Modern Portugal and its Science Culture – Regional and Generational Comparisons

Martin W Bauer & Susan Howard

Department of Social Psychology

London School of Economics and Political Science

Contact: m.bauer@lse.ac.uk

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0 Scientific and Science Culture in Portugal – Key Findings

The term '**culture of science'** designates a state of affairs and the activities targeted to enhance this state of affairs. The term answers the questions: who pays attention to science, who is interested, what mentality underlies the relationship which people perform with science? Furthermore, we distinguish between 'scientific culture' and the 'science culture'. While **scientific culture**, the conduct of scientific research, is largely a global affair, the wider **culture of science** varies widely with historical, geographical and cultural diversity. The science culture is determined by the level of education, mass media coverage and the cultural mentality with a longue duree. This report presents some evidence of the changing state of affairs in Portugal from 1989 to 2010 benchmarked against eleven other European countries.

Since it acceded to the European Union in 1986, Portugal's scientific culture has hugely expanded, and so has the news presence of science in the nation's conversation. Mass media reference to science multiplied in the quality press, while in the popular press this reached a peak in the early 1990s.

Attention to, attitudes towards and appreciation of science

We consider interest in science, feeling informed, and visiting science museums as markers of people's **attention to science**. Interest in science is generally lower in Portugal than in other EU countries. And in 2010 this was even lower than in 1989, compared to their EU counterparts. This is not only true for science, but also for sport and politics. Interest in science is regionally variable; those who are very interested in medical discoveries, new technologies and scientific discovery live mainly in the Lisbon area. Portuguese respondents also feel poorly informed about medical discoveries and scientific discoveries, compared to consistently more positive self-estimations from across the rest of EU12. Again, Lisbon dwellers feel better informed than others, for example those in the North. The Portuguese report fewer visits to science museums, art galleries and libraries than their European counterparts. Where one lives likely affects one's 'engagement' activity: limited access to museums, aquariums, galleries or libraries clearly could affect one's likelihood to visit these. Thus Lisbon dwellers make more use of galleries and museums compared to other regions of Portugal.

Knowledge and the image of science, and evaluating its outcomes on society, are important elements of a science culture. Attitudes to science have many facets. Most Portuguese expect science to improve their lives, to make for more interesting work and to provide better opportunities for the future. On this great consensus there is little difference across Europe. Over time, however, people become more ambivalent towards the idea that science improves their health and life comfort, while the expectation of better work and opportunities is increasing.

In the EU11, around half the respondents consistently disagree that science is irrelevant to their daily life, while in Portugal, 42% disagreed with this in 1989 compared to 28% in 2010. In 2010, more people in Portugal judge that science ‘make[s] our way of life change too fast' than in 1989; across the EU this has not greatly changed. More Portuguese agree that scientific know-how will make the Earth's natural resources inexhaustible. Support for animal experimentation is increasing across Europe and is generally stronger in Portugal than elsewhere.

On four evaluations, the gap between Portugal and Europe has widened over the years. By 2010 more Portuguese agreed that scientists are dangerous, while the opposite trend can be observed in the EU11. The statement 'Science and technology can NOT really play a role in improving the environment' finds increasingly sceptical agreement in Portugal. Portuguese also increasingly agree that ‘we depend too much on science and not enough on faith’, an opposite trend to the rest of the EU11.

These expectations of science are fairly similar across Portugal. The Central regions are slightly more suspicious, more likely to agree that ‘scientists have a power that makes them dangerous’. The North supports animal testing more but agrees less that ‘science and technology make our lives more comfortable’.

Overall, Portugal scores below the European average on tested knowledge of science. The knowledge score of maximum 13 items has increased in Portugal from 4.7 in 1989 to 6.1 in 2010; in the EU11 the increase is from 6.6 to 8.3. The gap hardly closes over the years. Ranking all EU12 countries on knowledge shows that Portugal stays at rank 12 for every year when measures were taken.

In Portugal, as elsewhere, the public imagination of science is epitomised by medicine; while biology, psychology, astronomy, physics and maths are considered ‘more scientific’ than they are

considered to be in other European countries. Astrology and homeopathy are seen as less scientific in Portugal than in the rest of Europe.

A three-dimensional science culture across generations

A factorial analysis of all the above characteristics yields a three-dimensional Culture of Science including **Enculturation** (interest, knowledge, and welfare expectations), **Cultural Scepticism** (secularism disappointed with science), and **Engagement** (visiting events and being knowledgeable). These dimensions are compared across generational age cohorts. Enculturation and engagement increase from older to younger generation. Enculturation shows a consistent gender gap across all generations; women being more challenged by science than men. Primary and tertiary educated Portuguese show stronger enculturation with science as the generations get younger. However, this is not the case for citizens with secondary education. Engagement with science generally increases across the generations. However, the Baby-Boomers and Generation X are particularly engaged when they have a university degree. Cultural sceptics are mainly younger and better educated, but also may be found among Baby-Boomers with secondary education. Among the determinants of science culture, generational cohort is the strongest influence, followed by level of education. Gender, different regions and urban dwelling are less influential overall. Enculturation is most strongly stratified across Portuguese Society, engagement with science less so. Scepticism differs mainly across an interaction of education and generation.

Different generations hold different images of science. The younger Portuguese adopt sharper definitions of science and non-science than the older. The appreciation of medicine and physics increases among younger Portuguese, while the appreciation of economics and history is more a matter for the older generations. The image of psychology is particularly strong among the middle aged generations. This overall image fits with the hierarchy of the sciences that puts medicine, physics and biology at the top of the ladder. But the positioning of the 'lesser sciences' varies for the middle generations.

An integral statistical model (logistic regressions) of the three dimensions of Portuguese science culture shows that enculturation indeed is a matter of generation, level of education, city dwelling, and some regions in the country. Cultural scepticism resonates with highly educated, city dwellers in the North and the Lisbon area. Engagement with science is a matter for the younger generations, with higher levels of education and city dwelling in the North and Lisbon area, but declining over the years.

We compared the trajectory of Portugal with that of Spain and the UK. A unit increase in enculturation, ie knowledge score, added 60% of a log unit of GDP in Portugal over the past 20 years, 49% in Spain and 35% in the UK. This means, that in Portugal, additional efforts to enhance Science culture are likely to have higher economic pay-offs than in other European countries.

1. Basic Indicators and Their Change Between 1989 and 2010

The term 'culture of science' designates a state of affairs and the activities targeted to enhance this state of affairs. The culture of science provides answers to the following questions: who pays attention to science and the activities of scientific research; can we gauge the distance of people from science; and which mentality underlies this relationship of closeness or distance to science?

This report presents empirical evidence of the state of affairs in Portugal and assesses changes from 1989 to 2010 on the basis of five waves of nationally representative attitude surveys as provided by Eurobarometer, the central survey instrument of the European Commission.

The state of affairs of 'public understanding of science' (henceforth PUS) is operationalised by a set of questionnaire-based indicators including factual knowledge, various facets of attitudes to science, being interested in science, feeling informed about science, engagement with science exhibitions, and an assessment of how Europe and the USA compare in matters of science and technology. These indicators provide individually and jointly a complex picture of the standing of science and technology in society and in different segments of society and how this standing might have changed over time. Change is assessed in real time (1989 to 2010), and virtually, across five generational cohorts from 'born in the roaring 1920s' to 'born after 1977 into a new world order', and compared across four Portuguese regions.

While the public's understanding of science is in part influenced by the PUS activities of the scientific community, ie the first sense of PUS, our report cannot be read as an evaluation of the latter's effectiveness, as the public's understanding of science is constrained by other influences such as education and public controversies. Rather the indicators of PUS as presented here provide the context, and a picture of the changing context, within which public engagement activities unfold at present and in the future. Therefore our report provides markers of context rather than indicators of performance.

Furthermore, we suggest a distinction between 'scientific culture' and the 'culture of science'. While scientific culture, the conduct of scientific research in the sense of scientia facere (Latin for making science) is now to a large extent a global affair, at most with organisational differences in the style and working climate of the laboratories, the wider culture of science continues to vary widely with historical, geographical and cultural diversity across the globe. While the laboratory

scientists work with the same material, use similar apparatus and communicate using a global peer-review system, the wider public of science in any particular context is determined by the local language, the level of general education, the mass media available and the local mentality with a longue duree. We would not expect this local context to be globalised in the near future. This is another argument why it is important to map out this local context with all the available information.

The present database and the opportunities of quasi-cohort analysis

The basis of the present analysis is the recently integrated database of four European-wide attitude surveys (EUROBAROMETER 1989, 1992, 2001 and 2005), an effort undertaken in collaboration with the GESIS, the German social science data archive (see Bauer, Shukla & Kakkar, 2009). These data rounds have had their own history of reporting and at times polemical reception across Europe (eg Pardo & Caro, 2002 and 2004; for a review see Bauer, 2008). The integrated database allows us to go beyond these past discussions. Marking a step change in data analysis, we are considering these rounds in conjunction to assess changes over time by separating year-to-year changes from changes across sliding age cohorts. This should allow us to assess the impact of recent changes in science-society relations within the long-term historical context.

Age cohorts are groups which share the common educational, political and cultural experience of a generation. The demarcation of age cohorts is to a certain extent arbitrary, taking into account some historical events over the last century, and the statistical requirement of roughly equal cohort size to support the comparative analysis. Because age cohorts are constructed ex-post from relatively recent cross-section surveys on a sliding age scale, we are strictly speaking of quasi-cohorts. The resulting generation cohorts do not comprise the entire age range, we do not know how the pre-war generation would have responded in their youth, nor do we know as yet how the youngest generation will respond in their older age. For a complete cohort study we need a few more survey rounds in the years to come. Hence some limits are pre-set for the analysis.

This limits our ability to truly separate age and generation effects (age and generation are too closely related in our data). We will not be able to split how much the variance in knowledge, interests and attitudes are a function of generational experience or of simply growing older. The interesting question of whether attitudes to science are a matter of growing older or of a generational common fate, cannot be answered.

However, we will be able to separate the generation effect (or age cohort effect) from the particular period of data collection.[1] For purposes of evaluating the changing relations between science and society in the country and beyond, 'year' is the key variable, as it allows us to map the before and after of key events and changing circumstances.

For the definition of the age cohorts we apply the following standard banding of age groups, equally applied across Europe. We work with a standard banding in order to be able to compare. A more refined analysis of age cohorts would make this banding a more empirical matter. We might have to consider different generational bandings in different historical contexts, and indeed over the past 100 years, European countries went through quite different historical transitions and contexts, which are likely to define generational age groups in different bandings. However, this is a question to tackle in a different context. In this report we work with the following definitions of 'generational cohorts':

New Order, born after 1977: this is the youngest cohort of respondents, growing up mainly after the geo-political changes of 1989 and the historical end of the Cold War, and waking up to the rhetoric of the 'new world order' and the victory of the capitalist style of economy. Their education is influenced by an IT-internet and biotech 'revolution' in the 1990s and into the new millennium. This is the internet generation that catches the euphoria of the 'new economy' in their teenage years. In Portugal, this is the first post-Revolution generation born and growing up after the events of 1974, with many even born after entry into the European Community in 1986. For them, these events are history only from hearsay and school textbooks.

Generation X is the generation born between 1963 and 1976. Globally speaking, they are the product of the birth control 'revolution' with smaller families, growing up through the oil crises of the 1970s, the nuclear armament and energy issues of the 1980s, and the US Star Wars initiative. They are also the TV generation. In the particular context of Portugal, this is the generation growing up when the Old Regime is in decline, living through the Carnation Revolution of 25th April 1974, and witnessing entry to the European Community in 1986 in their years of adolescence or as young adults.

[1] Note, that when taking 'year' as a variable with Eurobarometer, this might not only account for the passing of time, but also include a 'house effect' of the company collecting the data. Eurobarometer changes the consortium that collects its data every five years or so, and with the change in contracting company there might have come a change in interview procedures which could affect the data. In particular the ratio of DK responses is sensitive to changes in the interviewer instructions. Documentation is not available to estimate this house effect; and inspection of the DK rates in the appendix does not indicate a systematic increase or decrease of DK responses.

Baby Boomers are born between 1950 and 1962. Globally, they grow up with the optimism and modernisation drive of the post-war period. They witness the long period of economic prosperity between 1945 and 1970. During this period Western societies become 'affluent' and relatively free of material concerns. This generation is the protest generation of the 1970s, who adhere to idealistic aspirations, and are the carriers of post-material values. They develop scepticism over sweeping notions of 'Progress' arising from science and technology. In the Portuguese context, this generation carries the transition from the Old Portugal to the New Portugal after 1974 and into European Community Membership in 1986.

War & Crisis is the generation born between 1930 and 1949. In part witnessing WW2 and its aftermath, they form the immediate post-war generation educated into and during the Cold War. This generation carried the 'nuclear enthusiasm' of the 1950, which promised an energy revolution, 'energy too cheap to metre' in the atomic society. They carry material aspirations of post-war modernisation across Europe. In Portugal this is the generation supporting or opposing, growing up and living under the authoritarian regime of the 'Estado Novo' of Antonio Salazar and later Marcelo Caetano; some of the younger elements of this cohort are carrying the 'Carnation Revolution' of the armed forces of 1974.

The Roaring 20s, finally, is the oldest surviving generation. Bornbefore 1930, growing up through the buzzing period of the 1920s or the crash of 1929 and the economic crisis that followed, they experienced fully the upheavals of Fascism leading into WWII. This generation carries memories of two World Wars, and in Portugal may remember the time of Salazar's Coup d'Etat which established the Estado Novo in 1926. For this generation the Lisbon 'Fado' is live music rather than the TV evening with Amalia Rodriguez.

The science system of Portugal: a fast growing 'scientific culture'

A key characteristic of the Portuguese science system is that most indicators show a massive expansion over the past 30 years and in particular since the accession to the European Union in 1986. Gross expenditure on R&D in % of GDP more than doubled, while spending increased six times in constant prices, personnel and researchers involved in research multiplied by a factor of three to five, and the number of PhDs has exploded by a factor of 23 since the early 1990s, when

there were only a handful of PhD every year graduating from Portuguese universities. The number of university educated young increased close to 10 times from about 9000 in 1982 to more than 85000 in 2008.

Table 1.1 Some Indicators of The Scientific System of Portugal (real figures and index 1982=100)

GERD			Gov R&D		FTE personal		FTE Researchers		University		PhDs	
1982	0.28	100	115	100	8552	100	3962	100	9000	100	65	100
1986	0.32	114	128	111	9267	108	4454	112			200	308
1991			297	258					18671	207		
1995	0.54	193	364	317	15465	181	11599	293			600	923
2000			603	524					55000	611	860	1323
2008	0.81	289	695	604	25727	301	21116	533	85000	944	1522	2342

Source: Rosa & Chitas, 2010; Portuguese R&D statistics

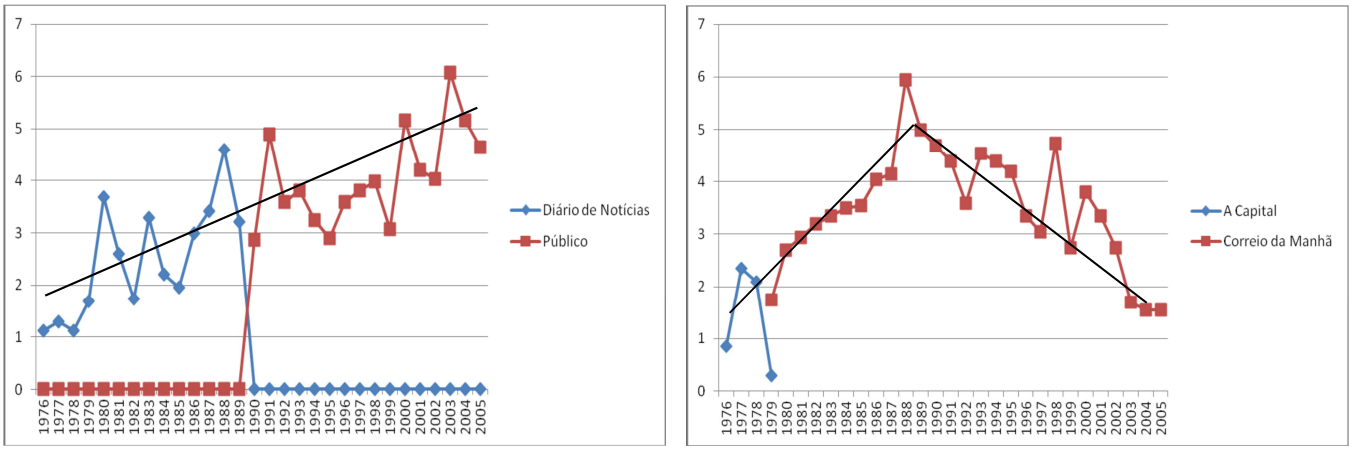
The number of internationally cited documents increased from about 2100 in 1996 to 8500 in 2011 (SCI Imago, 2013); citations of Portuguese research increased massively in the same period from 4000 in the 1990s to over 100,000 citations in the 2000s. The visibility of Portuguese research has clearly increased over the period, its position in the region moved from 0.73% to 2.62% of production, and in the world from 0.23% to 0.73% of production. The details of this *massive mobilisation of a scientific culture* cannot concern us any further here. For our purpose we note that the investment in research increased massively, while the number of researchers tripled. The number of university-educated youth increased more than ten times, as did those with a PhD as their final degree. Equally the production and citation of Portuguese science increased over the period of observation. The structure of this development of the Portuguese science system has been variously described and analysed (see Gago, 1991; Jesuino, 1995; Goncalves 2009). Clearly the Portuguese scientific system is moving stridently, but to what extent does the Portuguese population reflect and accommodate this fast development? That is the question which we want to address in the following on the basis of the available evidence.

Public Attention to Science

The level of attention to science in a country can be observed on the level of mass media coverage of scientific topics and on the level of salience of science as it is reflected in people's perceptions.

Figure 1.1 shows results from a systematic study of science news in the Portuguese press over a longer period of time. The figures show that in the quality press (Diario, Publico) science news has been steadily increasing since the 1970s; this is not the case for the more popular press (Capital, Correio). In that segment of the media market, science news peaked in the late 1980s, and has declined ever since. The period of decline in science coverage effectively covers the period we observe with Eurobarometer data. Since the early 1990s, the elite media have covered more science, while the popular media have reduced their science content. This would suggest a certain bifurcation in the science culture of Portugal along the lines demarcated by the different readerships of these media segments. We consider the press context as an index of the public conversation of science which offers entry points for conversations in everyday life for discussions with friends, family and fellows that condition the salience of issues and the perceptions of people. On the other hand, modern mass media are very sensitive to changes in public sentiment and incorporate these into their reportage to keep the attention of their readers; after all they need to sell papers or gain the attention of advertisers. We would therefore expect resonance more than causal influence between mass media coverage of science and public perceptions. But the science culture must indeed consider both elements of this resonance system.

Figure 1.1 Portuguese press coverage of science and technology 1976 to 2005



Note: The index measures the relative distribution of a news corpus (n=4311) split into quality and popular news sources. Source: Fonseca, PhD ISCTE, 2012, p70.

In order to describe the attention that the Portuguese public pays to science we examine three different indicators: questions asking about (1) people's interest in science and other matters, (2) people's feeling of being informed about science, and (3) people reporting having visited places where science is exhibited, such as science museums and zoos, in the recent past. These indicators

show to what extent the Portuguese take notice of science, feel part of the scientific circus, and discriminate issues in their lives.

Interest in science

Interest in science is an unusual emotion. Interest is part of general orientation in life; it involves movements that focus attention: the eyes and body posture are directed towards something, and this supports learning and the exploration of new and unfamiliar things. We find situations interesting which are complex but also comprehensible. And once we fully understand a thing, people's interest in it seems to wane (see Silvia, 2008).

We are using very general indicators, where we can compare the expressed interest in science with interests in other matters. The Portuguese report altogether less engagement with various topics of everyday life, not only with science. 1989 saw 27% of Portuguese very interested in sports, dropping to 18% in 2010 and in politics from 14 to 9%. The interest closer to science also drops for medical discoveries (25 to 15%), new technologies (20 to 16%) and scientific discoveries (21 to 14%); all fairly similar over time. Across the other EU11 countries the story is more stable over the years, with numbers more or less unchanged over the years. This would suggest an overall lessening of public interest in science over the past 20 years in Portugal. We will come back to this issue when we examine the changing interest across generations and level of education below.

While there are no regional differences for Portuguese interest in sport or politics, for science, it is a different story. The proportion of those who are very interested in medical discoveries is higher in Lisbon and the centre, at 28 and 25%, than in the North and South/Islands at 16 and 17%. In terms of overall interest (very and moderately interested, summed), Lisbon is the most engaged with medical discovery at 79% with the North the least engaged, at 67%. The same pattern (Lisbon engaged, the North less so) is visible for new technologies, and scientific discovery (Lisbon 64% engaged, the North 49%).

Being informed about science

In Portugal, self-ascribed levels of being informed about science are consistently low, and those who believe they are poorly informed increase from 42 to 55% for medical discoveries, and 49 to 58% for scientific discoveries. Again, this compares to consistently more positive self-estimations

from across the rest of the EU11 (for example in 1989 56% believed themselves to be moderately well informed about medical discoveries and in 2010 this proportion was 57%).

Around 40% in all Portuguese regions tend to estimate they are poorly informed about sport, 50% about politics, but for science the regions again vary in estimations. If 'very informed' and 'moderately informed' are summed, then for 'medical discoveries', respondents in Lisbon (62%) and the Centre (56%) see themselves are better informed than the North (47%) and South/Islands (47%). The pattern holds for new technologies (Lisbon at 58% compared to the lowest estimation in the South/Islands at 41%), and scientific discoveries (Lisbon 55% compared to 36% in the South/Islands and 37% in the North).

Table 1.2 Indicators of interest, being informed and engaged with science

Let us talk about those issues in the news in which you are very interested, moderately interested or not at all interested?
Sports, politics, new medical discoveries, new inventions and technologies, scientific discoveries
I would like you to tell me for each of the following issues in the news, if you are well informed, moderately, or poorly informed?
Sports, politics, new medical discoveries, new inventions and technologies, scientific discoveries
Now, let me ask you about your use of museums and similar institutions …. [visited, never visited over the past 12 months]
zoos & aquariums, natural history museums, public libraries, art museums

Engaging in exhibition events

We can construct some indication of public engagement with science when we consider people's self-reports of visits to exhibition sites such as zoos and museums. Such figures show people's general inclination, and as such they can be compared over time and across contexts; they must not

be interpreted as real visitor figures, which indeed might deviate widely. By 2005 Portuguese respondents who reported that they had never visited a zoo or aquarium had climbed from 75 to 84%, compared to the EU11's climb from 62 to 71%. According to personal admissions, natural history museums were never visited by 87% Portuguese in 1989 and 1992, and 78-79% in the EU11 in those years. Science fares no better or worse in Portugal than libraries or art galleries: by 2005, 87 and 90% reported that they had never visited these, respectively. In the EU11, 64 and 74% reported that they had never visited libraries and art galleries.

Visits to museums, aquariums, libraries and galleries are rare occasions in all regions, with respondents in the centre proving the least likely to visit almost any of these. Zoos and aquariums are the most visited, by 28% of Lisbon dwellers. These exhibitory events are clearly a minority pursuit. But we have to consider that responses to these items reflect inclinations as much as they will reflect access to such facilities. Most Portuguese will have limited opportunities to visit museums, aquariums, galleries or libraries in their neighbourhoods. Not surprisingly in Lisbon and the Centre region, these events find more resonance, probably because there are more opportunities. Further study of the relationship between access and engagement deserves attention in future research.[2]

[2] To construct an index of real motivation and inclination one would have to consider the distance of respondents from the next exhibition opportunity. Only for people equidistant from a science museum, will the difference in the visit response indicate a true difference in motivation and engagement.

Attitude facets to science

Table 1.3: Attitudes to Science

1. att1: Science and technology are making our lives healthier, easier and more comfortable
2. att2: Thanks to scientific and technological advances, the Earth's natural resources will be inexhaustible
3. att3: We depend too much on science and not enough on faith **(recoded for scaling)**
4. att4: Science and technology cannot really play a role in improving the environment **(recoded for scaling)**
5. att5: Scientists should be allowed to experiment on animals like dogs and monkeys if this can help sort out human health problems
6. att6: Because of their knowledge, scientists have a power that makes them dangerous **(recoded for scaling)**
7. att7: The application of science and new technology will make work more interesting
8. att8: In my daily life, it is not important to know about science **(recoded for scaling)**
9. att9 Science makes our way of life change too fast **(recoded for scaling)**
10. att10: Thanks to science and technology, there will be more opportunities for future generations

Comment: respondents either agree or disagree with these statements; these responses are later recoded for purposes of scaling, so that high attitude values consistently express a 'positive disposition' towards science. For the discussion in this section, all items are interpreted as they were asked.

Attitude is a generic term that ascribes to people a certain positioning vis-à-vis a given object of reference. A simple operational definition of 'attitude' is the positioning of an individual on a criterion scale in relation to an attitude object, in our case this will be science. A positive attitude thus describes a positive disposition that might make it more likely that one approaches science rather than shies away from it should the occasion arise. Attitudes evaluate matters at hand, and as people might evaluate science in many different respects, we talk of attitude facets. Our survey offers ten different attitude facets ascribed to people, each defined as a statement to which people express either agreement or disagreement (see Table 1.3).

It may be that the economy post 2007 is having an effect on whether science is making life more comfortable. In Portugal and the EU11, 60% and 72% respectively agreed with this in 1989, but in 2010 this dipped to 45% and 55%. Welfare expectations delivered by science have clearly declined.

In Portugal, in 2010 49% agreed that 'we depend too much on science and not enough on faith', up 10% from 39% in 1989. This goes in the opposite direction to the rest of the EU11 where 35% agreed with the statement in 2010, down 10% compared to 46% in 1989. What does this tell us about the Portuguese? This is unlikely to mean that the Portuguese are getting generally more religious, for which this is not an indicator, rather that more Portuguese than elsewhere in Europe remain apprehensive over the dominance of science over religion in daily life.

In the EU11, around 50% consistently disagree that science is irrelevant to their daily life, while in Portugal, 42% disagreed with this in 1989 compared to 28% in 2010, down 14% – science is becoming less relevant in Portuguese daily lives. Not only this, but science is now judged in Portugal to make 'our way of life change too fast', with 62% agreeing with this statement in 2010 compared to 51% in 1989, up 11% in 20 years. In the EU11 this has not changed much beyond the statistical error (1989 – 60% and 2010 – 55%). And also, while overall agreement has not changed, fewer Portuguese *strongly* agree that science and technology can drum up opportunities for future generations (from 32% in 1989 to 15% in 2010), while in the EU11 this has stayed the same at 27% – a bit less optimism on that count as well. Stable over time and place is the sense that science makes work more interesting (about 60% in both Portugal and the EU11).

