural experiment to examine the differential lifespan trends resulting from social status is to focus on one of the highest-status groups in recorded human history, namely, royalty. Our results reveal evidence of a gradual convergence in life expectancy between monarchs and their subjects. We estimate that historically, monarchs enjoyed a significant life expectancy advantage, living 5.2–7.1 years longer than the general population. However, such effect exhibits a quadratic time trend, suggesting that the lifespan gap has been narrowing over time, reflecting broader improvements in population health.

Our evidence is consistent with Stelter et al. (2021), who documented a decline in the health advantage of medical scholars over the past 300 years, particularly towards the end of the 19th century. Similarly, the narrowing life expectancy gap between royals and their general populations can be attributed to several factors, including greater access to health information and the development of public health systems such as universal healthcare and welfare institutions. However, such convergence is modest in magnitude and disappears when focusing specifically on ruling monarchs. These changes likely diminished some of the health advantages once uniquely afforded to royals, making life in the 21st century comparatively less privileged than in earlier centuries. Additionally, the health of royals today may be more strongly influenced by broader socioeconomic factors than by the institutional privileges that historically defined their status.

Although a certain degree of convergence in life expectancy was expected, the evidence suggests that ruling monarchs—the "top of the top"—have largely been protected from these shifts throughout history. The 20th-century transformation of many monarchies into constitutional systems reduced monarchs' powers and influence, leading to a likely decrease in the stress and responsibilities experienced by today's monarchs relative to their predecessors. This shift may have reduced exposure to distressors while potentially increasing exposure to eustressors. Research on stress and health indicates that such changes can profoundly affect immune function and the regulation of stress hormones (Steptoe et al. 2003; Steptoe and Marmot 2004; Sapolsky 1993).

Overall, our results suggest that the moderate convergence in life expectancy between royals and the general population is driven by broader socio-political transformations, and specifically, the rise of democratic governance and constitutional monarchy in Europe—where surviving monarchies gained limited powers and broader access to health resources for non-royals improved. Simultaneously, the transition to more stable and peaceful regimes (Sapolsky 2005) may have offset the loss of monarchs' decision-making power by improving the balance between distress and eustress. This shift would in turn reinforce their health advantages relative to both the high nobility and commoners. Moreover, our findings suggest that the longevity advantage historically enjoyed by ruling monarchs, relative to their high-nobility peers, cannot be explained by material socioeconomic status alone. Both groups shared high levels of wealth, education, and access to resources, yet only those in formal positions of power experienced systematically longer lives. This distinction points to the potential role of power status—defined by authority, perceived control, and social legitimacy—as an independent determinant of long-term health outcomes.

Although our historical dataset does not allow direct extrapolation to modern populations, it highlights how long-standing and durable the relationship between social position and health has been. Our results echo, at least to some extent, the protective role of purpose, autonomy, and meaningful social roles in explaining longevity. Although our analysis is historical in nature, the findings offer insights relevant to contemporary debates on the origins of health inequality and the social determinants of longevity. That is, ruling monarchs systematically lived longer than their high-nobility peers, despite both groups occupying the highest tiers of socioeconomic status (SES) in their respective societies. This suggests that power status—defined not simply by wealth or class, but by one's role, perceived authority, and formal position in the social hierarchy—may independently contribute to longevity. Such distinction encompasses several implications for policy making. First, health disparities are not driven solely by material conditions such as income or access to medical care but also by psychosocial mechanisms—including autonomy, purpose, and perceived control, which are not evenly distributed across the status ladder both for demand- and supply-side factors. This finding resonates with current debates about stress, status anxiety, and the health effects of social comparison. Such effects can persist at all levels of the socioeconomic spectrum, and social policies aimed at reducing health inequality should also consider factors beyond income redistribution—for example, promoting role fulfilment, agency, and status security, especially among those facing precarity or role loss.

