Old Solutions to New Problems: An Introduction to Threat-Heuristic Theory

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Abstract

The world is a dangerous place. This adage underlies many of the justifications for government. At a more granular level, protecting citizens from potential dangers serves as the justification for many of the measures governments undertake in the domains of foreign and domestic policy. Despite the relevance of danger writ large as a motivating force for outcomes of interest, political science has not yet interrogated the domain of dangers as a coherent space within which to study political preferences, attitudes and behaviors. In this paper, I develop Threat-Heuristic Theory (THT), a new individual-level model of the psychological processes connecting the detection of danger to preferences for reducing that danger through political action. I provide an extensive review of the threat perception literature in biology and cognitive science on which the theory is built. I argue that THT's model is general enough to apply across the space of dangers writ large and that its mechanisms are species-typical and so apply both to ordinary citizens and to political elites. I also present observational and experimental data from two original surveys to support: (1) THT's core concept of threat classification; (2) the distinctiveness of threat classification from other relevant constructs, including disposition and political ideology; and (3) the existence of a set of issue areas where THT is likely to outperform existing theories linking threat perception to political behavior. I show that this set includes topics of current relevance, including immigration, fundamentalism, and climate change.

Introduction

The study of contemporary politics, and political psychology in particular, is an exercise in reconciling very recent developments in human history – including participatory democracy, the rise of nation-states, and the invention of nuclear weapons – with the much longer history of humans themselves.[1] Much of our physical and mental scaffolding evolved under vastly different circumstances than the environments, material and social, we now navigate. And yet, we can develop theories of very modern political outcomes – including vote choice, nuclear deterrence, and support for the welfare state – by considering how features of that distant past manifest in our contemporary environment (Lopez and McDermott 2012; McDermott, Fowler, and Smirnov 2008; Sidanius and Kurzban 2013).[2]

I adopt this same perspective. Specifically, I argue that humans evaluate new and novel dangers that arise in the world today using the basic mental toolkit that evolved over our ancestral past. These adaptive mental processes helped humans identify dangers accurately enough and rapidly enough to mitigate their worst effects in ecologies that largely no longer exist. I argue these same mental processes come online today when we evaluate new dangers, even abstract ones, such as hostile ideologies. That is, we apply old solutions to new problems.

In this paper, I develop Threat-Heuristic Theory (THT), a general theory of threat perception and response that integrates findings from biology and cognitive science into an explanation of the policies people want for dealing with the dangers they perceive in the world.[3] A unique

[1] Conventionally, modern humans have been dated as 200,000 years old (Stringer 2002). Recently, Hublin et al. (2017) published findings suggesting anatomically, but not neurocranially, modern humans emerged at least 300,000 years ago.

[2] For evolutionarily informed models of vote choice, see the discussion of heuristics in Lau and Redlawsk (2001), the role of facial features in Banducci et al. (2008) and Olivola and Todorov (2010), and vocal pitch in Klofstad (2015). For nuclear deterrence, see alternative mechanisms to rational choice in Jervis (1989), McDermott, Lopez, and Hatemi (2017), and Thayer (2007). For welfare policy, see M. B. Petersen (2011) and Sznycer et al. (2017).

[3] I refer here to one of the two definitions of "threat": "A person or thing likely to cause damage or danger" (Stevenson 2010). The other definition ("A statement of intention to inflict pain, injury, damage, or other hostile action on someone in retribution for something done or not done.") can also be studied through the lenses of biology and cognitive science, with a focus on signal and information processing (e.g., Falk and Scholz 2018), but I do not address that literature or topic here.

and important concept within the theory is *threat classification* – the idea that our brains rapidly distinguish between different types of threats and formulate responses accordingly without deliberate reflection. This ability to discriminate between threat types allows our responses to be more efficient and tailored to the problem at hand. But the need to respond quickly, to avoid potential harms from coming about, means that the discrimination process is done rapidly. Hence the term "threat-heuristic."[4]

THT identifies and focuses on three types of threat in particular: threats of physical harm, threats of loss, and threats of contamination. Rather than assuming one of these types is always paramount for human beings, and thus the "real" driver of response preferences, THT posits that individuals can vary in how they classify the same target and that they can conceive of a target as posing more than one kind of threat. I refer to targets whose dangerousness has multiple dimensions as *complex*.

