A biological approach to health and environment: cohort sexual dimorphism in 20th-century Spain[1]

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Abstract

This paper analyzes the impact of environmental conditions upon biological components of well-being through the analysis of trends in sexual dimorphism in height. This is aimed at distinguishing eco-sensitive differentials between men and women from gender and socioeconomic related factors. For these purposes, adult height of Spanish cohorts born 1910-79 is utilized.

Self-reported data from seven waves of the Spanish Health Interview Survey (ENSE) were harmonized and aggregated into a database containing the following main variables: age, sex, birth year, educational attainment and self-reported height. These variables served to adjust and depicture trends in sexual dimorphism whereby OLS regression is used.

Large deviations (i.e. male disadvantage) from modern standards of sexual dimorphism occurred among cohorts that experienced structural deprivation or war-related hardships at pre-adult ages. This agrees with a higher male eco-sensitivity that is biologically determined. Both low values of dimorphism and the subsequent correction of these deviations were mediated by SES as approached by educational attainment (i.e. upper educated individuals were closer to modern standards of dimorphism within any birth cohort). The shift towards modern standards of sexual dimorphism had to do with both a strong increase of male mean height and a transitory slowing down of the secular trend among females.

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Introduction: height, sex and environment

Human height has become a classical indicator to approach some (biological) dimensions of well-being thus supplementing economic (e.g. income) and/or traditional health-related indicators (e.g. mortality). The main strength of this anthropometric indicator within social sciences consists on the influence of environmental factors upon both the timing of physical growth and the height finally attained in adulthood aside of the potential height genetically inherited.

Adult height is accepted to be a proxy of the individual's *net nutritional status* (the net result between energy intakes and energy expenditures) during the physical growth process which roughly spans over the two first decades of life. The body's energy inputs are mostly determined by the quantity and quality of foodstuffs whereas outputs are mainly, though not exclusively, determined by the exposure to illness and the potential burden of a prolonged physical effort during infancy and adolescence. It is expected that positive energy balances result in the attainment of one's genetically-inherited height whereas negative balances would result in the loss of some centimeters with respect to that maximum biological potential. Therefore, in broad terms, stature may inform on how successfully an individual or population have adapted to the surrounding environment from a health-related (i.e. nutritional) perspective[2]. This makes both the patterns of physical growth and the variations in cohort height useful indicators in key development areas (Murray et al., 2002).

A wide gradient of physical maturation patterns and mean adult heights has been observed across populations whereby Europe is a good illustration (Bodzsár and Susanne, 1998). For instance, the average height of Southern Europeans born at the end of the 1960s

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[2] In contexts of high mortality, complex interactions between selection and adaptation processes that are mediated by diverse biological and environmental factors may somehow alter that basic causation (Bozzoli et al., 2009). However, it is usually accepted that populations affected by structural deprivation, prolonged scarcity or frequent epidemics tend to experience marked reductions in mean adult stature regardless the mortality level since mortality and height have a number common determinants indeed (Bengston et al., 2004).

was still below the height attained by Northern Europeans born during the 1920s (Cavelaars et al, 2000). Northern and Central European countries increased their mean at a higher rate than Southern European countries during the first half of the 20th century. By contrast, Southern countries grew faster during the second half of the century in a sort of catch-up process that led to partly converge with the tall Europe (Garcia and Quintana-Domeque, 2007; Hatton and Bray, 2010). Spain reflects this vividly as it took only two decades (i.e. less than a real generation) to more than half the difference with respect to their taller Western counterparts. According to our estimates in this paper based on self-reported data, Spanish males born 1950-59 reached an adult mean height of about 172 cm. German and American of the same birth cohorts measured about 180 cm. and 178 cm, respectively. Only two decades later (cohorts born 1970-79) Spaniards had progressed until about 176 cm whereas Germans and Americans had stagnated or even slightly decreased (Komlos and Baur, 2004). This convergence seems to be the result of two factors: 1) a larger room for improvement in the environmental determinants of height in Southern Europe and 2) a progressive cessation of secular growth in countries were the population was already quite tall on average (i.e. it cannot be expected cohort height to increase permanently once living standards have reached high levels since many individuals within those well-off populations have already attained their maximum biological potential).

Sex differentials in height are a well studied issue within human biology but they are much less applied in social sciences as it may result obvious that males are naturally taller than females thus provoking the neglect of this indicator to approach the relationship between health and environment. Yet variations in sexual dimorphism over time have been found that are certainly an intriguing issue.

Secular increases in height among European women have been found lower than in males whether height was actually measured (Bodzsar and Susanne, 1998) or it was self-reported (Cavelaars et al., 2000). Cavelaars et al. analyzed cohort height series of males and females born 1920-1970 in a number of Western European countries. They found that increases among males were generally higher and, in consequence, the gap between sexes augmented with time (i.e. younger cohorts of Europeans had larger differences than older cohorts on average)[3]. This increase in sexual dimorphism occurred in a number of Western European countries and, interestingly, was not the result of a consistent trend but of a transitory divergence in the pace of physical growth between males and females. The causes of such a divergence remain unclear as we will discuss in the last section of this paper but the variations of sex dimorphism in stature over time are of enough interest themselves.

