

The Middle Opinion. USA 2020.

<https://sites.google.com/site/gordonburtmathsocsci/the-middle-opinion-usa-2020>

Chapter 1 (post-election draft, 8th January 2021)¹

Introduction and overview

Society has a distribution of opinions. It has middle opinions and it has extreme opinions. In the USA, people were already queueing in October to vote for one of two candidates. The middle opinion of the voters is that Trump is halfway towards the Conservative extreme whereas Biden is a third of the way towards the Liberal extreme, and the two candidates are equidistant from the (slightly Conservative) middle opinion.² Looking now at the Supreme Court, the distribution of opinion is about to lose its balance, replacing a member on one side with a member on the other side - with the result that the member that was in the middle no longer has the swing vote ...

...

... Tuesday 3rd November: election day

... 4th November: President Trump talks about asking the Supreme Court to stop the counting of votes.

... 7th November: Pennsylvania is declared for Biden and the networks declare Biden the winner.

...

... Wednesday 6th January: President Trump addresses his supporters and they march on the Capitol, pushing aside security and entering the building interrupting the ratification of the results

Not just in the USA but throughout the Western democracies recent decades have seen increasing polarisation between pluralism and populism. Populists claim that they alone represent the people. There is a breakdown of mutual toleration. To remedy this everyone on all sides should learn how to speak to their political opponents.³

It is worth noting that six years ago, in 2014, the Pew Research Center had identified heightened political polarization in the American public:

“How Increasing Ideological Uniformity and Partisan Antipathy Affect Politics, Compromise and Everyday Life

Republicans and Democrats are more divided along ideological lines – and partisan antipathy is deeper and more extensive – than at any point in the last two decades. These trends manifest themselves in myriad ways, both in politics and in everyday life. And a new survey of 10,000 adults nationwide finds that these divisions are greatest among those who are the most engaged and active in the political process.”⁴

¹ Gordon Burt: gordonjburt@gmail.com. Website: <https://sites.google.com/site/gordonburtmathsocsci/all>. October 27, 2020.

² Morning Consult ... *The Times*, 20 August 2020, p. 30. Chapter 4 contains more detail.

³ Based on a piece by Anne Applebaum reviewing five books on populism.

Applebaum, Anne. “Populism.” *The Observer*, *The New Review*, October 18, 2020: 14.

⁴ Pew Research Center. “Political polarization in the American public.” *Pew Research Center*. June 12, 2014. Accessed: November 22, 2016.

<http://www.people-press.org/2014/06/12/political-polarization-in-the-american-public/>.

Just as divisions are greatest amongst those most politically active, it may be that divisions are greatest at times when politics has centre stage – such as during presidential election campaigns.

An October front page headline in *The Times* was “Millenials all over the world have lost faith in democracy”.⁵ It referred to a report by The Centre for the Future of Democracy at Cambridge University.⁶

All this is the background to the topics in the book.

The key ideas

The key ideas in the book are as follows:

Opinions in the USA

Today is Tuesday 27th October 2020. Just seven days to go. “This is the most stressed electorate I can recall.”⁷ Biden leads by 9%.⁸ “... a Biden landslide”?⁹ However amongst Democrats there are nervous memories of the 2016 presidential election, the optimism back then ... and the subsequent frustration of their hopes due in part to the electoral college system. See the discussion in Chapter 2. And was the result perhaps simply the operation of the normal electoral cycle? See the analysis of USA presidential elections, 1789 to 2016 in Chapter 4.

“Biden favored on almost all issues” was the headline on Thursday 22 October.¹⁰ Evenly split on who to trust to manage the economy, voters put Biden ahead of President Trump on the coronavirus pandemic (12 points), on choosing Supreme Court justices and maintaining law and order (6 points), and on being more capable of uniting the country (20 points). The coronavirus pandemic has become the central issue of 2020 and President Trump’s optimism about its trajectory has been controversial – see Chapter 8. Ethnic tensions around law and order repeatedly erupt in the USA and erupted particularly strongly with the death of George Floyd at the hands of the police back in March. Public opinion about the racism protests which followed are analysed in Chapter 5.

“Trump’s foreign policy that never happened.” “Europe wonders if it can rely on U.S. again.” “Huawei’s new phones may not be around long.”¹¹ Do other countries

⁵ Chapter 5 argues that headlines like this are a misleading representation of public opinion.

⁶ Bakely, Rhys. “Millenials all over the world have lost faith in democracy.” *The Times*, October 20, 2020: 1, 2. Editorial. “On liberty. The merits of democracy need to be expounded to new generations.” *The Times*, October 20, 2020: 31.

⁷ American Psychological Association, cited in ... Lee M. Miringoff, cited in ... Lyall, Sarah. “For Democrats, the horror never ends.” *The New York Times International Edition*. October 26, 2020: 6.

⁸ 538: <https://projects.fivethirtyeight.com/polls/president-general/national/>

⁹ Herndon, Astead W. “Some Democrats envision a Biden landslide. They yearn for a victory big enough for a clear-cut rejection of Trump.” *The New York Times International Edition*. October 23, 2020: 6.

¹⁰ Burns, Alexander and Jonathan Martin. “Biden favored on almost all issues.” *New York Times*. October 22, 2020: 5. New York Times, Siena College poll, 20 October 2020, Report and data: <https://www.nytimes.com/2020/10/20/us/politics/biden-trump-times-poll.html>; <https://int.nyt.com/data/documenttools/us101520-crosstabs1/016bc5d8ae03038c/full.pdf> .

