LSE Middle East Centre

KUWAIT PROGRAMME

# WORLDVIEWS AND ATTITUDES TO SCIENCE IN KUWAIT

## THE ENGAGEMENT THRESHOLD HYPOTHESIS

Martin W. Bauer, Mohammad Sartawi and Gordon Sammut

LSE Middle East Centre Kuwait Programme Paper Series | 27 | June 2024

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# Worldviews and Attitudes to Science in Kuwait: The Engagement Threshold Hypothesis

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## About the Authors

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## Abstract

Between 2021–3, a research project was undertaken to explore more effective ways to design policy in science-related domains such as clean energy, the environment, and public health. The project involved two studies; one that analysed existing policy documents and media coverage concerned with the environment and public health, and the other that surveyed Kuwaiti attitudes towards science and explored their worldviews (the ways in which individuals make sense of and experience the world in general). The researchers hypothesised that a mismatch between worldviews held by the public and those represented in policy will result in less effective policies. In addition, the researchers sought to explore the current state of science culture in Kuwait (interest in science, engagement with science, promise and reserve toward science) and whether people with different worldviews differ in their attitudes toward science. Research findings indicate that there is indeed a mismatch between worldviews held by the public and those represented in policy documents and the media. In addition, differences among worldview types in attitudes towards science only appeared among those who are more interested in and engaged with science. These findings can be a useful guide to future policy design in any science-related policy domain.

## Introduction

In this paper we make basic observations on the state of attitudes to science in Kuwait in 2022. These observations are based on two representative surveys of the Kuwait population[1] undertaken as part of the 'Surveying Kuwaiti Worldviews to Promote Science Culture in Kuwait' project.

We initially hypothesised that there is a mismatch between the ways in which science and science policy are being promoted/communicated to the public and the ways in which individuals within the population generally make sense of and experience the world (the concept of worldviews). Our thesis is that understanding prevalent worldviews within a society is essential to promoting policy and influencing individual behaviour in line with said policy. Our focus is on policy concerning any domain related to science (health, clean energy, etc.), which necessitates the exploration of Kuwait's science culture. The project is funded by the LSE Middle East Centre (project MEC-KP-AC-2021-02), initially from October 2021 to September 2022, further extended to April 2023 due to delays in the process of data collection. Two Kuwait representative surveys were conducted in the second half of 2022 (see section: Kuwait Science Culture).

It is useful to make a distinction between 'scientific culture' and 'science culture'. This plays on the dual meaning of 'culture'. On the one hand 'culture' refers to the manner of constituting a productive unit its values and taken for granted norms of operation, i.e. the organisation of things and their modus operandi. In this sense, culture is the outcome or the dependent variable of managerial or policy interventions; we might also call this the perspective 'outside-in'. Managers are thus in a way 'culture workers' who design and maintain productive structures. We might call this the 'scientific culture', stressing the suffix '-fic' which comes from Latin *facere* (to make things).

On the other hand, any such industry responds to the local context in order to succeed. Here, culture means the context of any designs; we might call this the perspective 'inside-out'. This context is beyond short-term control as is the weather or the climate of a location. It requires knowledge and going with the flow. Here 'culture' is the independent variable that requires adaptation for actions to be sustainable. We might call this the 'science culture'. This all assumes a third perspective for which both 'outside-in' and 'inside-out' are perspectives to be observed and compared. What looks like a minor difference in suffix is an index of a key distinction that is relevant for public debates.

[1] Martin W. Bauer et al., 'Worldviews in Kuwait – A Discourse Analysis of Health and Environmental Policy Documents and Selected Media Coverage'(2022) [Project Deliverable 1: Surveying Kuwaiti Worldviews to Promote Science Culture, 26pp].

# Kuwaiti Scientific Culture

Scientific culture – the making of science in the conduct of organisation, theory, and research is nowadays a global affair. Research laboratories all over the world operate on the same materials with identical procedures and similar equipment. They use the same theoretical tools and mathematical formalisms, global mobility of expertise, and communicating to a global peer review process.

The field of Scientometrics assesses the performance of 'scientific culture' in all its diversity through indicators of publication and citations. For economic geographers the issue requires an analysis of the National Innovation System [NIS]. The Kuwaiti National Innovation System might be briefly characterised by three problems:

## Innovation Gap

Kuwait has a very high GDP per head which indicates a rich country in economic terms. However, at the same time Kuwait has rather low R&D expenditure as % of GDP. The literature highlights this eccentric position of Kuwait in the international context: Kuwait innovates far below expectations compared to other economies.[2]

## Educational Crisis

The crisis of the educational system of Kuwait is shared with other Middle Eastern countries. The way education is organised and performed results in a culture of conformism, a lack of freedom to experiment and a place where respect for authority trumps everything else.[3] In the international comparison of mathematics proficiency, i.e. the Trends in International Mathematics and Science Study (TIMMS) study of 2019, 15-year olds in Kuwait scored 383, close to the bottom of the mathematics league table (500 is the midpoint) in keeping with other Middle Eastern countries.[4] The same must be said about the average 'science proficiency' score.[5] This educational context is therefore an issue for the national innovation system.