Sexual dimorphism in stature (sexual dimorphism hereafter) may be an inherited trait or be the result of differences in internal hormonal environments which is supported by the occurrence of large sex differences in stature at an age among children in some families but not in others (Roche and Sun: 9-17). Within a population, variations in sexual dimorphism may be also interpreted in environmental terms. Similarly to cohort height, those variations may report on how successful the adaptation to a given environmental context has been in the long run. Successful adaptation in this case translates into expected biological standards whereas deviations from those standards would be indicative of different types of environmental-related growth disruptions. Unlike the sole indicator of stature, sexual dimorphism captures the long-run impact of environment upon men in relation to women or vice versa. There are several important aspects that must be considered for an adequate use of this indicator.

[3] This was not confirmed in García and Quintana's work on data from the European Household Panel (cohorts born 1950-80) where the pace of generational growth did not show a clear pattern by sex. In some countries absolute gains were higher for women (Belgium, Finland, Italy, Spain, and Sweden) whereas some others would have experienced greater gains among men (Austria, Denmark, Greece, Ireland, and Portugal). It must be noted, nevertheless, that these results are based on relatively few cases (even fewer than what is indicated by the authors given that a number of cases correspond to the follow-up of the same individuals across three or four waves of that panel).

The bulk of sex differences in height originate after infancy (i.e. pre-puberty and post-puberty periods; Gasser et al., 2000). In consequence environmental influences must be preferably analyzed in function of the time when differences arose within a given cohort. Accordingly, it seems reasonable to interpret the series of sexual dimorphism on the basis of a double time scale: the year of birth along with pubescence. The latter presents several difficulties. Firstly, the age at pubescence varied over time. For instance, age at menarche among girls has anticipated throughout the 20th century in a number of European countries as environmental conditions improved (Onland-Moret et al., 2005). Secondly, not every source containing anthropometric data includes information about the individuals' onset of pubescence all of which is attempted to be solved in the next section of the paper.

3. Data and Methods

Since the last decades of the 20th century many countries held health surveys on a regular basis. These surveys often include either measured or self-reported anthropometric measures among their items which allow us to exploring variations in sexual dimorphism.

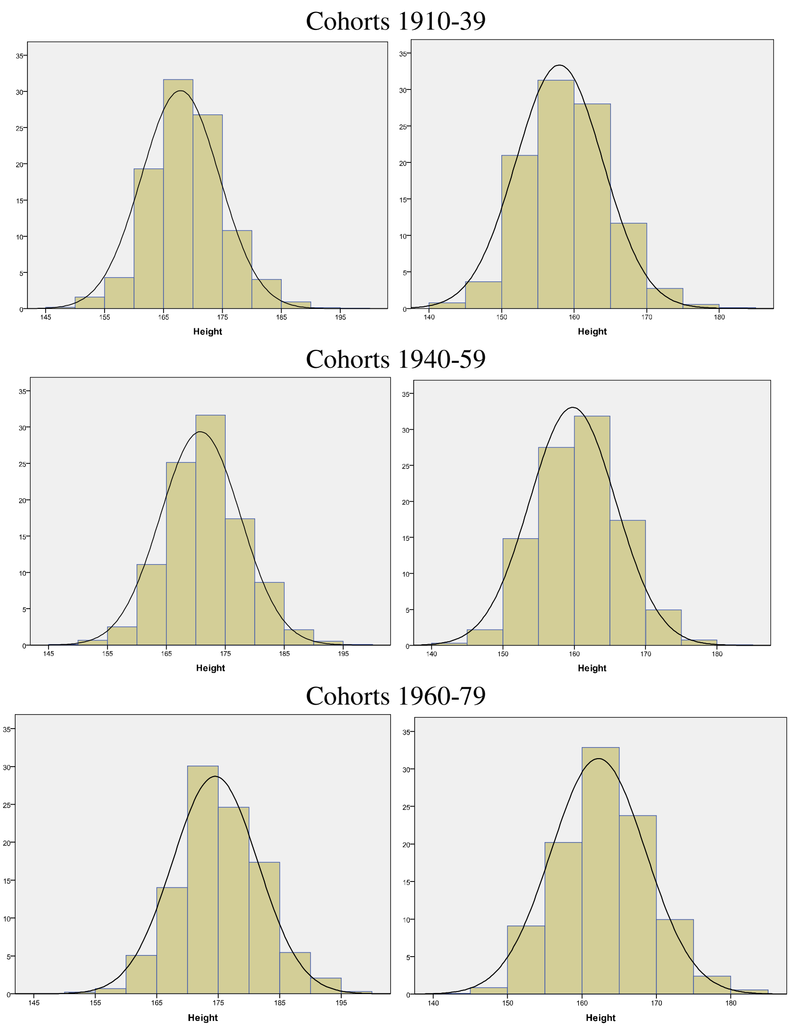
The Spanish Health Interview Survey (ENSE) is a cross-sectional survey held face to face that provides self-reported information on a number of health and socio-demographic issues. Microdata from all seven waves of the ENSE held between 1987 and 2006 were harmonized and aggregated into one dataset as detailed in previous works (Cámara and Spijker, 2010). Proxies, non-Spaniards and ages below 25 and over 79 were discarded[4]. This age range was set in order 1) to ensure that individuals have completed their physical growth process and 2) to prevent random effects caused by both a lower number of valid cases since age 80 and the stronger misreporting found among those ages. These age restrictions results in seventy birth cohorts (1910-1979) that are analyzed.