8 | Conclusion

This paper has examined the impact of royal and ruling status on individuals' age at death, focusing on differences in longevity between monarchs, their family members, and the general population. We provide robust evidence of a statistically significant life expectancy gap (or longevity advantage) of 5.2–.1 years between monarchs and other members of the royal family and an even larger gap of 7.4–14.5 years between royals and the general population across several European monarchies. However, such latter advantage has narrowed in recent decades.

The narrowing of health disparities between royals and the rest of the population over time is likely due to the significant decline in the actual power held by monarchs compared to their historical predecessors—with modern "ruling" royals often serving symbolic or ceremonial roles constrained by constitutional frameworks. Constitutional monarchies have generally adopted universal healthcare systems (Baten et al. 2024), providing comprehensive medical care to the general population and driving unprecedented improvements in prevention and living standards over the last two centuries.

It is worth mentioning that historically, monarchs wielded absolute or near-absolute power, granting them greater control but also exposing them to higher risks of revolts, social unrest, and violent attempts at assassination. In contrast, modern monarchs face fewer life-threatening pressures and tend to experience less power distress. However, they still face demands to maintain a public image, satisfy family, government, and citizen expectations, or endure constant media scrutiny. However, such demands, are arguably less severe than the historic risks of violent overthrow or assassination. Paradoxically, the very limitations on their power that have transformed them into largely symbolic figures may also restrict their ability to maximize their longevity.

Unlike historical monarchs who wielded near-absolute authority, modern constitutional monarchies in Europe operate within robust welfare systems that include social safety nets, public health initiatives, and universal healthcare access. Despite these structural transformations, health disparities between ruling and non-ruling royals have remained relatively stable over time. One possible explanation is that although monarchs' political power has diminished, the survival of the most stable monarchies may have generated positive eustress—beneficial stress that contributes to overall well-being.

Furthermore, monarchies that endured waves of democratization, which reshaped government structures in many countries, have demonstrated greater stability. In these stable regimes, individuals in top leadership positions might derive more benefits from eustress than suffer from distress. Our findings point to counterbalancing effects: Whereas health outcomes between non-ruling royals and the general population have converged, indicating shifting longevity patterns, the longevity advantage between ruling monarchs and both their kin and the general population has remained consistent throughout the period analyzed.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Endnotes

[1] A royal in this context refers to a member of a royal family, typically associated with a monarchy. Royals often hold titles such as king, queen, prince, or princess and may have ceremonial, political, or cultural roles depending on the country's system of governance. Their status is usually hereditary, passed down through generations, and they are often symbols of national identity, tradition, and history.

[2] Exception is if they abdicate, which, at least in our sample is a rare event, and even in such a circumstance, they often continue being members of the royal family.

[3] Exceptionally, some royal families might have been deposed by other royal families, and more frequently, a country's political system might change to adopt a Republic permanently such as in Italy, France, Germany, Romania, Bulgaria, or Portugal, or for some time such as in Spain in the two recent republican periods among other European countries.

[4] Those other royals enjoy substantial privileges, including lifestyle, upbringing, and even large portion of genetic inheritance, but do not hold positions of power, and hence do not bear the status-related (di)stress associated with representing the country and taking leadership roles.

[5] However, several studies show evidence of limited socioeconomic differences in survival in the first years of life (Davenport 2019; Corsini and Viazzo 1997).

[6] This raises the possibility of omitted variable bias that potentially restricts the interpretation and external validity of these results.

[7] The magnitude of which can vary based on factors such as the number of winners and the recipient's decision regarding prize donation.

[8] Distress and eustress dynamics and associated health outcomes observed in these elite groups might differ from those in the general population, where different stressors and coping mechanisms may be at play.

[9] Costa-Font and Ljunge (2018) document using a sample of second generation migrants that health influences the probability of employment promotion. Indeed, there is strong evidence that better physical and mental health give rise to selection into high-status corporate positions in Sweden (Keloharju et al. 2023).

