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RESEARCH ARTICLE

Uncertainty and political elites' behavior: introducing the uncertainty grid

Barbara Vis and Olaf van der Veen

Utrecht University School of Governance, Utrecht University, Bijlhouwerstraat, Utrecht
Corresponding author: Barbara Vis; Email: b.vis@uu.nl

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Abstract
Many, if not most, phenomena faced by political elites are characterized by uncertainty. This characterization also holds for the concept uncertainty itself, with conceptualizations and operationalizations differing both across and within bodies of scholarship. The conceptual vagueness poses a challenge to the accumulation of knowledge. To address this challenge, we integrate and expand existing work and develop an *uncertainty grid* to map phenomena (e.g., Covid-19; digitalization) or aspects thereof (e.g., vaccines; generative Artificial Intelligence [AI]). The uncertainty grid includes both the nature of a phenomenon's uncertainty (epistemic and/or aleatory) and its level and enables labeling phenomena as certain, resolvably uncertain, or radically uncertain. We demonstrate the utility of the uncertainty grid by mapping the development of uncertainty during the Covid-19 pandemic onto it. Moreover, we discuss how researchers can use the grid to develop testable hypotheses regarding political elites' behavior in response to uncertain phenomena.

Keywords: political elites; political behavior; uncertainty; uncertainty grid; Covid-19

Introduction

Uncertainty is a characteristic of many, if not most, of the phenomena about which political decisions are made, ranging from Covid-19, climate change, and digitalization to migration and socio-economic development (e.g., Dewulf and Biesbroek, 2018; Boin *et al.*, 2021; Jeannet *et al.*, 2023; Sayers *et al.*, 2023). Since the mid-1950s, much research in for instance cognitive psychology has focused on how humans process information and make decisions (for an overview, see Newell *et al.*, 2022). Research shows that the *context* of political elites' decision-making likely matters (Hafner-Burton *et al.*, 2013). A hitherto largely unexplored, yet possibly important contextual factor of political elites' decision-making is *the uncertainty of a phenomenon* itself. The uncertainty of a phenomenon likely influences the behavior of all political actors, from voters to political elites. Given the unprecedented uncertainty at the start of the Covid-19 pandemic (Sayers *et al.*, 2023), for example, voters could neither draw on their own past experiences or accumulated knowledge nor on information sources like the mass media to 'form coherent preferences on the proper remedies' (Altiparmakis *et al.*, 2021, 1160). Yet, so we argue, the effect is especially pertinent for political elites: all elected or appointed political representatives like ministers, members of parliament, or local politicians.[1] A main—or perhaps even *the* main—task of politicians is to make judgments and decisions about uncertain phenomena, with these decisions oftentimes influencing numerous peoples' lives—which is why our focus is on political elites.

[1]See e.g., Hafner-Burton *et al.* (2013) for a discussion of what is an elite.

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Political elites often use the term *uncertainty* when discussing policy problems and their solutions, suggesting that they recognize the uncertainty of phenomena. For example, between 1996 and early 2024, the term uncertainty was used more than 30,000 times in Dutch parliamentary documents.[2] A substantial share of these references are from the last five years (>10,000), thus related to the Covid-19 pandemic (early 2020–early 2023) and the war in Ukraine (February 2022–). This illustrates the certainty of uncertainty being an often-used term by politicians, something that also holds for scholars.[3] However, as a concept, uncertainty is characterized by uncertainty. For one, politicians refer to different things when talking about uncertainty. For example, in a Dutch parliamentary debate on the Temporary law Climate fund (*Tijdelijke wet Klimaatfonds*), they use the term uncertainty to (1) characterize transitions in general, (2) discuss the (alleged lack of) effectiveness of climate measures, and (3) opportunistically use it to stress the importance of another topic (namely: poverty reduction) (Handelingen II, 2023). Relatedly, conceptualizations and operationalizations of uncertainty also differ both across and within bodies of scholarship (see e.g. Rathbun, 2007; Botelho *et al.*, 2023). The latter is a problematic situation for accumulating knowledge.

To study the effect of the uncertainty of phenomena (e.g., Covid-19) or of aspects of phenomena (e.g., Covid-19 vaccines), phenomena need to be categorized based on their uncertainty. But how can this be done? In this article, we present a tool that enables exactly this: the *uncertainty grid*. To develop this grid, we draw on and extend existing research (especially Walker *et al.*, 2003; Kay and King, 2020; Botelho *et al.*, 2023). We take from the literature the differentiation of a phenomenon's uncertainty based on its *level* (low, medium, high) as well as its *nature* (epistemic—which is about how understandable the situation is—and aleatory—which is about how predictable outcomes are). We extend the existing literature in two ways: First, we propose that epistemic and aleatory uncertainty are orthogonal 'types' of uncertainty that each can take on different levels. Second, we pioneer the concepts *resolvable uncertainty* and *radical uncertainty*—as popularized by Kay and King (2020)—in political science in general and in research on political elites' behavior in particular. Radically uncertain phenomena are characterized by ambiguity, vagueness, or uniqueness, with more information or knowledge being insufficient to remove the uncertainty. Resolvable uncertainty, conversely, is removed with more information or knowledge.[4] Distinguishing between radical and resolvable uncertainty is not yet common in the literature on political elites' behavior. In fact, research on radical uncertainty or related concepts like 'deep uncertainty' (see Stanton and Roelich, 2021) or 'Knightian uncertainty' (Knight 2014 [1921]) is limited in general (cf. Lammers *et al.*, 2024, 26; for an exception, see e.g., Sayers *et al.*, 2023).[5,6] Still, making the distinction between radical and resolvable uncertainty is useful, because the 'radicalness' or 'resolvableness' of a phenomenon's uncertainty shapes the constraints as well as the opportunities political elites face in their decision-making. Therefore, we present radical and resolvable uncertainty as central elements in our uncertainty grid, resulting from specific combinations of the nature and level of uncertainty.

[2]Authors' search on March 6, 2024 of the term *onzeker** (uncertain*) in parliamentary documents (*Kamerstukken*) of the *Tweede Kamer* (lower house) between 01.01.1996 and 01.03.2024 on www.officielebekendmaking.nl.

[3]Just to give an impression of the use of the term *uncertainty* by scholars: a GoogleScholar search on April 4, 2024 yielded more than five million hits, with 1.2 million of these since 2020.

[4]Situations that allow for full certainty are very rare in political decision-making, which is why they fall outside this study's scope.

[5]For instance, a Web of Science search of the terms "radical uncertainty" AND "politic*" on 28 February 2024 yielded only 19 results, with only Vis (2025) analyzing the intersection between the two terms.

[6]We prefer the term 'radical uncertainty' to these related terms like 'deep uncertainty' because the existing literature on deep uncertainty is predominantly prescriptive/normative and prospective (for an overview, see e.g., Stanton and Roelich, 2021), whereas our focus is empirical/positive and retrospective. Kay and King's (2020) work on radical (vs. resolvable) uncertainty fits the latter focus better. Knightian uncertainty (Knight, 2014 [1921]) focuses mainly on situations of immeasurability, and can thereby be considered a subset of the conception of radical uncertainty that we adopt here.

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We develop our arguments in three steps. First, we discuss the lack of consensus in the scholarly literature regarding uncertainty as a concept (Section *Concepts of uncertainty: a lack of consensus*) and argue why it is important to focus on both the *level* of uncertainty (Section *Level of uncertainty: the first element of the uncertainty grid*) and its *nature* (Section *The nature of uncertainty: the second element of the uncertainty grid*). Different from some existing work, we propose that epistemic and aleatory uncertainty are orthogonal categories, with the level of uncertainty varying for both. It is here where the concepts radical and resolvable uncertainty come in: radical uncertainty can, for example, be characterized by a high level of epistemic uncertainty, by a high level of aleatory uncertainty, or by a high level of both. After presenting the uncertainty grid (Section *The uncertainty grid*), we illustrate its value by mapping the uncertainty of both aspects of Covid-19 (e.g., transmission) and its development over time more generally in the United Kingdom (UK) onto it (Section *Using the uncertainty grid: Covid-19 in the UK as an illustration*). Next, we sketch a research agenda on how the uncertainty grid can help researchers to study the influence of a phenomenon's uncertainty on political elites' behavior, generating both normative and empirical expectations for the effects of this uncertainty on political elites' behavior (Section *Research agenda*). We end with a discussion and conclusion (Section *Discussion and conclusion*).