## Trapped In Still Profitable Fossil Fuel Economy

In terms of principle economics, Kuwait, again like other Middle Eastern countries, is only very slowly transitioning to sustainable energy and related industries. The fossil fuel industry has been its traditional source of economic prosperity.

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[2] Husam Arman et al., 'Breaking Out Of The Innovation Trap? Towards Promoting Private R&d Investment In Kuwait', *LSE Middle East Centre Kuwait Programme Paper Series* 9 (2021). Available at: http://eprints.lse.ac.uk/109010/ (accessed 2 May 2024).)

[3] NZZ, 17 Feb 2022, p. 1

[4] 'TIMSS 2015: International Results In Mathematics', *TIMSS*. Available at: https://timssandpirls.bc.edu/timss2015/international-results/wp-content/uploads/filebase/full%20pdfs/T15-International-Results-in-Mathematics.pdf (accessed 2 May 2024); 'The South African TIMSS 2019, Grade 5 Results, Cape Town, Human Sciences Research Council', *TIMSS*. Available at: https://www.timss-sa.org/wp-content/uploads/2022/03/TIMSS-2019-Grade-5-National-report-FINAL.pdf (accessed 2 May 2024).

[5] 'TIMSS 2015: International Results In Mathematics' *TIMSS*.

## Kuwait Science Culture

A solution to all three issues mentioned above will require a focus on attitudes to science in a modern world across the population of Kuwait. A science culture that includes informed and engaged attitudes to science is an integral part of the National System of Innovation together with finance, skills and institutions.[6] Public attitudes legitimate and support institutions to channel skills, enthusiasm and finance resources towards innovative activities.

The science culture of a country remains primarily a local affair; it is an intangible asset of the country. It has many facets such as an educational system with science education in its curriculum. Science culture maintains the more or less vivid conversation of science in wider society that is fomented and reflected in mass media coverage and reportage of science and technology. The population thus entertains attitudes to science and the respect for scientific authority; science thereby sits among many other societal actors (players) and institutions (pillars).[7]

## Survey Data[8]

Two parallel attitude surveys were conducted of the Kuwaiti population;[9] here are basic details:

### 1. IPSOS Kuwait and Bahrain:

- Sample size: n=400.
- Face-to-face interviews among Kuwaiti nationals only; representative of the Kuwaiti populations with respect to gender, age, location, job status.
- Period of fieldwork: 20 August to end of September 2022.
- Questionnaire with 24 items.
- Languages: English and Arabic (respondent's choice).

[6] Husam Arman et al., 'Breaking Out of the Innovation Trap? Towards Promoting Private R&D Investment in Kuwait', *LSE Middle East Centre Kuwait Programme Paper Series* 9 (2021). Available at: http://eprints.lse.ac.uk/109010/(accessed 4 June 2024).

[7] Martin W. Bauer et al., 'Image, Perception and Cultural Authority of Science – By Way of Introduction', in Maartin Bauer W. et al. (eds) *The Cultural Authority of Science – Comparing across Europe, Asia, Africa and the Americas* (London, Routledge, 2019).

[8] We acknowledge the contributions to the project of Sarah Oufan (design of questionnaires), Aisha Al Sayegh (data integration) and Hannah Bunt (part of analysis).

[9] Martin W. Bauer et al. (2022), 'Worldviews in Kuwait – A Discourse Analysis of Health and Environmental Policy Documents and Selected Media Coverage,' May [project deliverable 1: Surveying Kuwaiti Worldviews to promote Science Culture].

## 2. KANTAR Kuwait online panel survey (operation run out of Cape Town)

- Sample size: n=1000.
- Computer Assisted Interviewing [CAI] from an online panel, representative of the population of the Kuwaiti territory; considering sampling quotas with respect to gender, nationality (Kuwaiti, Arab expats, non-Arab expats), location, job status (full-time, part-time etc.) and employment sector (public, private, freelance).
- Period of fieldwork: 20 September to 19 October 2022.
- Questionnaire with 45 items.
- Languages: English and Arabic (respondent's choice).

*Demographics*: The samples were grouped according to various demographic data. The following are the various demographic variables of interest and how the samples were grouped based on each variable.

*Education*: The sample was divided into three education categories according to educational attainment, the first being primary/secondary education only, the second being bachelors/diploma or equivalent, and the third being postgraduate education.

*Age*: The sample was divided into five age group categories, the first being under 20, the second being 20–29, the third being 30–39, the fourth being 40–49, and the fifth being the over 50 age group.