[10] This would be typically the case for those royals born in cohorts that were less exposed to limited improvements of life standards at young ages, where most of health benefits tend to cumulate, and for which period life expectancy at birth would have been a better indicator.

[11] For historical periods, standardized YLL reference tables do not exist, and age-specific life expectancies are rare or incomplete. However, LEB is the most consistent and available baseline across time and geography and taking the average along the lifespan captures to good extent the realization of life extensions in the population for the early years.

References

Adler, N. E., T. Boyce, M. A. Chesney, et al. 1994. "Socioeconomic Status and Health: The Challenge of the Gradient." *American Psychologist* 49, no. 1: 15–24.

Barclay, K. J., and M. Kolk. 2015. "Birth Order and Mortality: A Population-Based Cohort Study." *Demography* 52, no. 2: 613–639.

Baten, J., A. Batinti, J. Costa-Font, and L. Radatz. 2024. "Health Insurance and Height Inequality: Evidence From European Health Insurance Expansions." *Socio-Economic Planning Sciences* 93: 101905. https://doi.org/10.1016/j.seps.2024.101905.

Batinti, A., and J. Costa-Font. 2023. "Do Democratic Regimes Exhibit "Better" Health Outcomes?" In *Handbook on the Political Economy of Health Systems*, 27–41. https://doi.org/10.4337/9781800885066.00009.

Batinti, A., J. Costa-Font, and T. J. Hatton. 2021. "Voting Up? The Effects of Democracy and Franchise Extension on Human Stature." *Economica* 89, no. 353: 161–190. https://doi.org/10.1111/ecca.12393.

Becchetti, L., F. Pisani, and B. Acar. 2023. "Eudaimonic Wellbeing and Life Expectancy." *Kyklos* 76, no. 2: 179–195.

Besley, T., and M. Kudamatsu. 2006. "Health and Democracy." *American Economic Review* 96, no. 2: 313–318.

Borgschulte, M., M. Guenzel, C. Liu, and U. Malmendier. 2021. "CEO Stress, Aging, and Death (No. w28550)." National Bureau of Economic Research.

Borgschulte, M., and J. Vogler. 2019. "Run for Your Life? The Effect of Close Elections on the Life Expectancy of Politicians." *Journal of Economic Behavior & Organization* 167: 18–32.

Cerino, E. S., S. T. Charles, J. Mogle, et al. 2024. "Perceived Control Across the Adult Lifespan: Longitudinal Changes in Global Control and Daily Stressor Control." *Developmental Psychology* 60, no. 1: 45–58.

Clayton, P., and J. Rowbotham. 2008. "An Unsuitable and Degraded Diet? Part Two: Realities of the Mid-Victorian Diet." *Journal of the Royal Society of Medicine* 101, no. 7: 350–357.

Corsini, C. A., and P. P. Viazzo, eds. 1997. *The Decline of Infant and Child Mortality: The European Experience*, 1750–1990. Martinus Nijhoff Publishers.

Costa-Font, J., and M. Ljunge. 2018. "The 'Healthy Worker Effect': Do Healthy People Climb the Occupational Ladder?" *Economics and Human Biology* 28: 119–131.

Cutler, D., A. Deaton, and A. Lleras-Muney. 2006. "The Determinants of Mortality." *Journal of Economic Perspectives* 20, no. 3: 97–120.

Davenport, R. J. 2019. "Infant-Feeding Practices and Infant Survival by Familial Wealth in London, 1752–1812." *History of the Family* 24, no. 1: 174–206.

Erikson, R. 2001. "Why Do Graduates Live Longer?" In *Cradle to Grave: Life-Course Change in Modern Sweden*, edited by J. O. Jonsson and C. Mills. Sociology Press.

Fogel, R. W. 2004. *The Escape From Hunger and Premature Death, 1700–2100: Europe, America, and the Third World*. Cambridge University Press.