Concepts of uncertainty: a lack of consensus

Uncertainty is a concept that features in many fields and about which there is no consensual definition (Kozyreva and Hertwig, 2021). A broad, often-used definition is uncertainty as those situations with an unknown outcome or with inexact probabilities (Knight, 2014 [1921]). This is the conceptualization of uncertainty as used in, for instance, economics (Von Neumann and Morgenstern, 1944) and rationalist approaches in political science (e.g., Downs, 1957; Bueno de Mesquita *et al.*, 2003; see Rathbun, 2007 for a discussion of the different meanings of uncertainty in International Relations [IR]). Examples of research in this tradition are studies focusing on the effect of uncertainty about election outcomes or candidate positions on voters' behavior (e.g., Palfrey and Rosenthal, 1985; Gilligan and Krehbiel, 1989; Alvarez and Franklin, 1994; Herrmann, 2012) or voters' uncertainty about policy outcomes (Jacobs and Matthews, 2012, 2017; H. S. Christensen and Rapeli, 2021; L. Christensen, 2022). Uncertainty thus conceptualized results from *a lack of information*; if only enough information would have been available—for example about a policy's outcome—there would have been no uncertainty.

However, in politics and other domains a lack of information is typically not the only or even key problem. For one, politicians may face information overload (Walgrave and Dejaeghere, 2017), in which case information is not only insufficient for action, but may even produce *more* uncertainty. What is more, politicians may be unable to turn the information into usable knowledge due to information ambiguity: the problem of how to analyze or interpret information (Gerrits, 2012). The latter fits with the so-called cognitivist paradigm in IR, in which the key problem of uncertainty lies in the *ambiguity of information*. When information is ambiguous, it does not speak for itself, but must be processed in some way (e.g., by belief systems). So even if information is available, there remains the question of how to analyze or interpret it, whereby the appropriate course of action is not immediately clear (Rathbun, 2007, 535, 537). The cognitive paradigm in IR hereby aligns with psychological approaches that focus on the heuristics people display when making judgments and decisions and the related biases (e.g., Gilovich and Griffin, 2002), as well as with so-called Knightian uncertainty (Knight, 2014 [1921]).

The rationalist and the cognitive approaches thus zoom in on different conceptualizations of uncertainty. Several other conceptualizations have also been used to analyze uncertainty (Bevan, 2022, 21). Of these, characterizing uncertainty in terms of its *level*, where uncertainty is placed on a scale from total certainty or determinism to total uncertainty or ignorance, seems a particularly

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useful first step because of its implications for political elites' behavior. The *level of uncertainty* is thus the first element of the uncertainty grid, which we discuss in the next section.

Level of uncertainty: the first element of the uncertainty grid

The level of uncertainty refers to the extent to which a phenomenon is uncertain, 'ranging from the unachievable ideal of complete deterministic understanding at one end of the scale to total ignorance at the other' (Walker *et al.*, 2003, 7). Categorizing uncertainty in terms of its level allows us to distinguish between situations with low or moderate uncertainty from those with more fundamental uncertainty. This distinction is useful, because—normatively—those situations require different responses (e.g., Marchau *et al.*, 2019). For example, when planning, specific plans can be developed if situations are characterized by low levels of uncertainty. Conversely, if they are characterized by high levels of uncertainty, there is a need for plans that can be easily adapted to different situations (Walker *et al.*, 2003). As we discuss later, this also holds for political elites, making the level of uncertainty an important determinant of political behavior.

Scholars that conceptualize uncertainty by its level typically use a single scale that ranges from total certainty to total uncertainty (Bevan, 2022). Kay and King (2020), for example, place their concepts radical and resolvable uncertainty on such a single scale: from (1) situations where the outcome is perfectly predictable (what they—in line with most other work—label certainty), to (2) situations where there is some uncertainty about precise outcomes that either falls in a clear range or is reducible with more information (resolvable uncertainty—this is what most of the rationalist literature discussed in section *Concepts of uncertainty: a lack of consensus* focuses on), to (3) situations with so much uncertainty that they defy clear ranges and cannot be accurately predicted even with additional information (radical uncertainty—what some work in the cognitivist tradition focuses on). In their seminal study, Walker *et al.* (2003) break down resolvable uncertainty—a term they do not use themselves—into (a) situations where uncertainty can be captured in statistical terms (so-called statistical uncertainty), and (b) situations where a few different futures are plausible, but probabilities cannot accurately be assigned to those futures (scenario uncertainty). Building on Walker *et al.* (2003), Lammers *et al.* (2024, 10) similarly divide resolvable uncertainty into (a) 'shallow' and (b) 'medium' levels: in the former case, objective or subjective probabilities are assignable to the enumerated multiple alternatives; in the latter case, alternatives' perceived likelihoods can be ranked ordered only.

Different from some existing work, however, we argue that uncertainty cannot be put on a single scale only, because doing so equates types of uncertainty that hold quite different characters. For resolvable uncertainty, for example, Kay and King's (2020) definition includes both unknown facts —such as not knowing a capital city's name—and games of chance—such as roulette. The character or *nature* of uncertainty fundamentally differs between these two situations (cf. Bevan): in one, uncertainty results from lack of knowledge; in the other, from the event's uncertain outcomes.

The literature on a concept related to radical uncertainty, namely deep uncertainty (for a review, see Stanton and Roelich, 2021), provides useful insights on the different natures of uncertainty. Specifically, Marchau *et al.* (2019), following Walker *et al.* (2003), posit that deep uncertainty can result from either 'a lack of knowledge or data about the mechanism or functional relationships being studied', or from 'the potential for unpredictable, surprising, events' (Marchau *et al.*, 2019, 7). Ben-Haim (2006, 15), similarly, speaks of severe uncertainty in cases of either scarce information, or when fundamental change means the future cannot be easily predicted based on the past. This shows that in both situations of resolvable and radical uncertainty, the *nature* or character of uncertainty can differ fundamentally even when the *level* of uncertainty is the same. Thus, although approximating the level of uncertainty is paramount to categorizing phenomena, using a single scale is not appropriate. In the next section, we therefore introduce our preferred solution: using two orthogonal scales based on the *nature* of uncertainty.

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The nature of uncertainty: the second element of the uncertainty grid

How can the inadequacy of placing uncertainty on a single axis be resolved? We propose to do this by adding the nature of uncertainty (epistemic and/or aleatory) to the uncertainty grid. In a nutshell, *epistemic uncertainty* results from a lack of understanding of the environment, while *aleatory uncertainty* results from the environment's inherent variation (Kozyreva and Hertwig, 2021). Epistemic uncertainty questions how understandable the situation is,[7] thus applying to the past and the present; this is the type of uncertainty that for instance the rationalist tradition in political science typically focuses on. Aleatory uncertainty, conversely, questions how predictable the outcomes are, thus trying to extend the present situation to the future; this is the type of uncertainty that the cognitivist approach in political science (also) focuses on. Both epistemic uncertainty and aleatory uncertainty can be *radical*: epistemic uncertainty when the phenomenon's obscurity or complexity impairs full understanding of the situation; aleatory uncertainty when the uniqueness or extremeness of an event impairs making inferences about the potential outcomes (cf. Marchau *et al.*, 2019).[8] However, we break with Walker *et al.*'s (2003) idea that epistemic and aleatory uncertainty are opposing ends of the *same* axis. Instead, so we argue, the nature of uncertainty is *orthogonal*, meaning that epistemic and aleatory uncertainty are *not* mutually exclusive: a phenomenon or an aspect thereof can be characterized by one, both, or neither. Before presenting the uncertainty grid, we first further delineate the boundaries of epistemic and aleatory uncertainty.