In 2010 65% of Portuguese agreed that the power of science is dangerous and daunting, up 7% from 58% in 1989; in the EU11 the trend is in the opposite direction: less people agreed in 2010; down 10% to 53% compared to 63% in 1989.

People also evaluate the role that science might play with regard to the environment. Around 45% of Portuguese respondents disagreed that science had the know-how to make the Earth's natural resources inexhaustible both in 1989 and 2010, and slightly more, around 55% of the EU11, similarly disagree. The pessimistic 'science and technology cannot really play a role in improving the environment' elicited agreement from about 25% of both Portuguese and EU11 respondents.

Agreement that animal testing should be allowed has increased in Portugal from 44 to 54% from 1989 to 2010, and from 35 to 44% in the EU11. Portugal seems all in all more inclined to licence

animal experiments as part of scientific research, an issue that can be very controversial in other parts of Europe.

On the whole attitudes to science are fairly similar across all the regions, from North to South and to the Islands. The centre of Portugal agrees slightly more that ‘'cientists have a power that makes them dangerous’ (66% strongly or to some extent agreed) while only 56% of the South/Islands agree with this statement. The centre and the North are on different wavelengths about animal testing, with 61% of the centre agreeing with animal experimentation compared to 49% of the North, which is a difference of 12%. The North agrees less than the other regions that science and technology make our lives more comfortable (56%, compared to 62, 65 and 68% in the centre, South/Islands and Lisbon). It appears that the Northern region takes slightly different views on things. We will come back to this observation.

Knowledge and understanding of science

We assess knowledge of science with a number of factual quiz statements, the kind people might have encountered in a school test or on a TV quiz show: ‘the centre of the earth is very hot – is this true or false’? The survey had 13 such items, as shown in Table 1.4, some pertaining to textbook knowledge of physics and others to textbook knowledge of biology. None of the items pertains to social science. The research also carried two items of a more methodological nature, tapping into whether people were familiar with experimental logic of a drug trial and with probability reasoning as applied to genetic inheritance. We take these knowledge items as indicators of people’s overall familiarity with the kinds of things science has found out over the years and how science goes about finding things out. Some of these items are ‘tricked’, as they have to be recognised to be false in order to score a correct answer. We then sum up the correct answers and assign to every respondents a knowledge score for the 13 factual items (k13).

The overall picture of knowledge is presented in Figure 1.2. The distribution leans considerably to the right in Portugal, compared to the rest of Europe. The overall mean for Portugal is 5.54 (mode=6; SD=2.81) compared to EU11 with 7.34 (mode=8; SD=2.62). If one uses several items to form a composite measure, one can ask to what extent these items are consistent in forming this composite index. This is expressed as internal reliability (Cronbach’s alpha), which for Portugal is 0.72, while for the rest of EU11 this is 0.65. In conclusion, we are working with a relatively good

measure for comparing the population on familiarity with science in terms of factual science knowledge.

Looking at the overall knowledge scale over time in both Portugal and the EU11, knowledge has, in fact, increased – in Portugal from 4.7 out of a possible 13 to 6.1, in the EU11 from 6.6 to 8.3, which corresponds to an increase of nearly one standard deviation.

Portuguese respondents fared well over the years (circa 70% correct 1989 to 2005) on items stating that the 'centre of the earth is very hot', while correct answers are scored by about 15% more of EU11 respondents in every year measured.

Portugal has improved particularly on understanding scientific method with correct answers improving from 53 to 63% when asked how to conduct an experiment, (from 1992 to 2001) and from 32 to 53% when asked about probability of genetic inheritance (from 1989-2001). The EU11 has stayed pretty consistent on these items.

Antibiotics are incorrectly ascribed healing powers for viruses by the majority of Portuguese and EU11 participants (both 57%) in 1989. However, this improves to 44% in Portugal and 38% in the EU11 by 2005.

Knowledge of plants, plate tectonics and evolution has improved in Portugal – asked about the oxygen we breathe and the drift of the continents correct answers have gone from 73% (1989) to 84% (2005) and from 40 (1989) to 73% (2005) respectively. Numbers of Portuguese respondents who know that humans and dinosaurs did not roam the earth together increased from 26% to 48%.[3]

[3] We note a methodical difficulty to score higher which might apply in Portugal: items requiring a 'false is correct' answer to produce a correct score in surveys are more difficult to handle for people. An effect known as 'yes-saying or aquiescence bias' leads us to expect that people with less education are more inclined to consent rather than to dissent to a statement which they consider difficult (see Schuman & Presser, 1996, p204ff). So items 3, 7, 8, 9, 10, 12 and 13, where people have to dissent to score, are in that sense more difficult to handle. But as this pattern remains constant across the surveys, the relative comparison within any one context is possible without too much worrying about this effect.

Table 1.4 Knowledge Items*

1. Physics: The centre of the Earth is very hot
2. Biology: The oxygen we breathe comes from plants
3. Physics: Radioactive milk can be made safe by boiling it **(FALSE)**
4. Physics: Electrons are smaller than atoms
5. Physics: The continents on which we live have been moving for millions of years and will continue to move in the future
6. Biology: It is the father's genes that decide whether the baby is a boy or a girl [earlier version 'mothers genes']
7. Biology: The earliest humans lived at the same time as the dinosaurs **(FALSE)**
8. Biology: Antibiotics kill viruses as well as bacteria **(FALSE)**
9. Physics: Lasers work by focusing sound waves **(FALSE)**
10. Physics: All radioactivity is man-made **(FALSE)**
11. Biology: Human beings, as we know them today, developed from earlier species of animals
12. Physics: The Earth goes around the Sun (a)
    The Sun goes around the Earth (b) **(FALSE)**
13. Physics: It takes 1 month for the Earth to go around the Sun **(FALSE)**

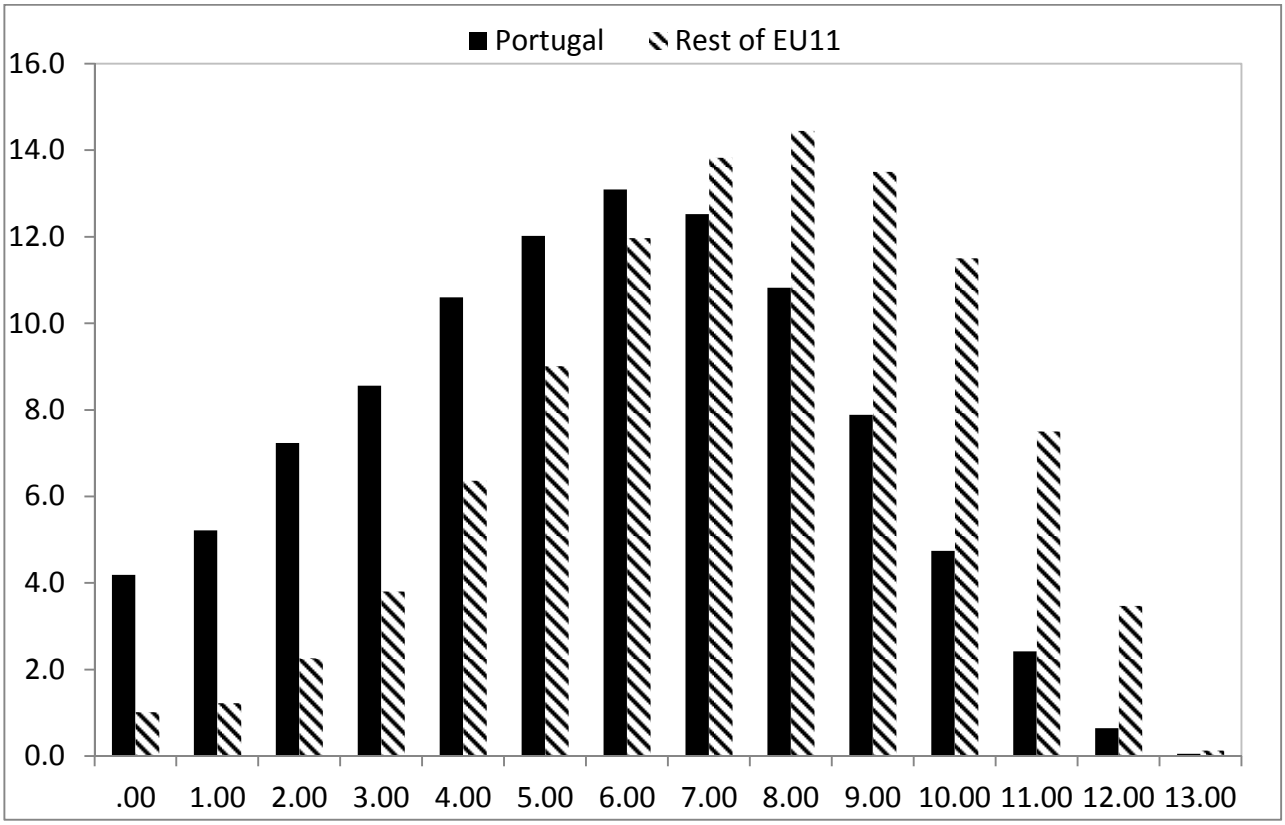
Scientific method

1. Experimental methods in the context of a drug trial
2. Probability reasoning in the context of genetic testing

**Not in 2010*

Comment: These statements are considered either 'true' or 'false' with reasonable consensus among experts; respondents score one point for each 'true is correct' or 'false is correct' response. DK responses are here not taken into account or considered as incorrect responses.

Figure 1.2 Knowledge scale distribution across all values (in percentage of respondents)



The EU11, in contrast, scored similar results for the oxygen item over the same period (around 80%) while improving from 67 to 88% for the continents item and from 45 to 66% for the evolution item.

In the EU11, knowledge of genetics has improved with the proportion of respondents who knew that the father's gene determines the sex of the baby going from 48 to 68% from 1989 to 2005. In Portugal, however, the majority of people either weren't certain or were incorrect on this item[4]. Also faring poorly were a consistent 50% Portuguese respondents who didn't know that radioactive milk cannot be made safe by boiling, compared to 20% diminishing to 14% DK responses in EU11. In the EU11, improvements also have occurred for responses to 'lasers work by focusing sound waves', with the correct ('false') response going from 35 in 1989 to 46% in 2005. However, in Portugal, the correct answer is given by a consistent 20% or thereabouts from 1989 to 2005.

The respective sizes of electrons and atoms present a conundrum to both Portuguese and EU11 respondents. The DK responses remain over 50% for Portugal, while in the EU11, 2005 sees DK

[4] On the other hand, this item is famously ambiguous as the story of genetic sex markers is, at a higher level, rather more complicated.

responses (previously in the 35% range) reducing by 10%, but both right and wrong answers go up – more surety without bringing improvements might indicate a sense of false confidence emerging over time on these long-standing and apparently familiar issues.

Switching the question format from a multiple choice (heliocentric versus Ptolemaic versions) to a Ptolemaic statement that is FALSE shows how much question phrasing can affect the responses: in both Portugal and EU11, correct answers take a dip when the phrasing changed: from around 80% correct (1989 and 1992) dipping to about mid 50% and about mid 60% respectively in 2001 and 2005 (see Bauer, Shukla & Kakkar, 2009) When it comes to considering how long it takes for the earth to orbit the sun, around 50% correctly gage this to be 'not one month' (but one year), with Portugal slightly behind the EU11 but both improving from 1989 to 2005 (42 to 51% in Portugal, 51 to 65% in the EU11).

When it comes to the knowledge quiz, there is a fair bit of variability among items across the regions of Portugal. Lisbon and the South/Islands fair well when asked about the temperature of the centre of the earth (81 and 76% correct respectively).

Lisbon and the centre do well when asked about oxygen (around 85% correct), whose gene determines sex (around 50%) and evolution (around 40%).

Lisbon fairs better than all over regions for radioactive milk (47% correct), electrons (49% correct), continental drift (70% correct), lasers (26% correct), radioactivity (34% correct) and the astronomy items (the earth orbits the sun – 77% correct, and this orbit takes a year – 55% correct).

No region excels when it comes to ascertaining the effectiveness of antibiotics (less than 20% correct in each region). The North fares worse than the rest with the second evolution question, considering the origins of human beings (56% correct).

Images of science: different disciplines and European activities in the world

Another way of judging knowledge is to consider participants' understanding of disciplines – how 'scientific' are a selection of subjects. Medicine has been consistently judged scientific in Portugal and in the EU11, with psychology, biology, astronomy, physics and maths judged more scientific by the EU11 than in Portugal (but consistently so over the years). Economics and history are considered less scientific in both Portugal and the EU11.

Table 1.5 Images of Science

Disciplines: People can have different opinions about what is scientific and what is not. For each one tell me how scientific you think it is …..

Economics, medicine, psychology, biology, astronomy, history, physics, astrology, mathematics, [homeopathy]

EU active: In which of the following areas is the EC itself actively doing scientific research

Agriculture, Energy, Science and technology, environment, defence

Positioning: For each of the following fields, could you tell me whether you think Europe is ahead, behind, or at the same level as the United States ….

Scientific discoveries, industrial technology, life science and biotechnology

Astrology is considered less scientific by Portuguese respondents in 2005 (40%) than in 1992 (60%) and this is very similar to the EU11 (39% in 2005 compared to 56% in 1992).

In 2005, the only data point, homeopathy was judged less scientific by the Portuguese than in the EU11 (51% compared to 59%).

When it comes to comparing opinions on how 'scientific' various disciplines are, all regions find medicine to be scientific at between 83 (North) and 93% (Lisbon). Regions are similar in their judgement of astrology (between 54 and 62% finding it scientific) and history (between 50 and 61%).

Psychology, biology, astronomy and physics are all judged to be more scientific by Lisbon and the South/Islands than in the North and centre. But then, so is homeopathy at 61 (Lisbon) and 70% (South/Islands). The South/Islands see maths as more scientific than elsewhere (80% at least 10% more than in Lisbon and the centre, with 61% in the North judging maths to be scientific). The South/Islands also see economics as scientific more than elsewhere (64% to the North's 46%).

Positioning of European science

Portugal has bleaker perceptions of EU-funded scientific activities than the EU11 and this stays the same over time. 65% judged the Brussels to be less active in 'agriculture' than the rest of the EC in 1989 and 2001, and between 85 and 90% less active in 'energy' in 1989 and 2001. We might interpret this as an index of unmet expectations from Brussels; such expectations vary across Europe, probably together with general attitudes towards European integration. Clearly in Portugal, these expectations are high and met to a lesser extent than elsewhere in Europe.

For science and technology, 92% judged Portugal inactive in 1989 and 82% in 2001 and for the environment, perception of activeness went up by 22% from 16 to 38%. Perception of activeness in defence also went up, from 9 to 19%.

However, 1992 was judged to be a better year, with perceptions of Portuguese activity in all areas improving between 9 and 25%.

Other members of the EU11 have, collectively, seen themselves as increasingly active in agriculture (49 to 64%), energy (20 to 37%), science and technology (20 to 41%), environment (30 to 54%) and defence (17 to 44%).

When it comes to comparing the EU to the USA, Portugal's perception is increasingly negative from 1989 to 2005, with 42 to 56% judging the EU behind the USA for scientific discoveries, 42 to 54% judging the EU behind the USA for industrial technology and 42 to 52% judging the EU behind the USA for life technology. In the EU11, around 40% judge the EU to be behind the USA in each area, in every year (1989, 1992 and 2005).

The Portuguese regions are fairly similar when it comes to judging Portugal in relation to Europe, and Europe in relation to the USA. The only exception is that the South/Islands see Europe as less active (78% judge Europe inactive compared to 68% in the centre and Lisbon) when it comes to the environment.

2 Benchmarking Changes in Portugal within the European Community

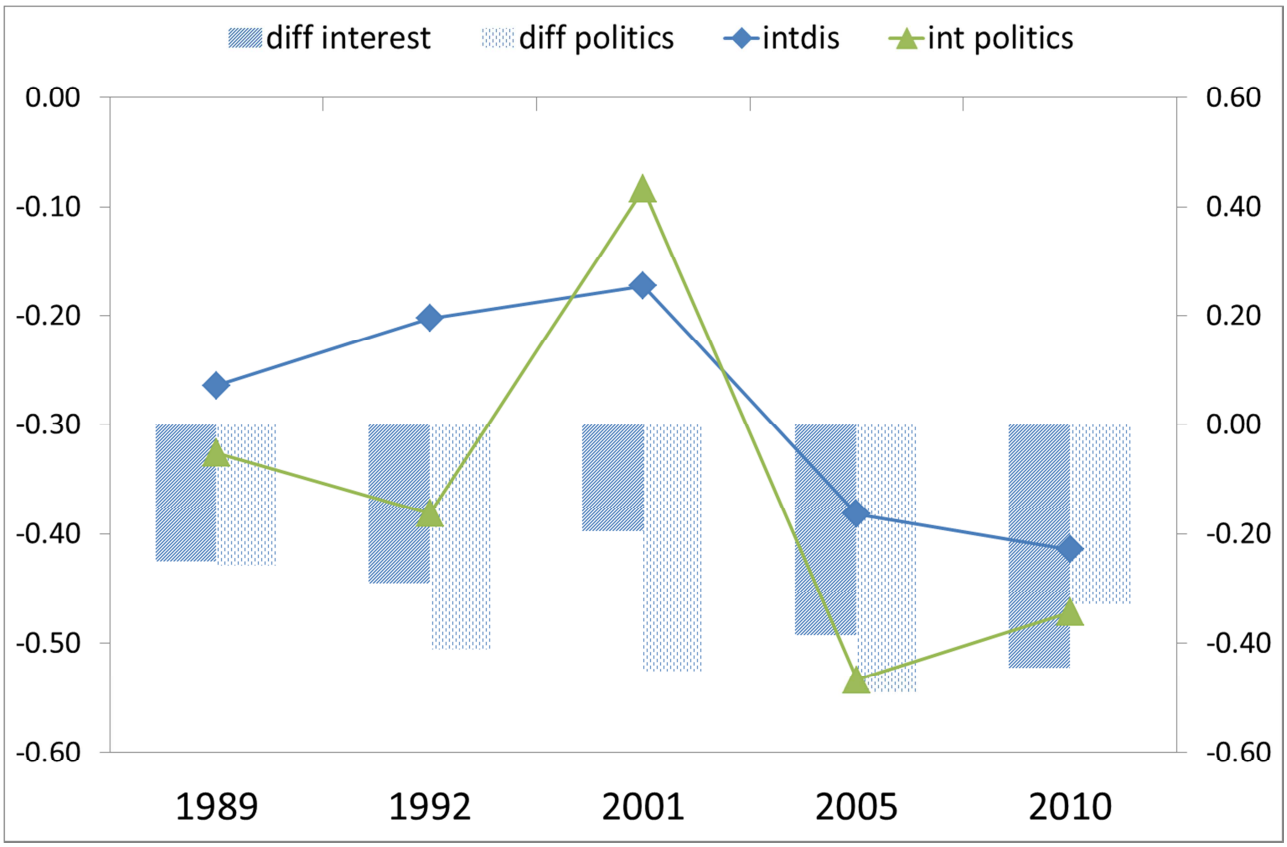
From the description of basic results of the five surveys of public understanding of science, we gained four possible groups of indicators of a changing culture of science:

- Attention to science
- Attitude facets
- Knowledge of science
- Images of science

For each of these areas we might ask, how has the Portuguese orientation towards science changed since the 1980s, always keeping in mind that other EU countries have moved as well?

Public Attention

Figure 2.1 Interest in politics and scientific discoveries compared to the rest of EU12



Comment: in z-value, European average overall (M= 0, SD=1)

Considering interest in science, we can observe trends in people's responses, and we can compare this trend to general interest in politics in Portugal and Europe. Figure 2.1 shows that over the period, both focuses of interest decline over the past 20 years (the line graph, on the left scale), and interest in politics as well as in science remain well below the European average (the bar chart on the right scale). Political interest fluctuates more than interest in science. We can also gauge that the movement of interest over the years might be non-linear, rising into the new millennium and subsequently declining. The decline in interest in recent years is accentuated by the fact that the gap between Portugal and the other European countries is increasing (see bar chart).

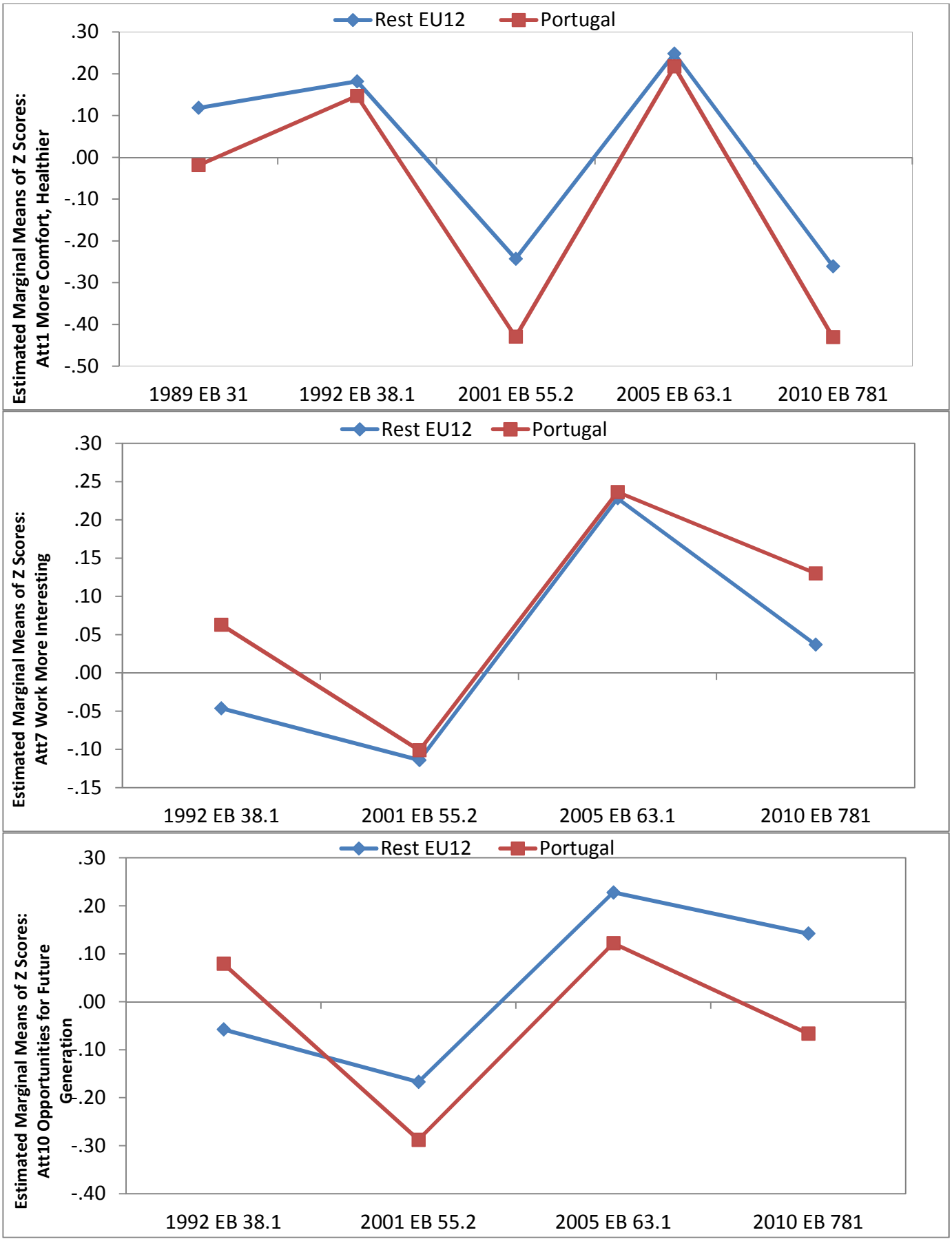
Attitudes facets over time

We have ten attitude facets in our observation base which track the positive or negative orientation of the Portuguese vis-à-vis science. For each of these we can ask, how do these facets develop over time in Portugal, and how does this development compare with the rest of Europe? The analysis of basic results across time shows that we observe three different patterns of comparative developments over time. Note we are reporting z-values, where the overall average across all EU12 countries is 0 with a standard deviation of 1, which means 66% of all responses fall between -1 and +1 of the distribution of responses. For all facets, the items are treated, so that a high score denotes a positive attitude and orientation towards science.

Three attitude facets develop entirely in parallel and without marked difference between Portugal and the rest of Europe. People in Portugal and the rest of Europe have equally high expectations of science, whether in terms of general welfare (makes like healthier, easier and more comfortable), or more interesting work, or better opportunities for future generations. While things fluctuate significantly up and down over the last 15 years, the trends are entirely parallel: decreasing on welfare expectation (B_{Port}= -0.036 / B_{EU}= -0.029), while expectations hold stable for work content and opportunities for the young generation, both in Portugal and in the rest of Europe. No difference: Portugal remains squarely within the European mood on these matters: science and technology is good for work; however with regard to general wellbeing, respondents are less sure.

Figure 2.2 Attitude facet with a pattern identical to other EU countries

high score = positive attitude



Three other attitude facets develop in parallel, but a gap between Portugal and Europe remains constant. In this pattern we observe the expectation that science makes resources inexhaustible, thus doing away with the limits of growth; these people reject the worry that life might change too fast – life cannot change fast enough; and people support animal experimentation in scientific research. The Portuguese have more confidence in science continuing to enable growth than the rest of Europe, and in Portugal, animal experiments are less sensitive than elsewhere in Europe. But overall, the speed of life changes worries the Portuguese more than elsewhere. The long-term trend on all of these indicators is slightly in favour of science across Europe: less worry, more confidence in science opening up new resources, and more licence for animal experimentation.

The third set of attitude facets show where Portugal departs increasingly from the European average over time. Respondents are asked: about the balance of faith and science (we rely 'too much on science and not enough on faith'); if scientists cannot play a role in saving the environment and might even be a dangerous profession; and finally whether science is ‘not important in daily life’. On all these items, respondents have to disagree to express a positive disposition towards science. In all four cases Portugal departs from the European trend. Europeans put their faith increasingly in science rather than in religion, not so in Portugal; Europeans increasingly reject the idea that scientists might be ‘dangerous’, not so in Portugal. Europeans see a role for science in saving the environment, decreasingly so in Portugal. Europeans see the importance of science in their daily lives, decreasingly so the Portuguese. On these four items, a sceptical element of Portuguese science culture seems to manifest itself; this orientation towards science seems to depart from the rest of Europe over the past 20 years. We will come back to this undercurrent of Portuguese science culture when we consider these items in conjunction below.