¹¹ Editorial Observer. “Trump’s foreign policy that never happened.” *The New York Times International Edition*. October 22, 2020: 11. Erlanger, Steven. “Europe wonders if it can rely on U.S. again.” *The New York Times International Edition*. October 23, 2020: 1. Zhong, Raymond. “Huawei’s new phones may not be around long.”

have a favourable view of the USA? ... of Donald Trump? Does the USA have a favourable view of China? Surveys carried out by Pew Research Center and others are analysed in Chapter 6. Opinions about war and peace, and foreign intervention, are analysed in Chapter 7.

The middle opinion

The middle opinion appears throughout the book in a number of different guises. There is the middle of the scale and the middle of the distribution. There are different measures of the middle of the distribution such as the median and the mean. It is the mean that I tend to focus on. Sometimes the middle opinion corresponds to the truth.¹² Sometimes the middle is the outcome which happens and sometimes it is the outcome which should happen – that is, either should happen in theory or should happen in order to optimise social value. Sometimes the middle is what the trajectory of outcomes oscillates about. Turning to reports of surveys in the news media, the middle is what should be reported on, but often is not.

Objects in attribute space

Objects have attributes and it is sometimes appropriate to think of objects as having a location in an attribute space. For example geographical maps show where physical objects are located in physical space. In politics, voters, candidates and parties can be located along the left-right continuum, a political space. In general we can think of political space and social space, often of several dimensions.

Opinions

We think of a person's opinions as the statements that are in their mind. The statements include statements of fact and statements of value. Statements refer to attributes and an attribute may be present in an all or none way, or present to a qualitative extent, or present to a quantitative extent. Attributes may be unipolar or bipolar.

Opinion surveys

Opinion surveys ask questions in which people are asked to choose between a set of options, and each option corresponds to a possible opinion (statement) that a person may have.

The abstract structure of public opinion ...

A survey provides a set of responses from a sample of people. The responses tell us about people's opinions on the substantive issues asked about in the questions. However, quite apart from the substantive aspect we can think about the abstract structure of the set of responses. Chapter 4 provides a detailed account illustrating the ideas with an analysis of opinions about the racism protests. Not included in Chapter 4 is the correlation structure of individual opinions and this is the subject of Chapter 7.

The New York Times International Edition. October 24-25, 2020: 8.

¹² 'Wisdom of the crowd': Francis Galton found in 1907 that mean opinion was close to fact. In 2018 "a new study improves 'crowd wisdom' estimates."

<https://phys.org/news/2018-04-crowd-wisdom.html>

Counteracting estimation bias and social influence to improve the wisdom of crowds

Albert B. Kao, Andrew M. Berdahl, Andrew T. Hartnett, Matthew J. Lutz, Joseph B. Bak-Coleman, Christos C. Ioannou, Xingli Giam, and Iain D. Couzin. Published: 18 April 2018.

<https://royalsocietypublishing.org/doi/10.1098/rsif.2018.0130>

... the analysis of the whole group and of subgroup difference ...

A key distinction is between whole group analysis and subgroup analysis. Subgroup analysis is relevant to current concerns about heightened partisanship in society, and in particular in politics.

... the underlying distribution approach ...

A key feature in this book is the *underlying distribution approach*. In this approach the surface percentages in any report on a survey are analysed to yield information about the underlying distribution and in particular about the middle opinion ... about the mean and median ... and also the standard deviation, polarisation and skewness. There is current concern about polarisation in society and here we define it in terms of the standard deviation. Chapter 1a (seven pages) provides an account of this approach and the approach is applied in many of the other chapters.

... the use of surface percentages

Reports of surveys in the media often report surface, aggregated, one-sided percentages – rather than the middle opinion of the underlying distribution.

Opinions in space

Space here refers not only to geographical space but also to other abstract social spaces. The results of both the 2016 and the 2020 presidential elections are analysed, showing how candidates' support varies across the 51 states and across different social categories (Chapters 2 and 3). The geography is analysed in terms of the adjacency network, the contour structure and the perimeter profile. International variation in opinion is discussed in Chapter 6. Psychological space is discussed in Chapter 7. Opinions in social categories about the coronavirus are also discussed in Chapter 8 – in addition to the analysis of social space in Chapters 2 and 3. Political space is discussed in various chapters.

The processing of opinions

The distinction between the popular vote and the electoral college vote provides a useful illustration of the processing of opinions. Chapters 2 to 4.

Opinions in time

Chapters 2 and 3 briefly discuss comparisons between the presidential elections of 2012, 2016 and 2020. However, the main discussion of opinions over time is in Chapter 4 with its consideration of the trajectory of the vote in presidential elections over the past couple of centuries. There is a brief discussion of time series models and a more substantial application of a damped pendulum model. Later in the book Part 4 returns to the topic of opinion dynamics. A UK case study considers a gravitational model of voter flows in political space from one election to the next. Finally, contagion models are considered, applying Lux's 1995 model of herd behaviour in the stock market and subsequent work to herd behaviour in other social spheres. Chapters 15 and 16.

Satisfaction ...

Values drive action and action is judged according to values – that is according to the satisfaction of values. Chapter 8 reports on the UK national survey of satisfaction with life overall.

... satisfaction with democracy ...

As noted earlier there has been some concern about the rise of populism and the growing dissatisfaction with democracy. Quite separate from this current concern is the general question of whether there is something inherently dissatisfying about democracy. For example Kenneth Arrow's impossibility theorem showed some limitations on democracy and Anthony Downs talked about the inherent inequality of democracy. Given the discussion of optimal social choice (see below) we can ask two questions: does democracy deliver the optimal social choice?; and does the optimal social choice itself have limitations on satisfaction? We show that it does.