Epistemic uncertainty: how understandable is the situation?

Epistemic uncertainty concerns one's ability to understand the environment, including the past and the present. More technically, it concerns our understanding of an outcome distribution, such as knowing a virus' basic characteristics at the start of a pandemic, or how candidate positions influence voters' behavior. High epistemic uncertainty typically reflects a (collective) lack of understanding. Also facts can be "uncertain" in that they are unknown. Kay and King (2020) give the example of the events surrounding the *Mary Celeste*, a boat that was found abandoned in 1872. It is still not known what happened to the crew members. Objectively, this is not uncertain, since theoretically it could have be known what had happened, but it is still subjectively (and thus epistemically) uncertain because it is not known exactly what.

The level of epistemic uncertainty (low, medium, or high) is determined by the degree to which the lack of knowledge is reducible after more investigation. Knowledge can be *hidden*: unknown, but findable through more investigation, like the characteristics of a population. It can also be *unobtainable*: both unknown and unfindable, like—at present—the events surrounding the Mary Celeste. In practice, the boundaries between levels of uncertainty (high, medium, or low) are not crisp—neither for epistemic nor for aleatory uncertainty. For example, since epistemic uncertainty relies on our understanding, a lack of knowledge is typically not either reducible or not. The level of uncertainty can rather transition over time. Scientific matters, for example, often follow a trajectory of unattainable to hidden to known (i.e., understandable). What deadly affliction happened to Europeans in the 14th century was impossible to know at the time (epistemic uncertainty high); through medical advancement, it eventually became subject to open questions (epistemic uncertainty medium), and finally has become well-understood as the bubonic plague

[7]We use the term 'understandable' instead of 'known' here because for political representatives, knowing more (e.g., having more data) does not automatically mean having more *knowledge*. In fact, politicians often face information overload (Walgrave and Dejaeghere, 2017), in which case more information may actually mean more uncertainty. The term 'understanding' captures this difference.

[8]Radical uncertainty as created by aleatory uncertainty resembles March's (1994, 178) definition of ambiguity as 'a lack of clarity or consistency in reality, causality, or intentionality'. Resolvable uncertainty, conversely, resembles March's (1994, 178) definition of uncertainty as 'imprecision in estimates of future consequences conditional on present actions'.

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(epistemic uncertainty low) (Kay and King, 2020). The distinction between hidden and unattainable information, i.e., medium and high epistemic uncertainty, also then still exists. This holds especially for shorter time scales, which is the typical timescale of a political decision-maker. For instance, there currently exists much scientific uncertainty surrounding climate change because exact knowledge is lacking about the precise effects of rising temperatures. Although this information is technically knowable (in the sense that in the future, knowledge about this will likely be much more advanced), this knowledge is practically unattainable to decision-makers today. This means that regarding the question whether there can be uncertainty in the objective world or whether all uncertainty is, in principle, in the mind of the person, we follow Hammond's (1996) *conditional indeterminism.* Conditional indeterminism is the idea 'that judgments are made under conditions of irreducible uncertainty *at the time the judgment is made*' (Hammond, 1996, 16–17 emphases in original).

The level of epistemic uncertainty often depends on the complexity of the situation. If the complexity is low, it is easy to gain full understanding of the situation and discern the range of potential outcomes (i.e., low epistemic uncertainty). When situations are somewhat complex, knowledge may be hidden but more information can still be obtained (medium epistemic uncertainty). At some point, the situation is so complex that we cannot fully understand it, regardless of the time or information (high epistemic uncertainty). Political decision-makers regularly find themselves faced with phenomena that can be characterized by, at a minimum, medium complexity, but oftentimes high complexity, thus medium or high epistemic uncertainty.

Also the rate of change often impacts the level of epistemic uncertainty. In theory, all epistemic uncertainty is reducible. But to reduce this, we must collect information about the environment and increase understanding of it. Doing so takes time, if it is at all possible. If the decision-making environment changes more rapidly than we can gain information about it, it will remain uncertain, even if the environment at any particular point is not complex (Kay and King, 2020, 35). What is more, also when the information growth outpaces the capacity to understand this—as in the case of information overload (Walgrave and Dejaeghere, 2017)—there is epistemic uncertainty.

Aleatory uncertainty: how predictable are the outcomes?

The phenomena political elites face are also likely characterized by aleatory uncertainty, which describes the inherent variation present in the decision-making environment. In some cases, perfect information means perfect predictions; in other cases, there would still exist extreme unpredictability. Aleatory uncertainty denotes this difference.

At aleatory uncertainty's lowest level, the outcome contains no variability; either because there is no variation, or because the variation is perfectly causally predictable. Since the sun rose every day before today, one can be certain (for all intents and purposes) it will rise again tomorrow; the outcome does not vary. Also uncertain phenomena that regard only the present fall in this category, since—by definition—only one outcome manifests in the present at the same time (i.e., there is no variability).

One level above that (i.e., medium aleatory uncertainty), there exists what Walker *et al.* (2003, 8) call *statistical uncertainty*: there is some variation, but it 'can be described adequately in statistical terms'. The variation varies normally around a mean. If you predict the number of days it will rain next year in the Netherlands, you will likely not be correct; but it is very unlikely that you will be more than 20 days off, and never more than 50.

When there is variation with extremes, such as in the case of Taleb's (2007) black swans—events that are considered completely unpredictable or unexpected, yet highly impactful—,[9] aleatory uncertainty is high. For example, the number of war deaths does not follow a normal

[9]Taleb (2007, chs. 1 and 4) names Black Monday—the stock crash of 1987—and 9/11 as examples of black swans.

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distribution, with deaths always staying close to the mean; instead, the differences in deaths span several orders of magnitude. Predictions, in this case, demand paying particular attention to the extremes, which can be done for instance through scenarios (Walker *et al.*, 2003).

This highest level of aleatory uncertainty also occurs during situations that fundamentally defy the language of distributions. For example, if an event is so unique that clear analogous data cannot be drawn, distributions do not apply (Knight, 2014 [1921]). In such cases, probabilities are fundamentally inestimable and decision-makers instead typically rely on reference narratives (Kay and King, 2020; Johnson *et al.*, 2023) or abductive reasoning (Ansell and Boin, 2019) to make decisions. Conceptually, there is thus a difference between this highest level of aleatory uncertainty and the situation with variation with extremes. Empirically though, that is in the behaviorally observable implications, this difference is small at best. Therefore, we group both under high aleatory uncertainty in our uncertainty grid, which we now present.

The uncertainty grid

In our uncertainty grid, a phenomenon or aspects thereof is characterized by a specific combination of epistemic and aleatory uncertainty: the uncertainty can be (a) either of an epistemic or an aleatory nature (of different levels), (b) both epistemic and aleatory, or (c) neither (i.e., low epistemic as well as aleatory uncertainty). While they use different terms,[10] viewing the two as orthogonal is in line with Botelho *et al.* (2023) However, we extend Botelho et al.'s work by also adding the *levels* of epistemic and aleatory uncertainty. What is more, the specific combination of epistemic and aleatory uncertainty jointly establish whether the (aspect of the) phenomenon is best characterized as radically uncertain, resolvably uncertain, or (almost) certain. Hereby, we offer a much more precise characterization of resolvable and radical uncertainty than is used in existing studies (e.g., Kay and King, 2020). Specifically if both epistemic and aleatory uncertainty are low, the phenomenon holds no or little uncertainty; high uncertainty on one or both means radical uncertainty. Resolvable uncertainty is situated in the middle. Thus, the uncertainty grid—see Figure 1—for instance reveals the different conditions under which politicians face radical uncertainty: because of a lack of understanding of the past or present (epistemic uncertainty); because this past and/or present cannot be used to make predictions about future outcomes (aleatory uncertainty); or both.