*Governorate of residence*: Kuwait is divided into six administrative divisions headed by a governor, or *muhafazas* (governorates). These are Al Asimah (the Capital), Hawally, Mubarak Al Kabeer, Farwaniya, Ahmadi, and Jahra.

*The Capital*: As of December 2022, the Public Authority for Civil Information shows a total population of 614,179 for the Capital; 46.8% Kuwaiti and 53.8% non-Kuwaiti, 53.5% male and 46.5% female. It comprises Kuwait City, the country's financial and political centre; the industrial and commercial hub of Shuwaikh and its port, along with the neighbouring residential areas where residents tend to be wealthier, more educated, and more exposed to the broader world.

*Hawally Governorate*: As of December 2022, the Public Authority for Civil Information shows a total population of 989,042 for Hawally; 24.9% Kuwaiti and 75.1% non-Kuwaiti; 56.1% male and 43.9% female. It comprises the commercial hubs of Hawally and Salmiya, along with several residential areas just outside of the suburbs of the Capital governorate.

*Al Ahmadi Governorate*: As of December 2022, the Public Authority for Civil Information shows a total population of 1,023,994 for Ahmadi; 33% Kuwaiti and 67% non-Kuwaiti; 64.7% male and 35.3% female. It contains Kuwait's largest and most productive oil well and is largely industrial with petroleum refineries and ports. It also includes the commercial area of Fuhaiheel. Al Ahmadi governorate extends south along the coast all the way to the southern border with Saudi Arabia. There are several residential areas where real estate is generally more affordable than the Capital or Hawally. The pristine waters and beaches of the very south of Kuwait are also the location of many weekend beach homes or chalets of generally wealthier Kuwaitis.

*Al Jahra Governorate*: As of December 2022, the Public Authority for Civil Information shows a total population of 607,549 for Jahra; 35.5% Kuwaiti and 64.5% non-Kuwaiti; 56.5% male and 43.5% female. It comprises the commercial hub of Jahra, along with several industrial and residential areas. It is the largest of Kuwait's governorates by area (also the least densely populated) and extends northwards and westwards to the Iraqi border, and borders Saudi to the south. It is mostly uninhabited desert.

*Al Farwaniya Governorate*: As of December 2022, the Public Authority for Civil Information shows a total population of 1,191,141 for Farwaniya (the most populous governorate), 21% Kuwaiti and 79% non-Kuwaiti, 70% male and 30% female. It contains the airport, the new Kuwait University campus complex, several industrial and commercial areas, and a few residential areas. It is the only landlocked governorate in Kuwait.

*Mubarak Al Kabeer*: As of December 2022, the Public Authority for Civil Information shows a total population of 306,208 for Mubarak Al Kabeer; 59% Kuwaiti and 41% non-Kuwaiti; 49.7% male and 50.3% female. It is comprised of residential areas only (hence mostly populated by Kuwaitis), with small commercial centres that service the residents of the governorate. It is also Kuwait's newest governorate, announced in 1999.

*Sector of employment*: Participants were grouped into three categories, those who work in the public sector (employs 87% of Kuwaitis who make up 75.4% of the public workforce and 8% of non-Kuwaitis who make up 24.6%), the private sector (comprised of 96% non-Kuwaitis), and freelance/entrepreneurial work.

*Income*: The sample was divided into three groups based on monthly income with those making less than 900 Kuwait Dinar (KD) in the first group, those making between 1000 KD–1999 KD in the second group, and those making more than 2000 KD in the third group.

*Religiosity*: Participants were asked to rate how religious they thought they were with possible responses being 'very religious', 'religious', 'moderate', 'slightly religious', and 'not at all religious'.

## Kuwaiti Worldviews

The notion of worldviews captured the imagination of social researchers at the beginning of the 21st century. The idea for a psychology of worldviews was first mooted by the German psychologist/philosopher Karl Jaspers,[10] in a long essay on the methodology of ideal-types and key dimensions of basic attitudes towards and images of the world [German *Weltanschauungen*, plural for worldviews].

Sammut, Mifsud and Brockdorff[11] propose that policy uptake is contingent, at least in part, on how individuals experience and make sense of the world. In their analysis, they found that individuals who subscribe to particular worldviews were found to be more receptive or resistant to certain policies than others.

[10] Karl Jaspers, *Psychologie der Weltanschauungen* [*the psychology of worldviews*] (Berlin: Springer Verlag, 2019).
[11] Gordon Sammut, Rebekah Mifsud and Noellie Brockdorff, 'The Role of Worldviews in Predicting Support for Recreational Cannabis', *Frontiers in Psychology* (2022).

On that basis, we predict that understanding worldviews is crucial in promoting any policy or culture, and that this should guide any attempts to design policies for more effective uptake. It is for this reason that a survey of worldviews in the population of Kuwait is central to our study. In addition to exploring the landscape of worldviews in Kuwait, we explore if and how they are associated with various science culture indicators and whether they can be operationalised in promoting science culture and designing more effective policy.