Figure 2.3 Attitude facets with a parallel trend in Portugal and other EU countries

high score = positive attitude

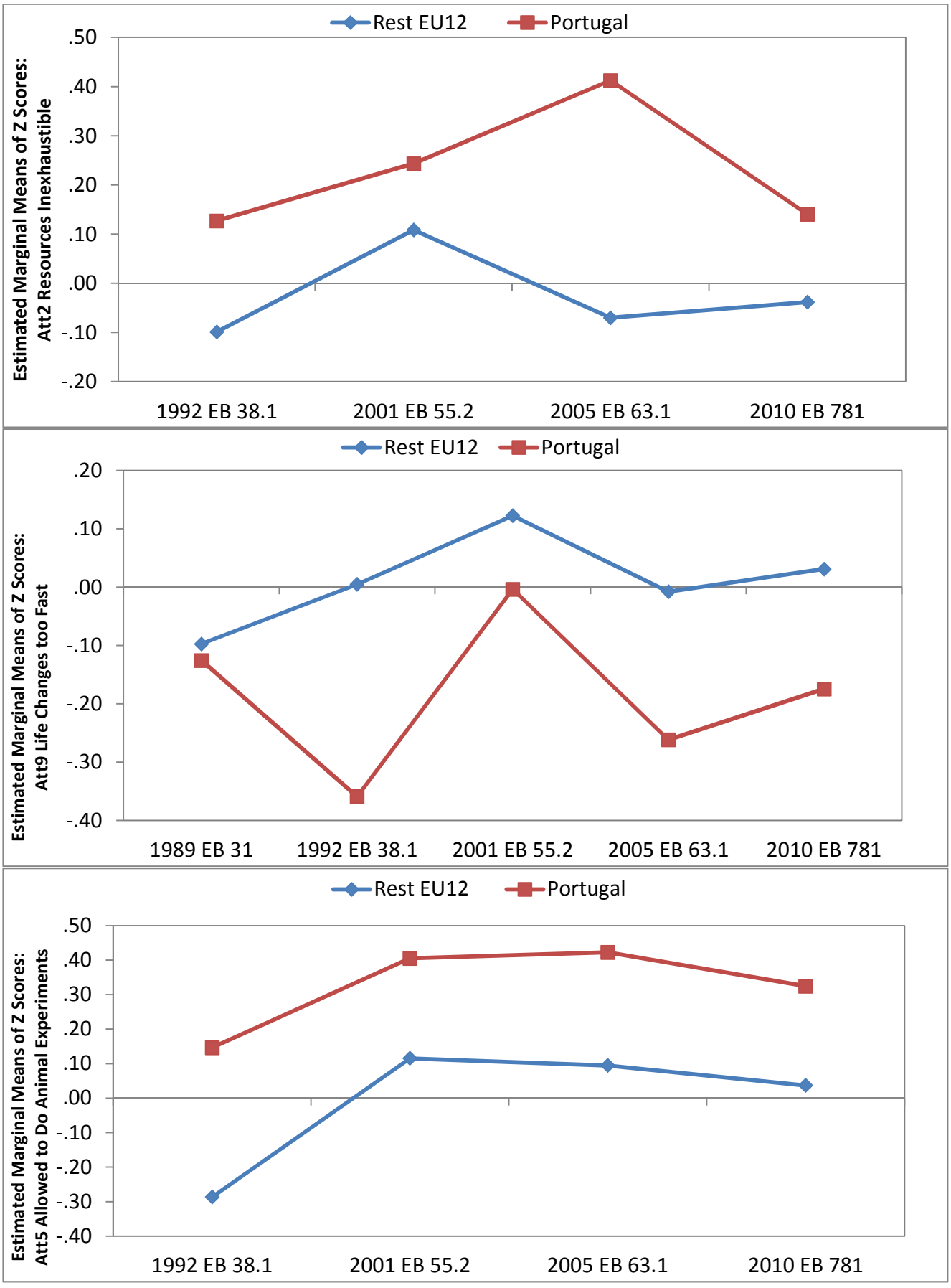
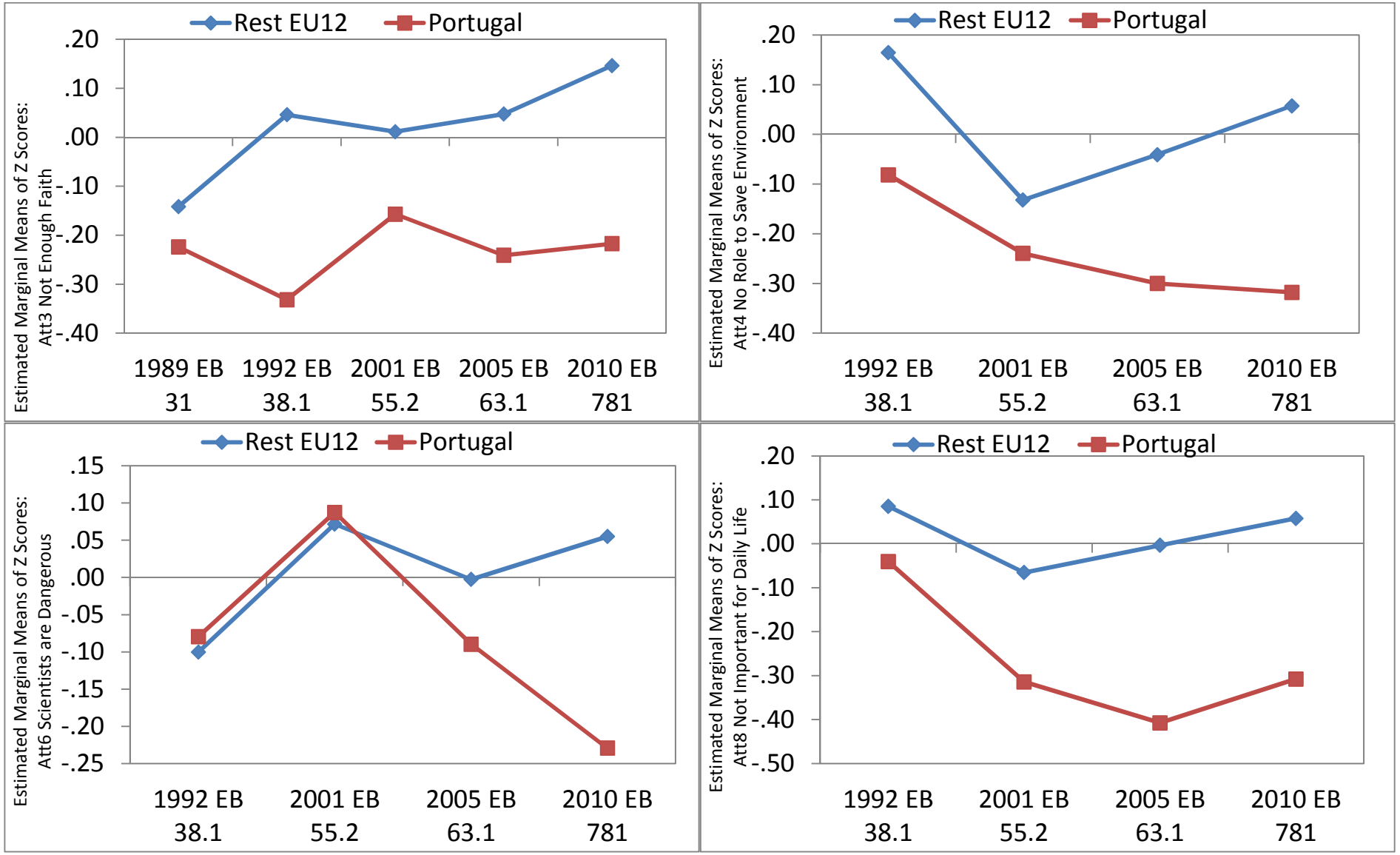
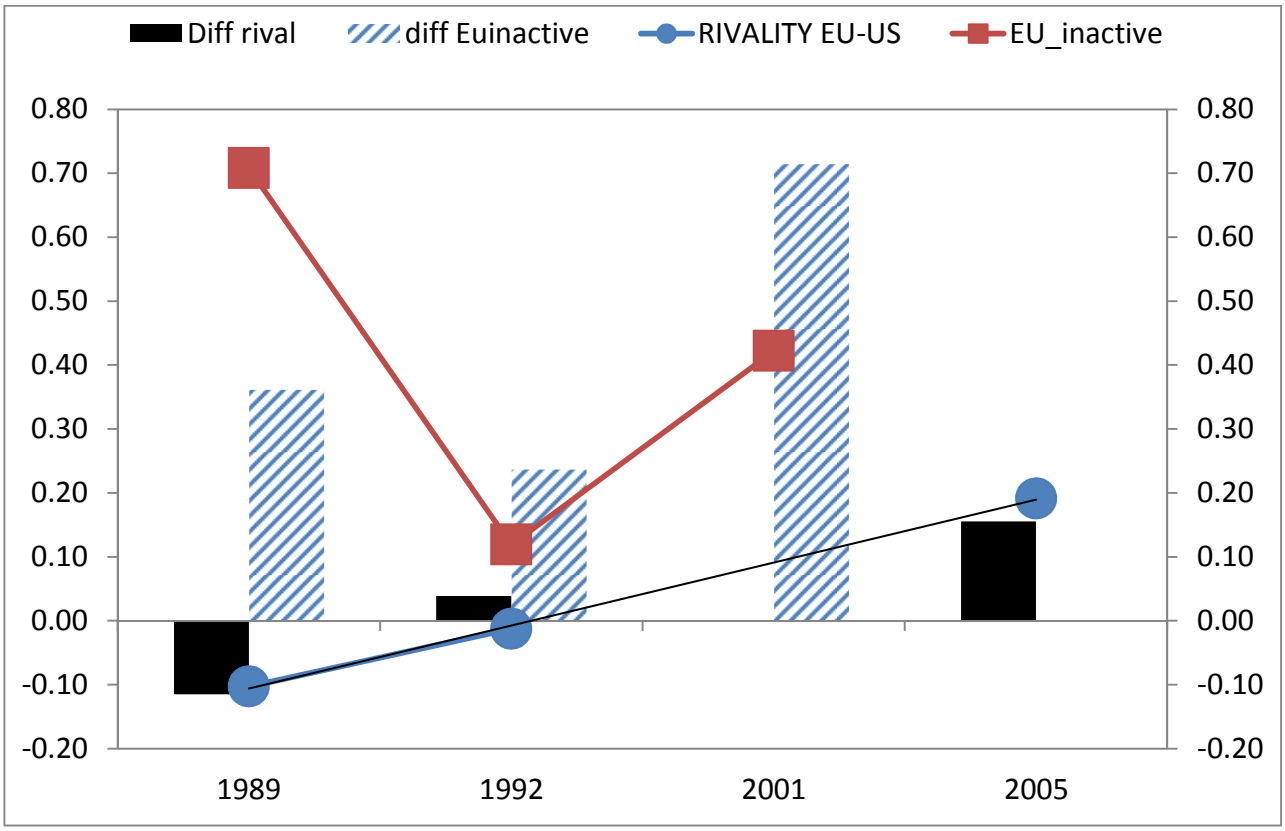


Figure 2.4 Attitude facets with an opening gap between Portugal and other EU countries high score = positive attitude



The representation of science includes aspects of a general image of science. This image of science is gauged by how the Portuguese see the contribution of European science, as supported by Brussels, and how this Europe fares in comparison with the USA.

Figure 2.5 Expectations of Brussels and the perceived EU-US rivalry



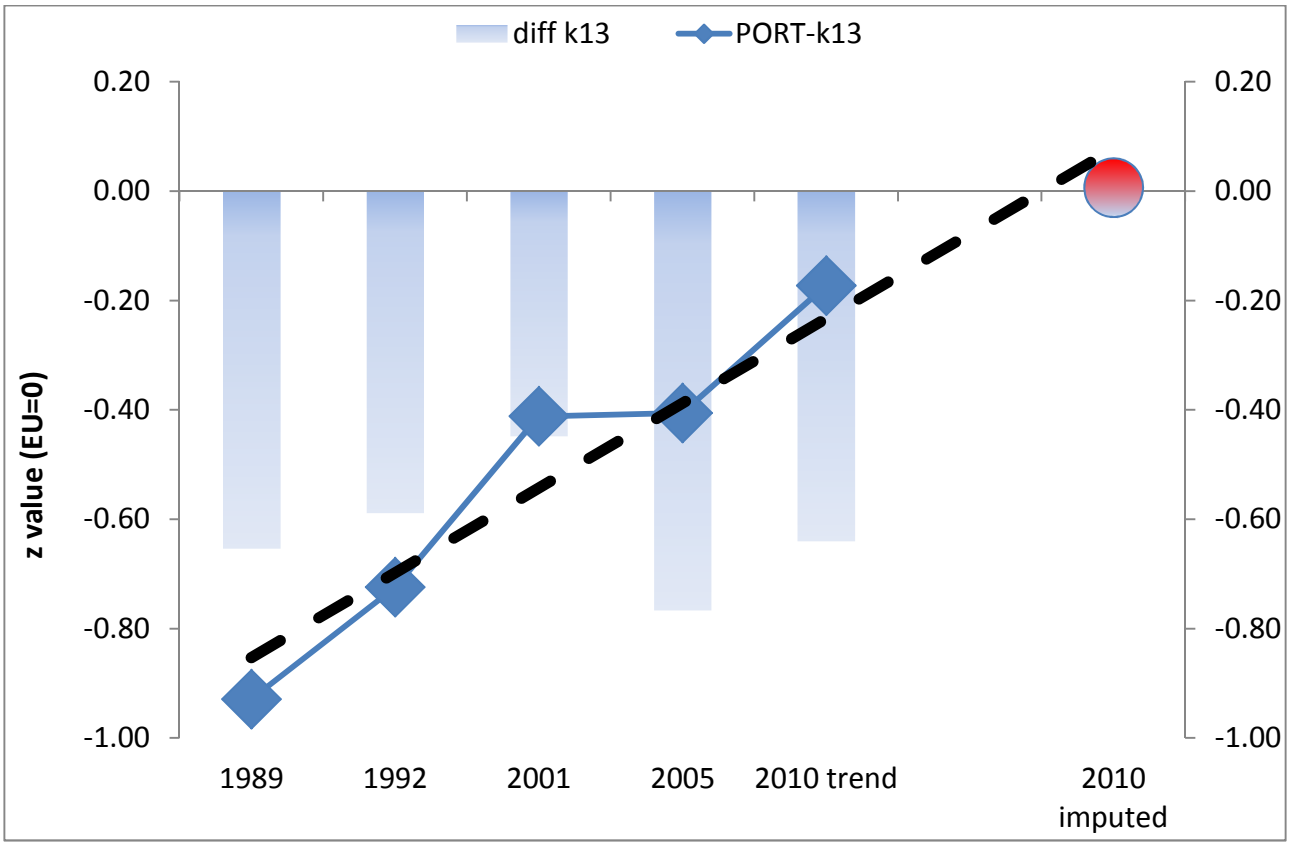
We cannot assume detailed knowledge in the population about Brussels in Portugal, as is the case elsewhere in Europe. Brussels and its activities remain distant rumours and a matter for insiders only. Thus responses to such 'familiarity with Brussels questions' need to be interpreted in a non-literal way. Perceiving whether Brussels is active in research areas such as agriculture, environment, defence, energy and science and technology is less a matter of knowledge and awareness, but most likely an expression of harbouring expectations; either high or low expectations towards Brussels. When people respond 'inactive', declaring that Brussels is inactive in an area of research, we interpret this as an expectation of disappointment due to the expectation that Brussels should be more active. It is not too surprising that the Portuguese are more disappointed by Europe due to higher expectations of Brussels, much higher than other Europeans. By 2001, the perception

'Brussels is inactive' was 70% of SD higher than in other countries. These expectations are declining into the new millennium, but the gap to other EU countries is increasing.

Furthermore, respondents were asked whether they see Europe lagging behind the USA in scientific discoveries, biotechnology or industrial innovation. These set of indicators offer a window into the 'image of science' over time. The Portuguese believe increasingly that Europe is lagging behind the USA. While in 1989, they believed this less to be the case than other Europeans, by mid-2000 more Portuguese believed this to be the case; the Portuguese are losing their confidence in European science, and the gap with other EU countries is increasing on that matter (see Figure 2.5).

Knowledge of science: educated familiarity

Figure 2.6 Trend in level of knowledge in relation to other EU countries



Comment: we consider two figures for 2010: a linear interpolation (trend) and a model based imputation of the value for 2010 from previous scores (imputed)

We have seen above, that the overall level of knowledge of science in the Portuguese population is somewhat lower than in other European countries. Figure 2.6 shows how this general science literacy level develops over the years. Clearly the level of knowledge improves with a linear trend and reaches the long-term European average by 2010. However, other European countries also improve their level of general science literacy over this period. If we consider the gap from the European average year by year, then we observe that this gap between Portugal and the rest of Europe is not getting smaller, but stays constant. While Portugal is increasing in science literacy, it does not reduce the gap to the rest of Europe over the past 20 years.

Table 2.1 Knowledge (k13) and Difference From EU by Year

1989	1992	2001	2005	2010	Rank
LUX	LUX	NL	DK	DK	1
F	F	DK	D	NL	2
NL	D	IT	NL	D	3
IT	DK	LUX	B	B	4
D	IT	F	LUX	LUK	5
UK	UK	D	F	F	6
DK	B	UK	UK	UK	7
B	NL	E	IT	IT	8
EIRE	E	B	E	E	9
GR	EIRE	GR	GR	GR	10
E	GR	EIRE	EIRE	EIRE	11
PORT	PORT	PORT	PORT	PORT	12

This stability in relative positioning with Europe is clear, when we consider the ranking of EU12 countries for each of the five years of comparison (ranking on average knowledge values). While there is some movement between countries, the position of Portugal remains number 12 in that group through all the years. Improvements in science literacy keep up with Europe, but do not change the positioning within this group of comparative countries.

3 Science culture in Portugal across generational cohorts

Having so far compared science culture in Portugal across time and with other European countries, in the following we want to focus mainly on the structure of this science culture within Portugal itself, and in particular by comparing changes across generational birth cohorts. To start with, let us have a quick look at the European context on this matter.

Table 3.1 Level of Knowledge across Generational Cohorts Compared across Europe

COHORT	>1977 New Order	1963-76 Gen X	1950-62 Babyboom	1930-49 Crisis&War	<1930 Roaring 20s
F	5	5	2	5	**1**
LUX	4	**1**	6	**2**	2
NL	2	3	3	**2**	3
D	3	6	5	3	4
DK	**1**	2	**1**	4	5
UK	9	8	7	6	6
B	10	9	8	8	7
IT	8	4	4	7	8
EIRE	12	11	11	9	9
GR	7	10	10	11	10
E	6	7	9	10	11
PT	***11***	***12***	***12***	***12***	***12***
K_mean	8.64	8.41	8.20	7.50	6.31
K_CV	0.28	0.29	0.31	0.36	0.47

Table 3.1 shows the ranking of EU12 countries on level of scientific knowledge (k13) for each age cohort. This shows the relative positioning of different age groups across Europe. As we have seen with changes over time, Portugal is stable in position 12 across all age cohorts, except for the youngest 'new order' generation: here Portugal has overtaken Ireland and has moved from position 12 to relative position 11. The figure also shows that overall, the knowledge improves considerably

from an average score of 6.31 among the 'Roaring 20s' generation to a score of 8.54 for the 'New Order' generation, while the variance within each age group is shrinking (see coefficient of variance: K_CV). Europe gets more scientifically literate from generation to generation, and across Europe, the generations get ever more alike. On the scientific mentality, European unification seems to be happening.

3.1 Science culture in Portugal: the three-dimension hypothesis

Many of the above variables are correlated with each other; so if people are more or less interested in science, they are also more or less active, informed, and knowledgeable, and might display more positive or more negative attitudes. This pattern of inter-relations between different indicators is usefully reduced by identifying a smaller number of indicators for example by way of principle component analysis. Many variables can thus be summarised meaningfully in a smaller number of constructed and interpretable composite indicators.

Indeed, for Portugal a three-dimensional description of science culture seems stable and useful to capture the public perception of science. Three independent components explain 66% of the variance (KM0=0.69; VARIMAX rotated, based on 3500 observations between 1989 and 2005; for details see Appendix), and we identify them as 'Enculturation', 'Cultural Scepticism' and 'Engagement' with science.

ENCULTURATION with Science (Factor 1)

Enculturation is the dimension of science culture which combines being well informed about (infodis2) and interested in new scientific discoveries (intdis), being knowledgeable (k13) about science, and having (att1) positive expectations of welfare arising from scientific development. These four components are highly correlated with each other, and in combination they also are in correlation with the following observations:

- For those who are enculturated with science, science has a role to play in saving the environment (att5); science is important for daily life (att7), and while scientists might be dangerous (att6-rec negative), science makes work more interesting (att7), and offers more opportunities for future generation (att10).
- Those encultured in science generally also visit libraries and art museums (cultact). We are dealing here with a dimension of general cultural capital.

- Those encultured with science will also know about scientific methods such as probability reasoning and experimental design.
- They are also interested in new medical discoveries (intmed) and new inventions (intinven)
- And are also more interested in sport and politics than others; the encultured seem generally more alert to societal events.

CULTURAL SCEPTICISM about SCIENCE (Factor 2)

Cultural scepticism in Portugal expresses itself in an unusual combination of two attitude facets: *Dislike of religion at the same time as a belief that science is failing to deliver*. It seems that these are secularists who are disappointed with the welfare outcomes of science so far. They seem to have had high expectations, but things have not materialised. We might also characterise this dimension as **disappointed secularism** because high scorers are doubly dissatisfied with the state of affairs: society is not secular enough, and science does not deliver the goods as fast as expected. This **cultural scepticism** with regard the current state of affairs goes along with:

- The belief that while scientists are NOT dangerous (Att6), life is NOT changing fast enough with scientific development (att9-rec). Sceptics are, however, worried about animal experiments (att5 negative); and do NOT grant science the capacity to stem the depletion of natural resources (att2 negative), while science has some role to play to save the environment (att4). Sceptics characteristically do NOT agree that science makes our work more interesting (att7 negative), NOR that it provides better opportunities for future generations (att10 negative). This attitude clearly reflects a differentiated view of the role of science in society with a sense of disappointment, not to say impatience with science.
- The sceptical are slightly less literate (k13) and also less familiar with scientific methods.
- They are admittedly poorly informed and with less interest in science, politics or even sport.
- Sceptics are clearly anti-religious when considering a science-religion dilemma (att3 recoded, r = -0.80), despite aligning formally with a religious denomination.

ENGAGEMENT with SCIENCE ON EXHIBITION (Factor 3)

Engagement is the dimension of science culture that is reflected in visiting science exhibitions together with a fair knowledge of facts (variables 'sciact' and 'k13'). The engaged visit science museums, zoos and aquariums where available. And this engagement goes together with

- A disbelief that science is the solution to exhausted natural resources (att2 negative); however granting that science has a role to play in saving the environment (att4); and that science is important in daily life (att8); in this respect, the engaged discern the role of science in a similar way to the sceptics.
- The engaged will have good knowledge of facts and methods;
- They also engage with other cultural meeting points such as libraries and art museums. The engaged mark their stakes in the cultural capital of the country.
- The engaged are informed about new medicine and practical innovations, less so on new discoveries. There is less explicit interest in science and less interest in politics and sports.

3.2 The three dimensions of science culture across generations

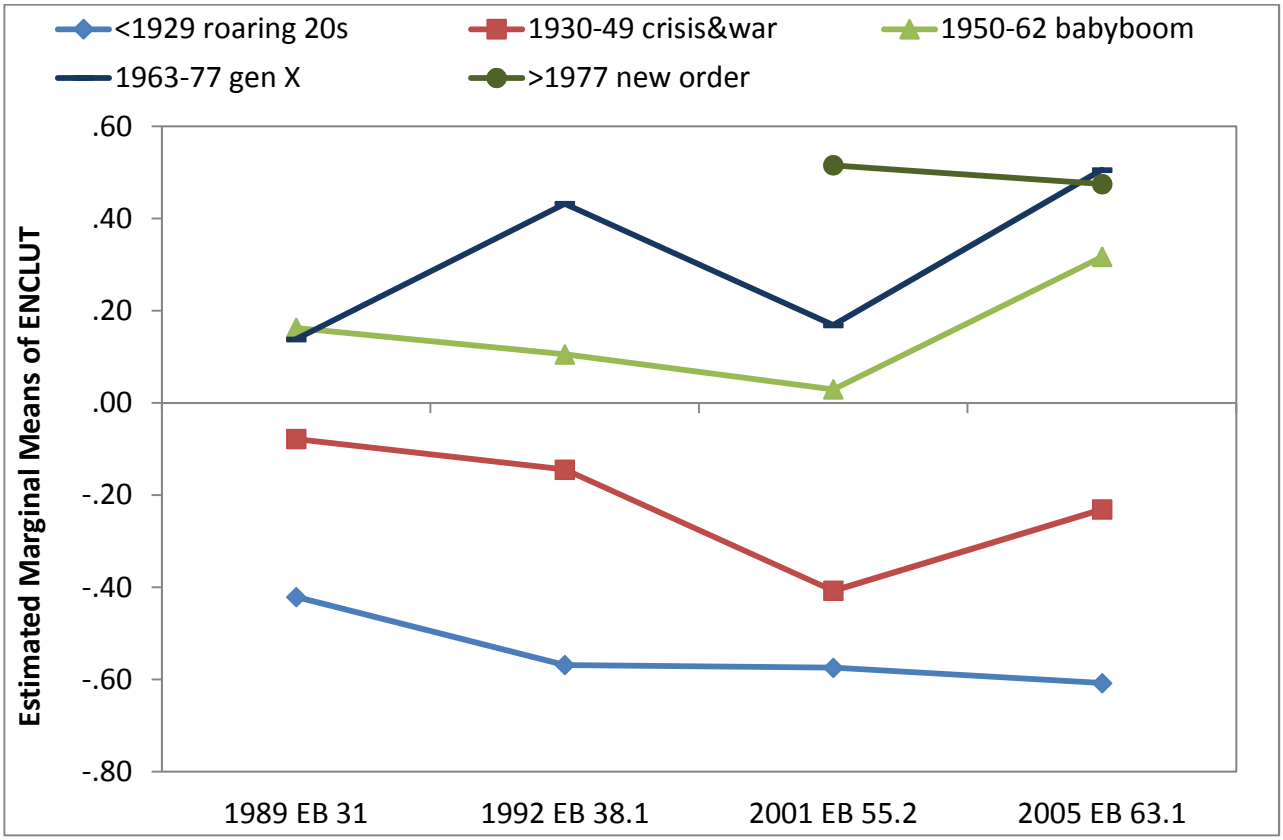
In the following we will explore these three dimensions of Portuguese science culture in relation to generational age groups, exploring interactions between influences; and in each case we control for other potential influences as far as the data goes.[5] This allows us to glimpse the future of science culture as a generational trend from the older to the younger generations, which gives a different take on change from comparing different waves of results over time. We thereby assume that being born and growing up in a particular period of history is the forming experience of science culture and this experience stays with the person as time goes by and they grow older.