The changing tone in color in the uncertainty grid in Figure 1 indicates the gradual shift from resolvable uncertainty (blue cells in the middle) to radical uncertainty (purple cells in the top row and in the column farthest on the right). The lines between the cells enable researchers to heuristically delineate between uncertainty that is resolvable and that is radical, which is especially relevant for empirical analyses.

In the next section, we illustrate the value of the uncertainty grid by showing how it can be used to analyze a particular phenomenon, namely the Covid-19 pandemic.

Using the uncertainty grid: Covid-19 in the UK as an illustration

Covid-19 serves as a quintessential example of an uncertain phenomenon. At various points of the pandemic, key details were unknown or unpredictable as political elites tried to make impactful decisions about their country's direction. It also serves as a useful illustration for the uncertainty grid because the uncertainty changed over time, as collective knowledge, or societal circumstances, or the disease itself evolved. This allows us to illustrate the different ways in which the uncertainty grid can be used. There are substantial differences across as well as within countries in the development of Covid-19 and the related policy responses (e.g., Boin *et al.*, 2021; Engler *et al.*, 2021). Therefore, we focus on one country only: the UK. Our discussion is necessarily selective: it

[10]Botelho *et al.* (2023) use the term 'ambiguity' for epistemic uncertainty and 'risk' for aleatory uncertainty.

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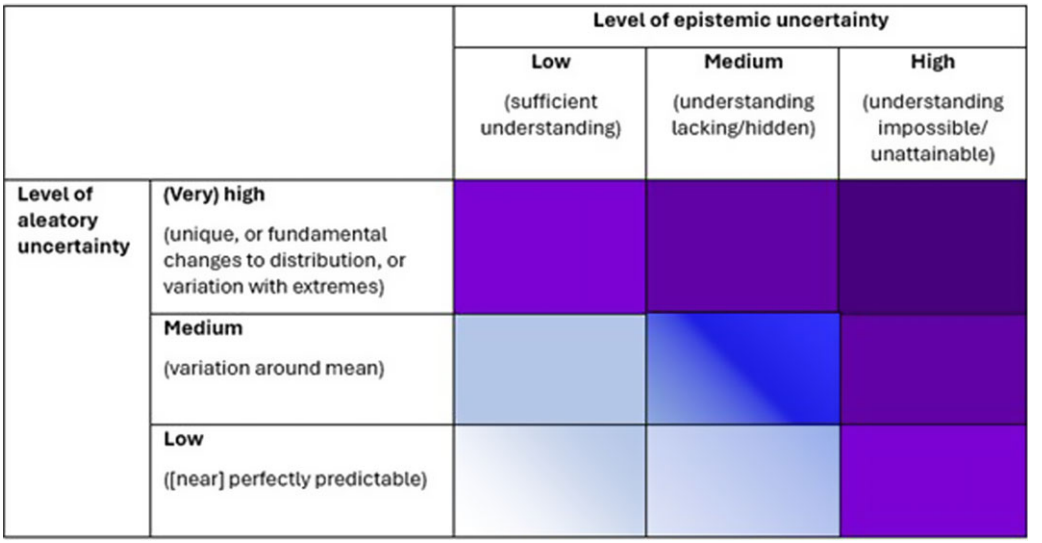


Figure 1. Uncertainty grid for placing phenomena based on the nature and level of uncertainty.
Note: Cells in purple—top row and farthest right column—denote *radical uncertainty*, with the darker the shade, the higher the degree of radicalness. Cells in blue denote *resolvable uncertainty*, with the darker the shade the lower the degree of resolvableness. The cell in light grey—bottom left—denotes little or no uncertainty. Epistemic uncertainty concerns how understandable the situation is; aleatory uncertainty concerns how predictable the outcomes are.
Source: authors' own complication, drawing on Botelho et al. (2023) and Walker et al. (2003).

is intended only to illustrate how researchers can use the uncertainty grid in two ways. First, they can map specific questions related to the pandemic—which we label *aspects*—onto the uncertainty grid, such as the transmissibility of the virus through children, or the role of air quality. Second, researchers can use the uncertainty grid to map the uncertainty related to the pandemic more generally and examine its development over time.

Mapping the uncertainty of aspects of the phenomenon of Covid-19 in the UK

Throughout the pandemic, politicians faced many aspects that were uncertain. Here, we highlight a few of them to illustrate how researchers can use the uncertainty grid to map their uncertainty, which varied in level (high, medium, low) and nature (epistemic, aleatory) both between aspects and over time. To do so, we rely on minutes from the meetings held in 2020 by the Scientific Advisory Group for Emergencies (SAGE), the major British scientific advisory body, because these minutes represent the information UK politicians had access to at the time. Some politicians, like Matt Hancock, report reading the minutes directly (Covid-19 Public Inquiry, 2023a, 17); others, like Boris Johnson, report having the meetings verbally summarized by, for instance, the Chief Medical Officer (Covid-19 Public Inquiry, 2023b, 6).

One aspect of the pandemic where uncertainty changed over time was whether (and how much) the virus could impact children. On February 4, 2020, SAGE reports that 'almost nothing is known about [Covid-19] in children' (SAGE, 2020b, 3). This shows that epistemic uncertainty is high, and also implies high aleatory uncertainty since a wide range of outcomes are plausible. One week later, SAGE notes that 'information about children remains limited. There is no clear modelling evidence that children are either protected or less susceptible, but clinical reports suggest that severity of disease may be less' (SAGE, 2020c, 2). This statement indicates that epistemic uncertainty is now at a medium level: initial reports existed, and limited understanding was possible.

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Compare these quotes to one given later in the pandemic, on November 4, 2020: 'Evidence continues to suggest that children and younger people (<18 years) are much less susceptible to severe clinical disease than adults (high confidence)' (SAGE, 2020g, 1). Here, epistemic uncertainty is relatively low: there appears to be sufficient understanding to make decisions. Aleatory uncertainty is now at a medium level, since the range of outcomes has shrunk significantly, but statistical uncertainty remains for the exact rate of susceptibility.

A related question concerned the degree to which children would transmit the disease to others. During April 2020, epistemic uncertainty was high, with SAGE noting that the 'evidence on the impact of children on spread is not clear' (SAGE, 2020d, 2). Aleatory uncertainty was at a medium level, since it concerned a matter of degree that varied around a mean. Over time, epistemic uncertainty moved to a medium level. For instance, SAGE minutes in October 2020 state that 'evidence suggests that pre-school and primary school-aged children are not currently playing a driving role in transmission', but that evidence is 'mixed' and 'more studies are needed' (SAGE, 2020f, 1).

Mapping the uncertainty of the phenomenon of Covid-19 in the UK over time

A second way in which researchers can use the uncertainty grid is to map a phenomenon's uncertainty (level, nature) over time. We again focus on Covid-19 in the UK for illustrative purposes, but now "zoom out" to the development of the pandemic as such. Here, too, we rely on SAGE-minutes, which we supplement where relevant with additional sources.