... middle opinion democracy

One of the most celebrated results in voting theory is Black's median voter theorem. (In view of the title of this book, I would refer to it as the median *opinion* theorem). Under certain circumstances this is what will happen and it will be a stable outcome, an equilibrium. However it may not be the optimal social choice. Under certain circumstances the mean opinion is the optimal social choice – and if the distribution of opinion is skewed then the median opinion does not coincide with the mean opinion. My use of the phrase 'middle opinion' seeks to keep both mean and median in play.

Optimal social choice

Opinions about values can be binary or ordered or quantified. A key distinction in the literature is between values defined in terms of preferences and values defined in terms of amounts of value – that is, a distinction between preference functions and value functions. That distinction leads to two different approaches to optimal social choice. (Part 3, Chapters 13 and 14)

Relations ... self and other ... positive and negative ... optimism ... war and peace

World society is about relations - relations within states and relations between states ... relations between groups and relations between individuals. For participants, a fundamental distinction is between the self and the other. This aspect is highlighted in the analysis of national opinions worldwide in Chapter 6. Another distinction is between positive and negative relations. Putting these two ideas together we need to consider positive and negative relations with the self and also with the other. A qualitative discussion of the valence of relations is given in Chapter 6a. There has been concern that recent years have seen increased negativity. This can be placed alongside the notion that optimism is a 'wondrously American' value. Note that optimism is an opinion that the future will be positive. The opinion that the *past* has been positive has been questioned by Black Lives Matter.¹³ (Chapter 8). Correlation analysis shows that opinions about positivity and negativity and in particular about peace and war relate to fundamental personality dimensions. Chapter 7.

Overview of the chapters

Opinion in the USA
Satisfaction and democracy

¹³ Harmon, Amy. "A fraternity that reveres a Civil War general faces a revolt." *The New York Times International Edition*. October 22, 2020: 6.

Optimal social choice
Opinion dynamics
International comparisons

1 Introduction and overview

1a Methodology: an underlying distribution approach
1b Relations: self and other; positive and negative

Part 1 Opinion in the USA

Trump: Mass, Space and Time in USA Elections, 1789-2020¹⁴

2 Opinions in space: the USA presidential election, 2016
3 Opinions in space: the USA presidential election, 2020
4 Opinions over time: the USA presidential elections, 1789-2016

Trump: the Abstract Structure of Public Opinion, USA 2020¹⁵

5 The abstract structure of public opinion: the racism protests 2020
6 The self and the other: national opinions worldwide
7 War, peace and psychology: the correlation structure of opinions
7a Personality, geography and other social variables
8 Optimism: the percentages reported in the media and the middle opinion

Part 2 Satisfaction and democracy

9 Satisfaction with life
10 Middle parties and the M-shaped distribution in political space
11 Satisfaction with democracy
12 Value spaces

Part 3 Optimal social choice

13 Optimal social choice, preference functions: Peter Emerson and Dublin City Council
14 Optimal social choice, value functions:

Part 4 Opinion dynamics

15 A gravitational model of flows in political opinion space, UK 2017
16 The contagion of opinion:
Herd behaviour in markets, polities, cultures and technologies

Part 5 International comparisons

17 Democracy and social progress, worldwide

¹⁴ I have changed my plans. Chapters 2,3 and 4 now form the core of a planned book:

Trump: Mass, Space and Time in USA Elections, 1789-2020

<https://sites.google.com/site/gordonburmathsocsci/the-middle-opinion-usa-2020/mass-space-and-time;>

¹⁵ I have changed my plans. Chapters 5 to 8 now form the core of a planned book:

Trump: the Abstract Structure of Public Opinion, USA 2020

<https://sites.google.com/site/gordonburmathsocsci/the-middle-opinion-usa-2020/abstract-structure-of-public-opinion>

18 Better world, worse democracy?

Overviews are not yet available for chapters 3 and 7.

1a Methodology: the underlying distribution approach

Many of the chapters in this book discuss surveys of public opinion. These surveys are reported on by the polling organisations and the reports form the basis for articles which appear in the news media. The surveys ask people to answer questions offering them a number of options to choose from. The reports often present the results in terms of the percentages of the people choosing the different options. Sometimes options are combined to give aggregated percentages. Often the options form an ordered scale. Sometimes the options which are combined are ‘one-sided’ in relation to the scale. I refer to this as a surface approach.

My view is that there is a more powerful way of analysing the results of the surveys, namely the underlying distribution approach. In the Chapter 5 on “The abstract structure of public opinion” I show how the surface percentages in a report on a survey can be analysed to yield information about the underlying distribution and in particular about the middle opinion ... about the mean, median, standard deviation, polarisation and skewness.

1b Relations: self and other; positive and negative

Overview. This short four-page ‘chapter’ considers the animosity which is present in today’s society. Whatever the issue is, the animosity becomes the meta-issue. A variety of proposals have been put forward for addressing animosity. Here we consider just a couple of these. First we consider the work of *More in Common* and their project *Democracy for President*. Finally we consider Dr Justine Huxley’s proposal. She has argued that it is imperative that love overcomes hate. Taking up this thought I set up a web page where I recorded some impressions during 2019. The injunction “Love the stranger” can be placed alongside animosity between nations. People’s opinions are distributed along the hate-love continuum. For example a scale used in Chapter 6 has four options: very unfavourable, somewhat unfavourable, somewhat favourable, and very favourable.

Part 1 Opinion in the USA

Part 1 focuses on the USA, and in particular on the current presidential election.