To start this comparison we compare the different generational groups across the different waves of the Eurobarometer survey. Figure 3.1 shows a growing polarisation in the country over the culture of science. Over time, the enculturation with science is declining among the two oldest age cohorts; it is increasing for the three younger age groups. The variance overall is increasing: for the New Order, Gen X and the Baby Boom generation there is little difference left, they very much converge

[5] We are using MANOVA, multiple analysis of variance techniques. MANOVA is putting a set of predictor variables against several dependent variables, in our case the three factorial dimensions of science culture. We can thus compare the relative influence of different predictors, including interaction effects of generational cohort against other influences such as gender or education, while holding everything constant.

in their enculturation with science, while for Crisis&War and Roaring 20s generations science culture is a much lesser affair. For Cultural Scepticism and Engagement this trajectory does not differ across the generational groups; the level of scepticism fluctuates over the years but without a clear trend; for engagement with science the long-term trend shows some decline.

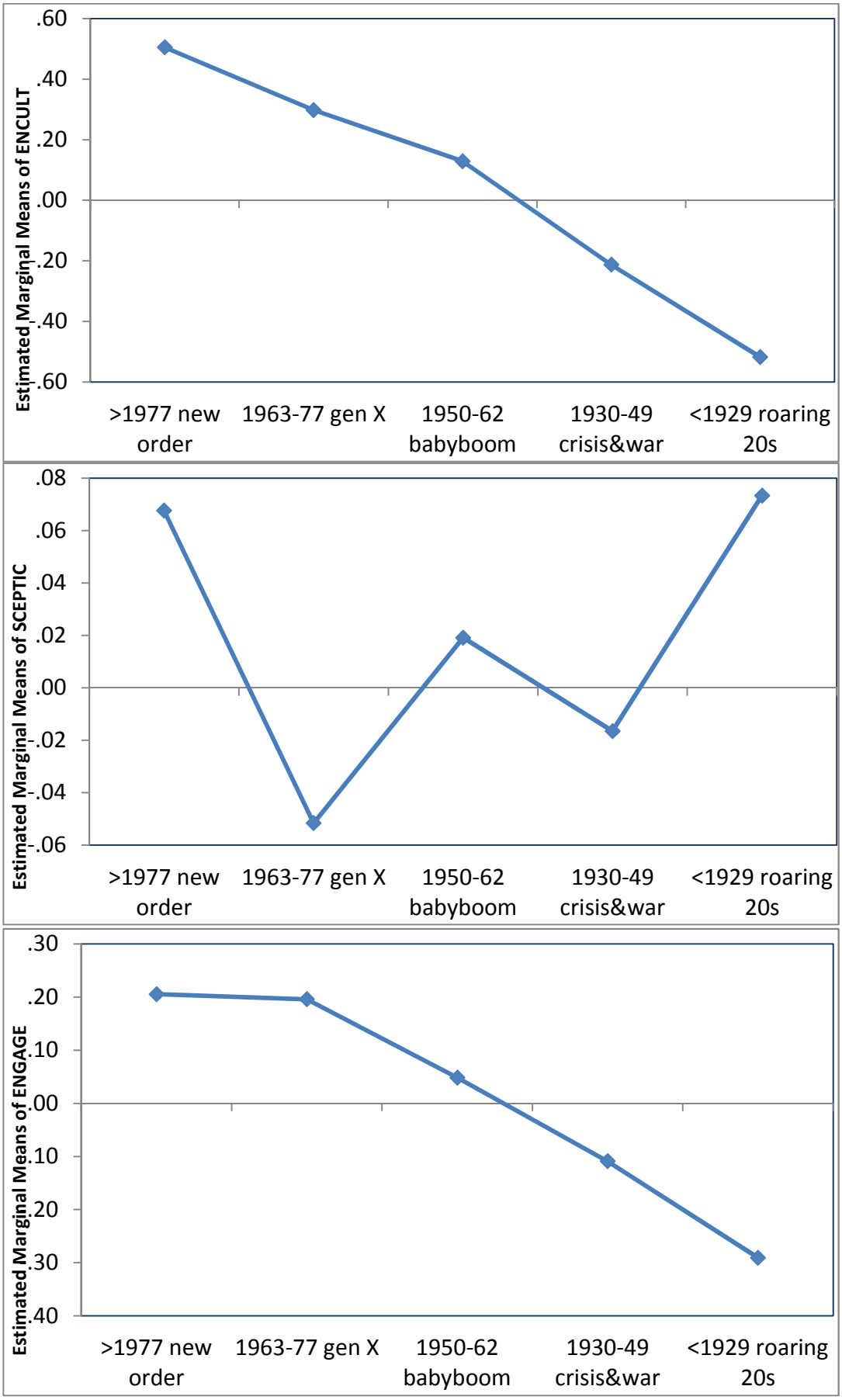
Figure 3.1 The Enculturation with science of five generational groups



Note: Covariates appearing in the model are evaluated at the following values: sex - Male = 1= 0.4616, urban = 1.8635, edu = 1.3510, Portugal 4 regions = 13221.5168

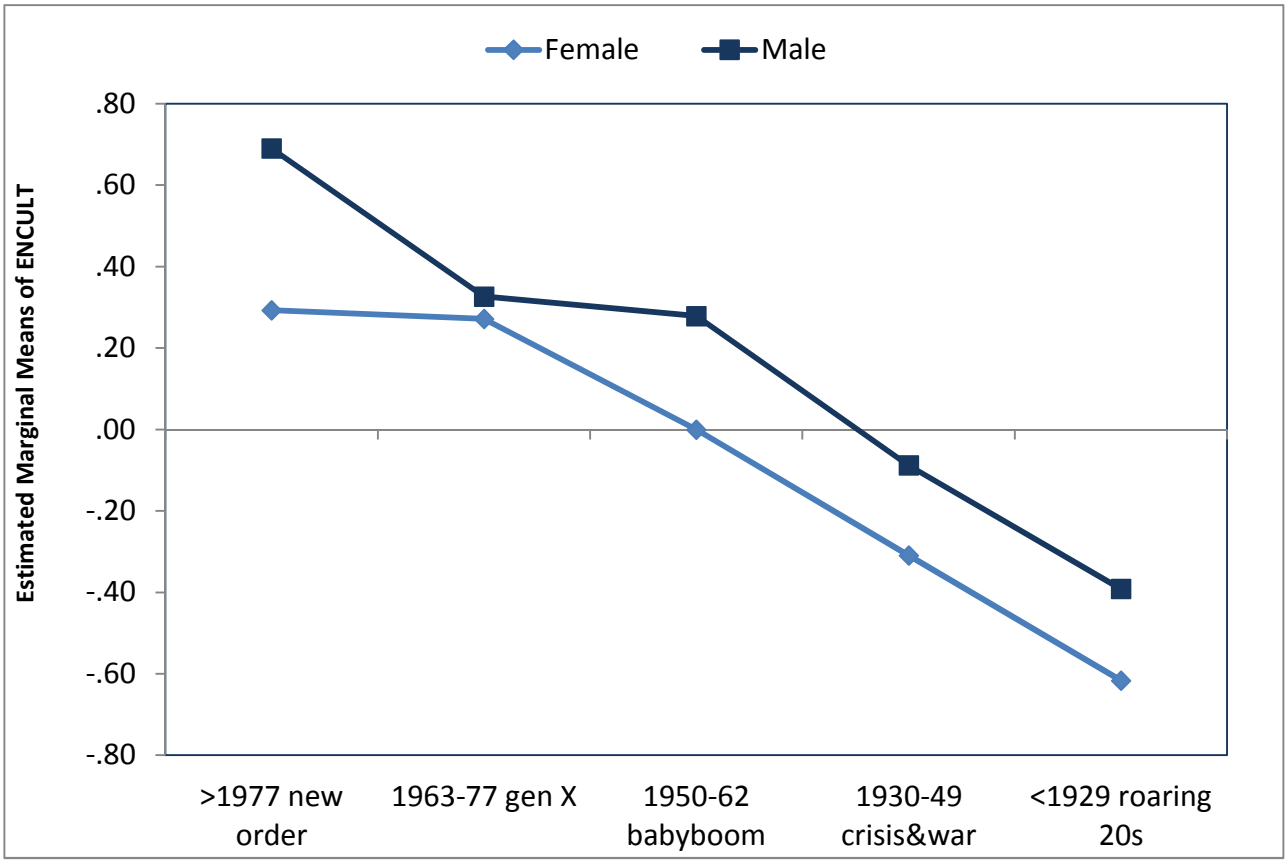
Focusing on the trajectory across generational groups, we observe the general trend for each of the dimensions of science culture as shown in Figure 3.2. Enculturation and Engagement show a continuous improvement as we move from the older to the younger generation. The development of scepticism follows a more ragged line of development. While the younger generation are less sceptical over the Portuguese science culture than the older, this is not a monotonic trend. We will come back to this difference in generational trajectories below.

Figure 3.2 Basic indicators across generational age cohorts



In Figure 3.3 we observe the gender gap across generations for Enculturation with science. This gender gap of women being slightly more distant from science than men is a persistent feature across all generations. The gap closes for Generation X and opens up again for the New Order youngest generation, everything else being equal. No such gender gap appears for Scepticism or Engagement.

Figure 3.3 Gender gaps across generations



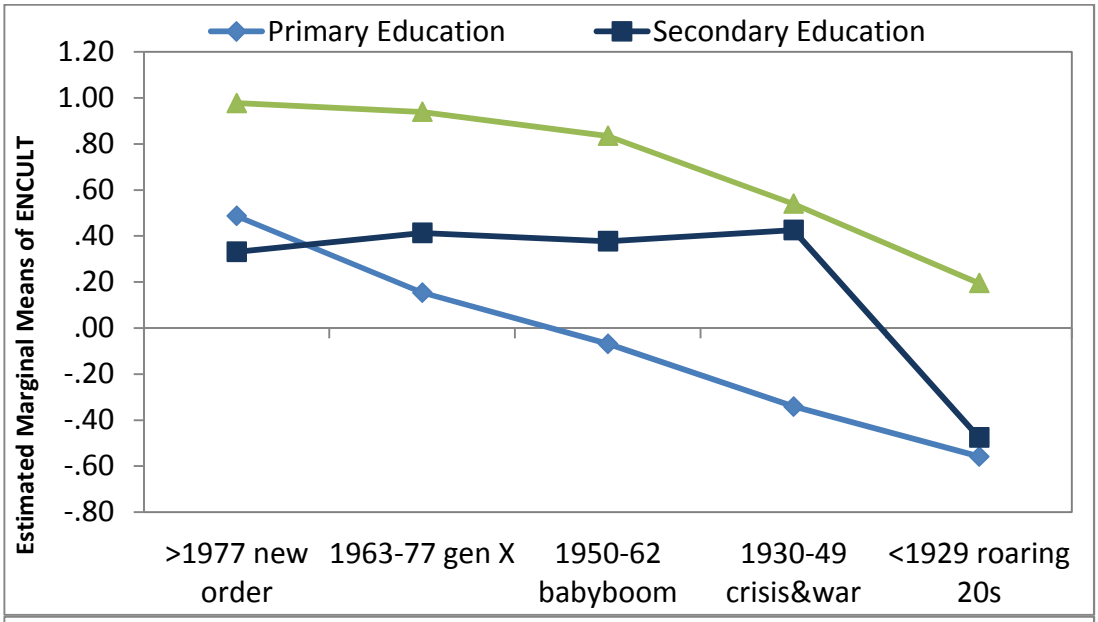
A strong source of variation in science culture is and remains the level of education of a person. As shown in figure 3.4, across all three dimensions, people in different educational brackets show different trajectories over the generational groups.

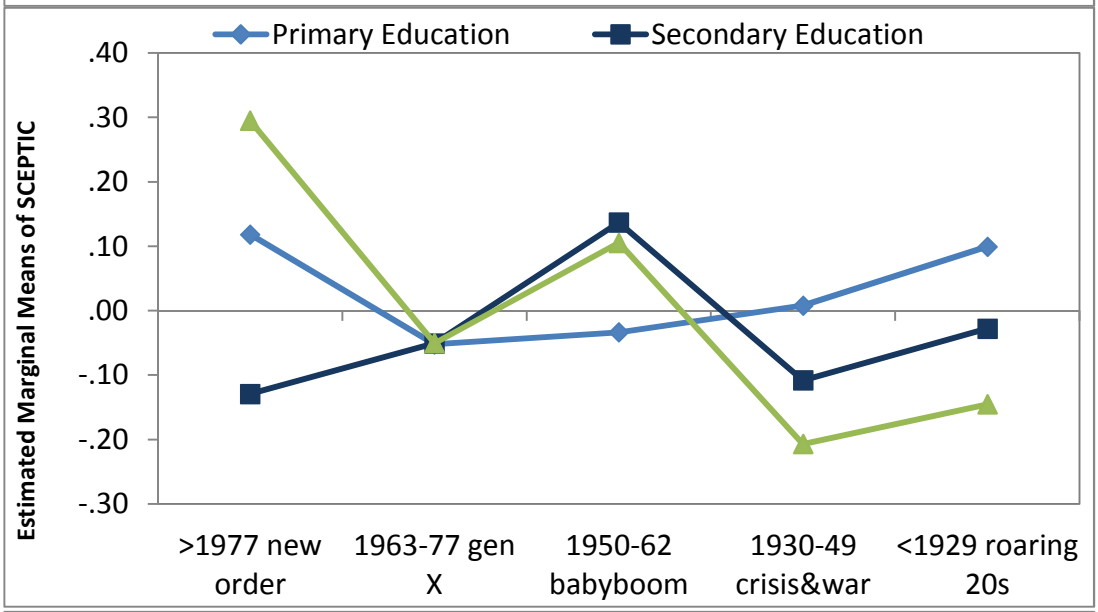
On enculturation with science, those in primary and tertiary education experience an ever closer relationship with science, while the gap between them remains wide. Portuguese with secondary education experience a leap from the oldest to the War&Crisis generation which shows no difference between secondary and tertiary education in their closeness to science. Henceforth there is little change for those with secondary education. They are lastly 'overtaken' by those with

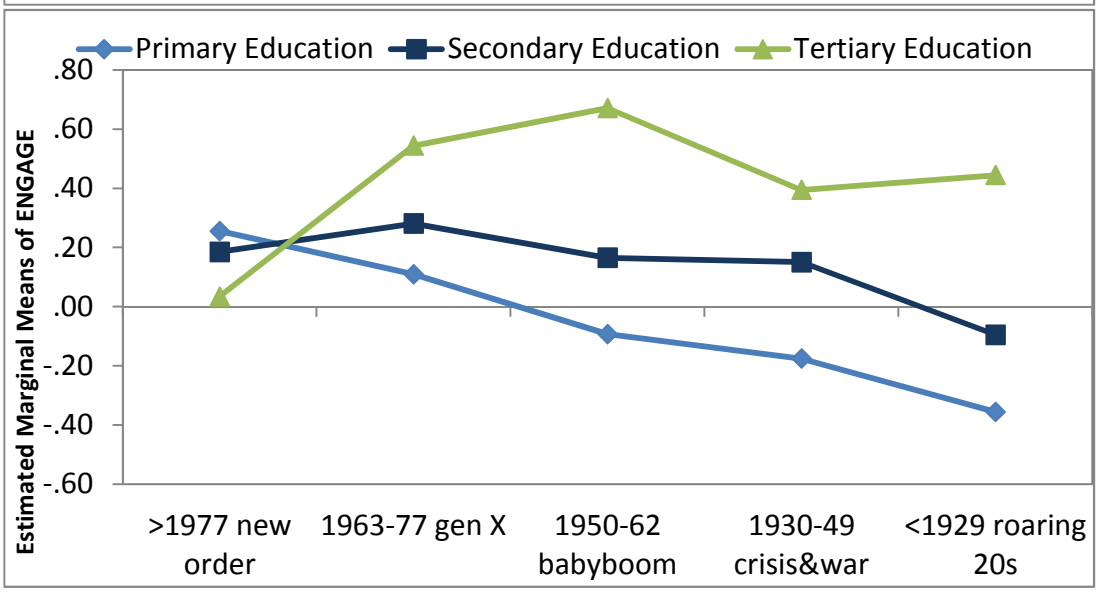
primary education and develop a large gap from those in tertiary level. While the enculturation with science seems to increase across generations in Portugal, this is less the case for those whose education ended at secondary level.

With regard to Cultural Scepticism, we observe different pattern across generations. Cultural sceptics deplore the emphasis on religion instead of science, and do not see much welfare arising from science; one could also see them as disappointed secularists. This dimension of science culture is particularly strong among Baby Boomers, and New Order generations with tertiary education are particularly disappointed with the progress of science culture. The trend is rising across generations: the younger, the more sceptical. Sceptics are also older with primary education only, and the Baby Boomers with a secondary education. The older with tertiary education and the youngest with secondary education seem least sceptical. The generational trend across generations differs for the three educational groups, everything else being equal: for the university educated, scepticism increases with age group; for those with secondary education, scepticism is declining across age groups, while for those with primary education, the long-term trend is stable. Overall we can say that scepticism about scientific culture afflicts in particular the Baby Boomers and the New Order generation.

Figure 3.4 Educational gap across generations



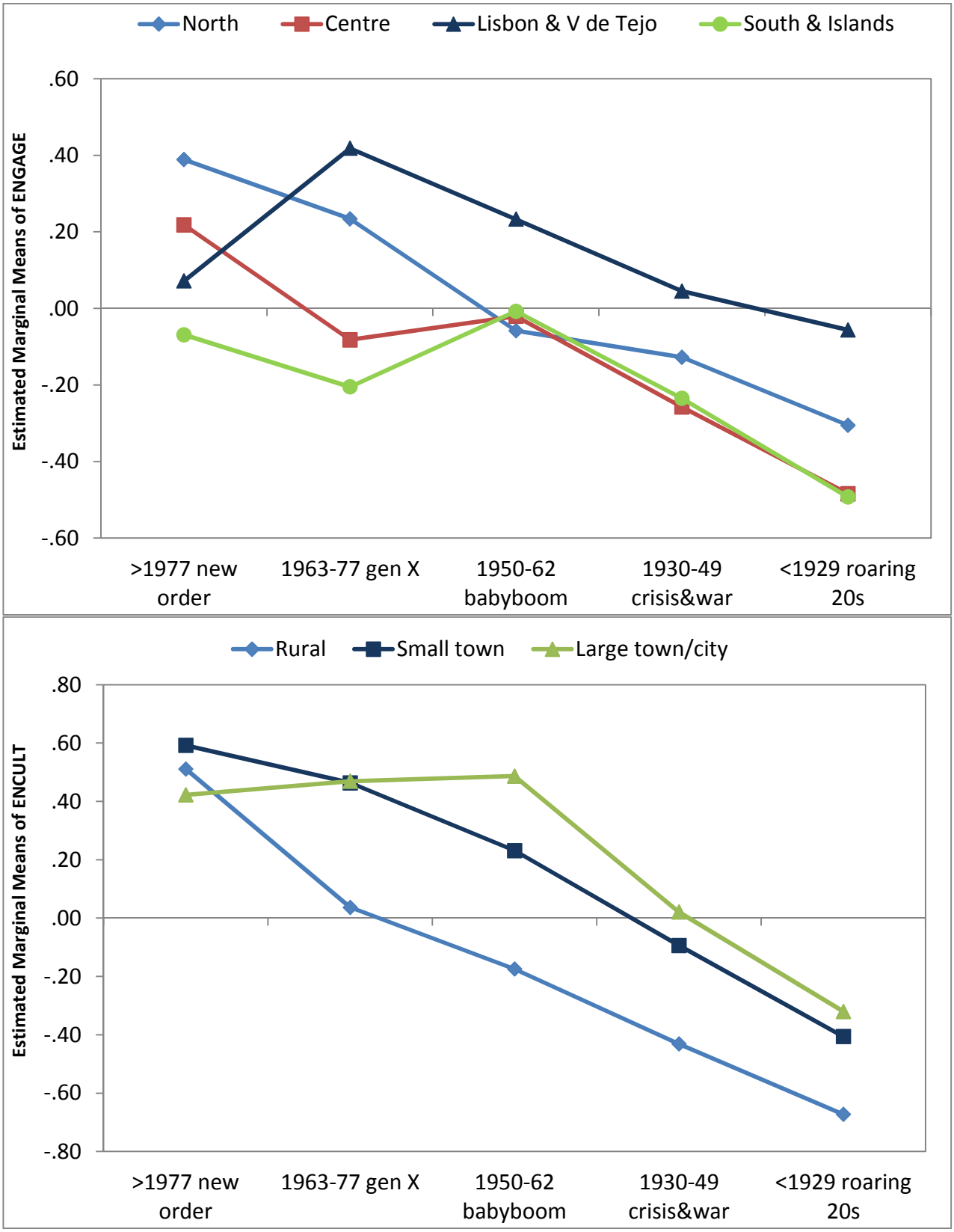




Engagement again shows different trajectories across generations when we consider their level of education as in figure 3.4, after controlling for period and other factors. Engagement with science increases for those with primary and secondary education from the older to the younger. The younger are more likely to frequent exhibitions of science than the older generations. The story is different for the highly educated though. Here the trend is stable, if not slightly declining across the generations. The Baby Boomers and Generation X are those who are most likely to visit science museums, zoos and other such exhibitions. However, university educated youngsters are even less likely to engage with science than those with primary and secondary education.

Not surprising, geography also makes a difference for science culture, as it most likely reflects different opportunities. We capture spatial diversity in two variables, by regions and by living in an urban or more rural environment. Enculturation with science is a feature of 'urbanity' rather than of rural life for most generations in Portugal, except for the youngest generation, where this gap has disappeared as shown in Figure 3.5. Engagement with science is increasing across all four regions of Portugal, though not to the same degree. Engagement is generally higher in the Lisbon Region and in the North, than in the Centre and South of the country, across all generations. However, we note that among the youngest New Order generation, the North and Centre seem more exposed to science than Lisbon and the South. As noted earlier, to interpret 'engagement' we must consider the provision of opportunities that are provided through initiatives such as Ciencia Viva across the country. The spread of engagement among Generation X and New Order might well reflect the changing patterns of provision of exhibitory science across the country in the last 20 years.

Figure 3.5 Regional and urban-rural diversity across generations



Having explored the generational trajectory in combination with a number of other variables, we are left with the question of the relative strength of these influences. Table 3.2 lists the strengths of

these influences expressed as eta^2, an index that varies between 0 and 1, 1 meaning maximum strength of influence. We observe that among the main influences the age related variables, age, birth year, age cohort, have the strongest influence on Enculturation and on Engagement, but little or no influence on Cultural scepticism. The fact that age^2 influences all three dimensions suggests some non-linearity in the relationship between science culture and age in Portugal, the middle aged being most implicated in any of these dimensions of science culture. Education is the second most important influence on science culture, but mostly for Enculturation and Engagement, and less so for scepticism. All dimensions respond to the year of the survey, which suggest a significant trend over time everything else being equal. Sex, region and urbanity make a difference in particular on Enculturation with science.

For the interpretation of the overall results it is important to consider the strength of the interaction effects. Interaction effects are in evidence in all the figures discussed above, which means that the trajectory of science culture is not identical across generational groups. Table 3.2 again shows that interactions across influences are particularly strong for Enculturation with science by age groups across year and education. For Cultural Scepticism it is the different trajectories of the educational groups that is noteworthy. The different trend of scepticism across generations in different educational groups is significant. For Engagement with science, the regional and educational disparities across age cohorts are significant. Overall, we can say that the variability of science culture is more constrained on the dimension Enculturation than on Scepticism and Engagement. For the latter dimensions, other variables not included in this research must account for the variability.

Table 3.2 MANOVA Models with Cohort and One Other Variable Fixed; Ceteris Paribus

Effect size Eta^2	ENCULTURATION	SCEPTICISM	ENGAGEMENT
Main effects			
Cohort	**0.078**	0.002 ns	**0.023**
Edu	**0.050**	0.000 ns	**0.018**
Sex	**0.009**	0.000 ns	0.000 ns
Urban-rural	**0.028**	0.000 ns.	**0.014**
Region	**0.010**	0.002 ns	0.001 ns.
Year of survey	**0.002**	**0.004**	**0.006**
Birth year	**0.088**	0.001 ns.	**0.025**
Age4	**0.075**	0.001 ns.	**0.024**
Age^2	**0.088**	**0.001**	**0.024**
Interaction effects			
Sex x cohort	**0.003**	0.001 ns	0.001 ns
Edu x cohort	**0.010**	**0.004**	**0.006**
Urban x cohort	**0.004**	0.002 ns	0.003 ns
Region x cohort	0.003 ns.	0.002 ns	**0.008**
Year x cohort	**0.011**	0.005 ns	0.001 ns
R^2 overall	**0.180 to 0.210**	**0.003 to 0.006**	**0.071 to 0.084**

Various models go into this table; levels of significance < 0.015

MANOVA Model: $F = a + (b_1)\text{cohort} + (b_2)Y$ / ceteris paribus: rotating Y variables from equation to controls; variables included: level of education, gender, region, urban-rural, year, age and age^2.

3.3 The image of science: a hierarchy of scientific pursuits

Another aspect of the culture of science of a country is the images of science that people entertain. A feature of such an image is the perceived hierarchy among different scientific pursuits. The notion of a hierarchy of knowledge is as old as Greek philosophy, when Plato declared the superiority of numerical over other kinds of knowledge, or when in the 19th century, August Comte's doctrine of Positivism offered another account of how different scientific pursuits formed a ladder of dignity. This extends in the modern problem of philosophy in demarcating science from non-scientific pursuits of knowledge. One wonders how these demarcation or hierarchy ideas manifest themselves in public perceptions. Eurobarometer asked in 1992, 2001 and 2005 how different disciplines fare in their status of being 'scientific'. The question was asked, given a list of subjects, *'please tell in your view, how scientific is subject X…..' (on a scale between 'very scientific' 'not at all scientific').* The ordering which people entertain in their perception of science can be described and compared, begging the questions on what criterion this judgement is entertained, which the survey leaves entirely unexplored.