Epistemic uncertainty: increasing & decreasing over time

When the novel coronavirus emerged in January 2020, epistemic uncertainty was high since basic features of the virus were still unknown (e.g., the symptoms of children discussed above, the virus' average contagiousness and deadliness) (SAGE, 2020a; BMA, 2022, 21), and understanding was unattainable. By mid-February 2020, there was more information on the virus' transmission but uncertainty remained about the precise mode of contagion, such as whether people could be asymptomatically contagious (SAGE, 2020b, 2–3). Overall, there continued to be a lack of clarity on many fronts (see e.g., Boin *et al.*, 2021). Throughout the pandemic, infections were regularly much higher and rates of transmission much faster than experts, such as SAGE in March 2020, had expected (cf. Cairney and Wellstead, 2021, 6)—not least because the epidemiological models used by experts come with uncertainty (Holmdahl and Buckee, 2020). Still, over time, what first was unknown, then could be estimated (albeit regularly with massive margins of error), and in some respects became increasingly known (e.g., how the virus spread). As such, epistemic uncertainty reduced over time as knowledge and, especially, understanding grew. This reduction in the level of epistemic uncertainty related to Covid-19 in the UK is visible in Figure 2: from high epistemic uncertainty (labelled 'Initial phase of Covid-19' in Figure 2), to medium epistemic uncertainty (e.g., 'First wave'), to low epistemic uncertainty (e.g., 'New variants'), when understanding was by and large sufficient for decision-making.

Aleatory uncertainty: from high, to medium

Contrary to the decline of epistemic uncertainty over time, *aleatory uncertainty* of the development of Covid-19 remained high until well into 2022. Initially, the virus' exact shape and impact was unknown. Previous viruses suggested that two distinct scenarios were likely: containment (as with severe acute respiratory syndrome [SARS]) or full outbreak (as with the Spanish flu in the 1910s). At early stages of Covid-19, it might have been possible to contain the disease (mainly to China). Without containment, the disease was most likely to spread throughout the world. This created a situation with potential outcomes at both extremes, thus high aleatory uncertainty. In late February and early March 2020, when it became clear that containment was

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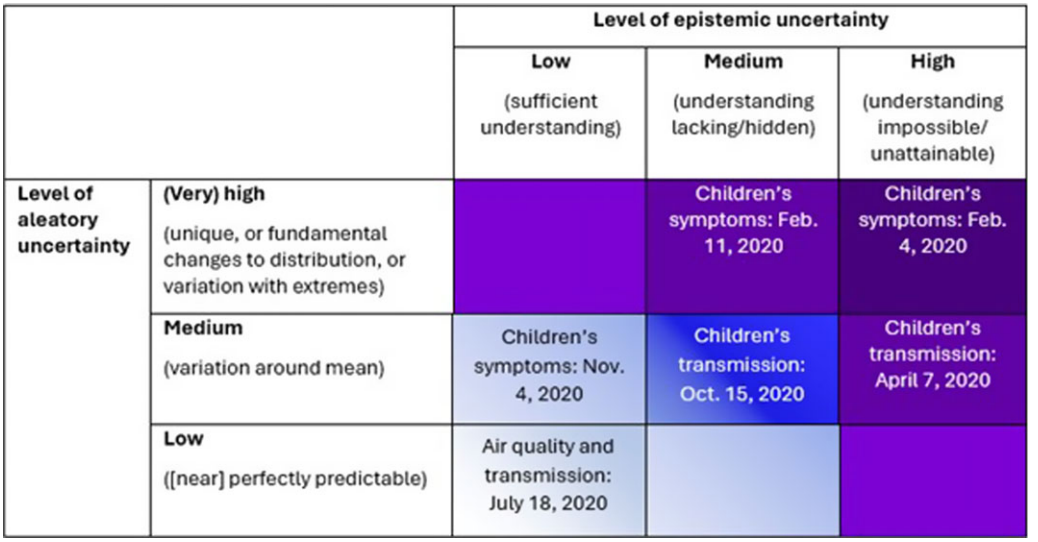


Figure 2. Illustration of the uncertainty grid: Aspects of Covid-19 in the UK.
Note: See Figure 1.

impossible; aleatory uncertainty instead started to center around the behavior of individuals, especially their support for and—related—adherence to government policy (e.g., Jørgensen *et al.*, 2021). Only when vaccines became widely available and new variants ceased to pose the same threat ('Widespread vaccination; no looming new variants' in Figure 3) did the extreme variation disappear and aleatory uncertainty remained at a medium level. Still, there were also some earlier pockets of time during which aleatory uncertainty was medium, for example in Spring/Summer 2021, after widespread vaccination and before the emergence of the Omicron variant (e.g., SAGE, 2021).

Placing a phenomenon like the development of Covid-19 in the UK onto the uncertainty grid, as in Figure 3, also reveals how the radicalness or resolvableness of a phenomenon's uncertainty changes over time. For instance, the uncertainty in the initial phase of Covid-19 (January-February 2020) was radical because both epistemic and aleatory uncertainty were high. During the first wave, the uncertainty was still radical, but with epistemic—but not aleatory—uncertainty reduced to a medium level.

Overall, our illustration of Covid-19 in the UK showed the different ways in which the uncertainty grid can be used to map uncertainty. In the next section, we discuss how researchers can then apply this map to study political elites' behavior.

Research agenda

How can the uncertainty grid be used to study political elites' behavior? In this section, we sketch an agenda for future research. In doing so, we differentiate between research that focuses on how politicians *should* respond (prescriptively, i.e., normative) and how they *do* respond (what we see empirically, i.e., positive). Where (aspects of) phenomena are placed on the uncertainty grid—and thus what is the nature and level of uncertainty—has potential implications for both.

Implications for studying how political elites should respond to uncertain phenomena

Normatively, when radical uncertainty results from high epistemic uncertainty (i.e., if understanding is impossible or unattainable—the purple column farthest on the right in

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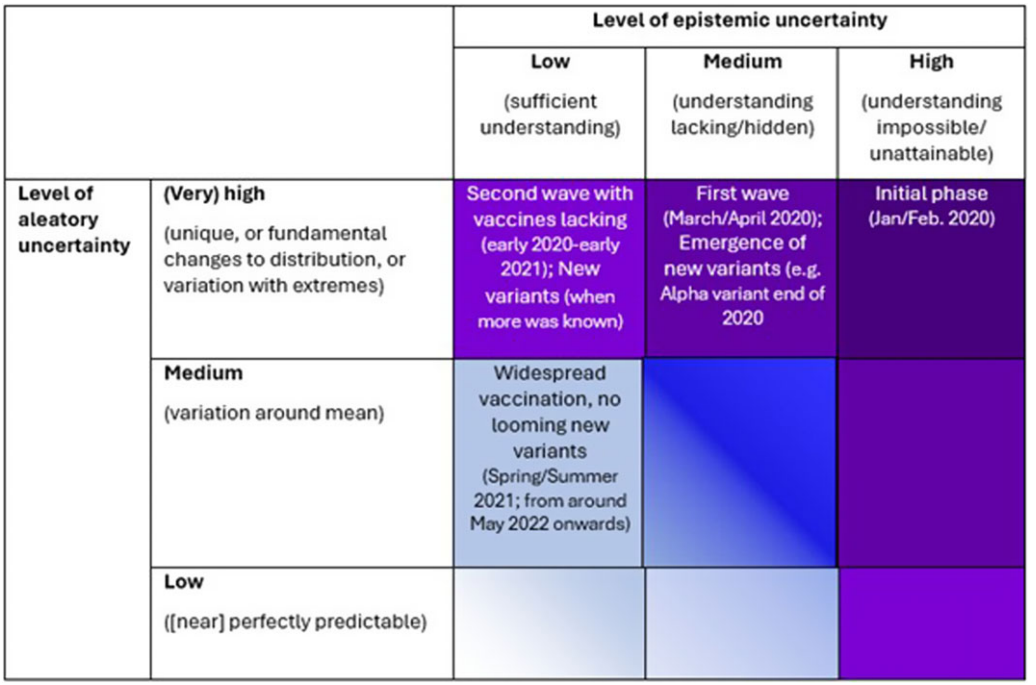


Figure 3. Illustration of the uncertainty grid: Development of Covid-19 in the UK.
Notes: See Figure 1.