[4] Proxies were allowed only in the waves of 2003 (33 per cent) and 2006 (6 per cent). Nationality and the birth country are only provided in 2003 and 2006.

Heights are self-reported. Their high correlation with measured heights validates these data for the study of trends (Rowland, 1990) even accounting for certain deviations from a normal distribution that have mainly to do with heaping. These deviations follow a similar pattern by sex and standards deviations across cohort groups remain reasonably constant and close to 6.86 cm that is accepted as standard among modern populations. Among males sd ranged from 6.12 cm (cohorts born 1910-14) to 7.10 cm (cohorts born 1975-79) whereas among females, sd ranged from 5.48 cm (cohorts 1910-14) to 6.56 cm (cohorts born 1975-79). Therefore similar increases in sd among men and women (0.90 cm and 1.08 cm respectively) are observed across cohort groups. Skeweness also affect both sexes similarly (Figure 1).

Figure 1
Height distributions (percent)

Males **Females**



Own computations. Microdata from the ENSE 1987-2006

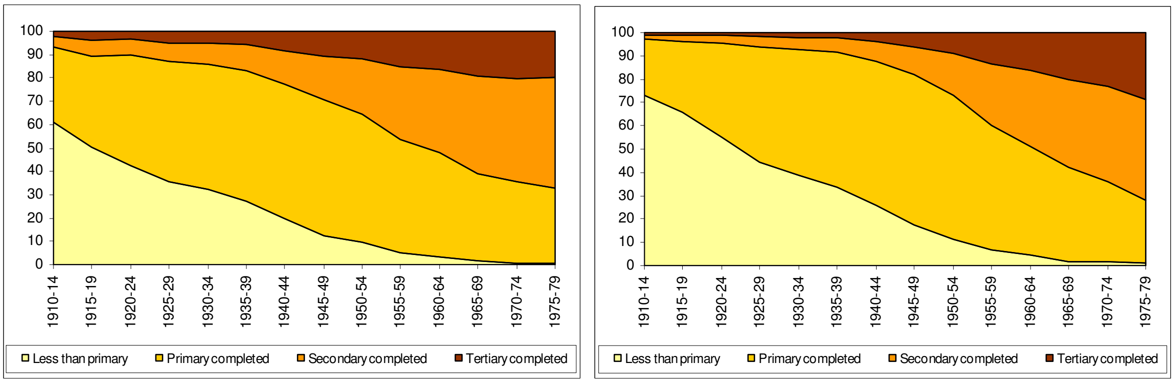
People tend to over-report their height systematically. In Spain this is particularly apparent among older cohorts since the digit preference over most of the 20^{th} century was 1.70 m and 1.60 m among males and females respectively. In consequence cohorts that were actually below from those values are who also over-reported the most. This is in accordance with an observed over-reporting pattern whereby the bias increases from approximately age 60 (Thomas and Frankenberg, 2002; Ezzati et al., 2006). Variations of mean height within a given cohort group (i.e. in function of age) may also have to do with a real age-related shrinking process[5].

Also, a number of works have pointed out a larger over-reporting among males (Gunnell et al., 2000; Kuczmarski et al., 2001; Spencer et al., 2002) as well as some association between misreporting and social class (Palta et al. 1982, Steward et al. 1987, Bostroem and Diderichsen, 1997). To the latter regard, if it is assumed that upper classes are taller and they underestimate their height whereas lower classes are shorter and they tend to overestimate them, height differentials between social groups will inevitably be underestimated. More importantly for our purposes, trends in sexual dimorphism might be affected by the shifts in the social class composition across cohort groups. Illustratively, neither the share nor the sex ratios of education levels are constant through cohort groups (Figure 2).

[5] The starting age of shrinkage is a matter of debate. It seems to occur shortly after age 30 in some individuals (Watkin, 1983) but other longitudinal studies did not prove it solidly until age 50s (Birrell et al., 2005). Since it commences people may gradually lose about 1 cm per decade with some faster shrinkage after age 70. The loses of stature associated to this process may account for between 2 and 5 cm depending on the life span of individuals (Borkan et al., 1983; de Groot et al., 1996; Dey et al. 1999).