## A Typology of Worldviews

Worldviews represent the generalised outlooks individuals adopt to navigate social life and to interpret and make sense of elements and events they encounter in their everyday lives. The current study looks at the distribution of worldviews in Kuwaiti society, analyses these in terms of socio-demographic attributes, and examines their relationship with culture of science. Worldviews can be of 5 types, that is Localised, Pragmatist, Orthodox, Reward and Survivor (see Table 1).

### Table 1: Worldview Types, Representative Statements and Distribution in Sample

| Study Variable | Survey Questions | Questions |
|---|---|---|
| **Localised** | The future depends on us and the choices we make. Every problem has a solution. Each and every one of us can make an effort to fix the laws and institutions so that they can be just and equal for everyone. This is how we can better address the needs of people and society. | 474 (33.8%) |
| **Pragmatist** | In life we must adapt ourselves to our circumstances and sometimes we need to go with the flow to avoid trouble. The rich and powerful protect their own interests, whereas the kind-hearted suffer. Sometimes you must work around the rules to help your loved ones. | 341 (24.3%) |
| **Orthodox** | To succeed in life, we need to follow the rules and local customs to maintain social order. We also need to show respect to each other and carry out our duties. In this way we can help others in our community. | 305 (21.7%) |
| **Reward** | In life, you get what you deserve. Life's challenges are overcome with the efforts we make, and these may offer new opportunities. One must cooperate with others, respect authority, and carry out one's duties. Our efforts will eventually lead to success. | 180 (12.8%) |
| **Survivor** | In life, things rarely end up well. People are what they are, and good people usually suffer and are exploited. It is best for one to keep their head down and get on with it. | 103 (7.3%) |

## The Measurement of Worldviews

In our study, we first asked respondents to rate the extent to which they agreed with each of the five worldview statements in turn on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). We then proceeded to ask respondents which worldview resonated most with their own views. In this way, respondents self-categorised their outlooks by worldview types as detailed above. The distribution of worldviews in our study was as shown in Table 1.

In the first of our two studies, we analysed various policy documents to determine which worldviews were most represented in what policy domains.[12] Based on our findings shown in Table 2, we predict that health policy would be better with uptake since it corresponds to the most common worldviews upheld in Kuwait (Localised and Reward). However, environment policy and media articles were more aligned with worldviews that are less commonly held (Pragmatist and Survivor), and therefore would be less effective.

**Table 2: Worldview Distribution in Text Across Policy Domains**

| Worldview Type | Environment Media | Environment Policy | Health Policy |
|---|---|---|---|
| **Localised** | 0.00% | 13.9% | 56.4% |
| **Reward** | 0.00% | 27.9% | 20.0% |
| **Survivor** | 28.6% | 3.8% | 16.4% |
| **Orthodox** | 14.3% | 16.5% | 5.5% |
| **Pragmatist** | 57.1% | 35.4% | 1.8% |

*Source: [documents n= 13]*

## Kuwaiti Attitudes to Science in 2022

Attitudes to science are globally measured on three core dimensions often with differences in nomenclature.[13] We will characterise Kuwaiti attitudes on these three dimensions (what we call the 3D+ model PREK) and examine how these are related to socio-demographic positions of respondents, and how these dimensions themselves relate to each other. The three core dimensions are engagement [E], evaluation [P,R] and familiarity with science [K], in slightly different ordering these read as PREK.

[12] Bauer et al., 'Worldviews in Kuwait'.

[13] Martin W. Bauer and Bankole Falade, 'Public Understanding of Science: Survey Research Around the World', in: Massimo Bucchi and Brian Trench (eds.), *Routledge Handbook of Public Communication of Science and Technology* (New York: Routledge, 2022), pp. 140–59.

## Engagement with Science [E]: News Attention, Interest in News and Civic Involvement

Engagement with science reflects the conative or motivational aspects of social attitudes. This finds expression in attention paid to science in everyday life, in information gathering, general interests in science topics, and levels of civic involvement with issues related to scientific and technological developments. To assess Kuwait's engagement with science, we use two of our indicators: interest in and civic involvement with science.

Table 3 shows that 52% of respondents stated that they were 'very interested' in new scientific discoveries compared to only about 30% 'very interested' in military and defence policy and 41.7% 'very interested' in the arts. Science seems to get more attention than defence and the arts.