Figure 1)—, it will be an ineffective response if political elites try to reduce the uncertainty by obtaining more information; the information necessary for sufficient understanding is simply not there. Similarly, when radical uncertainty results from high aleatory uncertainty (i.e., extreme variation)—, modeling the uncertain phenomenon (e.g., the spread of Covid-19 infections) is unlikely to be effective because differences between outcomes (and the possibility for unforeseen outcomes) become too great (Walker *et al.*, 2003, 7–8). In this latter case, it is more appropriate if politicians use plans that can be easily adapted to various situations (Ansell and Boin, 2019).

Using the uncertainty grid allows us to formulate more granular propositions on how political elites should behave still by distinguishing between the nature of uncertainty (epistemic, aleatory). For instance, political elites should respond differently to resolvable uncertainty resulting from epistemic uncertainty compared to aleatory uncertainty. When resolvable uncertainty is epistemic, looking for more information to reduce the uncertainty may be effective (Vis, 2025). Conversely, if resolvable uncertainty is aleatory, scenario mapping or modeling is more useful (Walker *et al.*, 2003, 7–8). Similarly, it matters for a response's effectiveness whether radical uncertainty is predominantly aleatory or epistemic in nature.

Implications for how political elites do respond to uncertain phenomena

Empirically, that is with regard to how political elites *do* respond to (aspects of) uncertain phenomena, a first plausible difference is whether uncertainty is *radical or resolvable*, irrespective of its origin (aleatory, epistemic). Broadly, this distinction (radical, resolvable) implies that some types of uncertainty are more challenging for political elites to deal with than others, or—given that uncertainty is a double-edged sword—offer them either more or less opportunities to, for instance, reap electoral gains (see also Van Kersbergen and Vis, 2022, 1; Vis, 2025). This leads to two hypotheses. First, when political elites face radical uncertainty, they are more likely to use

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heuristics—mental shortcuts that facilitate judgment and decision-making (see e.g., Gilovich *et al.*, 2002), because the situation is harder to fully grasp without them (Johnson *et al.*, 2023). Second, when they face radical uncertainty, political elites are more likely to change plans more frequently (Soltani, and Izquierdo, 2019), because of the typically more rapidly evolving understanding under radical uncertainty.

Likewise, it is plausible that political elites respond differently to (aspects of) phenomena that are epistemically versus those that are aleatory uncertain—even if they do not think in such terms. Regarding *epistemic uncertainty*, research in non-political domains shows that decision-makers tend to attempt to reduce the uncertainty, for example by gathering more information (Lipshitz *et al.*, 2007 on firefighters; Harenčárová, 2017 on paramedics). We thus hypothesize, first, that also political elites are likely to try and reduce epistemic uncertainty and, second, that the way they do so is similar to these other domains. An example from the Covid-19 pandemic includes the so-called corona dashboard, a website which was launched by the Dutch government in June 2020 and that was up and running until April 2024 and available to and used by political decision-makers as well as public organizations and citizens. According to the then Minister of Health, De Jonge, the dashboard was intended to enable taking more grounded decisions by increasing the grasp of the spread of the coronavirus,[11] thus to reduce epistemic uncertainty.

Regarding *aleatory uncertainty*, we put forward three preliminary hypotheses to be tested in subsequent empirical research. First, again in line with decision-makers in other contexts (e.g., Harenčárová, 2017), we hypothesize that political elites will acknowledge the (aleatory) uncertainty by preparing for various scenarios at the same time. This can for example be seen in the Dutch Delta Committee, which at points emphasized the use of 'robust strategies' to prepare for a variety of possibilities (Van 't Klooster and Veenman, 2021, 5). Second, we hypothesize that political elites will downplay the level of uncertainty when faced with situations characterized by high aleatory uncertainty, because salient aleatory uncertainty can threaten held worldviews, in which case downplaying uncertainty protects those views (Mitzen and Schweller, 2011). Finally, we hypothesize that they use the uncertain phenomenon opportunistically, purposefully utilizing it to 'increase support for themselves, their party, or their policies' (Vis, 2025, 554). For instance, in the May 2020 corona debate, several parliamentarians in the UK leveraged the Covid-19 pandemic to publicly oppose austerity politics.

In this third hypothesis regarding aleatory uncertainty, it is visible that our focus differs from the literature on deep uncertainty (for an application, see e.g., Van 't Klooster and Veenman, 2021). In that literature, uncertainty is typically seen as unwelcome or undesirable and thus as something that needs to be *managed*. Dewulf and Biesbroek (2018, 454, emphasis added), for example, state that: 'Different uncertainties *require* different strategies to address them'—with them subsequently examining the strategies that actors use to '*manage* different types and sources of uncertainty' (idem). This view of uncertainty may not always fit political elites, because for politicians, uncertainty also offers ample opportunities (see also Burden, 2003). Political elites often consider implications on votes when making decisions (e.g., Strøm, 1990; Jottier *et al.*, 2012). When the driver of political behavior changes from finding an effective policy solution to holding office or gaining votes, the role of uncertainty also changes from a barrier to effective decisions to a potential opportunity for political gain. For politicians, therefore, uncertainty also offers many opportunities.

We propose that these expectations can be best analyzed by examining the reactions that political elites display to phenomena with different degrees and types of uncertainty (i.e., that are mapped in different cells in the uncertainty grid). There are various ways to do so. A useful and straightforward one would be to start by conducting an in-depth case study to map aspects of a phenomenon—regarding Covid-19, this can for example be the origin of the Covid-19 virus, its infectiousness, development and effectiveness of vaccines, et cetera—which can be placed on the

[11]As stated in a Covid-19 press conference on May 19, 2020.

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uncertainty grid; our illustration and the resulting Figure 3 shows how such a case study can look like. The next step would then be to identify and examine the reactions displayed by political elites to each aspect (e.g., infectiousness), for example, by analyzing their speech acts, either qualitatively or through a computational text analysis approach (e.g., Grimmer and Stewart, 2013; Baden *et al.*, 2022). By comparing these two, the expectations outlined above can be tested.

Discussion and conclusion

The uncertainty of a phenomenon is a possibly important, yet hitherto largely unexplored contextual factor of political behavior, especially of that of political elites. For examining the effect of this contextual factor, a tool is needed that allows for categorizing a phenomenon's uncertainty and—if applicable—the development of this uncertainty over time. In this article, we present the uncertainty grid with which researchers can do exactly that. Our illustration of the uncertainty grid on the development of Covid-19 in developed democracies reveals that: (1) indeed, phenomena can vary in both nature (epistemic and/or aleatory) and level (low, medium, high), and that (2) aspects of this phenomenon can be placed on the uncertainty grid. Our illustration also demonstrates *how* these aspects can be placed: although a phenomenon can be plausibly placed across the spectrum depending on the question of interest, looking at the questions that are actually relevant for the politicians, and the knowledge they have to answer those questions, makes some of those areas more plausible than others.

Of course, the type of uncertainty a phenomenon exhibits is unlikely to be the only determinant of a politician's response. This can already be clearly seen for aleatory uncertainty, where we expect three different responses to be plausible depending on the situation. More research is also needed to determine what other factors might influence particular reactions. For example, individual characteristics–like personality–are considered to influence reactions to uncertainty (e.g. Fréchette *et al.*, 2017; Jach and Smillie, 2019), which may also hold for political elites. Moreover, political institutions are known to have wide-ranging implications for political behaviour (e.g. Strøm, 1990), which likely extends to reactions to uncertainty. These types of expectations could be spelled out explicitly and extended into more testable hypotheses.