Figure 2
Education completion by birth cohort
Spain, 1910-79

Males **Females**



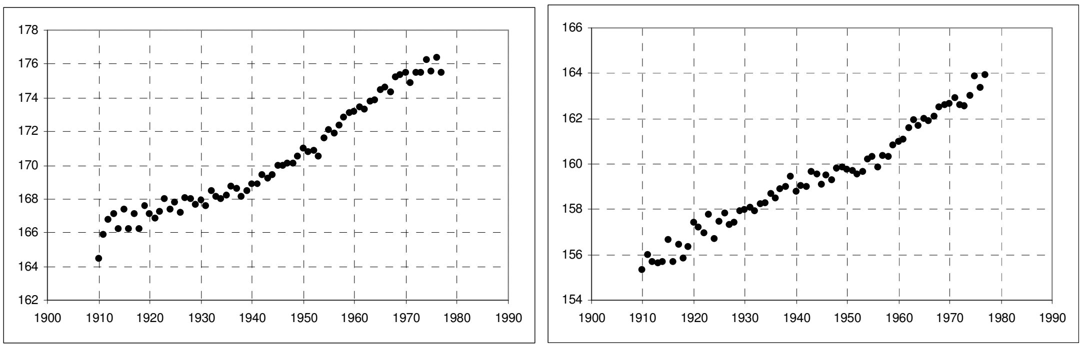
Source: Harmonized microdata from the ENSE (1987-2006)
Note: An abridged version of the International Standard Classification of Education (ISCED) was utilized to harmonized the educational attainment across surveys. Four categories were created (No studies completed, primary studies, secondary studies and tertiary studies) whereby the two latter were collapsed in the analysis.

OLS regression was used to produce series of sexual dimorphism by cohort group adjusted by age and educational attainment. The latter variable was used to approach the social class in a retrospective perspective.

We let a dummy variable for sex to capture the expected difference between males and females once age and education were partialled out since gender itself is a variable potentially influential on self-reporting. Age was transformed into its natural logarithm and education was also dummy-coded and entered in the model[6]. Regressions were run for each 5yr cohort group given that the trends in height were not linear overall (Figure 3) [7].

[6] Effects coding and contrast coding for this variable were also tested with minimal variations in the results.
[7] Several more specifications were tested whereby sex differentials in height did not substantially differ but heteroskedasticity (i.e. serial correlation of the residuals) was detected that is largely corrected through the specification eventually used (tests not shown and available on request).

Figure 3
Average height by birth cohort and 5yr birth cohort
Males **Females**



Finally a time trend was added to each of the regressions that resulted statistically significant among cohorts born 1955-74 (Table 1 displays a sample of results).

Table 1
Sexual dimorphism adjusted by age and educational attainment
Spain, cohorts 1910-79

1910-14		B	Sig	**1950-54**		B	Sig
N=	Agelog	67.018	0.605	N=	Agelog	-2.094	0.000
ref. no studies	Time	1.223	0.132	ref. no studies	Time	0.043	0.376
	Male	10.254	0.000		Male	10.887	0.000
	Primary studies	0.743	0.112		Primary studies	0.04	0.844
	Upper studies	1.392	0.216		Upper studies	1.877	0.000
1920-24		B	Sig	**1960-64**		B	Sig
N=	Agelog	-6.397	0.000	N=	Agelog	-0.756	0.000
ref. no studies	Time	-0.038	0.554	ref. no studies	Time	0.191	0.000
	Male	9.722	0.000		Male	11.913	0.000
	Primary studies	1.121	0.000		Primary studies	-0.067	0.801
	Upper studies	2.463	0.000		Upper studies	1.595	0.000
1930-34		B	Sig	**1970-74**		B	Sig
N=	Agelog	-4.793	0.000	N=	Agelog	-0.408	0.000
ref. no studies	Time	-0.047	0.321	ref. no studies	Time	0.157	0.016
	Male	9.637	0.000		Male	12.598	0.000
	Primary studies	1.252	0.000		Primary studies	-1.048	0.023
	Upper studies	2.87	0.000		Upper studies	0.636	0.155
1940-44		B	Sig	**1975-79**		B	Sig
N=	Agelog	-3.797	0.000	N=	Agelog	0.546	0.000
ref. no studies	Time	0.001	0.989	ref. no studies	Time	0.142	0.121
	Male	9.59	0.000		Male	12.68	0.000
	Primary studies	0.96	0.000		Primary studies	-0.241	0.786
	Upper studies	3.382	0.000		Upper studies	1.391	0.111