The concepts of space and time are fundamental to our understanding of the world. Chapter 2 looks at opinions in space, both social space and geographical space, as part of and as reflected in an account and analysis of the USA presidential election of 2020 – both the campaign and the results of the voting. Chapter 3 looks at opinions over time as reflected in the fluctuating party fortunes in the USA presidential elections over the period 1789-2016. A variety of mathematical models is applied to

understanding the trajectories. The central notion in all of this is public opinion. But what is public opinion? How should we conceptualise it? Chapter 5 provides an answer to this by presenting an account of the abstract structure of public opinion, illustrating the points with an analysis of the results of an opinion survey relating to the racism protests during the year in the USA.

2 Opinions in space: the USA presidential election, 2016

It had always been assumed that Hillary Clinton would win the Democratic primaries and then proceed to win the presidential election to become the USA's first woman president. But then came Trump. The USA presidential campaign had started the previous year and continued throughout 2016 to become the dominant news story of the year. On 30th July 2016 The Times stated that if the election were held [that day] Hillary Clinton would have a 47.1% chance of victory and Donald Trump would have a 52.9% chance ...

In what follows we study first the campaign and then the results. The analysis of the results pays particular attention to the variation of opinion over space: over social space as reflected in how social groups voted; and over geographical space as reflected in the geographical pattern of the vote.

3 Opinions in space: the USA presidential election, 2020

This will be an analysis of the election results ...

4 Opinions over time: USA presidential elections, 1789-2016

This year's contest between Donald Trump and Joe Biden prompts us to look at the history of US presidential elections. The aim is to look back at the trajectories for a few key aspects over the past two centuries. Who has become president and how long have they lasted? Which parties have competed and how long do they hold the presidency? What is the trajectory of the presidential party vote? What is the relationship between the popular vote and the electoral college vote? A mathematical approach is adopted.

The party system has evolved since 1789 and for the last 166 years there has been two-party competition between Democrats and Republicans. Past presidents and their parties are listed. A third of the presidents have been one-term presidents, a third have been two-term presidents, and a third of the presidents have been 'abnormal-circumstances' presidents. Since Jimmy Carter in 1977 there have been forty years of 'normal' presidents. Looking at the conditional probability of having a further win, a party with just one consecutive win has a two-thirds chance of having a second consecutive win. If it does have a second consecutive win, it has just a one-third chance of having a third consecutive win. (Based on just 19 runs.)

The two main parties dominate the percentage vote with the Other vote close to zero except for a few occasional outbreaks. The Democrat proportion of the two-party vote is studied for the period 1912-2016. A simple autoregressive model suggests random oscillation about 47.2%. However, our main interest is in dynamic systems

models and the common reference to ‘the swinging of the political pendulum’. The mathematics of the damped pendulum are explained. The concepts of velocity and acceleration are defined in relation to the percentage vote data. The trajectory of the Democrat proportion and its *velocity* is characterised by orbiting round a spiral anticlockwise; and the trajectory of the Democrat proportion and its *acceleration* is characterised by oscillating along a straight line.

The distinction between the *popular vote* and the *electoral college vote* is explained. First the results for 2016 are discussed. The percentages for the popular vote, for the electoral college vote and for the states won are presented. The cumulative distributions of state percentages and of electoral college votes are shown. Then the results for 1912 to 2016 are analysed. The percentages have fluctuated. The college vote appears to be a magnification of the popular vote – sometimes dramatically so. These large college vote percentages have been less in evidence in recent elections, partly reflecting closer margins in the popular vote. A model suggests a linear relationship between the two percentages with a magnification factor of about 4 – but there are also large deviations from this relationship. Similar observations apply to a model where there is a proportional relationship between the z-scores of the two percentages. The latter model is underpinned by a consideration of the position of candidates on a political continuum and the distributions of individuals and of states or college votes on the continuum.

Finally, we note how the above components come together to give a simplified model of the whole system.

5 The abstract structure of public opinion: the racism protests 2020

The middle opinion is a concept located in the abstract structure of public opinion. A prior concept, indeed the foundational concept, is the distribution of opinion. The middle opinion can be identified with the mean of the distribution. Public discussion in the media tends to be selective, latching on to newsworthy percentages, whereas discussion of the middle opinion would be less misleading.

The account is illustrated by an analysis of public opinion in the USA in early summer 2020 regarding the racism protests at that time.

Towards the end of May 2020, a white policeman killed an unarmed black man. Protests against the killing and against racism spread throughout the USA and indeed throughout the world and continued over the following weeks. There were further incidents of police killing black men and the protests continued into the autumn.

What do the citizens of the USA think about the George Floyd killing, about the protests and civil unrest, about the police and about President Trump and the government’s response? Ipsos surveyed 1004 adults on 1-2 June, at the end of the week of protests after the killing. Ipsos reported: “Civil unrest in the wake of George Floyd’s killing - A majority of Americans support peaceful protests and demonstrations, many are sympathetic to demonstrators.”

[To be continued]

6 The self and the other: national opinions worldwide

How do different countries view one another?

The year 2020 is the 75th anniversary of the defeat of Nazi Germany. The commemorations and news coverage show how important the events of World War II still are in people's minds. But do they all agree about what happened? Which country contributed most to the defeat of Germany – was it the USA, the UK or Russia? The perception percentages amongst eight Western countries satisfied the equation $UK=60-USA$. Relative to the mean perception, each of the USA and the UK rated their own contribution more highly. Taking Germany's perceptions as a benchmark the ratings related to each country's distinctive experience of the war.

At the beginning of the year, in January 2020, Pew Research Centre obtained the opinions of people in 33 countries worldwide, covering Europe (16 countries), Asia (6), Africa (4), Middle East (3) and America (4). One of the questions related to favourability. People were asked how favourably they viewed certain people and countries ...