Importantly, although the uncertainty grid allows for placing a phenomenon or aspects thereof based on their "objective" uncertainty, this does not mean that an individual political decision-maker actually *perceives* a phenomenon to hold that type and/or level of uncertainty. A politician may perceive or characterize an uncertain phenomenon as certain (Mitzen and Schweller, 2011), or be ignorant of a known fact. Our uncertainty grid allows us to separate this individual from collective knowledge, and thus characterize a phenomenon regardless of a particular politician's assessment. An interesting avenue for future research would be to examine to what extent a phenomenon's "objective" uncertainty (nature and/or level) is similar or different from a politician's *perception* of this uncertainty, and why. Perceived uncertainty could be inferred based on statements made by politicians, and these could then be juxtaposed to the "objective" uncertainty at the time. By allowing for more granular placement of phenomena, the uncertainty grid allows for more nuanced conclusions to be reached on avenues like these.

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References

Altiparmakis, Argyrios, et al. "Pandemic politics: policy evaluations of government responses to COVID-19." *West European Politics* **44**.5–6 (2021): 1159–79, https://doi.org/10.1080/01402382.2021.1930754.

Alvarez, R. Michael, and Charles H. Franklin. "Uncertainty and political perceptions." *The Journal of Politics* **56**.3 (1994): 671–88, https://doi.org/10.2307/2132187.

Ansell, Chris, and Arjen Boin. "Taming deep uncertainty: the potential of pragmatist principles for understanding and improving strategic crisis management." *Administration & Society* **51**.7 (2019): 1079–112, https://doi.org/10.1177/0095399717747655.

Baden, Christian, et al. "Three gaps in computational text analysis methods for social sciences: a research agenda." *Communication Methods and Measures* **16**.1 (2022): 1–18, https://doi.org/10.1080/19312458.2021.2015574.

Ben-Haim, Yakov. *Info-Gap Decision Theory Decisions Under Severe Uncertainty*. Oxford: Academic Press, 2006.

Bevan, Luke D. *Through a Model, Darkly: An Investigation of Modellers' Conceptualisation of Uncertainty in Climate and Energy Systems Modelling and an Application to Epidemiology*. Doctoral thesis, University College London, 2022, https://discovery.ucl.ac.uk/id/eprint/10157068/.

BMA. "The public health response by UK governments to COVID-19." *BMA Covid Review* **4** (2022).

Boin, Arjen, Allan McConnell, and 'Paul t Hart. *Governing the Pandemic The Politics of Navigating a Mega-Crisis*. Cham: Palgrave Macmillan, 2021.

Botelho, Catarina, et al. "Uncertainty deconstructed: conceptual analysis and state-of-the-art review of the ERP correlates of risk and ambiguity in decision-making." *Cognitive, Affective, & Behavioral Neuroscience* **23**.3 (2023): 522–42, https://doi.org/10.3758/s13415-023-01101-8.

Bueno de Mesquita, B., et al. *The Logic of Political Survival*. Cambridge: MIT Press, 2003.

Burden, Barry C. "Everything but Death and Taxes. Uncertainty and American Politics." In C. Burden Barry (Ed.), *Uncertainty in American Politics* (pp. 3–23). Cambridge: Cambridge University Press, 2003.

Cairney, Paul, and Adam Wellstead. "COVID-19: effective policymaking depends on trust in experts, politicians, and the public." *Policy Design and Practice* **4**.1 (2021): 1–14, https://doi.org/10.1080/25741292.2020.1837466.

Christensen, Hendrik Serup, and Lauri Rapeli. "Immediate rewards or delayed gratification? A conjoint survey experiment of the public's policy preferences." *Policy Sciences* **54**.1 (2021): 63–94, https://doi.org/10.1007/s11077-020-09408-w.

Christensen, Love. "How does uncertainty affect voters' preferences?." *British Journal of Political Science* **52**.3 (2022). 1186–204, https://doi.org/10.1017/S0007123421000247.

Covid-19 Public Inquiry. Transcript of Module 2 Public Hearing on 30 November 2023 (301123). (2023a), https://covid19.public-inquiry.uk/wp-content/uploads/2023/11/30195755/C-19-Inquiry-30-November-2023-Module-2-Day-29.pdf.

Covid-19 Public Inquiry. Transcript of Module 2 Public Hearing on December 2023 (301123). (2023b).

Dewulf, Art, and Robbert Biesbroek. "Nine lives of uncertainty in decision-making: strategies for dealing with uncertainty in environmental governance." *Policy and Society* **37**.4 (2018): 441–58, https://doi.org/10.1080/14494035.2018.1504484.

Downs, Anthony. *An Economic Theory of Democracy*. New York: Harper and Row, 1957.

Engler, Sarah, et al. "Democracy in times of the pandemic: explaining the variation of COVID-19 policies across European democracies." *West European Politics* **44**.5–6 (2021): 1077–102, https://doi.org/10.1080/01402382.2021.1900669.

Fréchette, Guillaume R., et al. "Personality, information acquisition, and choice under uncertainty: an experimental study." *Economic Inquiry* **55**.3 (2017): 1468–88, https://doi.org/10.1111/ecin.12438.

Gerrits, Lasse. *Punching Clouds: An Introduction to the Complexity of Public Decision-Making*. Litchfield Park: Emergent Publications, 2012.

Gilligan, Thomas W., and Keith Krehbiel. "Asymmetric information and legislative rules with a heterogeneous committee." *American Journal of Political Science* **33**.2 (1989): 459–90, https://www.jstor.org/stable/3118130.

Gilovich, Thomas, Dale Griffin, and Daniel Kahneman, editors. *Heuristics and Biases: The Psychology of Intuitive Judgment*. New York: Cambridge University Press, 2002.

Gilovich, Thomas, and Dale Griffin. "Introduction - Heuristics and Biases: Then and Now." In Thomas Gilovich et al. (Ed.), *Heuristics and Biases: The Psychology of Intuitive Judgment* (pp. 1–18). New York: Cambridge University Press, 2002.

Grimmer, Justin, and Brandon M. Stewart. "Text as data: the promise and pitfalls of automatic content analysis methods for political texts." *Political Analysis* **21**.3 (2013): 267–97, https://doi.org/10.1093/pan/mps028.

Hafner-Burton, Emilie M., D. Alex. Hughes, and David G. Victor "The cognitive revolution and the political psychology of elite decision making." *Perspectives on Politics* **11**.2 (2013): 368–86, https://doi.org/10.1017/S1537592713001084.

Hammond, Kenneth R. *Human Judgment and Social Policy: Irreducible Uncertainty, Inevitable Error, Unavoidable Injustice*. Oxford: Oxford University Press, 1996.

Handelingen II. "Nr. 101, Item 25." Nr. 101, Item 25, (2023), https://zoek.officielebekendmakingen.nl/h-tk-20222023-101-25.html.

Harenčárová, Hana. "Managing uncertainty in paramedics' decision making." *Journal of Cognitive Engineering and Decision Making* **11**.1 (2017): 42–62, https://doi.org/10.1177/1555343416674814.

Herrmann, Michael. "Voter uncertainty and failure of Duverger's Law: an empirical analysis." *Public Choice* **151**.1 (2012): 63–90, https://doi.org/10.1007/s11127-010-9734-2.

https://doi.org/10.1017/S1755773925100246 Published online by Cambridge University Press

Holmdahl, Inga, and Caroline Buckee. "Wrong but useful — what Covid-19 epidemiologic models can and cannot tell us." *New England Journal of Medicine* **383**.4 (2020): 303–05, https://doi.org/10.1056/NEJMp2016822.

Jach, Hayley K., and Luke D. Smillie. "To Fear or Fly to the Unknown: Tolerance for Ambiguity and Big Five Personality Traits." *Journal of Research in Personality* **79** (2019): 67–78, https://doi.org/10.1016/j.jrp.2019.02.003.