Source: Own calculating from ENSE microdata

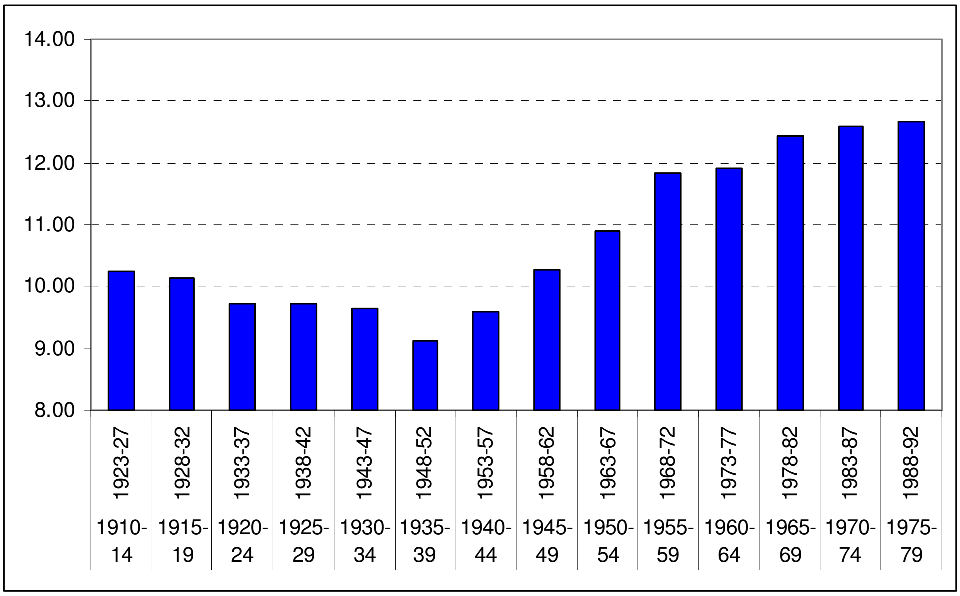
The series of sexual dimorphism are plotted against a double time scale representing the birth cohort and its estimated central year at puberty (CAP). The latter was approached by the peak height velocity (PHV). PHV is the highest rate of growth in stature during pubescence. It approximates maturity because its correlation with the timing of sexual and skeletal maturation (Roche and Sun, 2002: 9). Accordingly, PHV in this work was estimated by using the mean ages at menarche of Spanish female cohorts that were drawn from previous studies (Prado, 1984 and 1989; Hernández and García-Moro, 1987; González-Apraiz and Rebato, 1995; Cabanes et al., 2009). Menarche usually happens one year after the pubertal spurt (i.e. CAP and PHV) occurred. Therefore it is possible to estimate CAP/PHV for a given female cohort from its mean age at menarche. Among males, the biological lag in the onset of puberty with respect to females is applied for the same birth cohort (puberty occurs about two years later among males and PHV was lagged accordingly). For instance, Spanish females born in 1935 recorded a mean age at menarche of 13.19 years. Since PHV occurs about one year before menarche, the central age at puberty was estimated to be 12.19. In consequence the supplementary time reference for that birth cohort will be 1947 (1935+12 in rounded numbers). Their male counterparts would have experienced their PHV about two years later (at about age 14, that is female age at menarche + 1), in 1949. Thus it is assumed that sexual dimorphism within the birth cohort 1935 is mainly a result of the dynamics of physical growth occurred from 1947 to 1949. For parsimony purposes these two dates were averaged to 1948. It must be noted that the shifts in the age at menarche over the 20th century have a minor effect in the calculation of this time scale since the range of the age at menarche in Spain among cohorts born 1920-1979 was 12.43-13.35.

To be noted, the resulting series of sexual dimorphism are based on nearly 100,000 valid cases which permit solid cross-tabulations upon the independent variables (sex, birth cohort and education) (Table A1 on the appendix).

4. Results

Sexual dimorphism decreased across cohorts born during the first decades of the twentieth century. This downward trend bottomed out among Spaniards born 1935-39 matching the Civil War (1936-39). That minimum was slightly above 9 centimeters. Since then an upward trend is observed that was particularly steeper among cohorts born 1940-60. At the end of the analyzed period (cohorts born 1975-79) this indicator was over 12.5 cm (Figure 3).

Figure 3
Variations in sexual dimorphism in Spain (cm)
Cohort (1910-79) and puberty (1923-92)



Source: Own calculating from ENSE microdata

Divergent physical growth trends between men and women lay behind these variations in sexual dimorphism. Prior to the 1940s not only did women grow at a higher pace across cohort groups but relative differences in the growth rates peaked (Figures 4 and 5Figure). Spanish women born between 1920 and 1939 practically doubled men in the rate of physical growth across cohorts (this would be indicated by a value of -100 in Figure 5).

Figure 4
Annual rate of physical growth (11 yr moving average)
Spain, cohorts (1916-74)