How does the value of a leader relate to the value of their country? The value of President Trump is less than the value of the USA: $Trump=USA-20$ with percentage favourability as a measure.

Valuing the self, 91% of USA citizens say "USA being the world's leading power" would be better for the world than China being the world's leading power (4% say China) or neither (4%).

The UK gives USA a favourability score of 57. However on the underlying scale of $[-1,+1]$ the middle opinion (mean) is $+0.06$, a very low positive score. The standard deviation is $s=0.20$. This gives a polarisation $p=0.20$, well below 0.5 and hence safely on the single-peaked side of flat.

The median of 33 countries gives USA a favourability score of 54. The distribution of scores is strongly unimodal – and symmetric. The scores ranged from 20 (Turkey) to 83 (Israel), with a median of 54 (Spain and Slovakia). The UK is close to the median and so we can say that the worldwide middle opinion of the USA is a very low positive score. So it is misleading for the Pew Research Centre to say "U.S. image generally favorable, but some exceptions".

The USA gives China a favourability score of 26. Thus the USA view of China is much the same as the Russia view of USA. On the underlying scale of $[-1,+1]$ the middle opinion (mean) is -0.27 , a fairly negative score.

A survey in the UK in May 2020 found that a large majority believe that the virus started in Wuhan wet market. A strong negative towards China is greatest for an international inquiry, next for an international court, next for China mainly to blame for UK impact, next for China completely to blame for allowing the virus to spread, and least for stopping Huawei. Those who voted Leave in the 2016 referendum are more critical than those who voted Remain. Younger people are more supportive of Huawei.

A survey in the UK in 2016 of Labour Party members found a positive view of the UK, Germany and Sweden, a strong negative view of the USA and Israel and an even stronger negative view of Iran, Russia and Saudi Arabia.

7 War, peace and psychology: the correlation structure of opinions

[7 War, peace and psychology: the correlation structure of opinions](#)

Chapter 5 provided a discussion of the abstract structure of public opinion and this chapter is a continuation of the same topic. The focus here is on the relationship between the variables which characterise people's opinions, in particular on the statistical relationships as reflected in the correlation structure. As in Chapter 5 we illustrate the ideas using a case study. The case study used in this chapter is the journal article *Personality Dimensions and Attitudes Towards Peace and War* by Blumberg and his colleagues.

7a Personality, geography and other social variables

[This chapter¹⁶ looks at the relationships between a variety of social and psychological variables and, on this basis, places the variables in an abstract space. Variation between nations and between regions is studied rather than variation between individuals. The focus is on per capita variables not aggregate variables. This chapter is the first of several in which the abstract concept of space plays a central role.]

This chapter is on psychology and geography and a range of important social variables. How do regions within the UK differ? How do the different variables relate to one another? 'Friendly Scots and grumpy Londoners' was typical of the superficial newspaper headlines, belying the depth of the actual study of 380 Local Authority Districts in the UK by Rentfrow and his colleagues. The pattern of results was similar to findings from previous research: personality traits are unevenly distributed geographically and this is associated with a range of important social outcomes. Personality was assessed using the Big Five Inventory. An analysis of the correlations at the individual and group level locates the Big Five along a continuum: from Agreeableness to Conscientiousness to Stability to Extraversion to Openness. The correlations for each of the Five have a single-peaked profile on the continuum. Likewise, the correlations for each of twenty-four political, economic, social, health and demographic variables have a single-peaked or single-troughed profile on the continuum.

8 Optimism: the percentages reported in the media and the middle opinion

A number of USA presidents have praised the American value of optimism and linked this to Norman Vincent Peale's advocacy of 'the power of positive thinking'. It has been suggested that Peale has been a source for the optimism which is part of Donald Trump's repertoire, which has been displayed in his comments on the coronavirus. Alongside Trump's repertoire of optimism are repertoires of negativity, self-regard, extreme value and volatility.

To what extent do citizens of the USA share Trump's optimism about the coronavirus? A survey suggests that the middle opinion is neutral between optimism and pessimism about whether or not the worst is over. At least in this instance there is no general American value of optimism. Middle opinion in many subgroups is also neutral. More optimistic are Republicans. More pessimistic are Democrats and African Americans. These opinions may reflect both past experience and future prospects; intrinsic inclinations; and leadership influence.

¹⁶ YB15, Chapter 6, 110-132.

The reporting of public optimism in the news media often does so in terms of surface percentages. An underlying distribution approach identifying the middle opinion shows that sometimes the surface percentages are misleading. This is particularly so for aggregated one-sided percentages. The New Year Day front page headline in *The Times* is used as a case study.

Clearly there are a lot of possible statements which one can make, depending on what percentage one selects. The percentages reported in the news media are to some extent arbitrary and not very informative about the whole distribution.

In order to emphasise the arbitrariness of percentages we identify the set of all possible option subsets and the set of all possible percentages. There are a lot of possible percentages. Some of them are majorities. There are a lot of possible majorities.

The abundance of majorities creates a problem. The majority concept is very prevalent in politics and the abundance of majorities provides opportunities for 'politicking'.

Part 2 Satisfaction ... Value spaces.

9 Satisfaction with life

This chapter's account of satisfaction with life provides some background for the discussion of people's satisfaction with democracy which is given in a later chapter – although it has to be said that politics is not given any reference to in the studies considered in the present chapter.