Jacobs, Alan M., and J. Scott Matthews. "Policy attitudes in institutional context: rules,uncertainty, and the mass politics of public investment." *American Journal of Political Science* **61**.1 (2017): 194–207, https://doi.org/10.1111/ajps.12209.

Jacobs, Alan M., and J. Scott Matthews. "Why do citizens discount the future? Public opinion and the timing of policy consequences." *British Journal of Political Science* **42**.4 (2012): 903–35, https://doi.org/10.1017/S0007123412000117.

Jeannet, Anne-Marie, et al. "A need for control? Political trust and public preferences for Asylum and refugee policy." *European Political Science Review* **15**.3 (2023): 427–43, https://doi.org/10.1017/S1755773923000012.

Johnson, Samuel G. B., Avri Bilovich, and David Tuckett. "Conviction narrative theory: a theory of choice under radical uncertainty." *Behavioral and Brain Sciences* **46** (2023): e82, https://doi.org/10.1017/S0140525X22001157.

Jørgensen, Frederik, et al. "Public support for government responses against COVID-19: assessing levels and predictors in eight Western democracies during 2020." *West European Politics*, **44**.5–6 (2021): 1129–58, https://doi.org/10.1080/01402382.2021.1925821.

Jottier, Dimi, John Ashworth, and Bruno Heyndels. "Understanding voters' preferences: how the electorate's complexity affects prediction accuracy and wishful thinking among politicians with respect to election outcomes." *Kyklos* **65**.3 (2012): 340–70, https://doi.org/10.1111/j.1467-6435.2012.00542.x.

Kay, John, and Mervyn King. *Radical Uncertainty*. London: The Bridge Street Press, 2020.

Knight, Frank. *Risk, Uncertainty and Profit*. Boston: Houghton Mifflin, 2014 [1921].

Kozyreva, Anastasia, and Ralph Hertwig. "The interpretation of uncertainty in ecological rationality." *Synthese* **198**.1 (2021): 1517–47.

Lammers, Wouter, et al. "Theories of uncertainty communication: an interdisciplinary literature review." *Science Communication* **46**.3 (2024): 332–65, https://doi.org/10.1177/10755470241231290.

Lipshitz, Raanan, et al. "What's Burning? The RAWFS Heuristic on the Fire Ground." In R Hoffman Robert (Ed.), *Expertise Out of Context: Proceedings of the Sixth International Conference on Naturalistic Decision Making* (pp. 97–112). New York: Taylor & Francis Group, 2007.

March, James G. *A Primer on Decision Making: How Decisions Happen*. New York: The Free Press, 1994.

Marchau, Vincent A. W. J., et al., editors. *Decision Making under Deep Uncertainty: From Theory to Practice*. Cham: Springer Nature, 2019, https://doi.org/10.1007/978-3-030-05252-2.

Mitzen, Jennifer, and Randall L. Schweller. "Knowing the unknown unknowns: misplaced certainty and the onset of war." *Security Studies* **20**.1 (2011): 2–35, https://doi.org/10.1080/09636412.2011.549023.

Newell, Ben R., David A. Lagnado, and David R. Shanks. *Straight Choices: The Psychology of Decision Making*. Abingdon & New York: Routledge, 2022.

Palfrey, Thomas R., and Howard Rosenthal. "Voter participation and strategic uncertainty." *American Political Science Review* **79**.1 (1985): 62–78, https://doi.org/10.2307/1956119.

Rathbun, Brian C. "Uncertain about uncertainty: understanding the multiple meanings of a crucial concept in international relations theory." *International Studies Quarterly* **51**.3 (2007): 533–57, https://www.jstor.org/stable/4621727.

SAGE. SAGE 2 Minutes: Coronavirus (COVID-19) Response. 28 January. 2020a, https://www.gov.uk/government/publications/sage-minutes-coronavirus-covid-19-response-28-january-2020.

SAGE. SAGE 4 Minutes: Coronavirus (COVID-19) Response, 4 February. 2020b, https://www.gov.uk/government/publications/sage-minutes-coronavirus-covid-19-response-4-february-2020.

SAGE. SAGE 6 Minutes: Coronavirus (COVID-19) Response, 11 February. 2020c, https://www.gov.uk/government/publications/sage-minutes-coronavirus-covid-19-response-11-february-2020.

SAGE. SAGE 23 Minutes: Coronavirus (COVID-19) Response, 7 April. 2020d, https://www.gov.uk/government/publications/sage-minutes-coronavirus-covid-19-response-7-april-2020.

SAGE. SAGE 42 Minutes: Coronavirus (COVID-19) Response, 18 June. 2020e, https://www.gov.uk/government/publications/sage-42-minutes-coronavirus-covid-19-response-18-june-2020/sage-42-minutes-coronavirus-covid-19-response-18-june-2020.

SAGE. SAGE 62 Minutes: Coronavirus (COVID-19) Response, 15 October. 2020f, https://www.gov.uk/government/publications/sage-62-minutes-coronavirus-covid-19-response-15-october-2020.

SAGE. SAGE 65 Minutes: Coronavirus (COVID-19) Response, 4 November. 2020g, https://www.gov.uk/government/publications/sage-65-minutes-coronavirus-covid-19-response-4-november-2020.

SAGE. SAGE 85 Minutes: Coronavirus (COVID-19) Response, 31 March. 2021, https://www.gov.uk/government/publications/eighty-fifth-sage-meeting-on-covid-19-31-march-2021.

Sayers, Anthony M., et al. "Covid-19 policy convergence in response to Knightian uncertainty." *Political Studies Review* **21**.3 (2023): 625–35, https://doi.org/10.1177/14789299221109081.

Soltani, Alireza, and Alicia Izquierdo. "Adaptive learning under expected and unexpected uncertainty." *Nature Reviews Neuroscience* **20**.10 (2019): 635–44, https://doi.org/10.1038/s41583-019-0180-y.

https://doi.org/10.1017/S1755773925100246 Published online by Cambridge University Press

Stanton, Muriel C. Bonjean, and Katy Roelich. "Decision making under deep uncertainties: a review of the applicability of methods in practice." *Technological Forecasting and Social Change* **171** (2021): 120939, https://doi.org/10.1016/j.techfore.2021.120939.

Strøm, Kaare. "A behavioral theory of competitive political parties." *American Journal of Political Science* **34**.2 (1990): 565–598, https://doi.org/10.2307/2111461.

Taleb, Nassin Nicolas. *The Black Swan: The Impact of the Highly Improbable*. London: Penguin, 2007.

Van Kersbergen, Kees, and Barbara Vis. "Digitalization as a policy response to social acceleration: comparing democratic problem solving in Denmark and the Netherlands." *Government Information Quarterly* **39**.3 (2022): 101707, https://doi.org/10.1016/j.giq.2022.101707.

Van 't Klooster, Susan A., and Sietske A. Veenman. "Shaping future perspectives in policy advice under deep, long-term uncertainty. the case of the Dutch Delta Committee." *Futures* **127** (2021): 102700, https://doi.org/10.1016/j.futures.2021.102700.

Vis, Barbara. "Introducing a conceptual map of political elites' responses to different types of uncertain phenomena." *Political Studies Review* **23**.2 (2025): 550–58, https://doi.org/10.1177/14789299231222847.

Von Neumann, Jon, and Oskar Morgenstern. *Theory of Games and Economic Behavior*. Princeton: Princeton University Press, 1944.

Walgrave, Stefaan, and Yves Dejaeghere. "Surviving information overload: how elite politicians select information." *Governance: An International Journal of Policy and Administration* **30**.2 (2017): 229–44, https://doi.org/10.1111/gove.12209.

Walker, Warren E., et al. "Defining uncertainty: a conceptual basis for uncertainty management in model-based decision support." *Integrated Assessment* **4**.1 (2003): 5–17, https://doi.org/10.1076/iaij.4.1.5.16466.

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