Figure 3.6 The image of a scientific hierarchy in Portugal

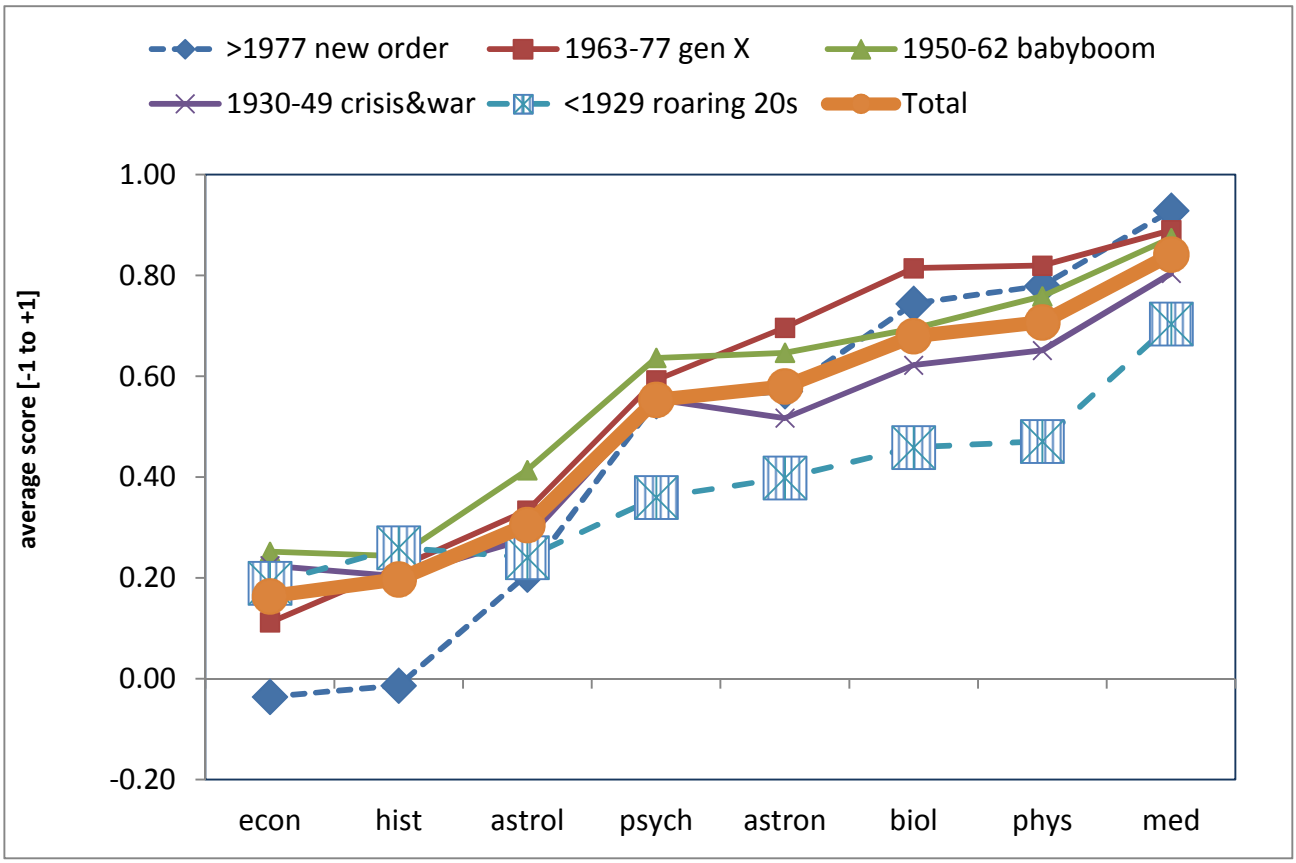


Figure 3.6 shows that the image of an overall hierarchy of scientific pursuits is indeed detectable in Portugal, as it is in other places. The group of five including **medicine, physics, biology, astronomy and psychology** is clearly demarcated from the group of three including economics, history and astrology or drawing horoscopes. The grouping of para-scientific pursuits with economics and history, as representing the social sciences and humanities in this list, might be unflattering for these topics, but reflects the discrimination in public opinion. The gradient of this hierarchy is steeper for the youngest cohort group and flatter for the older generations. The young Portuguese make sharper distinctions between science and lesser or non-scientific pursuits.

Figure 3.6 also shows some difference in the perceptions in the different generational groups. While there is much variation across generations in the assessment of physics and biology (eta^2 > 0.30), there is medium generational variability for medicine and astronomy, and much less variation for the other topics.

Figure 3.7 The inter-generational difference in the 'scientificity' of disciplines

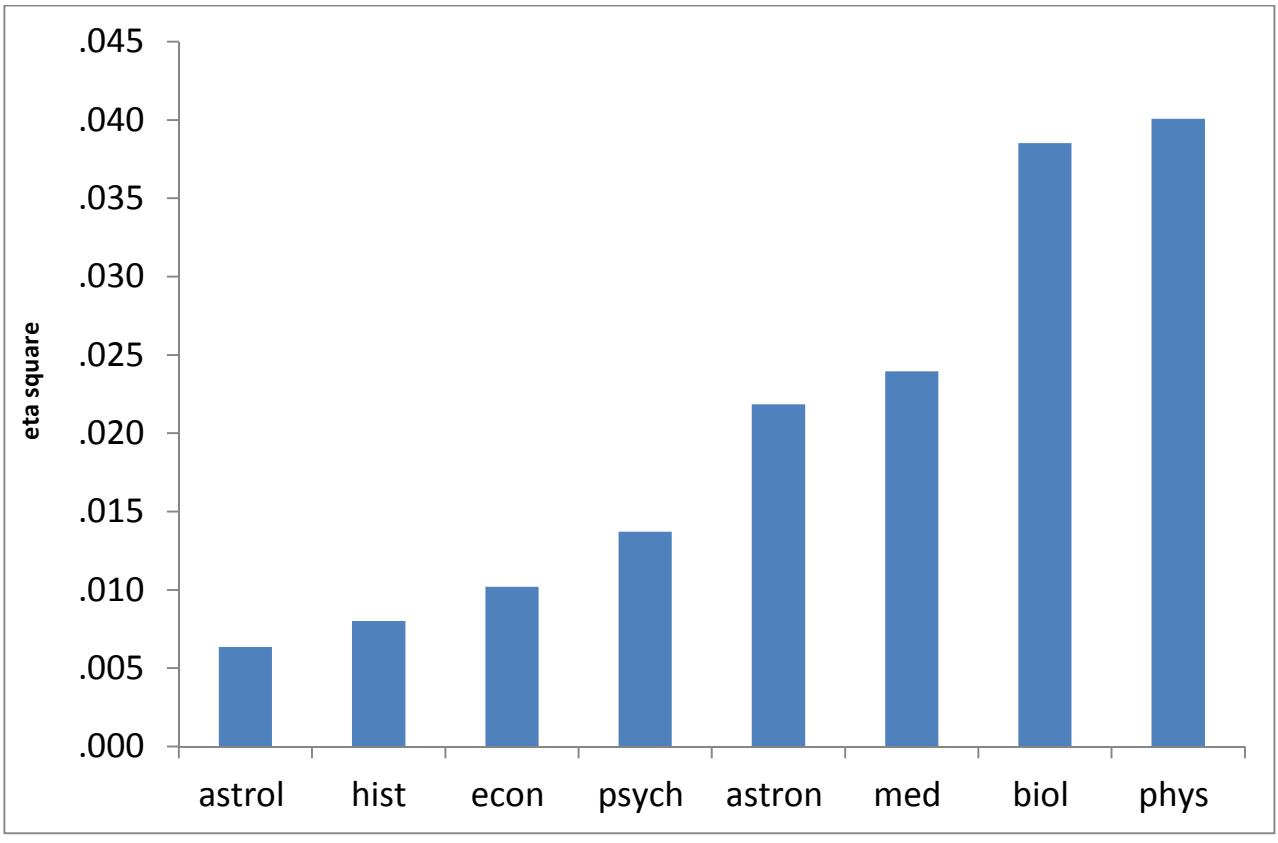


Table 3.1 shows that the ordering of the hierarchy of science does however vary little across the different generational groups. Across all groups, medicine, physics and biology clearly define what

science means. Here we have consensus, the stable core of a social representation of science. Some variation appears as to the positioning of psychology; the Crisis&War generation sees more science in psychology than in astronomy. Equally the positioning of economics and history is not consensual; the Baby Boomers and Crisis&War generation see more science in economics than in history, while the oldest and the youngest see more in history. The relatively high position of astrology is surprising, but most probably reflects confusion over terms: 'astrology' is easily confused with 'astronomy' by alliteration, and indeed there is good evidence for such confusion among respondents across Europe. If the term 'horoscopes' is used instead of 'astrology', scientific esteem drops (see Allum & Stoneman, 2012).

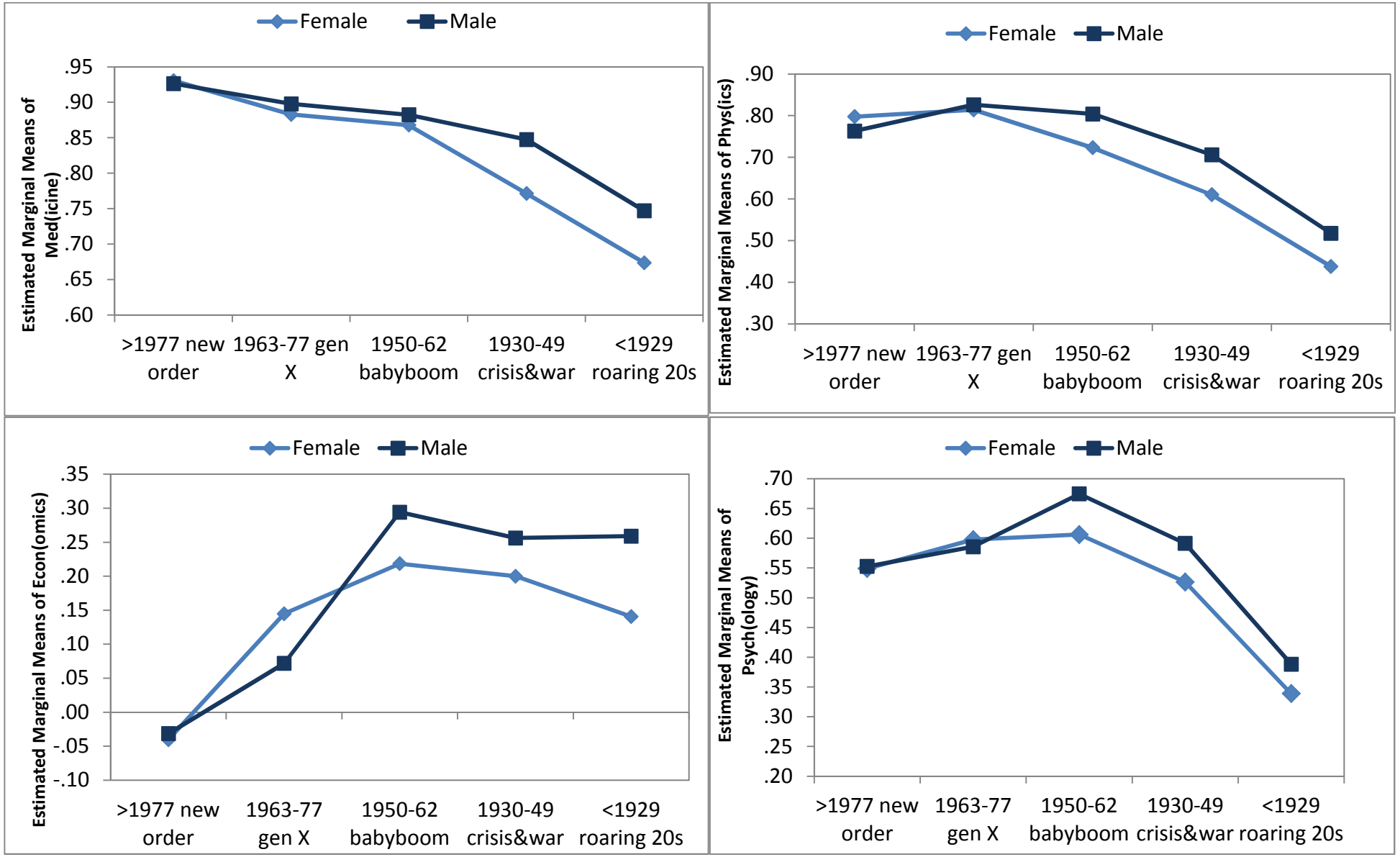
Table 3.3 The Rank Ordering of Sciences by Generational Group

New Order	Gen X	Babyboom	Crisis&War	Roaring 20s	Overall
Med	**med**	**med**	**med**	**med**	**med**
Phys	**phys**	**phys**	**phys**	**phys**	**phys**
Biol	**biol**	**biol**	**biol**	**biol**	**biol**
Astron	**astron**	**astron**	**psych**	**astron**	**astron**
Psych	**psych**	**psych**	**astron**	**psych**	**psych**
Astrol	**astrol**	**astrol**	**astrol**	**hist**	**astrol**
Hist	**hist**	**econ**	**econ**	**astrol**	**hist**
Econ	**econ**	**hist**	**hist**	**econ**	**econ**

We can explore these generational differences in the image of science also by plotting the esteem of different disciplines across the generational groups and gender. Figure 3.8 shows that for physics and medicine, this picture is very clear. The younger the respondent, the more these topics are seen as scientific. This is true for both men and women, but men tend to grant more scientific status than women.

When we consider economics and psychology, the picture is slightly different, again men seem to grant more scientific status than women in general, however, the overall trend across generations is different. Economics is respected as science among the older generations, but not among Generation X and New Order. Psychology's status is increasing from the older generations to the Baby Boomers, who seem to hold this subject in higher esteem than subsequent generations.

Figure 3.8 The 'scientificity' for physics, medicine, economics and psychology by cohorts and sex



Overall, we can say the image of science in Portugal is characterised by a relatively stable hierarchy among different scientific pursuits, on which the young make much sharper distinctions than the older generations. While the esteem of physics and biology increases across generations, that of economics decreases, and psychology is very much the topic of the Crisis&War generation.

4 An integrated model of the culture of science in Portugal

Yet another take on the culture of science in Portugal is enabled by visualising the effects of different variables in a slightly different manner. Logistic regression analysis considers a prediction on reaching a high above a certain threshold value (highest 10-20%) on our three dimensions Enculturation, Scepticism and Engagement. We can then ask and plot the probability of reaching high values for each of the predictors in comparison to a baseline figure. Figures 4.1 to 4.3 plot these results for generational group against the baseline New Order, level of education with primary education as the base, male against female, small town and city against rural dwelling, years against 1989 and Portuguese regions against the North. Any dot with 95%-confidence interval that does not sit on the x-axes marks a significant effect. All effects are controlled against each other, meaning everything else being equal.

Figure 4.1 Logistic regression, odds changes for ENCULTURATION being high

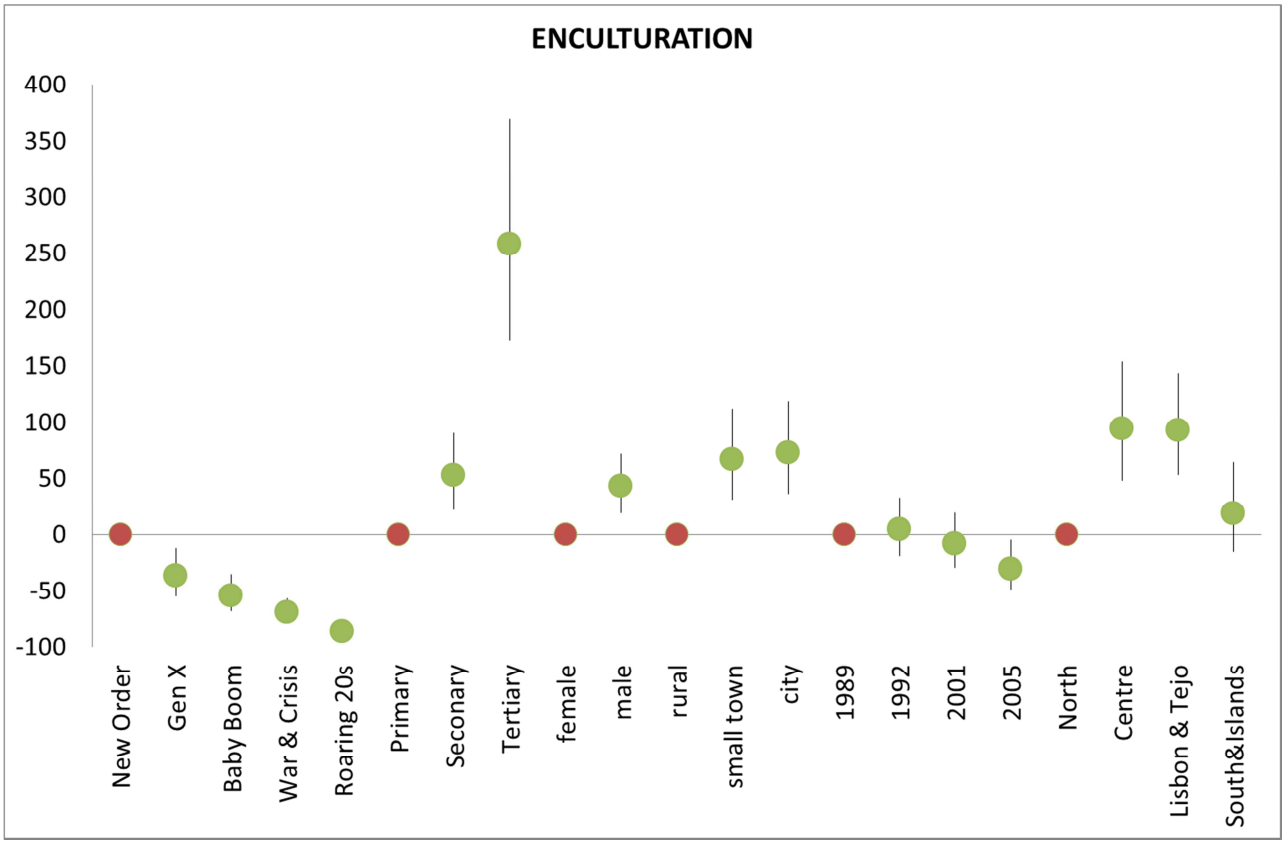
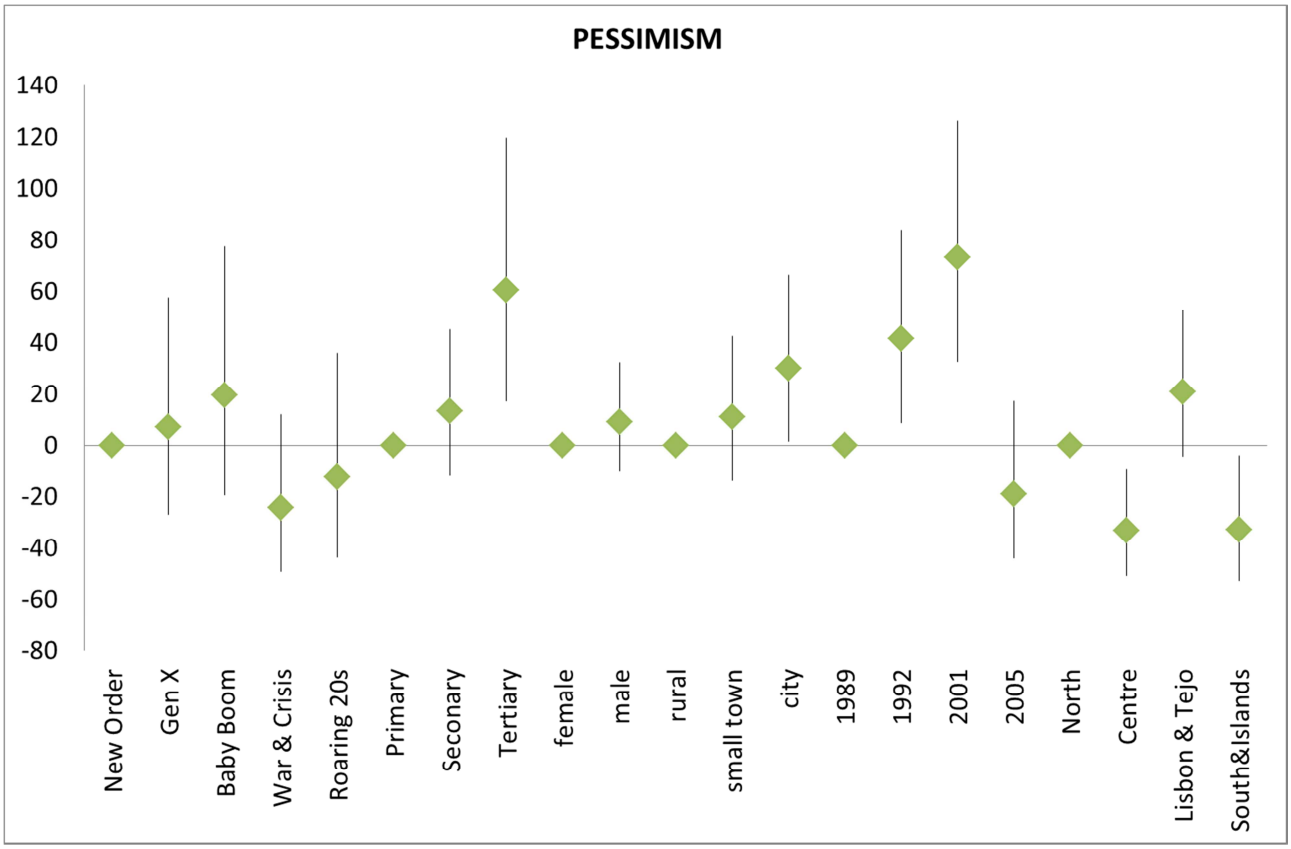


Figure 4.1 shows that **Enculturation with Science** is in a linear relation across the generational groups. With each generation the probability of reaching a high score decreases. For the Roaring 20s, a high score in Enculturation is 100% less likely than for a New Order kid. The level of education has even a steeper gradient. For a tertiary educated Portuguese, to reach a high score

Enculturation is 250% more likely than for a person of primary education. Portuguese men are some 30% more likely than women, and dwellers in small towns and cities are some 50% more likely than rural folk to score high here. Compared to these effects, the passing of time makes little difference, though a high score is slightly less likely in more recent years. Regionally, the Centre and the Lisbon Region is clearly more likely to find Enculturation in Science than elsewhere.

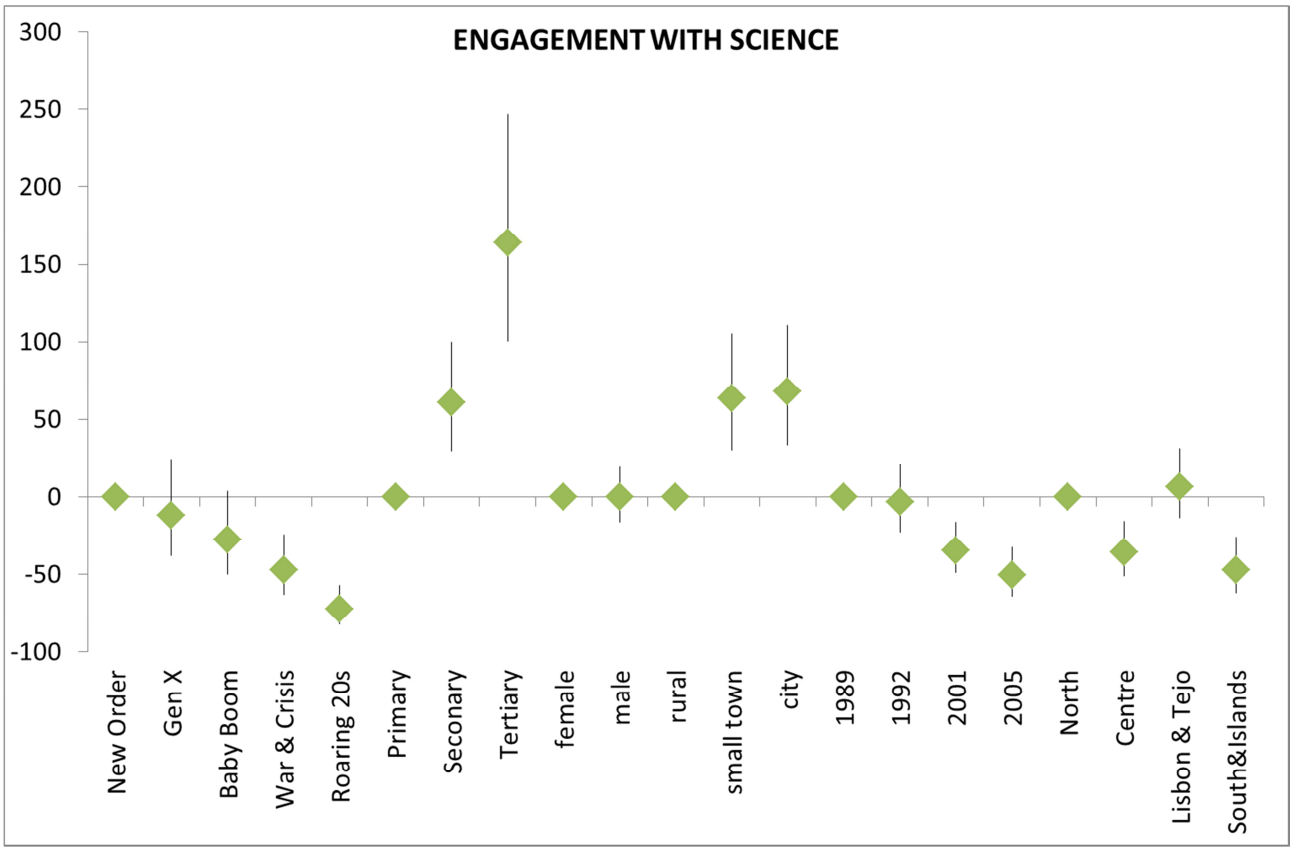
Figure 4.2 Logistic regression, odds changes for CULTURAL SCEPTICISM being high



The story is slightly different when we consider the curious dimension **Cultural Scepticism** as in figure 4.2. Cultural sceptics think that science should dominate religion, but science has not delivered the goods so far. They express impatience and frustrated expectations with the achievements of science, but not from a point of view of alienation from society. There is no generational difference on Scepticism that survives our final test. All lines sit on the x-axes. However education makes a difference. The tertiary educated will be 60% more likely to score highly sceptical compared to those with only primary education; secondary education does not differ from primary education in that respect. Equally, men and women Sceptics do not differ, while those living in large agglomerations are 30% more likely to be sceptical than rural and small town dwellers. Compared to 1989, time makes a difference. Sceptics were more likely among

respondents in 1992 and 2001 than more recently, and they are less likely to be found in the Centre and the South, compared to the North and the Lisbon Region. Sceptics are thus more likely to be found among the educated City dwellers, living in the North or Lisbon Region and more likely in evidence in the 1990s than in recent years.