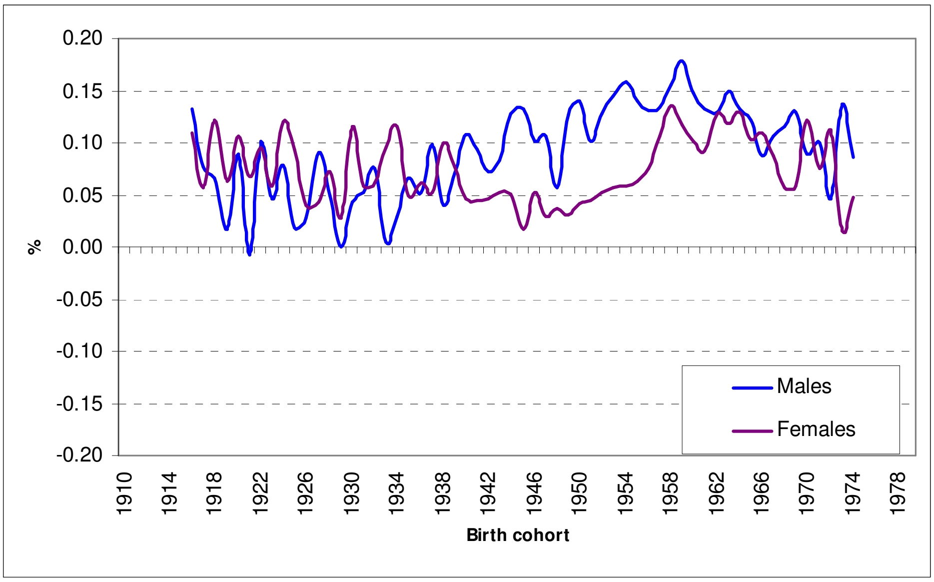
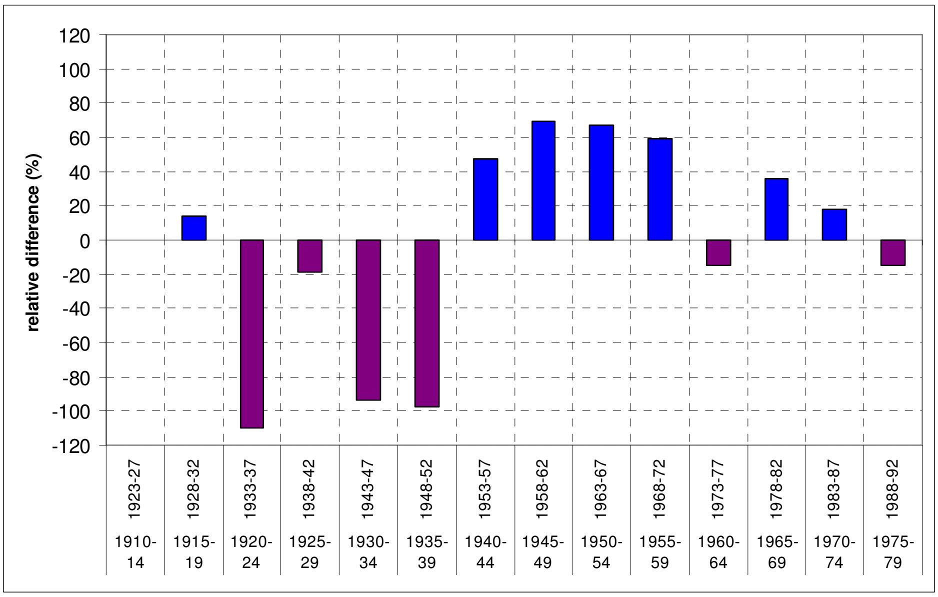


Figure 5
Difference in the rate of growth across cohorts (percent)

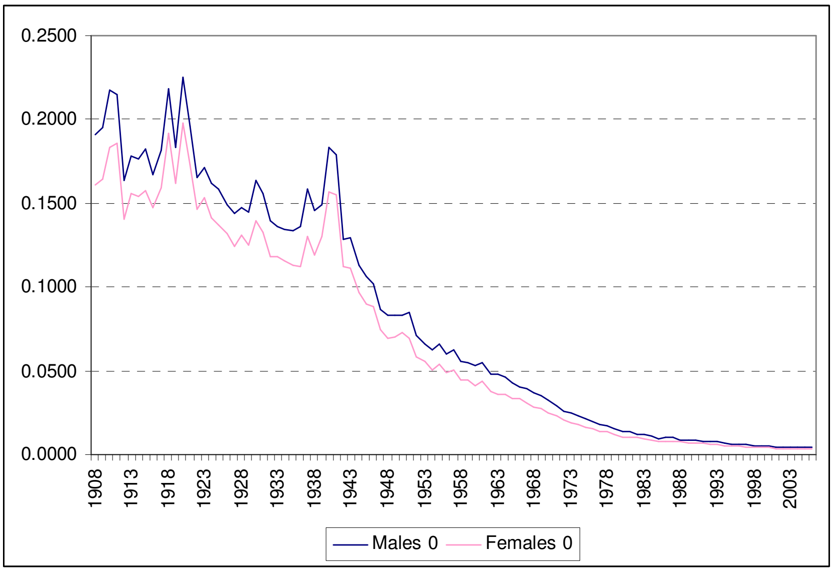


These results agree with the higher eco-sensitivity among males theorized by human biology. In words girls are biologically more resistant than boys and therefore environmental stressors at early ages would affect males more negatively. Interestingly, although dimorphism in height mainly originated after infancy, the impact of structural deprivation (e.g. that of the first decades of the twentieth century in Spain) seems to be driven by the living conditions during the first years of life rather than by the environment at the time of puberty. For instance sexual dimorphism bottomed out among cohorts born 1935-39 which had to do with very low values of male growth. Notwithstanding, a broader look at the life cycle of cohorts contribute to precise this interpretation of results.