We judge situations according to their value; and in our choices we pursue value. One aspect of value is subjective well-being – which itself is a multidimensional concept. Recent studies of wellbeing find that on average the average individual has 'halfway positive' wellbeing. Also, most individuals have around 'halfway positive' wellbeing, most of the time. The life of an individual involves a variety of activities and different individuals have different activity mixes. Activities vary in their capacity to generate happiness. In particular intrinsic activities generate more happiness than do instrumental values. Activity situations are multidimensional and a variety of factors affect the impact on happiness. Different groups – defined by a variety of social attributes - have different wellbeing. However variation between groups is very much less than variation between individuals. Changes in social attributes – for example, changes in geographical or relationship location - are associated with changes in wellbeing.

In terms of methodology the scales used are unipolar whereas values such as satisfaction are more appropriately conceptualised as bipolar. Results are reported for the surface scales and not for any underlying scale. Most of the attributes are positive but one attribute is negative, namely anxiety.

10 Middle parties and M-shaped distribution

Overview. This chapter is about the strength of parties in the middle of political space and about the distribution of strength amongst all parties.

Section 1. The first section in the chapter looks at some of the discussion in the UK about empowering the centre ground in the face of populist extremists. In extreme times, middle voters yearn for middle parties. Existing middle parties may show resurgence and new middle parties may form. However the resurgence may collapse and the new parties may die. The middle may not be strong enough to counter the power on either side. A similar experience may occur for extreme parties. What may be left is the continuing power of two ‘mid-extreme’ parties. The result is that the voting distribution is M-shaped.

Section 2. The rest of the chapter looks at the distribution of political values, a foundational concept. We start with some general remarks about distributions. A simple classification of distributions is based on the number of peaks in the distribution (one, two or many) and the location of the peaks (middle or endpoint, left or right).

Here we are interested in the distribution of political preferences as expressed by the percentage support for political parties. Two types of distribution are considered. The first type is the distribution of percentages when the party percentages are ordered by decreasing size. The 2019 presidential election in Tunisia is used as a case study.

The second type of distribution concerns how individuals and parties are distributed in political space. We consider cases in five different countries: Portugal, Poland, Austria, Israel, and the UK. The Austria and Israel case studies are given an extended treatment. The presence of an M-shaped distribution is noted. Whereas these first four case studies consider only a one-dimensional Left-Right political space, the UK case study consider two-dimensional space: a Left-Right dimension and a Leave-Remain dimension.

Although we have used the phrase ‘political preferences’ the findings can also be thought of as relating to political identities and to the distribution of political identities.

11 Satisfaction with democracy

Does democracy deliver satisfaction? - or dissatisfaction? Over the past year [2015], dissatisfaction has been expressed with various aspects of democracy. Democratic elections raise hopes of satisfaction which cannot be fulfilled for all. The elections we have studied in previous chapters [YB15] have given the satisfaction of victory, sometimes to a majority and sometimes to just a minority but always leaving at least a sizeable minority experiencing the dissatisfaction of defeat. Moreover the following chapter will show that the percentage experiencing the satisfaction of victory in UK elections has declined over the past seventy years.

The concept of a value space can provide useful insight into these issues. Using it, Chapter 14 will show that there are theoretical limits to the amount of satisfaction which democracy can deliver. In this chapter we look at two studies which are particularly informative. The first study asks about the amount of value of each option; it asks about many options; and the analysis applies multiple criteria in its evaluation of the options. The second study asks for a full preference ordering of the options.

With the prospect (at the time) of a coalition government a survey asked people to place a value on each of nine possible government outcomes. All nine options had a mean negative rating, with a Conservative majority government being the least negative. However this option scored poorly on polarisation and extreme

dissatisfaction. People's views were approximately consistent with single-peaked value functions on a left-right continuum in value space.

After the election, dissatisfaction within society gave way to dissatisfaction within parties ...

Finally it should be noted that the same broad argument applies not just to democracy but to any system of government, and not just to systems of government but to all social arrangements.

12 Value spaces

We consider value spaces in three different contexts: amount of value, preference and voting percentage. In each case there is a set of individuals and a set of objects.

The first context is where each individual places a value (an amount of value) on each object. For example in one of the studies discussed in Chapter 11 each individual places a value on each possible coalition government. A possible model for this situation is that objects are located in an object space and that people have different ideal points in object space and different single-peaked value functions on object space. Both the inverted modulus function and the quadratic function are discussed. The latter gives the result that the social welfare of a situation depends on the population sensitivity, the population-weighted variation, the deviation of the situation from the welfare ideal and the welfare ceiling.

The second context is where each individual puts an order of preference on the set of objects. For example in one of the studies discussed in Chapter 11 each individual puts an order of preference on the candidates for the Labour party leadership. The set of orderings of four objects forms a tetradecahedron in which single-peaked transversals can be identified.

The third context is where each individual identifies only their first preference amongst a set of objects. This enables an aggregate social value, the percentage of first preferences, to be placed on each object – as in the various elections studied in Chapters 8 to 12. The overall result is a point in percentage space and the set of constituency results gives a set of points. The case where the set of points lie on a circle inscribed in a tetrahedron is discussed.

There is a relationship between value space, preference space and percentage space: preference orderings correspond to regions of value space; and percentage space is a finite polytope contained in value space. For example the preference hexagon can be inscribed in the percentage triangle – and the preference tetradecahedron in the percentage tetrahedron.

Part 3 Optimal social choice

Part 3 considers optimal social choice in two contexts, the first where people have preferences over a set of options and the second where people place an amount of value on each of a set of options.