Gale, C. R., G. D. Batty, and I. J. Deary. 2008. "Locus of Control at Age 10 Years and Health Outcomes and Behaviors at Age 30 Years in the 1970 British Cohort Study." *Psychosomatic Medicine* 70, no. 1: 72–78.

Greaves, P. 2018. "Regional Differences in the Mid-Victorian Diet and Their Impact on Health." *JRSM Open* 9, no. 3: 2,054,270,417,751,866.

Heckhausen, J., and R. Schulz. 1995. "A Lifespan Theory of Control." *Psychological Review* 102, no. 2: 284–304.

Hoge, C. W., A. Terhakopian, C. A. Castro, S. C. Messer, and C. C. Engel. 2007. "Association of Posttraumatic Stress Disorder With Somatic Symptoms, Health Care Visits, and Absenteeism Among Iraq War Veterans." *American Journal of Psychiatry* 164, no. 1: 150–153.

Infurna, F. J., N. Ram, and D. Gerstorf. 2013. "Level and Change in Perceived Control Predict 19-Year Mortality: Findings From the Americans' Changing Lives Study." *Developmental Psychology* 49, no. 10: 1833–1847.

Jaadla, H., E. Potter, S. Keibek, and R. Davenport. 2020. "Infant and Child Mortality by Socio-Economic Status in Early Nineteenth-Century England." *Economic History Review* 73, no. 4: 991–1022.

Keloharju, M., S. Knüpfer, and J. Tåg. 2023. "CEO Health." *Leadership Quarterly* 34, no. 3: 101,672.

Knapik, J. J., R. E. Marin, T. L. Grier, and B. H. Jones. 2009. "A Systematic Review of Post-Deployment Injury-Related Mortality Among Military Personnel Deployed to Conflict Zones." *BMC Public Health* 9: 1–22.

Lazarus, R. S., and S. Folkman. 1984. *Stress, Appraisal, and Coping*. Springer.

Leive, A. 2018. "Dying to Win? Olympic Gold Medals and Longevity." *Journal of Health Economics* 61, no. 2018: 193–204.

Link, B. G., and J. Phelan. 1995. "Social Conditions as Fundamental Causes of Disease." *Journal of Health and Social Behavior* 35: 80–94.

Marmot, M. 2013. *The Health Gap: The Challenge of an Unequal World*. Bloomsbury Press.

Marmot, M. G. 2006. "Status Syndrome: A Challenge to Medicine." *JAMA* 295, no. 11: 1304–1307.

Marmot, M., M. J. Shipley, and G. Rose. 1984. "Inequalities in Death: A Study of a British Civil Servant Population." *BMJ (Clinical Research Edition)* 298, no. 6675: 1003–1007.

McGonigal, K. 2016. "The Upside of Stress: Why Stress Is Good for You, and How to Get Good at It."

McKeown, T., and R. G. Record. 1962. "Reasons for the Decline of Mortality in England and Wales During the Nineteenth Century." *Population Studies* 16, no. 2: 94–122.

Modin, B. 2002. "Birth Order and Mortality: A Life-Long Follow-up of 14,200 Boys and Girls Born in Early 20th Century Sweden." *Social Science & Medicine* 54, no. 7: 1051–1064.

Nicholas, T. 2023. "Status and Mortality: Is There a Whitehall Effect in the United States?" *Economic History Review* 76, no. 4: 1191–1230.

Oeppen, J., and J. W. Vaupel. 2002. "Broken Limits to Life Expectancy." *Science* 296, no. 5570: 1029–1031.

Office for National Statistics (ONS). 2024. "National Life Tables—Life Expectancy in the UK: 2020 to 2022."

Rablen, M. D., and A. J. Oswald. 2008. "Mortality and Immortality: The Nobel Prize as an Experiment Into the Effect of Status Upon Longevity." *Journal of Health Economics* 27, no. 6: 1462–1471.