Figure 4.3 Logistic regression, odds changes for ENGAGEMENT with science being high

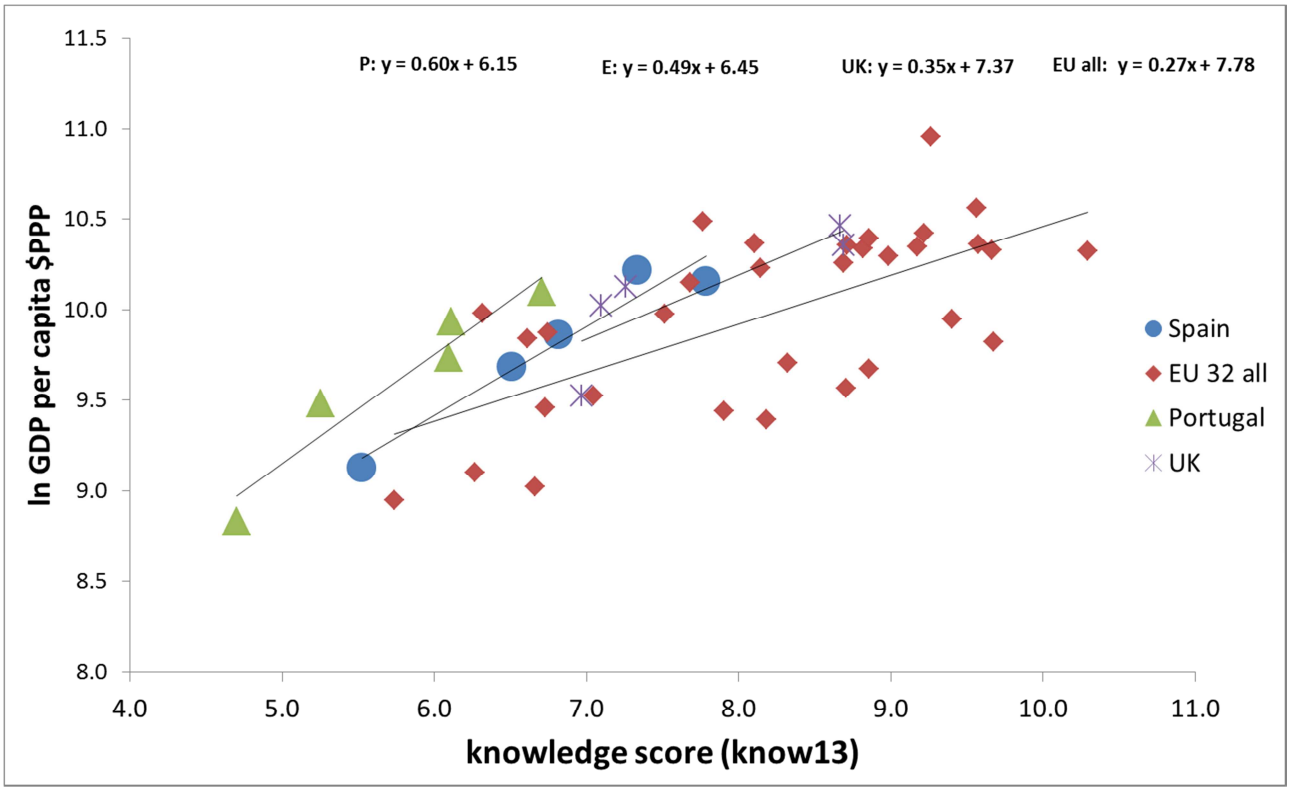


Finally, figure 4.3 shows those who are engaging with science in visiting events and exhibits and being interested and knowledgeable at the same time. Like with enculturation, high level of Engagement has a clear gradient across generations. A person born in the 1920s is 70% less likely to engage with science than a person born after 1977. Equally education makes a huge difference. A person with tertiary education is 150% more likely to engage than a person with primary education; even secondary education adds 50% likelihood to such a tendency. Women do not differ from men at all, but high level of engagement is 50% more likely in small town and larger agglomerations than in rural Portugal. Engagement has declined in recent years, compared to 1989 and the early 1990s, and it is less in evidence in the Centre and South of the country compared to the North and Lisbon. Engagement with science on exhibition seems to be the likely remit of the educated and young, living in large agglomerations in the North and Lisbon area.

A final comparison brings yet again a different perspective to the culture of science in Portugal. Eurobarometer offers data on 32 European countries in 2005 and longitudinal data for 12 European countries including Portugal since 1989. This database allows us to model a hypothetical **production function** of science culture. We ask the following question: under the assumption of a direct link between Science Culture and the economic prosperity of a country, how strong is that link across all European countries in 2005, and how does this function play out over time for a selected group of countries? We are using the knowledge measure, which is a key component of the dimension Enculturation with Science, as a proxy for science culture.

Figure 4.4 plots this hypothetical production function from science culture onto economic prosperity as indicated by log units of GDP per capita in purchasing power parities ($PPP). An increase of 1 on ln(GDP) means an increase in order of magnitude from 10 to 100, or 100 to 1000. In general this relationship is a positive one, increased science culture across 32 European countries is positively related to economic prosperity. An average increase of 1 point in the Enculturation score (measured by the knowledge proxy) adds 27% of a log unit of GDP across Europe.

Figure 4.4 The hypothetical production function of Science Culture in European comparison



We can also compare the trajectory over the past 20 years for selected countries, in this case Portugal with Spain and the UK as benchmarks. An increase in the average knowledge score added 60% of a log unit of GDP in Portugal over the past 20 years, 49% in Spain and 35% in the UK. This shows that the expected added value of a Science Culture is not equal across contexts. As a country improves its Enculturation with science, the added value of an additional increase is declining, which seems to reflect the iron economic **Law of Diminishing Returns**. However, in the case of Portugal, additional efforts to enhance the Science Culture are likely to add more in terms of economic value than is the case in comparative European countries.

This last glimpse of Portuguese Science Culture must be taken as an entirely hypothetical model to be read with a pinch of salt. It however serves to shows where the analysis of large scale data might take us: to evidence-based effective estimates of the added value of science culture in terms of the prosperity of the country.

Readers who prefer to look at the survey data before any further analysis may consult the appendices IV and V below. Appendix IV compares the responses item by item of Portugal with the rest of EU12 across all five survey waves; appendix V reports the results item by item across four Portuguese regions.

With this we come to an end of our report. Needless to say, there is only so much this research can achieve by analysing the data as a desk job out of London. We very much hope to achieve two things with this report. Firstly, to put in evidence what can be said about Portuguese science culture on the basis of the Eurobarometer, which is unfortunately still widely unknown or ignored. A fact that was sadly evidenced when Portugal's former Science Minister Mariano Gago at a conference in Nancy in 2012 felt compelled, maybe badly advised, to cite US data on 'changing attitudes to science', being unaware of any European or Portuguese evidence. Secondly, we hope that the observations presented in this report will be the basis for further discussions that could bring together the rich basis of science culture research that is accumulating in Portugal. Thereby, we hope to make a modest contribution to the growing science culture of Portugal.

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Appendix I: Overall Database Information

Table A1.1 : Five-waves of Eurobarometer surveys on 'general science attitudes', EU-12

	1989	1992	2001	2005	2010	Total
France	1005	1008	1004	1021	1018	5056
Belgium	1002	1043	1058	1024	1012	5139
Netherlands	1025	1022	1061	1005	1018	5131
Germany *	1024	2032	2038	1507	1531	8132
Italy	1022	1021	995	1006	1018	5062
Luxembourg	303	500	619	518	503	2443
Denmark	1014	1000	1000	1013	1006	5033
Eire	1006	1000	1006	1008	1007	5027
UK	1276	1374	1304	1307	1311	6572
Greece	1000	1003	1004	1000	1000	5007
Spain	1001	1021	1000	1036	1004	5062
Portugal	1000	1000	1000	1009	1027	5036
Total	11678	13024	13089	12454	12455	62700

*From 1992 onwards including East and West

Figure A1.2: the structure of the longitudinal database

		1989	**1992**	**2001**	**2005***	**2010**
Attitude Facets						
att1	more comfort, healthier, easer	x	x	x	A	x
att2	resources inexhaustible		x	x	A	x
att3	not enough on faith	x	x	x	A	x
att4	no role to save environment		x	x	A	x
att5	allowed to do animal experiments		x	x	A	x
att6	scientists are dangerous		x	x	B	x
att7	work more interesting		x	x	B	x
att8	no important for daily life		x	x	B	x

att9	life changes too fast	x	x	x	B	x
att10	opportunities for future generations		x	x	B	x
*2005 saw a split-half design of the questionnaires, hence version A and B						
Knowledge						
K13*	knowledge scale k13	x	x	x	x	
experi	drug experiment		x	x		
probab	gene probability	x	x	x		
*for reasons beyond the control of researchers, 2010 saw the knowledge items deleted from the survey						
Engagement						
sciact	visiting science museums, zoos	x	x	x	x	
cultact	visiting museum and art galleries		x	x	x	
Interest and attention						
Indis	interest in scientific discoveries	x	x	x	x	x
intmed	interest in new medical discoveries	x	x		x	x
intinvent	interest in new inventions	x	x		x	
intsport	interest in sport	x	x	x	x	X
intpolit	interest in politics	x	x	x	x	X
infodis	informed on scientific discoveries	x	x	x	x	X
infomed	informed on medical discoveries	x	x		x	X
infoinvent	informed on new inventions	x	x		x	
infosport	informed on sport	x	x	x	x	x
infopolit	informed on politics	x	x	x	x	x
images of science						
image	how scientific is ….. (8 items)		x	x	x	
		1989	**1992**	**2001**	**2005**	**2010**

Appendix II: The Basic Information on Portugal

Table A1.3: distribution of generational cohorts across regions and survey year

	Portugal 4 regions				**Total**
	North	**Centre**	**Lisbon & Vale de Tejo**	**South & Islands**	
>1977 new order	14%	15%	12%	11%	**666**
1963-77 gen X	28%	22%	26%	25%	**1303**
1950-62 babyboom	22%	16%	19%	21%	**991**
1930-49 crisis&war	25%	32%	29%	30%	**1425**
<1929 roaring 20s	11%	16%	13%	12%	**651**
Total	**1812**	**1046**	**1570**	**608**	**5036**

	YEAR AND ROUND NUMBER					Total
Generational group	**1989 EB 31**	**1992 EB 38.1**	**2001 EB 55.2**	**2005 EB 63.1**	**2010 EB 78.1**	
>1977 new order	0	0	21%	16%	30%	13%
1963-77 gen X	27%	34%	22%	26%	23%	26%
1950-62 babyboom	20%	20%	19%	16%	20%	20%
1930-49 crisis&war	32%	25%	29%	32%	24%	28%
<1929 roaring 20s	21%	21%	10%	11%	3%	13%
Total	1000	1000	1000	1009	1027	5036

Table A1.4: age distribution in percentages across regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
15-24	20	16	18	16
25-39	27	24	25	22
40-54	23	20	23	24
55 AND MORE	30	41	34	38
Total N	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

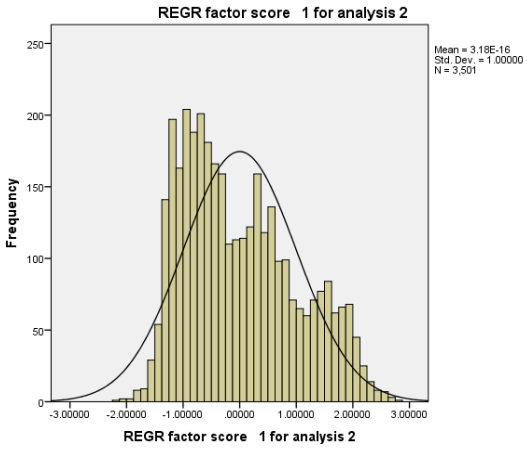
Appendix III: Structure of Key Variables

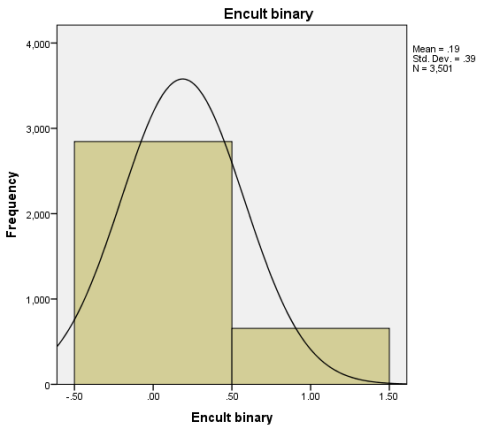
Culture of Science – three factor structures

- Three-factor principle component solution; Varimax rotation Kaiser Normalisation
- Criterion: scree plot 'knee bend' would suggest 2-Factors; Eigenvalue >1 suggests 3-Factors
- KMO = 0.694, 65% of variance explained (33% + 18% + 15%)
- N = 3501 [does not include 2010, knowledge items are missing; 2005 data split-half on attitudes, thus only two attitude facets included, welfare and secularism]
- Binary variable: 1 > M + 1 SD; 0 </= M +1SD; ie right hand cut-off at M+1 SD
- Extraction Method: Principal Component Analysis
- Rotation converged in 5 iterations
- All factor loadings <0.30 are deleted to improve the readings

Rotated Component Matrix: correlations between Items and Factors

	Component		
	ENCULT	SCEPTIC	ENGAGE
Informed about new discoveries (infodis2)	**0.78**		
Interested in new discoveries (intdis)	**0.75**		
Knowledgeable (know scale k13)	0.62		**0.33**
Secularism: att3 not enough on faith (rec)		**0.86**	
Welfare expectations: att1 comfort, healthier	0.41	**-0.60**	
Activities: sciact = scimus + zoo			**0.95**
Explained Variance	33%	18%	15%





Factor1: ENCULTURATION WITH SCIENCE

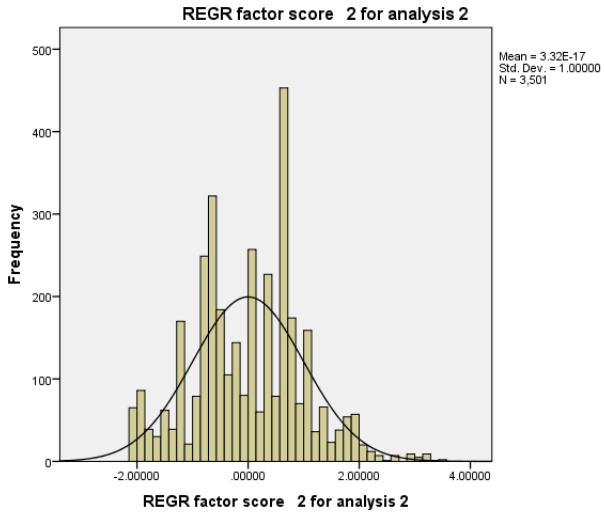
(infodis2, intdis, k13, att1 positive): informed, interested, knowledgeable and holding welfare expectations

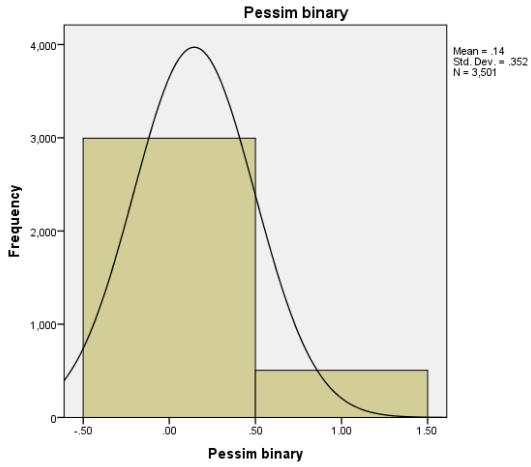
Correlations with

- att5 science has a role to play in saving environment, att6 negative: scientists can be dangerous; att7 makes work more interesting, att8 important for daily life, att10 more opportunities for future generations
- Cultact: also visiting libraries and art museums
- Knowing about scientific methods: probability, experiments
- Being also interested in new medical discoveries (intmed), new inventions (intinven)
- Being also interested in sport and politics, more than others

Observations:

- The distribution of Enculturation is skewed towards the lower level.
- The mode is below the mean of the distribution.





Factor2: CULTURAL SCEPTICISM

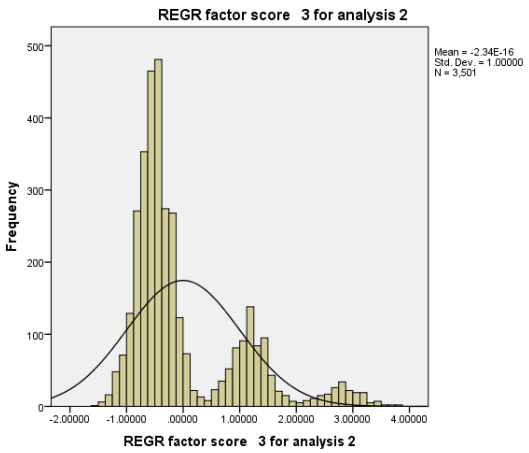
(att3-rec, att1 negative): <u>TOO MUCH RELIGION AND NO SHOW FROM SCIENCE</u>, no welfare expectations

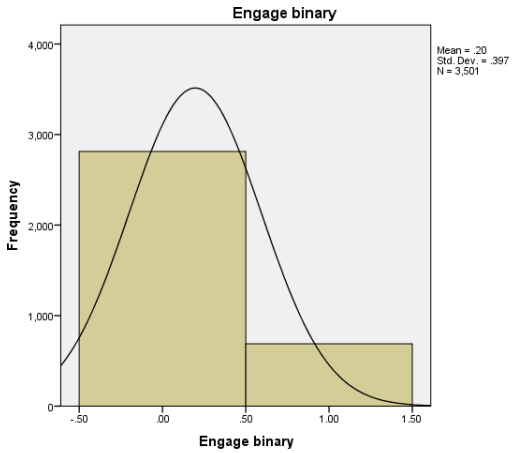
Correlated with:

- Att6: scientists are not dangerous, att9: life is not changing fast enough, BUT <u>att5 negative</u>: sceptical about animal experiments; <u>att2 negative</u>: science is no solution to exhausting resources, but att4, science has some role to play to save environment; <u>att7 negative</u>: science does not make work more interesting; <u>att10 negative</u>: science does not provide opportunities for future generations
- Knowledge: less literate (k13) and less familiar with scientific methods
- Admittedly poorly informed (all info variables slightly negative); little interest in science, politics or even sport
- Most likely an anti-religious factor (att3 recoded, r=-0.80), despite aligning with a religious denomination

Observations:

- The distribution of Cultural Scepticism is fairly normal.
- There are two modes, one below and one above the mean.





Factor3: ENGAGEMENT WITH SCIENCE

Sciact, k13: visiting events and knowledgeable (cultural capital)

Correlated with:

- Att2 negative: science is no solution to exhausting resources; but att4: science has role to play in saving environment; att8 science is important in daily life
- Some relation to knowledge of facts and methods
- Strong engagement with cultural events: libraries and art museums (cultact and cult: cultural capital)
- Informed about medicine and new inventions, rather than new discoveries, BUT little explicit interest; some information about politics and sports

Observations:

- The Distribution of Engagement with Science is far from normal.
- There are three modes, one very low, one in the middle, and one at higher level.
- There are three distinct groups of low, medium and high engagement.

Appendix IV

Codebook Comparing Portugal to EU11

Let us talk now about those issues in the news which interest you. For each issue I read out, please tell me if you are very interested, moderately interested or not at all interested in it?

Portugal NEWS INTERESTED – SPORTS

	1989	1992	2001	2005	2010
VERY INTERESTED	27	17	51	17	18
MODERATELY INTERESTED	35	44	0	46	48
NOT AT ALL INTERESTED	36	38	47	37	33
DK	2	2	1	0	0
Total	1000	1000	1000	1009	1027

Phi = 0.41

Portugal NEWS INTERESTED - POLITICS

	1989	1992	2001	2005	2010
VERY INTERESTED	14	12	25	6	9
MODERATELY INTERESTED	43	49	0	46	50
NOT AT ALL INTERESTED	41	37	74	48	41
DK	2	2	1	0	1
Total	1000	1000	1000	1009	1027

Phi = 0.41

Portugal NEWS INTERESTED - NEW MEDICAL DISCOVERIES

	1989	1992	2001	2005	2010
VERY INTERESTED	25	30		17	15
MODERATELY INTERESTED	47	49		52	56
NOT AT ALL INTERESTED	25	18		29	27
DK	3	3		1	1
Total	1000	1000		1009	1027

Phi = 0.17

Portugal NEWS INTERESTED - NEW TECHNOLOGIES

	1989	1992	2001	2005	2010
VERY INTERESTED	20	22		16	
MODERATELY INTERESTED	42	45		46	
NOT AT ALL INTERESTED	34	28		38	
DK	4	5		1	
Total	1000	1000		1009	

Phi = 0.13

Portugal NEWS INTERESTED -SCIENTIFIC DISCOVERIES

	1989	1992	2001	2005	2010
VERY INTERESTED	21	23	25	15	14
MODERATELY INTERESTED	42	46	0	47	48
NOT AT ALL INTERESTED	33	27	74	37	36
DK	4	4	1	1	1
Total	1000	1000	1000	1009	1027

Phi = 0.42

Let us talk now about those issues in the news which interest you. For each issue I read out, please tell me if you are very interested, moderately interested or not at all interested in it?

EU11 NEWS INTERESTED - SPORTS

	1989	1992	2001	2005	2010
VERY INTERESTED	27	30	57	27	27
MODERATELY INTERESTED	36	37	0	40	39
NOT AT ALL INTERESTED	37	32	41	33	35
DK	1	0	2	0	0
Total	10678	12024	12089	11445	11428

Phi = 0.37

EU11 NEWS INTERESTED - POLITICS

	1989	1992	2001	2005	2010
VERY INTERESTED	26	30	46	26	22
MODERATELY INTERESTED	49	51	0	48	51
NOT AT ALL INTERESTED	25	18	51	25	27
DK	1	0	3	0	0
Total	10678	12024	12089	11445	11428

Phi = 0.43

EU11 NEWS INTERESTED - NEW MEDICAL DISCOVERIES

	1989	1992	2001	2005	2010
VERY INTERESTED	38	44		37	38
MODERATELY INTERESTED	44	44		48	47
NOT AT ALL INTERESTED	17	11		14	14
DK	1	1		0	1
Total	10678	12024		11445	11428

Phi = 0.08

EU11 NEWS INTERESTED - NEW TECHNOLOGIES

	1989	1992	2001	2005	2010
VERY INTERESTED	31	35		33	
MODERATELY INTERESTED	44	46		48	
NOT AT ALL INTERESTED	24	18		19	
DK	1	1		0	
Total	10678	12024		11445	

Phi = 0.08

EU11 NEWS INTERESTED - SCIENTIFIC DISCOVERIES

	1989	1992	2001	2005	2010
VERY INTERESTED	32	37	34	33	34
MODERATELY INTERESTED	44	45	0	48	47
NOT AT ALL INTERESTED	23	17	61	19	18
DK	2	1	5	1	1
Total	10678	12024	12089	11445	11428

Phi = 0.47

I would like you to tell me for each of the following issues in the news if you are very well informed, moderately well informed or poorly informed about it?

Portugal NEWS INFO LEVEL - SPORTS

	1989	1992	2001	2005	2010
VERY WELL	20	11	51	13	12
MODERATELY WELL	43	45	0	49	42
POORLY	36	42	48	37	44
DK/NA	2	1	0	0	2
Total	1000	1000	1000	1009	1027

Phi = 0.46

Portugal NEWS INFO LEVEL - POLITICS

	1989	1992	2001	2005	2010
VERY WELL	9	5	23	4	5
MODERATELY WELL	51	54	0	56	43
POORLY	38	40	77	40	51
DK/NA	2	1	0	0	1
Total	1000	1000	1000	1009	1027

Phi = 0.45

Portugal NEWS INFO LEVEL - MEDICAL DISCOV

	1989	1992	2001	2005	2010
VERY WELL	6	6		3	4
MODERATELY WELL	51	49		55	40
POORLY	42	43		40	55
DK/NA	2	1		1	1
Total	1000	1000		1009	1027

Phi = 0.13

Portugal NEWS INFO LEVEL - NEW TECHNOLOGIES

	1989	1992	2001	2005	2010
VERY WELL	5	5		4	
MODERATELY WELL	45	42		49	
POORLY	48	51		46	
DK/NA	2	2		1	
Total	1000	1000		1009	

Phi = 0.08

Portugal NEWS INFO LEVEL - SCIENTIF DISCOV

	1989	1992	2001	2005	2010
VERY WELL	5	4	36	3	3
MODERATELY WELL	44	41	0	47	37
POORLY	49	52	63	50	58
DK/NA	3	3	1	1	2
Total	1000	1000	1000	1009	1027

Phi = 0.51

I would like you to tell me for each of the following issues in the news if you are very well informed, moderately well informed or poorly well informed about it?

EU11 NEWS INFO LEVEL - SPORTS

	1989	1992	2001	2005	2010
VERY WELL	23	27	57	28	32
MODERATELY WELL	39	40	0	41	38
POORLY	36	32	42	30	29
DK/NA	2	1	1	1	1
Total	10678	12024	12089	11445	11428

Phi = 0.37

EU11 NEWS INFO LEVEL - POLITICS

	1989	1992	2001	2005	2010
VERY WELL	20	22	45	24	22
MODERATELY WELL	56	60	0	56	55
POORLY	22	17	54	20	22
DK/NA	2	1	2	1	1
Total	10678	12024	12089	11445	11428

Phi = 0.47

EU11 NEWS INFO LEVEL - MEDICAL DISCOV

	1989	1992	2001	2005	2010
VERY WELL	13	12		13	13
MODERATELY WELL	56	59		60	57
POORLY	29	28		26	30
DK/NA	2	2		1	1
Total	10678	12024		11445	11428

Phi = 0.05

EU11 NEWS INFO LEVEL - NEW TECHNOLOGIES

	1989	1992	2001	2005	2010
VERY WELL	11	10		12	
MODERATELY WELL	51	52		54	
POORLY	35	37		33	
DK/NA	2	2		1	
Total	10678	12024		11445	

Phi = 0.05

EU11 NEWS INFO LEVEL - SCIENTIF DISCOV

	1989	1992	2001	2005	2010
VERY WELL	11	9	47	10	13
MODERATELY WELL	50	51	0	53	52
POORLY	36	38	51	35	35
DK/NA	3	2	2	2	1
Total	10678	12024	12089	11445	11428

Phi = 0.49

Now, let me ask you about your use of museums, zoos and similar institutions. Can you tell me how many times in the last twelve months you have visited each type of place that I am going to read out? If you have never been there, say "NONE"

Portugal CULT INST VISIT - SCIEN TECH MUSEUM * YEAR AND ROUND NUMBER

	1989	1992	2001	2005	2010
VISITED	9	10	9	6	
NEVER VISITED	90	89	92	94	
DK NA	1	1	0	0	
Total	1000	1000	1000	1009	

Phi = 0.10

Portugal CULT INST VISIT - ZOO AQUARIUM

	1989	1992	2001	2005	2010
VISITED	24	29	17	16	
NEVER VISITED	75	71	83	84	
DK NA	0	1	0	0	
Total	1000	1000	1000	1009	

Phi = 0.14

Portugal CULT INST VISIT - NATURAL HIS MUSEUM

	1989	1992	2001	2005	2010
VISITED	12	12			
NEVER VISITED	87	87			
DK NA	1	1			
Total	1000	1000			

Phi = 0.04

Portugal CULT INST VISIT - PUBLIC LIBRARY

	1989	1992	2001	2005	2010
VISITED		24	14	13	
NEVER VISITED		75	86	87	
DK NA		1	0	0	
Total		1000	1000	1009	

Phi = 0.15

Portugal CULT INST VISIT - ART MUSEUM

	1989	1992	2001	2005	2010
VISITED		17	7	10	
NEVER VISITED		82	93	90	
DK NA		1	0	0	
Total		1000	1000	1009	

Phi = 0.17

Now, let me ask you about your use of museums, zoos and similar institutions. Can you tell me how many times in the last twelve months you have visited each type of place that I am going to read out? If you have never been there, say "NONE"

EU11 CULT INST VISIT - SCIEN TECH MUSEUM

	1989	1992	2001	2005	2010
VISITED	17	18	11	16	
NEVER VISITED	81	82	89	84	
DK NA	2	1	0	0	
Total	10678	12024	12089	11445	

Phi = 0.12

EU11 CULT INST VISIT - ZOO AQUARIUM

	1989	1992	2001	2005	2010
VISITED	35	38	27	29	
NEVER VISITED	62	62	73	71	
DK NA	3	1	0	0	
Total	10678	12024	12089	11445	

Phi = 0.16

EU11 CULT INST VISIT - NATURAL HIS MUSEUM

	1989	1992	2001	2005	2010
VISITED	21	20			
NEVER VISITED	78	79			
DK NA	2	1			
Total	10678	12024			

Phi = 0.03

EU11 CULT INST VISIT - PUBLIC LIBRARY

	1989	1992	2001	2005	2010
VISITED		44	32	36	
NEVER VISITED		55	68	64	
DK NA		1	0	0	
Total		12024	12089	11445	

Phi = 0.13

EU11 CULT INST VISIT - ART MUSEUM

	1989	1992	2001	2005	2010
VISITED		28	21	26	
NEVER VISITED		71	79	74	
DK NA		1	0	0	
Total		12024	12089	11445	

Phi = 0.10

Here is a quick quiz. For each thing I say, please tell me if it isTRUE or FALSE. If you don't know, say so, and we will skip to the next.