13 Optimal social choice, preference functions: Peter Emerson and Dublin City Council

Rosie Hackett was a member of the Irish Citizen Army in the Easter Rising of 1916 ... How should Dublin commemorate its past? ... Is it better to forget? ... People disagree: they often have different values - so they often prefer different social options. How should a social choice be made? Different social choice methods sometimes choose the same option and sometimes choose different options. People tend to want the social choice method which chooses the option that they want. Losing sides often complain about the method used. This prompts the question: are some methods intrinsically better than others? A substantial literature addresses this question and this has led some people to advocate specific methods and to seek the adoption of these methods. Citing Dummett and others, Peter Emerson of the De Borda Institute¹⁷ is a long-standing and energetic critic of two-option voting and of majority choices, advocating instead the Modified Borda Count (MBC) for decision-making, the Quota Borda System (QBS) in elections and the matrix vote in governance.

In 2013 Emerson was instrumental in Dublin City Council using the BC method to decide the name of a new bridge over the River Liffey. In this chapter, the results of the voting are analysed. Statistical measures of the distribution of rankings are used as criteria for judging the winner. Most methods choose the same winner, Rosie Hackett, but a few do not. Kay Mills has fewest lowest rankings and lowest polarisation. Rosie Hackett is the most overtly political option, has a bimodal ranking distribution, has greater spread in rankings and has most polarisation. There is a sizeable negative correlation in the rankings of Hackett and Bermingham. A continuum from Hackett to Bermingham to Stoker exhibits single-peaked group means for 'supporter groups'. The corresponding single-peaked transversal has most voters on or near it. This Dublin Bridge continuum relates to the familiar Left-Right political continuum. Councillors' votes relate to their party allegiance. The Left vote for Hackett and the Right vote for Mills or Bermingham. The treatment of those voters who only give their top rankings is also discussed. Should the minimisation of polarisation be a social choice criterion? The social choice literature is noted.

14 Optimal social choice, value functions: social design, ethics and the amount of value

Ethics is a complex subject and here we focus on a specific ethical criterion, the utilitarian social welfare function. The ideas are relevant to other values besides welfare and the maximisation of total welfare may under certain circumstances be associated with the minimisation of inequality. The notion of value in this chapter is that an object can have a certain amount of value for an individual. Limitations on social value are noted. There are tensions between competing options. The provision of more than one option allows some relaxation of these limitations and tensions. If the option space is continuous then the social value function can take a variety of specific forms. The notion of value-generating power is introduced. Given certain assumptions, the mean social value is a maximum at the mean ideal. Sub-optimal social value can arise as a result of the following factors: a sub-maximal value of the

¹⁷ *The de Borda Institute*. Accessed, 4 February 2018. <http://www.deborda.org/>. See also: Emerson, Peter. "Belfast and Dublin City Council Decision-Making." Pages 14 to 25 in ANA Commentary 50, January 2018: <https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbmxb3Jkb25idXJ0bWF0aHNvY3NjaXxneDo1MzZlZmNlMjQ4Nzky>

best option; population variation in ideals; the distance of the provided option from the best option; and sensitivity to deviation from the ideal. Practical social design requires attention to a variety of design dimensions and knowledge about people's values regarding these dimensions. This knowledge may not be known in advance and so the design process can be usefully informed by the identification of design dimensions and the obtaining of evidence about people's values regarding these dimensions. An application of these ideas to educational design is described.

Part 4 Opinion dynamics

15 A gravitational model of flows in political opinion space, UK 2017

Overview. The election wasn't supposed to happen in 2017 and Theresa May wasn't expected to lose her majority. The events surrounding this surprising election are discussed in the first part of the chapter and the modelling of the results is presented in the second part of the chapter.

...

The political process concentrated power, transforming the voting results into seats in parliament and into government. It changed the distribution of power. The government had lost its overall majority but as the leader of the largest party, Theresa May, reached an accord with Northern Ireland's Democratic Unionist Party and formed a minority government.

Models of the 2017 results are presented. One model represents the result as a point in percentage space. Another model uses a stepped geometric series to represent the size distribution of party votes as an order function. In a third model, as a distribution in political space.

Comparing the 2015 and 2017 elections, volatility (which is related to modular distance in percentage space) was greater for votes than it was for seats. The biggest party's share of the vote increased from 2015 to 2017 and this was reflected in a difference in the order functions. Labour in the centre-left of political space was the major gainer. Flows in political space followed a gravitational law.

The results of the 2017 election are discussed in relation to models of the party vote trajectories over the period 1945 to 2015.

16 The contagion of opinion:

Herd behaviour in markets, politics, cultures and technologies

What is the basis for human action - the emulation of others or the exercise of individual judgment? In a modern society much attention is given to the place of reason in the organisation of people's lives. Yet some of the most dramatic events of the modern world have involved the collective behaviour of the herd. In the economic sphere it is the emulation involved in herd behaviour which Kindleberger invokes to explain the manias and panics which repeatedly seize the global financial markets. In the political sphere the twentieth century has seen extensive mobilisations of political

opinion in favour of major political systems. At the same time in the wider society there has been a long process of the emulation of modern culture and the waning of traditional cultures, while at a more specific level cultural fashions rise and fall and there are outbreaks of 'social panics'. Even in technology herd behaviour is present: new and future technologies are widely and successfully 'hyped'. The literature refers to technology traps and the tendency to become 'locked in' to inferior technologies.

Part 5 International comparisons

17 Democracy and social progress, worldwide

[“This chapter¹⁸ looks at the relationships between a variety of social and psychological variables and, on this basis, places the variables in an abstract space. Variation between nations and between regions is studied rather than variation between individuals. The focus is on per capita variables not aggregate variables. This chapter is the first of several in which the abstract concept of space plays a central role. The chapter has two parts. The first part is on social value ...”]