Redelmeier, D. A., and S. M. Singh. 2001. "Survival in Academy Award-Winning Actors and Actresses." *Annals of Internal Medicine* 134: 955–962.

Rodin, J. 1986. "Aging and Health: Effects of the Sense of Control." *Science* 233, no. 4770: 1271–1276.

Roelfs, D., E. Shor, K. Davidson, and J. Schwartz. 2010. "War-Related Stress Exposure and Mortality: A Meta-Analysis." *International Journal of Epidemiology* 39, no. 6: 1499–1509.

Rosen, G. 1979. *The Evolution of Social Medicine*, 23–50. NJ Prentice-Hall.

Ryff, C. D., and B. Singer. 1998. "The Contours of Positive Human Health." *Psychological Inquiry* 9, no. 1: 1–28.

Sapolsky, R. M. 1993. "Endocrinology Alfresco: Psychoendocrine Studies of Wild Baboons." In *Recent Progress in Hormone Research*, 437–468. Elsevier.

Sapolsky, R. M. 2005. "The Influence of Social Hierarchy on Primate Health." *Science* 308, no. 5722: 648–652.

Sasaki, S., H. Kurokawa, and F. Ohtake. 2019. "Positive and Negative Effects of Social Status on Longevity: Evidence From Two Literary Prizes in Japan." *Journal of the Japanese and International Economies* 53: 101037. https://doi.org/10.1016/j.jjie.2019.101037.

Selye, H. 1956. *The Stress of Life*. McGraw-Hill.

Sharpe, P. 2012. "Explaining the Short Stature of the Poor: Chronic Childhood Disease and Growth in Nineteenth-Century England 1." *Economic History Review* 65, no. 4: 1475–1494.

Stelter, R., D. De la Croix, and M. Myrskylä. 2021. "Leaders and Laggards in Life Expectancy Among European Scholars From the Sixteenth to the Early Twentieth Century." *Demography* 58, no. 1: 111–135.

Steptoe, A., S. Kunz-Ebrecht, N. Owen, et al. 2003. "Socioeconomic Status and Stress-Related Biological Responses Over the Working Day." *Biopsychosocial Science and Medicine* 65, no. 3: 461–470.

Steptoe, A., and M. Marmot. 2004. "Socioeconomic Status and Coronary Heart Disease: A Psychobiological Perspective." *Population and Development Review* 30: 133–150.

Suandi, M. 2022. "Promoting to Opportunity: Evidence and Implications From the U.S. Submarine Service." UC Berkeley Working Paper.

Sulloway, F. J. 1996. *Born to Rebel: Birth Order, Family Dynamics, and Creative Lives*. Pantheon Books.

Varcoe, C., A. Browne, and A. Blanchet Garneau. 2019. "Beyond Stress and Coping: The Relevance of Critical Theoretical Perspectives to Conceptualising Racial Discrimination in Health Research." *Health Sociology Review* 28, no. 3: 245–260.

Vyas, S., P. Hathi, and A. Gupta. 2022. “Social Disadvantage, Economic Inequality, and Life Expectancy in Nine Indian States.” *Proceedings of the National Academy of Sciences of the United States of America* 119, no. 10: e2109226119.

Walton, J. 2003. “Book Review of From Plain Fare to Fusion Food. British Diet From the 1890s to the 1990s.” Institute of Historical Research. www.history.ac.uk/reviews/paper/waltonJK.html.

Wilkinson, R. G., and K. Pickett. 2006. “Income Inequality and Population Health: A Review and Explanation of the Evidence.” *Social Science & Medicine* 62, no. 7: 1768–1784.

Williams, D. R., J. Lawrence, and B. Davis. 2019. “Racism and Health: Evidence and Needed Research.” *Annual Review of Public Health* 40: 105–125.

Woods, R. 2000. *The Demography of Victorian England and Wales*. Cambridge University Press.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** Supporting Information.