Portugal KNOWLEDGE - CENTRE OF EARTH

	1989	1992	2001	2005	2010
TRUE	68	71	76	72	
FALSE	6	7	10	8	
DK NA	27	22	15	20	
Total	1000	1000	1000	1009	

Phi = 0.11

Portugal KNOWLEDGE - OXYGEN

	1989	1992	2001	2005	2010
TRUE	73	86	87	84	
FALSE	8	5	8	9	
DK NA	19	9	5	7	
Total	1000	1000	1000	1009	

Phi = 0.19

Portugal KNOWLEDGE - RADIOACTIVE MILK

	1989	1992	2001	2005	2010
TRUE	14	18	18	16	
FALSE	35	36	45	35	
DK NA	51	47	37	49	
Total	1000	1000	1000	1009	

Phi = 0.11

Portugal KNOWLEDGE - ELECTRONS

	1989	1992	2001	2005	2010
TRUE	33	31	29	29	
FALSE	10	13	12	16	
DK NA	57	56	59	56	
Total	1000	1000	1000	1009	

Phi = 0.07

Portugal KNOWLEDGE - CONTINENTS MOVING

	1989	1992	2001	2005	2010
TRUE	40	57	65	73	
FALSE	18	7	9	7	
DK NA	42	36	26	21	
Total	1000	1000	1000	1009	

Phi = 0.26

Portugal KNOWLEDGE - GENE DECIDING SEX

	1989	1992	2001	2005	2010
TRUE	40	41	50	44	
FALSE	15	20	20	26	
DK NA	45	39	30	30	
Total	1000	1000	1000	1009	

Phi = 0.15

Here is a quick quiz. For each thing I say, please tell me if it is TRUE or FALSE. If you don't know, say so, and we will skip to the next.

EU11 KNOWLEDGE - CENTRE OF EARTH

	1989	1992	2001	2005	2010
TRUE	85	86	88	87	
FALSE	4	4	4	7	
DK NA	11	10	9	6	
Total	10678	12024	12089	11445	

Phi = 0.08

EU11 KNOWLEDGE - OXYGEN

	1989	1992	2001	2005	2010
TRUE	78	80	79	80	
FALSE	14	13	14	16	
DK NA	8	7	7	4	
Total	10678	12024	12089	11445	

Phi = 0.07

EU11 KNOWLEDGE - RADIOACTIVE MILK

	1989	1992	2001	2005	2010
TRUE	14	12	12	9	
FALSE	63	65	65	77	
DK NA	22	23	23	14	
Total	10678	12024	12089	11445	

Phi = 0.12

EU11 KNOWLEDGE - ELECTRONS

	1989	1992	2001	2005	2010
TRUE	40	41	41	44	
FALSE	22	23	24	31	
DK NA	38	36	35	25	
Total	10678	12024	12089	11445	

Phi = 0.12

EU11 KNOWLEDGE - CONTINENTS MOVING

	1989	1992	2001	2005	2010
TRUE	67	80	82	88	
FALSE	12	5	5	5	
DK NA	21	15	13	7	
Total	10678	12024	12089	11445	

Phi = 0.19

EU11 KNOWLEDGE - GENE DECIDING SEX

	1989	1992	2001	2005	2010

TRUE	48	48	49	68	
FALSE	28	29	30	18	
DK NA	24	23	21	14	
Total	10678	12024	12089	11445	

Phi = 0.17

Portugal KNOWLEDGE - EARLIEST HUMANS

	1989	1992	2001	2005	2010
TRUE	27	28	24	26	
FALSE	26	25	43	48	
DK NA	47	47	33	25	
Total	1000	1000	1000	1009	

Phi = 0.24

Portugal KNOWLEDGE - ANTIBIOTICS

	1989	1992	2001	2005	2010
TRUE	57	62	55	44	
FALSE	6	13	19	26	
DK NA	37	26	25	30	
Total	1000	1000	1000	1009	

Phi = 0.23

Portugal KNOWLEDGE - LASERS

	1989	1992	2001	2005	2010
TRUE	20	20	22	20	
FALSE	18	20	21	22	
DK NA	62	60	56	58	
Total	1000	1000	1000	1009	

Phi = 0.05

Portugal KNOWLEDGE - RADIOACTIVITY

	1989	1992	2001	2005	2010
TRUE	24	27	44	32	
FALSE	25	33	20	30	
DK NA	52	40	36	38	
Total	1000	1000	1000	1009	

Phi = 0.19

Portugal KNOWLEDGE - HUMAN BEINGS

	1989	1992	2001	2005	2010
TRUE	57	57	63	62	
FALSE	14	13	17	20	
NA	29	30	21	18	
Total	1000	1000	1000	1009	

Phi = 0.13

Does the sun go around the earth?

Portugal KNOWLEDGE EARTH MOVEMENT - SUN

	1989	1992	2001	2005	2010
SUN ORBITS EARTH	9	9	35	35	
EARTH ORBITS SUN	80	82	55	56	
DK NA	11	9	10	9	
Total	1000	1000	1000	1009	

Phi = 0.32

EU11 KNOWLEDGE - EARLIEST HUMANS

	1989	1992	2001	2005	2010
TRUE	28	26	22	22	
FALSE	45	50	58	66	
DK NA	27	24	20	12	
Total	10678	12024	12089	11445	

Phi = 0.17

EU11 KNOWLEDGE - ANTIBIOTICS

	1989	1992	2001	2005	2010
TRUE	57	55	43	38	
FALSE	25	28	39	52	
DK NA	18	18	17	10	
Total	10678	12024	12089	11445	

Phi = 0.23

EU11 KNOWLEDGE - LASERS

	1989	1992	2001	2005	2010
TRUE	25	27	27	27	
FALSE	35	36	35	46	
DK NA	40	38	38	27	
Total	10678	12024	12089	11445	

Phi = 0.11

EU11 KNOWLEDGE - RADIOACTIVITY

	1989	1992	2001	2005	2010
TRUE	23	26	28	28	
FALSE	56	53	52	60	
DK NA	21	21	20	12	
Total	10678	12024	12089	11445	

Phi = 0.10

EU11 KNOWLEDGE - HUMAN BEINGS

	1989	1992	2001	2005	2010
TRUE	59	65	68	71	
FALSE	25	18	18	20	
NA	16	17	14	9	
Total	10678	12024	12089	11445	

Phi = 0.12

Does the sun go around the earth?

EU11 KNOWLEDGE EARTH MOVEMENT - SUN

	1989	1992	2001	2005	2010
SUN ORBITS EARTH	12	12	29	32	
EARTH ORBITS SUN	80	81	64	64	
DK NA	8	7	7	4	
Total	10678	12024	12089	11445	

Phi = 0.23

How long does it take for the earth to go around the sun?

Portugal KNOWLEDGE EARTH MOVEMENT - TIME

	1989	1992	2001	2005	2010
YEAR	42	46	55	51	
MONTH	20	22	17	19	
DK NA	18	14	28	31	
INAP	20	18	0	0	
Total	1000	1000	1000	1009	

Phi = 0.35

People can have different opinions about what is scientific and what is not. For each one tell me how scientific you think it is.

Portugal SCIENCE OPINION ECONOMICS(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		57	36	56	
NOT SCIENTIFIC		27	47	25	
DK/NA		16	18	19	
Total		1000	1000	1009	

Phi = 0.22

Portugal SCIENCE OPINION MEDICINE(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		84	91	88	
NOT SCIENTIFIC		6	2	2	
DK/NA		10	8	11	
Total		1000	1000	1009	

Phi = 0.14

Portugal SCIENCE OPINION PSYCHOLOGY(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		64	67	72	
NOT SCIENTIFIC		12	16	10	

DK/NA	24	16	18	
Total	1000	1000	1009	

Phi = 0.11

Portugal SCIENCE OPINION BIOLOGY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		72	75	75	
NOT SCIENTIFIC		6	6	5	
DK/NA		22	19	20	
Total		1000	1000	1009	

Phi = 0.04

How long does it take for the earth to go around the sun?

EU11 KNOWLEDGE EARTH MOVEMENT - TIME

	1989	1992	2001	2005	2010
YEAR	51	51	55	65	
MONTH	18	20	23	19	
DK NA	11	10	21	16	
INAP	20	19	0	0	
Total	10678	12024	12089	11445	

Phi = 0.35

People can have different opinions about what is scientific and what is not. For each one tell me how scientific you think it is.

EU11 SCIENCE OPINION ECONOMICS(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		54	46	66	
NOT SCIENTIFIC		40	46	30	
DK/NA		6	8	4	
Total		12024	12089	11445	

Phi = 0.17

EU11 SCIENCE OPINION MEDICINE(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		93	93	95	
NOT SCIENTIFIC		4	4	3	
DK/NA		3	3	2	
Total		12024	12089	11445	

Phi = 0.04

EU11 SCIENCE OPINION PSYCHOLOGY(A)

	1989	1992	2001	2005	2010
SCIENTIFIC		73	68	78	
NOT SCIENTIFIC		20	25	18	

DK/NA	7	7	4	
Total	12024	12089	11445	

Phi = 0.10

EU11 SCIENCE OPINION BIOLOGY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		87	89	90	
NOT SCIENTIFIC		7	6	7	
DK/NA		6	5	4	
Total		12024	12089	11445	

Phi = 0.05

People can have different opinions about what is scientific and what is not. For each one tell me how scientific you think it is (continued).

Portugal SCIENCE OPINION ASTRONOMY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		72	63	72	
NOT SCIENTIFIC		7	18	8	
DK/NA		21	19	20	
Total		1000	1000	1009	

Phi = 0.16

Portugal SCIENCE OPINION HISTORY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		64	36	56	
NOT SCIENTIFIC		23	48	27	
DK/NA		13	16	17	
Total		1000	1000	1009	

Phi = 0.25

Portugal SCIENCE OPINION PHYSICS(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		75	76	79	
NOT SCIENTIFIC		4	9	4	
DK/NA		21	15	17	
Total		1000	1000	1009	

Phi = 0.12

Portugal SCIENCE OPINION ASTROLOGY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		60	57	47	
NOT SCIENTIFIC		17	25	31	
DK/NA		23	18	21	
Total		1000	1000	1009	

Phi = 0.15

Portugal SCIENCE OPINION MATHEMATICS

	1989	1992	2001	2005	2010
SCIENTIFIC			64	73	
NOT SCIENTIFIC			22	11	
DK/NA			14	16	
Total			1000	1009	

Phi = 0.15

Portugal SCIENCE OPINION HOMEOPATHY

	1989	1992	2001	2005	2010
SCIENTIFIC				51	
NOT SCIENTIFIC				13	
DK/NA				36	
Total				1009	

Phi N/A

People can have different opinions about what is scientific and what is not. For each one tell me how scientific you think it is (continued).

EU11 SCIENCE OPINION ASTRONOMY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		83	79	82	
NOT SCIENTIFIC		10	14	13	
DK/NA		7	7	4	
Total		12024	12089	11445	

Phi = 0.07

EU11 SCIENCE OPINION HISTORY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		53	38	59	
NOT SCIENTIFIC		43	56	38	
DK/NA		4	6	3	
Total		12024	12089	11445	

Phi = 0.17

EU11 SCIENCE OPINION PHYSICS(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		90	90	91	
NOT SCIENTIFIC		4	6	5	
DK/NA		6	4	3	
Total		12024	12089	11445	

Phi = 0.06

EU11 SCIENCE OPINION ASTROLOGY(B)

	1989	1992	2001	2005	2010
SCIENTIFIC		56	54	39	
NOT SCIENTIFIC		36	38	56	
DK/NA		7	8	4	
Total		12024	12089	11445	

Phi = 0.19

EU11 SCIENCE OPINION MATHEMATICS

	1989	1992	2001	2005	2010
SCIENTIFIC			73	86	
NOT SCIENTIFIC			22	11	
DK/NA			6	3	
Total			12089	11445	

Phi = 0.17

EU11 SCIENCE OPINION HOMEOPATHY

	1989	1992	2001	2005	2010
SCIENTIFIC				59	
NOT SCIENTIFIC				31	
DK/NA				10	
Total				11445	

Phi N/A

Let us imagine that two scientists want to know if a certain drug is effective against a disease. In your opinion, which is the better way to test this drug?

Portugal SCIENTIFIC DRUG TEST EVALUATION

	1989	1992	2001	2005	2010
1ST SCIENTIST		27	14		
2ND SCIENTIST		53	32		
3RD SCIENTIST		0	30		
DK/NA		20	24		
Total		1000	1000		

Phi = 0.45

Suppose doctors tell a couple that their genetic make-up means that they've got a one in four chance of having a child with an inherited illness. Does this mean that:

Portugal KNOWLEDGE HEREDITARY DISEASE RISK

	1989	1992	2001	2005	2010
3 CHILDREN OK	9	8	4		
1ST CHILD SICK	12	11	10		
SAME RISK EACH	32	46	53		
4TH CHILD SICK	11	9	9		
DK NA	36	27	24		
Total	1000	1000	1000		

Phi = 0.18

Let us imagine that two scientists want to know if a certain drug is effective against a disease. In your opinion, which is the better way to test this drug?

EU11 SCIENTIFIC DRUG TEST EVALUATION

	1989	1992	2001	2005	2010
1ST SCIENTIST		19	16		
2ND SCIENTIST		67	26		
3RD SCIENTIST		0	39		
DK/NA		14	20		
Total		12024	12089		

Phi = 0.54

Suppose doctors tell a couple that their genetic make-up means that they've got a one in four chance of having a child with an inherited illness. Does this mean that:

EU11 KNOWLEDGE HEREDITARY DISEASE RISK

	1989	1992	2001	2005	2010
3 CHILDREN OK	3	2	2		
1ST CHILD SICK	6	6	6		
SAME RISK EACH	64	71	71		
4TH CHILD SICK	6	5	6		
DK NA	20	16	16		
Total	10678	12024	12089		

Phi = 0.07

I would like to read you now some statements that people have made about science, technology or the environment. For each statement, please, tell me how much you agree or disagree

Science & Technology are making our lives healthier, easier and more comfortable.

Portugal SCIENCE & TECHNOLOGY LIFECOMFORT(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	23	34		30	8
AGREE SOME EXTENT	37	38	59	44	37
NEITHER NOR	14	5		11	29
DISAGREE SOME EXT	6	7	25	5	15
STRONGLY DISAGREE	2	5		1	2
DK/NA	19	13	16	10	9
Total	1000	1000	1000	501	513

Phi = 0.53

Thanks to scientific and technological advances, the earth's natural resources will be inexhaustible.

Portugal SCIENCE & TECHNOLOGY RESOURCES(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		9		9	2
AGREE SOME EXTENT		18	28	24	21
NEITHER NOR		9		16	23
DISAGREE SOME EXT		18	50	18	29

STRONGLY DISAGREE	27		13	15
DK/NA	20	22	19	10
Total	1000	1000	501	1027

Phi = 0.51

We depend too much on science and not enough on faith.

Portugal SCIENCE & TECHNOLOGY FAITH(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	14	23		13	9
AGREE SOME EXTENT	25	32	55	33	40
NEITHER NOR	24	10		21	26
DISAGREE SOME EXT	8	12	28	13	15
STRONGLY DISAGREE	4	9		4	4
DK/NA	25	14	17	15	6
Total	1000	1000	1000	501	1027

Phi = 0.48

Scientific and technological research cannot play an important role in protecting the environment and repairing it.

Portugal SCIENCE & TECHNOLOGY ENVIRONMENT(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		7		8	4
AGREE SOME EXTENT		19	29	21	25
NEITHER NOR		8		17	26
DISAGREE SOME EXT		19	48	26	28
STRONGLY DISAGREE		26		11	8
DK/NA		21	24	18	9
Total		1000	1000	501	1027

Phi = 0.51

I would like to read you now some statements that people have made about science, technology or the environment. For each statement, please, tell me how much you agree or disagree.

Science & Technology are making our lives healthier, easier and more comfortable.

EU11 SCIENCE & TECHNOLOGY LIFECOMFORT(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	25	27		31	16
AGREE SOME EXTENT	47	52	71	44	39
NEITHER NOR	13	6		15	26
DISAGREE SOME EXT	7	8	19	6	13
STRONGLY DISAGREE	2	3		2	4
DK/NA	5	4	9	2	2
Total	10678	12024	12089	5726	5815

Phi = 0.47

Thanks to scientific and technological advances, the earth's natural resources will be inexhaustible.

EU11 SCIENCE & TECHNOLOGY RESOURCES(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		6		6	5
AGREE SOME EXTENT		18	23	15	16

NEITHER NOR	8		17	19
DISAGREE SOME EXT	26	60	28	30
STRONGLY DISAGREE	32		28	25
DK/NA	10	17	5	5
Total	12024	12089	5726	11428

Phi = 0.50

We depend too much on science and not enough on faith.

EU11 SCIENCE & TECHNOLOGY FAITH(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	18	16		13	11
AGREE SOME EXTENT	28	27	45	26	24
NEITHER NOR	19	10		26	23
DISAGREE SOME EXT	15	20	38	18	22
STRONGLY DISAGREE	11	18		15	17
DK/NA	9	8	17	3	3
Total	10678	12024	12089	5726	11428

Phi = 0.47

Scientific and technological research cannot play an important role in protecting the environment and repairing it.

EU11 SCIENCE & TECHNOLOGY ENVIRONMENT(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		8		7	5
AGREE SOME EXTENT		17	28	19	17
NEITHER NOR		5		16	16
DISAGREE SOME EXT		26	60	32	36
STRONGLY DISAGREE		36		22	22
DK/NA		9	13	3	4
Total		12024	12089	5726	11428

Phi = 0.51

Scientists should be allowed to research that causes pain and injury to animals like dogs and chimpanzees if it can produce information about human health problems.

Portugal SCIENCE & TECHNOLOGY ANIMALS(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		15		20	14
AGREE SOME EXTENT		29	65	33	40
NEITHER NOR		8		17	20
DISAGREE SOME EXT		16	18	9	14
STRONGLY DISAGREE		15		7	8
DK/NA		16	17	15	4
Total		1000	1000	501	1027

Phi = 0.48

Because of their knowledge, scientific researchers have a power that makes them dangerous.

Portugal SCIENCE & TECHNOLOGY RESEARCHERS(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		22		15	19

AGREE SOME EXTENT	36	58	45	46
NEITHER NOR	8		14	19
DISAGREE SOME EXT	11	21	12	8
STRONGLY DISAGREE	6		4	2
DK/NA	18	21	9	7
Total	1000	1000	508	1027

Phi = 0.44

The application of science and new technology will make work more interesting.

Portugal SCIENCE & TECHNOLOGY WORK(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		22		21	14
AGREE SOME EXTENT		37	61	44	49
NEITHER NOR		9		16	22
DISAGREE SOME EXT		12	15	5	6
STRONGLY DISAGREE		3		1	1
DK/NA		17	24	12	8
Total		1000	1000	508	1027

Phi = 0.44

For me, in my daily life, it is not important to know about science.

Portugal SCIENCE & TECHNOLOGY DAILY LIFE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		17		24	14
AGREE SOME EXTENT		21	58	28	30
NEITHER NOR		9		14	24
DISAGREE SOME EXT		19	34	16	20
STRONGLY DISAGREE		23		12	8
DK/NA		11	8	5	3
Total		1000	1000	508	1027

Phi = 0.55

Scientists should be allowed to research that causes pain and injury to animals like dogs and chimpanzees if it can produce information about human health problems.

EU11 SCIENCE & TECHNOLOGY ANIMALS(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		11		17	15
AGREE SOME EXTENT		24	48	28	29
NEITHER NOR		7		18	17
DISAGREE SOME EXT		18	39	15	17
STRONGLY DISAGREE		35		20	21
DK/NA		6	13	3	2
Total		12024	12089	5726	11428

Phi = 0.55

Because of their knowledge, scientific researchers have a power that makes them dangerous.

EU11 SCIENCE & TECHNOLOGY EU11 RESEARCHERS(A)

	1989	1992	2001	2005	2010

STRONGLY AGREE	27		21	17
AGREE SOME EXTENT	36	63	36	36
NEITHER NOR	7		17	20
DISAGREE SOME EXT	14	25	14	17
STRONGLY DISAGREE	9		8	7
DK/NA	8	12	3	3
Total	12024	12089	5719	11428

Phi = 0.48

The application of science and new technology will make work more interesting.

EU11 SCIENCE & TECHNOLOGY WORK(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		19		25	16
AGREE SOME EXTENT		41	64	43	45
NEITHER NOR		9		18	22
DISAGREE SOME EXT		14	19	8	10
STRONGLY DISAGREE		7		3	4
DK/NA		10	17	3	4
Total		12024	12089	5719	11428

Phi = 0.47

For me, in my daily life, it is not important to know about science.

EU11 SCIENCE & TECHNOLOGY DAILY LIFE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		14		15	11
AGREE SOME EXTENT		22	42	22	23
NEITHER NOR		7		15	17
DISAGREE SOME EXT		27	50	26	31
STRONGLY DISAGREE		25		20	18
DK/NA		5	8	1	1
Total		12024	12089	5719	11428

Phi = 0.48

Science makes our way of life change too fast.

Portugal SCIENCE & TECHNOLOGY WAY OF LIFE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	20	32		21	15
AGREE SOME EXTENT	31	38	67	48	47
NEITHER NOR	19	6		12	23
DISAGREE SOME EXT	7	9	19	6	8
STRONGLY DISAGREE	2	3		3	1
DK/NA	21	13	14	9	6
Total	1000	1000	1000	508	1027

Phi = 0.47

Thanks to science and technology, there will be more opportunities for the future generation.

Portugal SCIENCE & TECHNOLOGY FUTURE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		32		27	15
AGREE SOME EXTENT		34	66	41	50
NEITHER NOR		8		15	21
DISAGREE SOME EXT		7	15	4	6
STRONGLY DISAGREE		3		1	1
DK/NA		16	19	13	7
Total		1000	1000	508	1027

Phi = 0.48

Science makes our way of life change too fast.

EU11 SCIENCE & TECHNOLOGY WAY OF LIFE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE	26	23		22	19
AGREE SOME EXTENT	34	35	61	35	36
NEITHER NOR	14	9		18	19
DISAGREE SOME EXT	14	18	28	17	18
STRONGLY DISAGREE	6	8		7	6
DK/NA	5	6	11	2	2
Total	10678	12024	12089	5719	11428

Phi = 0.42

Thanks to science and technology, there will be more opportunities for the future generation.

EU11 SCIENCE & TECHNOLOGY FUTURE(A)

	1989	1992	2001	2005	2010
STRONGLY AGREE		27		35	27
AGREE SOME EXTENT		40	74	41	47
NEITHER NOR		8		13	14
DISAGREE SOME EXT		11	12	7	6
STRONGLY DISAGREE		5		2	2
DK/NA		9	13	3	3
Total		12024	12089	5719	11428

Phi = 0.47

In which of the following areas is the European Community itself active?

Portugal EC ACTIVITIES IN AGRICULTURE

	1989	1992	2001	2005	2010
ACTIVE	35	51	35		
NON ACTIVE	65	49	65		
Total	1000	1000	1000		

Phi = 0.15

Portugal EC ACTIVITIES IN ENERGY

	1989	1992	2001	2005	2010

ACTIVE	9	28	14		
NON ACTIVE	91	72	86		
Total	1000	1000	1000		

Phi = 0.22

Portugal EC ACTIVITIES IN SCIENCE&TECHNOLOGY

	1989	1992	2001	2005	2010
ACTIVE	8	33	18		
NON ACTIVE	92	67	82		
Total	1000	1000	1000		

Phi = 0.27

Portugal EC ACTIVITIES IN ENVIRONMENT

	1989	1992	2001	2005	2010
ACTIVE	16	34	38		
NON ACTIVE	84	66	62		
Total	1000	1000	1000		

Phi = 0.21

Portugal EC ACTIVITIES IN DEFENCE

	1989	1992	2001	2005	2010
ACTIVE	9	27	19		
NON ACTIVE	91	73	82		
Total	1000	1000	1000		

Phi = 0.18

In which of the following areas is the European Community itself active?

EU11 EC ACTVITIES IN AGRICULTURE

	1989	1992	2001	2005	2010
ACTIVE	49	64	64		
NON ACTIVE	51	36	36		
NA/DK	0	0	0		
Total	10678	12024	12089		

Phi = 0.14

EU11 EC ACTIVITIES IN ENERGY

	1989	1992	2001	2005	2010
ACTIVE	20	31	37		
NON ACTIVE	80	69	63		
NA/DK	0	0	0		
Total	10678	12024	12089		

Phi = 0.15

EU11 EC ACTIVITIES IN SCIENCE&TECHNOLOGY

	1989	1992	2001	2005	2010
ACTIVE	20	36	41		
NON ACTIVE	80	64	59		
NA/DK	0	0	0		
Total	10678	12024	12089		

Phi = 0.19

EU11 EC ACTIVITIES IN ENVIRONMENT

	1989	1992	2001	2005	2010
ACTIVE	30	47	54		
NON ACTIVE	70	53	46		
NA/DK	0	0	0		
Total	10678	12024	12089		

Phi = 0.20

EU11 EC ACTIVITIES IN DEFENCE

	1989	1992	2001	2005	2010
ACTIVE	17	33	44		
NON ACTIVE	83	67	56		
NA/DK	0	0	0		
Total	10678	12024	12089		

Phi = 0.24

For each of the following fields, could you tell me whether you think Europe is ahead of, behind, or at the same level as the United States?