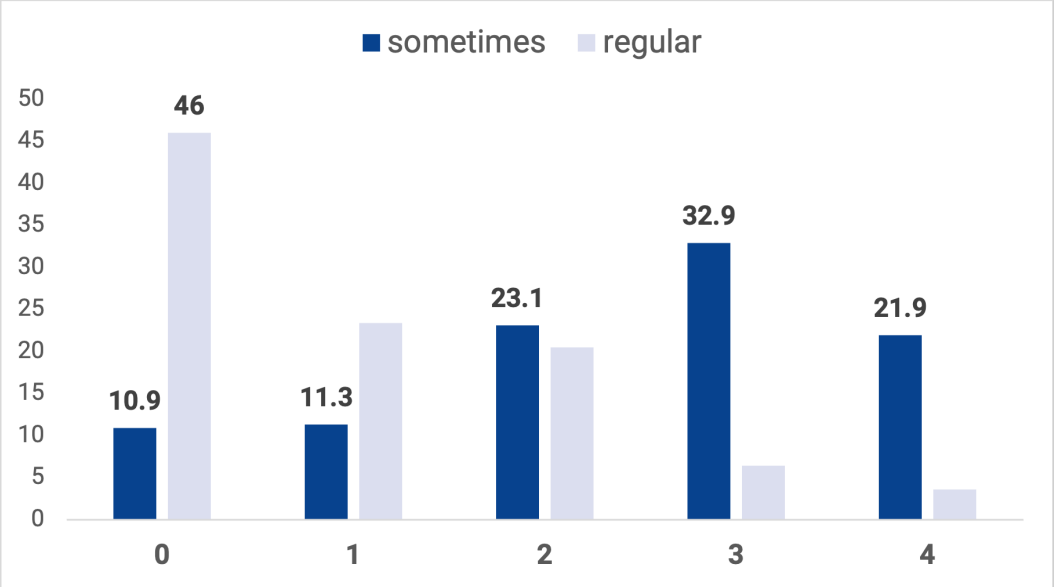
### Table 3: Interest in Different News Topics

| How interested are you in ...? | New science | Defence | Art |
|---|---|---|---|
| **Very interested** | 52.4% | 29.8% | 41.7% |
| **Moderately interested** | 41.8% | 53.5% | 48.6% |
| **Not at all interested** | 5.8% | 16.7% | 9.7% |
| **Orthodox** | 14.3% | 16.5% | 5.5% |

*Source: Kantar, n=1000.*

Civic engagement was measured with four items. The first asking how often one reads about science in newspapers, magazines, or the internet; the second asking how often one talks to friends about science and technology; and the third asking how often one attends public meetings or debates on science and technology, and the fourth asking how often one signs petitions or joins street demonstrations about pollution, climate change, etc. Respondents would choose from the following response options: 'never', 'hardly', 'occasionally', 'regularly', and 'don't know'. We scored 'engagement' by the number of times respondents respond with 'occasional/sometimes' or 'regular' across all four items as shown in Figure 1.

**Figure 1: Different levels 0–4 of forms of engagement with science among Kuwaiti depending on criterion 'regular' or 'sometimes' to read about science, talk, join events, or petition in % of respondents [n=1403]**




## Evaluations of Science: Promise and Reserve [P, R]

Evaluations of science involves casting a judgement. It has become common currency in the literature to consider this under two aspects: utility and deontic value. People can declare expectations and aspirations of a utilitarian nature with respect to science; they expect good and less good things to arise from new developments and engage in a kind of cost/benefit analysis. Or people express preoccupations of a moral and ethical nature regarding developments of science; science can interfere, challenge and jeopardise existing deontic values that are considered important. We call these two aspects 'promise' and 'reserve' with regard to science.

The variable promise [P] assesses respondents' feelings on two items, agreeing or disagreeing on a 4-point or 5-point scale [with a middle option, neither agree nor disagree (NN)] with the following two statements:

- Science and technology will provide more opportunities for the next generation.
- Science and technology make our lives healthier, easier, and more comfortable.

Taken together, 67.5 percent of respondents either 'strongly agree' or 'agree' with the first statement, and 67.8 percent either 'strongly agree' or 'agree' with the second, showing that most respondents felt promise toward the development of science and technology.

This variable reserve [R] is assessed by gauging agreement or disagreement on two items:

- Science makes our way of life change too fast.
- We trust too much in science (technology), and not enough in religious faith.

Taken together, 67.3 per cent of respondents either 'strongly agree' or 'agree' with the first statement, and 53.5 per cent either 'strongly agree' or 'agree' with the second, showing that most respondents also felt some reservation towards the development of science and technology. As we will show, many expect utility and but also show deep seated ambivalence; '*odi et amo*' type, 'I love it and I hate it' [in the words of the ancient Roman poet Catullus]. The two indicators are highly correlated.

In the discussions on attitudes to science, knowledge is often considered to be a driver of positive attitudes according to the elite stereotype 'the more you know, the more you love it'. We consider this misleading because higher knowledge often comes with more critical attitudes. Also, this stereotype misrepresents the logic of attitudes. More usefully, familiarity and knowledge of science is to be considered a quality of the attitude. Judgements and behavioural intentions are based either on a low or high knowledge base. Based on high knowledge and definite images, they are 'resistant to change'; familiarity is an index of 'crystallised attitudes'. Judgements and interests based on diffuse knowledge or unclear images of science are more likely to shift with additional information.