Males' catch-up (towards normal values of sex dimorphism) started early after war, among those born in the 1940s which would be puzzling in light of the hardships suffered during that decade. The exposure to these hardships should have affected boys more than girls. Nevertheless, and contrarily to the experience of earlier cohorts, those born during the 1940s had a chance for thriving because the critical period of sexual dimorphism (i.e. CAP/PHV) occurred since the middle of the 1950s when a meaningful improvement of living conditions was taking place.

This evidence indicates that females did better under stressing environmental conditions and among cohorts with little room for recovery within pre-adult ages. This is supported by other health-related indicators like infant mortality that displayed a reduction of boys disadvantage paralleling their catch-up in height with respect to females (Figure 6).

Figure 6
Infant mortality rate in Spain (1908-2008)



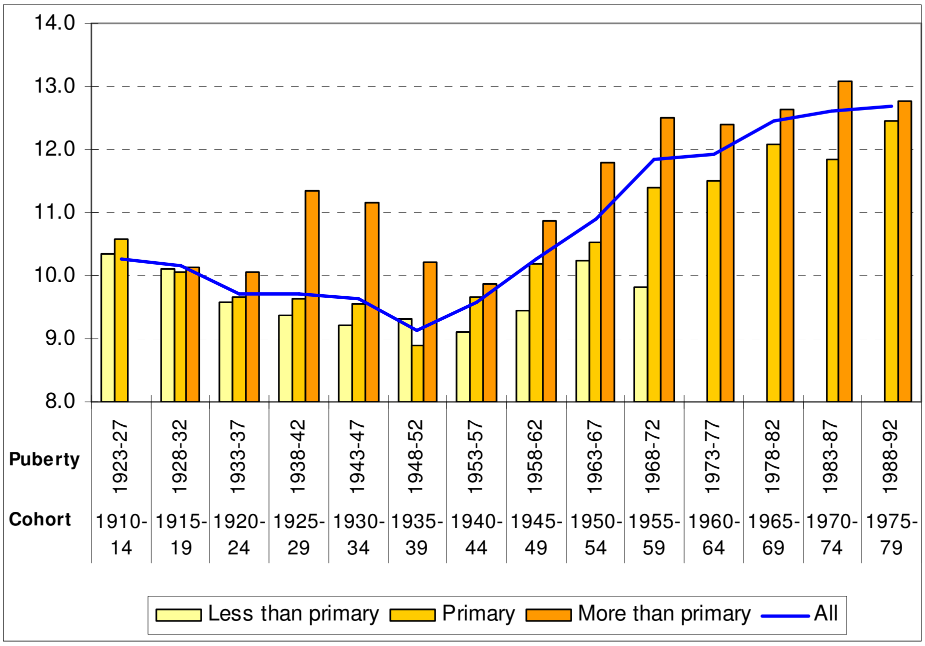
Source: Human Mortality Database

Standards of sexual dimorphism among current developed populations (i.e. populations that have not suffered from any major growth disruptor) are approximately 13 cm (Tanner, 1978). Accordingly, sexual dimorphism among Spanish cohorts born over a good part of the twentieth century was abnormally low which means that males were disproportionally short in relation to females. This, notwithstanding, was mediated by socioeconomic variables.

All social classes (if we let education to approach that variable) seem to have been exposed to environmental hazards during the first decades of the twentieth century. Likewise the upward trend in height dimorphism was shared by all social groups. This is indicated by fairly parallel trends by educational attainment (Figure 7). Nevertheless height dimorphism always ranged closer to modern standards among upper educational levels and deviations from those standards were significantly lower within this social group, particularly among cohorts that were highly exposed to environmental stressors.

Figure 7All social classes (if we let education to approach that variable) seem to have been exposed to environmental hazards during the first decades of the twentieth century. Likewise the upward trend in height dimorphism was shared by all social groups. This is indicated by fairly parallel trends by educational attainment (Figure 7)

Sexual dimorphism by educational attainment in Spain
Cohorts 1910-79



5. Conclussions and discussion

Throughout the twentieth century increases in cohort height among Spanish females were lower than among males. As a result sexual dimorphism increased from older to younger cohorts. This did not occurred consistently across cohorts but it was mainly the result of an acceleration of male growth among cohorts born during the second half of the century at the time that females' growth temporarily slowed down.

Cohorts who grew up in favorable environments tended to attain biologically expected values of dimorphism contrary to cohorts who lived pre-adult ages under structural hardships. Among these cohorts disproportionally low values of adult male height are observed that explain strong deviations from modern standards of dimorphism. Such deviations were lower among the presumably well-off (upper educational levels) who also progressed towards modern standards earlier.

The cycles of female advantage were related to the most critical episodes of hardship in twentieth-century Spain (i.e. the war and immediate postwar) that in addition occurred at critical ages for the individual's physical development (i.e. early infancy and adolescence). Males grew less than females under a negative environmental context and, oppositely, they did better than females once environmental conditions became less severe. Since growth among males is more susceptible to adverse living conditions in childhood and early adulthood, they would have also responded more positively to improvements in living conditions. As environmental stressors diminished females' biological advantage lost its importance which is reflected by both, differentials in infant mortality rates (they diminished) and sexual dimorphism (it increased). Previous works support this interpretation in that they have showed a larger impact of environmental hazards such as disease and malnutrition on males (Bielicki 1986; Kuh et al., 1991). Also, it has been observed that social environment seems to have less influence on females' stature (i.e. socioeconomic-related differences in adult height are larger among men than among women) (Demoulin, 1998).