Portugal RESEARCH EUR-USASCIENTIFIC DISCOV

	1989	1992	2001	2005	2010
AHEAD	10	13		5	
BEHIND	42	49		56	
SAME LEVEL	18	16		20	
DK NA	30	22		18	
Total	1000	1000		1009	

Phi = 0.17

Portugal RESEARCH EUR-USA INDUSTR TECHNOLOGY

	1989	1992	2001	2005	2010
AHEAD	8	12		6	
BEHIND	42	49		54	
SAME LEVEL	20	17		20	
DK NA	30	22		19	
Total	1000	1000		1009	

Phi = 0.15

Portugal RESEARCH EUR-USA LIFE TECHNOLOGY

	1989	1992	2001	2005	2010
AHEAD	7	16		7	
BEHIND	42	40		52	
SAME LEVEL	21	19		22	
DK NA	30	25		20	
Total	1000	1000		1009	

Phi = 0.18

For each of the following fields, could you tell me whether you think Europe is ahead of, behind, or at the same level as the United States?

EU11 RESEARCH EUR-USA SCIENTIFIC DISCOV

	1989	1992	2001	2005	2010
AHEAD	12	16		12	
BEHIND	48	48		51	
SAME LEVEL	26	26		28	
DK NA	13	11		9	
Total	10678	12024		11445	

Phi = 0.07

EU11 RESEARCH EUR-USA INDUSTR TECHNOLOGY

	1989	1992	2001	2005	2010
AHEAD	14	17		14	
BEHIND	45	42		48	
SAME LEVEL	26	27		27	
DK NA	15	14		11	
Total	10678	12024		11445	

Phi = 0.07

EU11 RESEARCH EUR-USA LIFE TECHNOLOGY

	1989	1992	2001	2005	2010
AHEAD	12	16		14	
BEHIND	48	43		45	
SAME LEVEL	25	27		31	
DK NA	16	14		10	
Total	10678	12024		11445	

Phi = 0.09

Portugal MARITAL STATUS

	1989	1992	2001	2005	2010
SINGLE	28	29	25	18	18
MARRIED/LIVING AS MARRIED	61	59	60	59	63
DIVORCED/SEPARATED/WIDOWED	11	12	15	23	17
DK/NA	0	0	0	0	1
Total	1000	1000	1000	1009	1027

Phi = 0.17

Portugal SEX

	1989	1992	2001	2005	2010
MALE	48	47	46	41	46
FEMALE	52	53	54	59	54
Total	1000	1000	1000	1009	1027

Phi = 0.05

Portugal AGE EDUCATION

	1989	1992	2001	2005	2010
14 YEARS OR YOUNGER	66	53	60	53	51
15 YEARS	7	4	5	4	6
16 YEARS	6	5	5	6	5
17 YEARS	3	6	5	4	5
18 YEARS	4	7	6	6	6
19 YEARS	2	3	2	3	2
20 YEARS	2	3	4	3	2
21 YEARS	1	1	2	1	2
22 YEARS OR OLDER	3	5	3	8	14
STILL STUDYING	7	12	9	6	0
NEVER STUDIED	0	0	0	1	9
DK/NA	0	0	0	7	0
Total	1000	1000	1000	1009	1027

Phi = 0.42

Portugal AGE EDUCATION RECODED

	1989	1992	2001	2005	2010
UP TO 15 YEARS	73	57	65	56	56
16-19 YEARS	15	22	18	19	18
20+ YEARS	6	9	8	12	11
STILL STUDYING	7	12	9	6	9
NEVER STUDIED/NA	0	0	0	8	6
Total	1000	1000	1000	1009	1027

Phi = 0.25

EU11 MARITAL STATUS

	1989	1992	2001	2005	2010
SINGLE	26	26	25	20	21
MARRIED/LIVING AS MARRIED	62	62	58	63	62
DIVORCED/SEPARATED/WIDOWED	12	13	15	16	15
DK/NA	0	0	2	1	2
Total	10678	12024	12089	11445	11428

Phi = 0.11

EU11 SEX

	1989	1992	2001	2005	2010
MALE	49	49	48	46	48
FEMALE	51	51	52	54	52
Total	10678	12024	12089	11445	11428

Phi = 0.02

EU11 AGE EDUCATION

	1989	1992	2001	2005	2010
14 YEARS OR YOUNGER	26	22	17	17	15
15 YEARS	9	8	8	7	6
16 YEARS	11	13	13	10	11
17 YEARS	8	8	8	7	7
18 YEARS	11	12	13	12	14
19 YEARS	5	5	6	6	7
20 YEARS	4	5	5	6	5
21 YEARS	4	4	4	5	5
22 YEARS OR OLDER	11	13	16	20	22
STILL STUDYING	11	11	10	9	0
NEVER STUDIED	0	0	0	0	9
DK/NA	0	0	0	1	0
Total	10678	12024	12089	11445	11428

Phi = 0.34

EU11 AGE EDUCATION RECODED

	1989	1992	2001	2005	2010
UP TO 15 YEARS	35	31	25	24	21
16-19 YEARS	35	37	40	36	38
20+ YEARS	19	21	24	30	31
STILL STUDYING	11	11	10	9	9
NEVER STUDIED/NA	0	0	0	2	2
Total	10678	12024	12089	11445	11428

Phi = 0.17

Portugal AGE EXACT

	1989	1992	2001	2005	2010
Minimum	15	15	15	15	15
Maximum	89	89	90	94	92
Mean	42	43	45	50	47
Std. Deviation	18	20	19	19	19
Total	1000	1000	1000	1009	1027

Portugal AGE RECODED - 4 GROUPS

	1989	1992	2001	2005	2010
15-24	21	24	21	10	15
25-39	26	26	24	24	25
40-54	25	18	22	23	25
55 AND MORE	28	32	34	43	35
Total	1000	1000	1000	1009	1027

Phi = 0.16

Portugal OCCUPATION OF RESPONDENT

	1989	1992	2001	2005	2010
FARMER	5	5	2	1	1
FISHERMAN	0	0	0	0	0
PROFESSIONAL	0	1	0	1	1
EMPLOYED PROFESSIONAL	1	2	1	2	1
OWNER OF SHOP	8	10	5	3	4
BUSINESS PROPIETOR	0	1	1	1	1
MANAGEMENT	3	4	3	7	5
SUPERVISOR	2	0	0	1	0
MANUAL WORKER	21	18	23	21	20
OTHER (AT DESK, TRAVELLING, SERVICE, ETC)	16	12	15	12	11
MILITARY SERVICE	1	0	0	0	0
HOUSEWIFE NOT EMPLOYED	18	12	12	8	7
STUDENT	5	12	9	6	9
UNEMPLOYED	3	4	5	6	13
RETIRED	18	21	25	33	25
Total	1000	1000	1000	1009	1027

Phi = 0.32

EU11 AGE EXACT

	1989	1992	2001	2005	2010
Minimum	15	15	15	15	15
Maximum	97	94	99	96	98
Mean	44	43	44	47	48
Std. Deviation	18	18	18	18	18
Total	10678	12024	12089	11445	11428

EU11 AGE RECODED - 4 GROUPS

	1989	1992	2001	2005	2010
15-24	19	18	16	12	12
25-39	30	30	28	26	24
40-54	23	24	24	27	26
55 AND MORE	27	29	31	35	38
Total	10661	12024	12089	11445	11428

Phi = 0.11

EU11 OCCUPATION OF RESPONDENT

	1989	1992	2001	2005	2010
FARMER	3	2	1	1	1
FISHERMAN	0	0	0	0	0
PROFESSIONAL	2	1	1	2	2
EMPLOYED PROFESSIONAL	2	1	1	2	2
OWNER OF SHOP	5	4	4	3	3
BUSINESS PROPIETOR	0	2	1	2	2
MANAGEMENT	8	8	8	9	8
SUPERVISOR	1	1	1	1	1
DK NA	1	0	0	0	0
MANUAL WORKER	14	13	15	12	12
OTHER (AT DESK, TRAVELLING, SERVICE, ETC)	12	15	18	18	18
MILITARY SERVICE	0	0	0	0	0
HOUSEWIFE NOT EMPLOYED	20	16	12	13	10
STUDENT	10	10	11	9	9
UNEMPLOYED	5	7	6	5	7
RETIRED	16	19	21	22	26
Total	10678	12024	12089	11445	11428

Phi = 0.19

Portugal TYPE OF COMMUNITY

	1989	1992	2001	2005	2010
RURAL/VILLAGE	45	48	40	33	44
SMALL/MIDDLE TOWN	26	26	28	40	40
LARGE TOWN	30	26	32	26	15
DK/NA	0	1	1	1	1
Total	1000	1000	1000	1009	1027

Phi = 0.19

Portugal RELIGION - DENOMINATION

	1989	1992	2001	2005	2010
ROMAN CATHOLIC	89	91		89	
PROTESTANT/OTHER CHRISTIANS	1	0		1	
ORTHODOX	0	0		0	
JEWISH	0	0		0	
MUSLIM	0	0		0	

BUDDHIST	0	0	0	
HINDU	0	0	0	
OTHER	1	1	1	
NONE/DK/NA	10	8	8	
Total	1000	1000	1009	

Phi = 0.09

EU11 TYPE OF COMMUNITY

	1989	1992	2001	2005	2010
RURAL/VILLAGE	37	35	32	34	33
SMALL/MIDDLE TOWN	35	36	37	38	39
LARGE TOWN	28	28	30	28	28
DK/NA	0	1	1	0	0
Total	10678	12024	12089	11445	11428

Phi = 0.07

EU11 RELIGION - DENOMINATION

	1989	1992	2001	2005	2010
ROMAN CATHOLIC	50	45		45	
PROTESTANT/OTHER CHRISTIANS	22	20		21	
ORTHODOX	9	8		9	
JEWISH	0	0		0	
MUSLIM	0	0		1	
BUDDHIST	0	0		0	
HINDU	0	0		0	
OTHER	1	2		2	
NONE/DK/NA	18	25		21	
Total	10678	12024		11445	

Phi = 0.11

Appendix V

Codebook Comparing Portuguese Regions

NEWS INTEREST - SPORTS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY INTERESTED	26	25	27	25
MODERATELY INTEREST	33	37	34	36
NOT AT ALL INTEREST	39	37	39	36
DK	1	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.06

NEWS INTEREST - POLITICS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY INTERESTED	11	12	16	11
MODERATELY INTEREST	38	37	37	40
NOT AT ALL INTEREST	49	50	46	47
DK	2	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.09

NEWS INTEREST - NEW MEDICAL DISCOVERIES * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY INTERESTED	16	25	28	17
MODERATELY INTEREST	51	49	51	56
NOT AT ALL INTEREST	30	24	19	24
DK	3	1	1	3
Total	1469	869	1228	470

1989, 1992, 2005, 2010

Phi = 0.16

NEWS INTEREST - NEW TECHNOLOGIES * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY INTERESTED	18	19	23	14
MODERATELY INTEREST	40	42	49	49
NOT AT ALL INTEREST	38	36	25	34
DK	4	4	2	4
Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.13

NEWS INTEREST -SCIENTIFIC DISCOVERIES * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY INTERESTED	14	21	25	17
MODERATELY INTEREST	35	36	39	37
NOT AT ALL INTEREST	48	40	34	43
DK	3	2	2	3
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.15

NEWS INFO LEVEL - SPORTS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY WELL	23	18	23	19
MODERATELY WELL	35	39	35	37
POORLY	41	42	41	42
DK/NA	1	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.07

NEWS INFO LEVEL - POLITICS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY WELL	9	7	11	8
MODERATELY WELL	40	41	41	40
POORLY	49	51	47	50
DK/NA	1	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.08

NEWS INFO LEVEL - MEDICAL DISCOV * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY WELL	4	6	6	3
MODERATELY WELL	43	50	56	44
POORLY	52	44	36	51
DK/NA	2	1	1	3
Total	1469	869	1228	470

1989, 1992, 2005, 2010

Phi = 0.15

NEWS INFO LEVEL - NEW TECHNOLOGIES * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY WELL	6	3	6	1
MODERATELY WELL	40	48	52	40
POORLY	52	49	40	57
DK/NA	3	1	1	2
Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.15

NEWS INFO LEVEL - SCIENTIF DISCOV * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VERY WELL	8	9	14	10
MODERATELY WELL	29	37	41	26
POORLY	60	54	45	61
DK/NA	3	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.17

CULT INST VISIT - SCIEN TECH MUSEUM * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VISITED	8	7	10	4
NEVER VISITED	91	92	90	94
DK NA	0	1	1	2
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.10

CULT INST VISIT - ZOO AQUARIUM * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VISITED	22	13	28	15
NEVER VISITED	78	87	71	85
DK NA	0	0	0	0
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.15

CULT INST VISIT - NATURAL HIS MUSEUM * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VISITED	11	7	16	11
NEVER VISITED	88	92	83	87
DK NA	1	1	1	2
Total	713	382	686	219

1989, 1992

Phi = 0.11

CULT INST VISIT - PUBLIC LIBRARY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VISITED	19	14	18	16
NEVER VISITED	81	85	82	84
DK NA	0	1	0	0
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.06

CULT INST VISIT - ART MUSEUM * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
VISITED	12	9	14	7
NEVER VISITED	88	90	85	93
DK NA	0	1	0	0
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.09

KNOWLEDGE - CENTRE OF EARTH * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	65	65	81	76
FALSE	9	8	5	10
DK NA	26	27	14	15
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.17

KNOWLEDGE - OXYGEN * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	79	84	87	78
FALSE	8	6	6	12
DK NA	13	10	7	10
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.12

KNOWLEDGE - RADIOACTIVE MILK * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	16	19	15	16
FALSE	31	32	47	41
DK NA	53	49	38	43
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.16

KNOWLEDGE - ELECTRONS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	25	29	39	27
FALSE	13	11	15	9
DK NA	62	61	46	63
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.16

KNOWLEDGE - CONTINENTS MOVING * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	48	57	70	63
FALSE	13	9	9	9
DK NA	39	34	21	29
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.19

KNOWLEDGE - GENE DECIDING SEX * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	40	47	50	31
FALSE	21	17	20	25
DK NA	39	36	30	44
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.14

KNOWLEDGE - EARLIEST HUMANS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	25	25	28	27
FALSE	31	38	42	29
DK NA	44	37	31	43
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.13

KNOWLEDGE - ANTIBIOTICS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	49	53	61	57
FALSE	14	16	18	15
DK NA	37	31	21	29
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.15

KNOWLEDGE - LASERS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	17	19	26	17
FALSE	17	18	26	19
DK NA	65	63	48	65
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.16

KNOWLEDGE - RADIOACTIVITY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	27	33	36	31
FALSE	23	24	34	26
DK NA	50	43	30	43
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.17

KNOWLEDGE - HUMAN BEINGS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
TRUE	56	62	61	66
FALSE	16	10	20	13
NA	29	28	19	21
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.13

KNOWLEDGE EARTH MOVEMENT - SUN * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SUN ORBITS EARTH	24	23	17	29
EARTH ORBITS SUN	65	66	77	60
DK NA	12	11	7	10
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.13

KNOWLEDGE EARTH MOVEMENT - TIME * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
YEAR	43	46	55	51
MONTH	20	18	20	17
DK NA	26	24	18	23
INAP	11	12	7	9
Total	1425	798	1305	481

1989, 1992, 2001, 2005

Phi = 0.12

SCIENCE OPINION ECONOMICS(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	46	44	51	64
NOT SCIENTIFIC	35	32	36	23
DK/NA	20	24	13	14
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.15

SCIENCE OPINION MEDICINE(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	83	84	93	89
NOT SCIENTIFIC	6	2	1	2
DK/NA	11	14	5	9
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.16

SCIENCE OPINION PSYCHOLOGY(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	65	60	73	76
NOT SCIENTIFIC	12	14	15	7
DK/NA	22	26	12	17
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.16

SCIENCE OPINION BIOLOGY(B) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	65	67	84	82
NOT SCIENTIFIC	10	6	3	3
DK/NA	24	27	13	16
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.22

SCIENCE OPINION ASTRONOMY(B) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	65	60	76	76
NOT SCIENTIFIC	11	10	12	8
DK/NA	24	30	12	16
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.18

SCIENCE OPINION HISTORY(B) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	50	51	51	61
NOT SCIENTIFIC	32	28	38	28
DK/NA	18	21	11	12
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.13

SCIENCE OPINION PHYSICS(B) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	71	69	85	83
NOT SCIENTIFIC	8	7	4	5
DK/NA	22	24	11	12
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.17

SCIENCE OPINION ASTROLOGY(B) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	54	52	55	62
NOT SCIENTIFIC	21	20	31	23
DK/NA	25	29	14	15
Total	1052	599	962	396

1992, 2001, 2005

Phi = 0.17

SCIENCE OPINION MATHEMATICS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	62	70	70	80
NOT SCIENTIFIC	20	11	19	8
DK/NA	18	18	11	11
Total	712	416	619	262

2001, 2005

Phi = 0.16

SCIENCE OPINION HOMEOPATHY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SCIENTIFIC	44	38	61	70
NOT SCIENTIFIC	11	14	17	6
DK/NA	44	47	22	23
Total	369	239	277	124

2005

Phi = 0.26

SCIENTIFIC DRUG TEST EVALUATION * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
1ST SCIENTIST	22	18	20	20
2ND SCIENTIST	36	49	46	43
3RD SCIENTIST	15	14	16	16
DK/NA	28	20	18	20
Total	683	360	685	272

1992, 2001

Phi = 0.13

KNOWLEDGE HEREDITARY DISEASE RISK * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
3 CHILDREN OK	7	5	9	4
1ST CHILD SICK	13	9	10	11
SAME RISK EACH	33	46	49	53
4TH CHILD SICK	9	10	10	7
DK NA	37	30	22	24
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.19

SCIENCE & TECHNOLOGY LIFECOMFORT(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	16	17	24	16
AGREE SOME EXTENT	40	45	44	49
NEITHER NOR	12	12	7	9
DISAGREE SOME EXT	12	10	13	11
STRONGLY DISAGREE	3	1	2	1
DK/NA	18	15	11	14
Total	1433	806	1295	480

1989, 1992, 2001, 2005, 2010

Phi = 0.16

SCIENCE & TECHNOLOGY RESOURCES(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	5	5	4	2
AGREE SOME EXTENT	21	23	25	19
NEITHER NOR	13	12	9	14
DISAGREE SOME EXT	30	31	29	32
STRONGLY DISAGREE	11	9	20	16
DK/NA	20	20	14	17
Total	1252	729	1087	460

1992, 2001, 2005, 2010

Phi = 0.16

SCIENCE & TECHNOLOGY FAITH(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	11	8	17	7
AGREE SOME EXTENT	38	43	33	39
NEITHER NOR	17	18	11	17
DISAGREE SOME EXT	13	13	20	14
STRONGLY DISAGREE	4	2	6	3
DK/NA	17	15	12	20
Total	1625	928	1430	545

1989, 1992, 2001, 2005, 2010

Phi = 0.19

SCIENCE & TECHNOLOGY ENVIRONMENT(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	4	5	5	2
AGREE SOME EXTENT	24	22	26	20
NEITHER NOR	14	14	8	15
DISAGREE SOME EXT	29	33	31	33
STRONGLY DISAGREE	9	7	16	13
DK/NA	20	19	15	17
Total	1252	729	1087	460

1992, 2001, 2005, 2010;

Phi = 0.16

SCIENCE & TECHNOLOGY ANIMALS(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	11	8	13	10
AGREE SOME EXTENT	38	53	40	46
NEITHER NOR	13	10	8	11
DISAGREE SOME EXT	15	13	18	13
STRONGLY DISAGREE	8	3	11	7
DK/NA	16	12	10	13
Total	1252	729	1087	460

1992, 2001, 2005, 2010

Phi = 0.18

SCIENCE & TECHNOLOGY RESEARCHERS(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	13	12	16	13
AGREE SOME EXTENT	45	54	44	43
NEITHER NOR	10	11	7	13
DISAGREE SOME EXT	11	10	16	16
STRONGLY DISAGREE	4	1	4	2
DK/NA	18	12	13	13
Total	1257	726	1090	462

1992, 2001, 2005, 2010

Phi = 0.15

SCIENCE & TECHNOLOGY WORK(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	11	9	18	14
AGREE SOME EXTENT	47	52	48	48
NEITHER NOR	12	13	8	12
DISAGREE SOME EXT	10	10	11	10
STRONGLY DISAGREE	2	1	1	1
DK/NA	18	15	13	15
Total	1257	726	1090	462

1992, 2001, 2005, 2010

Phi = 0.14

SCIENCE & TECHNOLOGY DAILY LIFE(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	17	8	11	11
AGREE SOME EXTENT	34	39	34	37
NEITHER NOR	12	14	9	13
DISAGREE SOME EXT	20	26	26	22
STRONGLY DISAGREE	9	6	15	10
DK/NA	9	6	6	6
Total	1257	726	1090	462

1992, 2001, 2005, 2010

Phi = 0.17

SCIENCE & TECHNOLOGY DAILY LIFE(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	16	8	11	11
AGREE SOME EXTENT	34	39	33	37
NEITHER NOR	12	14	9	13
DISAGREE SOME EXT	20	26	26	22
STRONGLY DISAGREE	9	6	15	10
DK/NA	9	6	6	6
Total	1257	726	1090	462

1989, 1992, 2001, 2005, 2010

Phi = 0.17

SCIENCE & TECHNOLOGY FUTURE(A) * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
STRONGLY AGREE	15	14	22	19
AGREE SOME EXTENT	47	53	47	51
NEITHER NOR	11	11	8	10
DISAGREE SOME EXT	9	7	10	7
STRONGLY DISAGREE	2	0	1	1
DK/NA	16	14	12	11
Total	1257	726	1090	462

1992, 2001, 2005, 2010

Phi = 0.13

EC ACTIVITIES IN SCIENCE&TECHNOLOGY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ACTIVE	17	19	24	16
NON ACTIVE	83	81	76	84
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.08

EC ACTIVITIES IN ENERGY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ACTIVE	17	17	19	12
NON ACTIVE	84	83	81	88
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.05

EC ACTIVITIES IN SCIENCE&TECHNOLOGY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ACTIVE	17	19	24	16
NON ACTIVE	83	81	76	84
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.09

EC ACTIVITIES IN ENVIRONMENT * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ACTIVE	28	32	32	22
NON ACTIVE	72	68	68	78
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.08

EC ACTIVITIES IN DEFENCE * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ACTIVE	18	17	21	13
NON ACTIVE	82	83	79	87
Total	1056	559	1028	357

1989, 1992, 2001

Phi = 0.06

RESEARCH EUR-USASCIENTIFIC DISCOV * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
AHEAD	8	9	13	7
BEHIND	50	50	47	54
SAME LEVEL	18	14	21	19
DK NA	24	27	20	21

Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.11

RESEARCH EUR-USA INDUSTR TECHNOLOGY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
AHEAD	9	9	9	3
BEHIND	47	46	49	56
SAME LEVEL	19	17	22	17
DK NA	25	28	20	23
Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.11

RESEARCH EUR-USA LIFE TECHNOLOGY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
AHEAD	11	8	12	6
BEHIND	42	45	45	52
SAME LEVEL	20	19	23	19
DK NA	28	28	21	24
Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.11

MARITAL STATUS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
SINGLE	23	22	25	23
MARRIED/LIVING AS MARRIED	62	62	59	59
DIVORCED/SEPARATED/WIDOWED	14	16	16	17
DK/NA	1	0	0	0
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.05

SEX * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
MALE	47	45	44	47
FEMALE	53	55	56	53
Totlal	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.03

AGE EDUCATION * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
14 YEARS OR YOUNGER	63	61	47	53
15 YEARS	6	3	6	3
16 YEARS	5	5	6	5
17 YEARS	3	4	6	5
18 YEARS	5	5	8	6
19 YEARS	2	3	3	4
20 YEARS	2	3	3	4
21 YEARS	1	2	2	1
22 YEARS OR OLDER	4	7	8	8
STILL STUDYING	6	5	9	6
NEVER STUDIED	2	2	2	3
DK/NA	1	1	1	2
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.18

AGE EDUCATION RECODED * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
UP TO 15 YEARS	69	64	53	56
16-19 YEARS	15	17	22	19
20+ YEARS	6	10	12	11
STILL STUDYING	7	7	10	9
NEVER STUDIED/NA	2	3	3	5
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.15

AGE EXACT

	North	Centre	Lisboa e Vale do Tejo	South and Islands
Minimum	15	15	15	15
Maximum	92	91	88	94
Mean	44	48	45	47
Std. Deviation	19	20	19	19
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

AGE RECODED - 4 GROUPS * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
15-24	20	16	18	16
25-39	27	24	25	22
40-54	23	20	23	24
55 AND MORE	30	41	34	38
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.09

OCCUPATION OF RESPONDENT * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
FARMER	5	2	1	2
FISHERMAN	0	0	0	0
PROFESSIONAL	1	1	1	1
EMPLOYED PROFESSIONAL	1	1	1	1
OWNER OF SHOP	6	5	5	6
BUSINESS PROPIETOR	1	1	1	0
MANAGEMENT	3	4	6	6
SUPERVISOR	1	1	1	0
MANUAL WORKER	25	19	18	19
OTHER (AT DESK, TRAVELLING, SERVICE, ETC)	11	9	18	13
MILITARY SERVICE	0	0	0	0
HOUSEWIFE NOT EMPLOYED	11	13	10	12
STUDENT	7	7	10	9
UNEMPLOYED	8	7	5	5
RETIRED	20	30	25	26
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.21

TYPE OF COMMUNITY * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
RURAL/VILLAGE	50	63	19	39
SMALL/MIDDLE TOWN	29	22	37	44
LARGE TOWN	21	14	43	16
DK/NA	0	0	2	0
Total	1812	1046	1570	608

1989, 1992, 2001, 2005, 2010

Phi = 0.38

RELIGION - DENOMINATION * Portuguese regions

	North	Centre	Lisboa e Vale do Tejo	South and Islands
ROMAN CATHOLIC	94	96	80	89
PROTESTANT/OTHER CHRISTIANS	0	0	2	1
ORTHODOX	0	0	0	0
JEWISH	0	0	0	0
MUSLIM	0	0	0	0
BUDDHIST	0	0	0	0
HINDU	0	0	0	0
OTHER	1	0	2	1
NONE/DK/NA	4	3	16	9
Total	1082	621	963	343

1989, 1992, 2005

Phi = 0.24

REGION2 and RegionPort

	North	Centre	Lisboa e Vale do Tejo	South and Islands
North	1812	0	0	0
Centre	0	1046	0	0
Lisboa e Vale do Tejo	0	0	1570	0
Alentejo	0	0	0	323
Algarve	0	0	0	188
Acores	0	0	0	47
Madeira	0	0	0	50
Total	1812	1046	1570	608