This chapter is on social value How do countries differ? How do different dimensions of social value relate to one another? Does more money lead to more social value? World maps of social progress for 133 countries are given in the 2015 Report for the Social Progress Index (SPI). The overall SPI correlates +0.8 with GDP per capita. It correlates +0.8 with life satisfaction and -0.8 with extreme poverty – but it has only a weak negative correlation, -0.4, with inequality. An analysis of the twelve main variables in the SPI identifies a first principle component which explains almost 50% of the total variance, running from basic features of progress to more advanced features. The correlations between variables suggest ‘divergent sequential development’. A separate study considers the relationship between GDP per capita and democracy: does more money lead to more democracy? - or is there a U-shaped relationship?

Chapters published previously elsewhere

A number of the chapters have been published previously elsewhere. These are indicated with an asterisk in Table 1 below.

Table 1 Chapters published previously elsewhere¹⁹

1 Introduction and overview

1a Methodology: an underlying distribution approach

1b The meta-issue: to hate or to love?

Part 1 Opinion in the USA

¹⁸ The present chapter is an extract from YB15, Chapter 6, 111-120.

¹⁹ Burt, Gordon. *Conflict, Complexity and Mathematical Social Science*. Bingley: Emerald. 2010. Burt, Gordon. *Values, World Society and Modelling Yearbook, 2015*. Newcastle: Cambridge Scholars, 2017.

Burt, Gordon. *Values, World Society and Modelling Yearbook, 2017*. Newcastle: Cambridge Scholars, 2018.

2 Opinions in space: the USA presidential election, 2016	
3 Opinions in space: the USA presidential election, 2020	
4 Opinions over time: the USA presidential elections, 1789-2016	
5 The abstract structure of public opinion: the racism protests 2020	
6 The self and the other: national opinions worldwide	
7 War, peace and psychology: the correlation structure of opinions	
*7a Personality, geography and other social variables	Yearbook 2015, Chapter 6
8 Optimism: the percentages reported in the media and the middle opinion	
Part 2 Satisfaction and democracy	
9 Satisfaction with life	
10 Middle parties and the M-shaped distribution in political space	
*11 Satisfaction with democracy	Yearbook 2015, Chapter 11
*12 Value spaces	Yearbook 2015, Chapter 14
Part 3 Optimal social choice	
13 Optimal social choice, preference functions: Peter Emerson and Dublin City Council	
*14 Optimal social choice, value functions:	CCMSS
Part 4 Opinion dynamics	
*15 A gravitational model of flows in political opinion space, UK 2017	Yearbook 2017, Chapter 4
*16 The contagion of opinion: Herd behaviour in markets, politics, cultures and technologies	
Part 5 International comparisons	
*17 Democracy and social progress, worldwide	Yearbook 2015, Chapter 6

General Background

Ten years ago I wrote a book on mathematical social science entitled *Conflict, Complexity and Mathematical Social Science*,²⁰ and in recent years I have produced a number of yearbooks on *Values, World Society and Modelling*²¹ which have received favourable comment,²² including a review of the 2017 Yearbook in the *Journal of Peace Research Book Notes*.²³

I have now turned my attention to specific topics, all at a somewhat preliminary stage. In 2018 I wrote *Football and Mathematics*.²⁴ Recently I have drawn together previous work into two volumes, *Humanities and Mathematics*²⁵ and *Religion and*

²⁰ Burt, Gordon. *Conflict, Complexity and Mathematical Social Science*. Bingley: Emerald. 2010.

²¹ Burt, Gordon. *Values, World Society and Modelling Yearbook, 2014*. Newcastle: Cambridge Scholars, 2016.

Burt, Gordon. *Values, World Society and Modelling Yearbook, 2015*. Newcastle: Cambridge Scholars, 2017.

Burt, Gordon. *Values, World Society and Modelling Yearbook, 2017*. Newcastle: Cambridge Scholars, 2018.

²² 2014 Yearbook, reviews by Professors Oliver Ramsbotham, Kristian Gleditsch and Christopher Mitchell:

<http://www.cambridgescholars.com/productreviews/61006>.

2015 Yearbook, reviews by Professors Ken Avruch and Glenn Palmer:

<http://www.cambridgescholars.com/productreviews/61934>.

2017 Yearbook, reviews by Professors Peter Abell and Lars-Erik Cederman:

<https://www.cambridgescholars.com/productreviews/62623>.

²³ *Journal of Peace Research*, Book Notes. [Review of Gordon Burt \(2018\) Values, World Society and Modelling Yearbook 2017](https://www.prio.org/JPR/BookNotes/?x=1208), by Peter Abell. Published online 2 August 2018. <https://www.prio.org/JPR/BookNotes/?x=1208>.

²⁴ Burt, Gordon. *Football and Mathematics. Premier League and World Cup*. Newport Pagnell: Mathematical Social Science Publishing. 2018.

²⁵ Burt, Gordon. *Humanities and Mathematics*.

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbmxb3Jkb25idXJ0bWF0aHNvY3NjaXxneDozM2RkZTQ3NDVMTQyYzMy>.

*Mathematics*²⁶, both only in early draft form. In 2019 I looked at the Brexit debate in the UK²⁷, and now in 2020 I have been looking at politics in the USA.

²⁶ Burt, Gordon. *Religion and Mathematics*.

<https://docs.google.com/viewer?a=v&pid=sites&srcid=ZGVmYXVsdGRvbWFpbmxb3Jkb25idXJ0bWF0aHNvY3NjaXxneDozZDNkZGFkMGE4YTg1MjRh>.

²⁷ Burt, Gordon. *Brexit* website, January 2020. <https://sites.google.com/site/gordonburtmathsocsci/central>.