The upward trend in dimorphism started among cohorts born during the 1940s, thus in an environmentally unfavorable context which opposes to the eco-sensitivity hypothesis. In 1936 the Spanish Civil War started that lasted until 1939. The immediate postwar years witnessed hardships characterized by severe deprivation (even hunger episodes) for broad segments of the Spanish population. Even after those episodes were overcome, the autarchic policy promoted by the fascist-oriented dictatorship kept the country under a situation of scarcity until well into the 1950s (it is estimated that food security was not attained until the middle of the 1950s; Cussó, 2005). From then on, particularly during the decade of 1960s, an intense process of economic growth and social improvements took place. Yet Spanish males (supposed to be more eco-sensitive than females) started their catch-up in growth quite earlier, in the 1940s. This invites one to hypothesize on a potential recovery during adolescence.

For sure, Spanish males born during the first decades of the century were very short even with respect to females. Consequently, subsequent increases in sexual dimorphism cannot be interpreted as a male advantage in social or environmental terms. Certainly the divergence of cohort height between males and females mostly coincided with the most obscure decades of Franco's dictatorship that promoted traditional catholic values as well as an autarchic economic policy. Potentially, this is an institutional environment that promotes unfair social norms or 'environmental disadvantages' for females (Costa-Font and Gil, 2008). However, a similar slowing down of female cohort height (self-reported) occurred in other European countries (Cavelaars et al., 2000) and the United States (Komlos and Lauderdale, 2007: 209). Generally this also coincided with a significant increase of male cohort height but this happened in both tall and short-averaged countries and, more importantly, under diverse political and socioeconomic contexts. For instance, Sweden experienced a female height plateau at a time that the welfare state provisions were already well paced in that country (i.e. among cohorts born during the 1960s). Therefore a gender inequality-based hypothesis is not convincing although it cannot be discarded since explanations of the female height stagnation remain unclear.

Selective effects do not seem a plausible explanation at least in Spain. A decline in infant mortality would imply more (and less selected) surviving (and shorter) males. In Spain, infant mortality decreased dramatically between 1940 and 1960 and this happened along with a reduction of sex differentials in infant mortality and along with the strong increase of male mean height.

Age at menarche in Spain lowered among cohorts born 1930-1960 which could be associated to the improvement of nutrition and an earlier attainment of the minimum weight that menstruation requires according to the critical weight hypothesis (Frisch, 1985). This therefore might have caused female average height to slow down. Yet subsequent cohorts of Spanish females grew taller whereas menarcheal ages kept on lowering. A number of works have displayed a positive relationship between individuals' adult height and the age at the first menstruation (i.e. early menarche is associated with lower-than-average adult height among girls; Gigante et al., 2006). There is however no consensus on that point (Ibañez et al., 2000) and, furthermore, it is unclear that the aforementioned correlation also stands at a population level as some international evidence has displayed (Onland-Moret et al., 2005). This correlation is also controversial in light of some basic statements from auxology that present the physical growth as a target-function (i.e. the anticipation of the age at menarche would be compensated by the postponement of the growth cessation to older ages; Tanner, 1986; Bogin, 1999).

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Appendix

Table A1 Valid cases by variable of interest

	Educational attainment				
Cohort	Less than primary	Primary completed	Secondary completed	Tertiary completed	Total
			Males		
1910-14	271	144	19*	10*	444
1915-19	476	370	64	36*	946
1920-24	862	966	138	71*	2037
1925-29	1018	1494	219	150	2881
1930-34	1279	2116	373	202	3970
1935-39	995	2090	414	214	3713
1940-44	746	2147	524	315	3732
1945-49	485	2276	729	433	3923
1950-54	408	2274	971	514	4167
1955-59	255	2287	1489	742	4773
1960-64	171*	2225	1786	828	5010
1965-69	84*	1518	1681	774	4057
1970-74	28*	894	1094	519	2535
1975-79	20*	504	727	293	1544
Total	7098	21305	10228	5101	43732
			Females		
1910-14	473	159	12*	6*	650
1915-19	862	400	40*	13*	1315
1920-24	1407	1045	86*	28*	2566
1925-29	1796	2028	174*	70*	4068
1930-34	2076	2864	277	116*	5333
1935-39	1643	2796	291	122*	4852
1940-44	1224	2960	413	189*	4786
1945-49	862	3251	628	310	5051
1950-54	567	3038	918	449	4972
1955-59	372	2902	1473	758	5505
1960-64	256*	2756	1949	972	5933
1965-69	98*	1963	1870	995	4926
1970-74	54*	1125	1340	742	3261
1975-79	30*	572	908	563	2073
Total	11720	27859	10379	5333	55291

*Less than 5 percent within the cohort group