### Table 4: Correlation Matrix of Promise, Reserve, Evaluation, Knowledge or PREK Indicators

| How interested are you in ...? | R | E Sometime | K2 |
|---|---|---|---|
| P = Promise [hi = high] | .614** | -.057* | .055* |
| R = Reverse [hi = lots] | 1 | -0.048 | -0.045 |
| Engage sometime | | | .068* |

The high correlation, as shown in table 4 [r=0.614], between P and R suggests that Kuwait is expressive of an '*Odi et Amo*' culture of science. Ambivalence is the rule; people hold at the same time high expectations of science as they have strong reservations, or they have no expectations nor reservations. The same pattern of prevalent ambivalence can be observed in Southeast Europe.[14] By contrast, the correlation of P or R with knowledge [K2] is low, equally with engagement. Engagement with science seems to be negatively correlated with having high expectations of science. Highly engaged Kuwaitis are slightly more sceptical of science.

[14] Martin W. Bauer et al., 'Image, Perception and Cultural Authority of Science', pp. 301–18.

## Familiarity with Science

Familiarity with science is the third dimension of attitudes to science and it has gained much attention in the past as 'science literacy' or knowledge of science, mostly measured by way of a knowledge quiz. Correct answers according to scientific textbook authority are then counted to score points on a scale. We prefer to talk of 'familiarity with science' as a measure of psychological distance from science; people are familiar with a basic vocabulary of science that is used to express simple facts. Here we are also open to consider other forms of beliefs and images of science that are cognitive in nature but not necessarily factual, such as technocracy tolerance [TT], and cognitive styles of holistic versus categorical thinking.

We assess familiarity with science on a knowledge quiz with two items which are as follows (we presented the items with graded responses 'probable' 'very probable', 'improbable' or 'very improbable' to gauge the sensitivity of results to different question wording):

- The centre of the earth is very hot [earth; physics, true=correct]
- Antibiotics kill viruses as well as bacteria [antibiotics, biology, false=correct]

We report the results on these two items in combination (Table 5); they combine into a 3-point score (k2 = earth + antibiotics).

**Table 5: Familiarity with Science Expressed by Score K2 for both IPSOS and Kantar 2022 [n=1403]**

| K2 | Correct | Frequency | % |
|---|---|---|---|
| **None** | 0 | 187 | 13.3 |
| **Earth or Antibiotics** | 1 | 910 | 64.9 |
| **Earth and Antibiotics** | 2 | 306 | 21.8 |

## Technocracy Tolerance [TT]

The two statements 'we have no option but to trust those who govern science' and 'scientists know best what is good for the country' can be taken as an indicator of technocracy tolerance if people agree to this. Technocracy asks people to defer public decisions to experts and accept expert authority without questions being asked. This expectations among elites are more or less tolerated in a society. In other words, technocracy tolerance if you agree, or intolerance if you disagree.

- We have no option but to trust those governing science [no option trust].
- Scientists know best what is good for the public/country [deference]

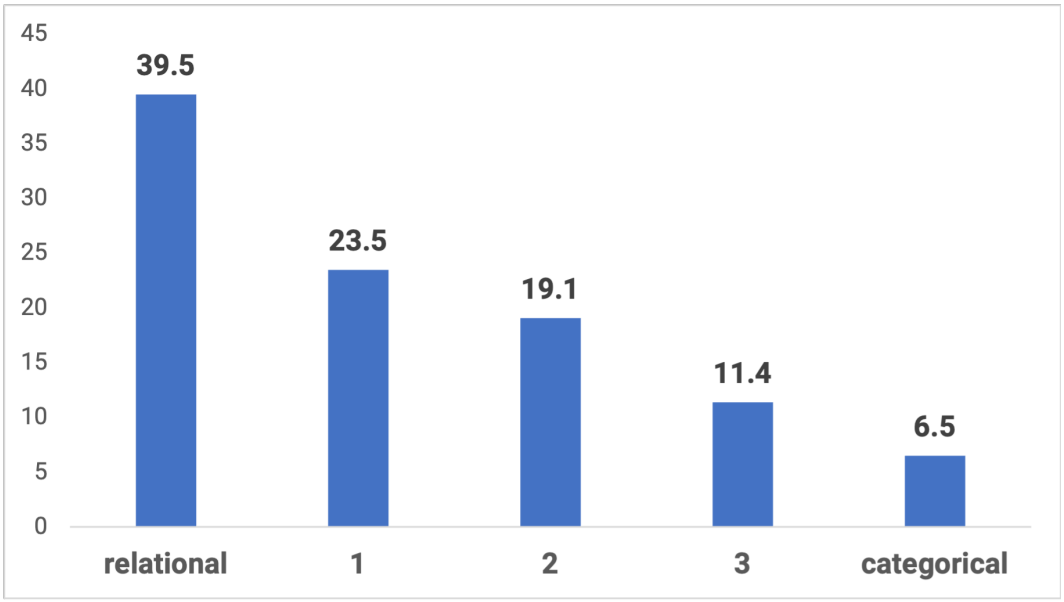
These items were intended to assess the extent to which people will defer to science and scientists to make decisions for the general public and 'run the show'.

The first statement, on 'no option trust' received 'strong agreement' from 23.9% of respondents and 'agreement' from 49.5% of respondents. The statement was 'disagreed' with by 16.1% of respondents and 'strongly disagreed' with by 10% of respondents. The second statement on 'deference to science' received 'strong agreement' from 19.1% of respondents and 'agreement' from 63.5% of respondents. A majority seems to be happy to defer to science for the good of the country.

## Styles of Thinking and Reasoning: Relational-Holistic or Abstract-Categorical

Finally, we examine a stylistic feature of Kuwaiti mentality, the distribution of styles of thinking that can be characterised as 'relational' versus 'categorical' ways of thinking.[15] This feature is assessed by asking respondents to pick pairs of objects from sets of three, e.g. teacher-doctor-homework or monkey-banana-panda. Relational thinkers classify things spontaneously according to practical context, how things are systemically related, for example 'teacher-homework' belong together because a teacher gives homework to their students in the context of schooling. On the other hand, the abstract-analytical mind classifies teacher with the doctor as tokens of the category professions. The same can be said about monkey and panda, two kinds of animals versus monkey and banana which the monkey likes to eat for nutritional value. Respondents were presented with four triplets.

**Figure 2: Styles of Kuwaiti thinking considering four object triples, the relative frequency in % of respondents with categorical classifications of style, 0–5, 0 = none categorical ? all 'relational', 5 = all 'categorical'. [n=1000, Kantar 2022]**




[15] Richard E. Nisbett et al., 'Culture and Systems of Thought: Holistic Versus Analytic Cognition', *Psychological Review* 108 (2001), pp. 291–310.

Our results show the Kuwaiti population is about two thirds holistic-relational thinkers and only one third abstract-analytical thinkers choosing a maximum 1 out of 4 categorical pairs as shown in Figure 2. Only 6.5 percent of people in Kuwait exhibit a thoroughly abstract-categorical thinking style. Men tend to be more categorical, women more relational thinkers. However, with longer education this difference becomes smaller.

## The Relations of Worldview and Science Culture: The Filter Hypothesis

We tested whether worldviews differ in line with differences in culture of science indicators. None of the mean differences between worldview types were statistically significant. The same pattern of results was observed for Kuwaiti nationals analysed alone as with the entire sample including foreign nationals.

**Table 6: One-way ANOVAs for differences in Culture of Science indicators; independent Factor Variable = World View Types**

| Indicator | F | n | P |
|---|---|---|---|
| **Promise** | 0.547 | 4, 1398 | ns |
| **Reserve** | 1.017 | 4, 1398 | ns |
| **Relational-Categorical** | 1.573 | 4, 8730 | ns |
| **Knowledge** | 0.885 | 4, 1398 | ns |
| **Technocracy Tolerance** | 0.248 | 4, 8980 | ns |

## Filtering for Interest and Engagement with Science

We hypothesised that a possible reason for why no type differences emerged in attitudes to science between worldviews was because the Kuwaiti population might be either equally resistant or equally favourable to science, regardless of worldview type.

We therefore decided to run the same analysis after filtering out those who expressed either 'Moderate' or 'No Interest' in new scientific discoveries. We reasoned that if individuals expressed concern with science, worldview types would discriminate the nature of this concern. We found some support for this hypothesis in our findings. Specifically, we found statistically significant differences between worldview type and the Reserve index, which measures reservations towards science (scientific change is too fast and we trust science too much), amongst those who expressed a high interest in science. However, on closer inspection, none of the pairwise differences between worldview types were statistically significant.

### Table 7: One-way ANOVA output filtered for 'High Interest' on Reserve index; independent Factor variable = Worldview Types

| Indicator | F | n | P |
|---|---|---|---|
| Reserve | 3.105 | 4, 519 | <0.05 |

We then tested whether differences between worldview types would transpire on any of the seven science culture indices amongst those who responded that they regularly read articles about science. Using this filter, differences emerged in Reserve ($F(4,491) = 4.414$, $p<0.01$) and Technocracy Tolerance ($F(4, 313)=2.862$, $p<0.05$).

### Table 8: One-way ANOVAs filtered for those who regularly read about science; independent Factor Variable = World View Types

| Indicator | F | n | P |
|---|---|---|---|
| Reserve | 4.414 | 4, 491 | <0.01 |
| Technocracy Tolerance | 2.862 | 4, 313 | <0.05 |

Tukey's post-hoc tests revealed that the Orthodox worldview demonstrated significantly less reservations than Localised and Pragmatist worldviews, whilst no pairwise differences emerged for Technocracy Tolerance. We then ran the same analysis for those who responded that they regularly signed petitions or protested for/against science issues (civic engagement). Once again, we found significant differences on the Reserve variable with the Localised worldview demonstrating a significantly higher mean than the Orthodox worldview. Whilst pairwise differences were not statistically significant on the Relational-Categorical, thinking variable despite the fact that the overall model was statistically significant.

### Table 9: One-way ANOVAs filtered for those who regularly raise their Voices for/against science isues; independent Factor Variable = World View Types

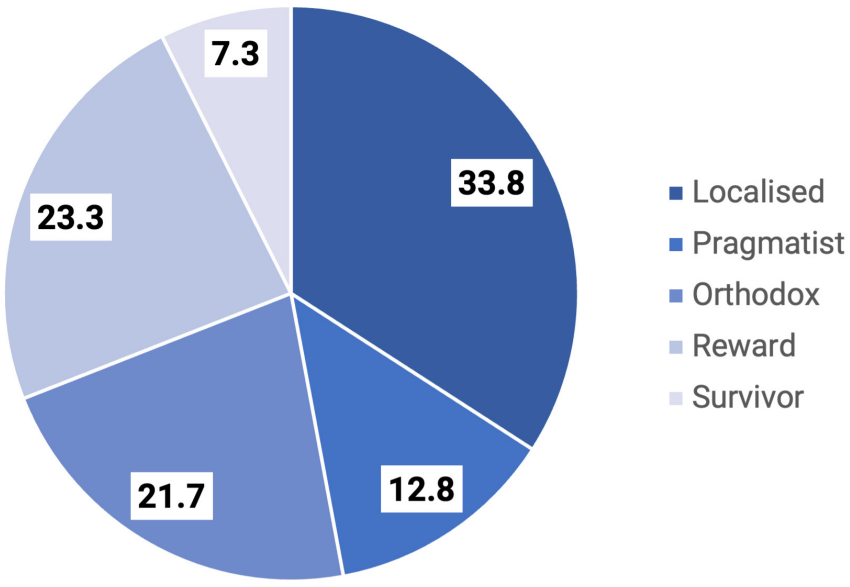
| Indicator | F | n | P |
|---|---|---|---|
| Reserve | 3.147 | 4, 169 | <0.05 |
| Relational-Categorical | 2.933 | 4, 124 | <0.05 |

These findings conclude (broadly speaking) that science is not an issue for most Kuwaitis and the differences in worldviews do not distinguish attitudes to science in the general population. Among those who are highly engaged, worldviews differentiate those who express high reservations about science from those who do not. This points in the direction of worldviews becoming salient as science becomes an active issue in given public. This is a crucial finding suggesting a threshold in science engagement that activates differences between worldview types regarding attitudes towards science more broadly.

## Summary and Conclusion

Our findings indicate that the most prevalent worldview in Kuwait is Localised (33.8%), followed by Reward (24.3%), and followed by Orthodox (21.7%). These three worldviews encapsulate the majority of Kuwait's population (79.8%). Therefore any attempts to promote policy should consider representing and considering these three worldviews. Our findings also indicate that people in Kuwait with masters or PhD degrees, as well as those who describe themselves as very religious, are much more likely than those with lower levels of education to hold localised worldviews. Those subscribing to a localised worldview express more reservation towards science than individuals with an orthodox worldview, who surprisingly are more common among those who describe themselves as not at all religious. However, differences in science culture indicators emerge only among individuals who are more interested and engaged in science, and although interest in science is relatively high in Kuwait according to the data, engagement with science is relatively low. Therefore, any attempts to influence science culture or guide policy design that corresponds to the worldviews of the majority would need to create more interest and encourage engagement with science.

**Figure 3: Distribution of Worldviews in the Kuwaiti Population [IPSOS and Kantar, n=1403]**



Our studies indicate that health policy addresses the most prevalent worldviews in Kuwaiti society but needs to target reward and orthodox worldviews. As for environmental policy, there needs to be a shift of focus from representing predominantly pragmatist worldviews to more localised, reward, and orthodox worldviews. This would entail:

1. Highlighting everyone's involvement in any efforts to impact change with a focus on individual agency and local concerns (Localised).
2. Highlighting the opportunities and benefit to all involved (Reward).
3. Appealing to a higher cause or moral code, and highlighting a sense of duty towards a greater good (Orthodox).

While this is partially accomplished in the environmental policy documents analysed, the focus is placed mostly on exposing an impending disaster and showing how the worst of it can be avoided (pragmatist). In addition, policy formulated in terms of worldviews needs to address the reserve expressed by those subscribing to a localised worldview (the most prevalent) and, be designed to put them at ease in this regard. However, effective uptake is only predicted among those with an action-oriented interest in and engagement with science. Therefore, a first step in any policy program related to science is the promotion of interest and engagement.

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