I present several types of evidence to build the case for Threat-Heuristic Theory in this paper. I first introduce and synthesize findings from biology and cognitive science supporting the basic premises of THT. I then use original survey data to establish the utility of THT for issue areas within political science. With this data, I show: (1) that THT's 3-threat model captures meaningful differences in how dangers are conceived of, including those that are highly politicized; (2) that the independent variable at the heart of THT – *threat classification* – is empirically distinct from established constructs, including party identification, conservatism, and a range of trait and personality measures linked to threat perception in the literature; and (3) that threat classification can be a strong predictor of policy preferences. To gain

[4]Throughout this paper, I use the words "mental" and "psychological" to refer to processes occurring in the mind and "neurological" to refer to processes occurring in the brain. As the brain-bases of many mental processes are still uncertain, I generally default to "mental" or "psychological". With the exception of the phrase "cognitive science", I avoid the use of "cognitive" and "cognition" wherever possible because these terms carry a very different meaning in political science than their original fields. "Cognition" in psychology and neuroscience refers to a broad set of mental processes, including perception, attention, learning, and memory, which can be largely unconscious. In political science, however, the use of "cognitive" often serves as a stand-in for "thinking" or the deliberate engagement of higher-level mental functions. This difference in definitions is consequential when considering a theory of heuristic (i.e., not deliberative) information processing, which is "cognitive" by the standards of psychology or neuroscience but not political science. I use these other terms, therefore, to avoid confusion.

some causal purchase on the relationship between threat classification and other constructs, one of the studies uses a nonword paradigm in which subjects classify novel dangers that do not exist. This enables me to observe threat classification for the first time, which is not possible with politically salient issues, and to establish the relationship between initial classification and existing constructs such as conservatism.

This paper makes several theoretical contributions to the political science literature. First, it provides the first significant review of recent research in biology and cognitive science on how humans deal with danger. Second, it introduces a new individual-level theory linking threat perception to the formation of policy preferences, with a psychological model that applies equally to citizens and elites. The model's flexibility in the populations to which it applies derives from its foundation in species-typical psychological processes. Species-typical processes occur in all humans and are present and operative independent of political sophistication.[5] Finally, while THT's framework shares some foundations with theories of inter-group threat in social psychology, it arises from a more general approach, treating danger as a *kind* of thing, not limited to other people.[6] This leads to a theory with a wider range of potential applications for political science.

From a practical perspective, the theory's main contribution is to show that threat classification can explain why individual preferences can vary systematically over a wide range of danger-mitigating policy options. Particularly when a danger is complex, existing theories struggle to systematically account for the ways in which preferences vary between individuals. For example, theories of immigration preference focus solely on the pro-/anti- distinction, with little ability to explain why individuals who express anti-immigrant sentiment prefer some means of restriction more than others (e.g., a border wall over visa limitations). By

[5]For other examples of species-typical psychological processes see Kahneman (2003) and Kahneman and Tversky (1984).

[6]"Natural kinds" are defined by Griffiths (2004) as "categories which admit of reliable extrapolation from samples of the category to the whole category. In other words, natural kinds are categories about which we can make inductive scientific discoveries" (903). "Investigative kinds" are natural-kind concepts whose boundaries are under investigation (907). The argument made here is that "danger" should be considered an investigative kind.

identifying policy preferences explicitly as threat response strategies, THT can shed light on preferences for specific elements within the set of possible solutions (e.g., border wall construction) using a framework that applies across issue areas.

This paper proceeds in four additional sections. I first discuss the literature integrating threat perception into political science. I then outline Threat-Heuristic Theory and discuss the evidence for the theory's premises. In the third section, I show that THT core concepts are distinct from other constructs, including political ideology and personality measures. The fourth section concludes.

Threat Perception in Political Science

Threat perception is a familiar background concept in political science, and political psychology in particular.[7] Feeling "threatened" is an accepted prime-mover of political behavior.[8]

One strand of the literature linking threat perception to politics focuses on individual-level variation in sensitivity to danger in the environment. The argument in its basic form is that variation in an outcome of interest – an attitude or behavior – is driven by variation in the perception that something is or is not dangerous and thus worth acting upon. Differences in the detection of politically salient dangers have been linked to: conservatism (e.g., Hibbing, Smith, and Alford 2014; Jost, Nosek, and Gosling 2008; van Leeuwen and Park 2009), gender (Harris and Miller 2000; McClure et al. 2004), several of the Big Five personality traits (Dallago and Roccato 2009; Sibley and Duckitt 2009), Social Dominance Orientation (Costello and Hodson 2011; Crowson, Debacker, and Thoma 2006), Right-Wing Authoritarianism (Lavine, Lodge,

[7] I mean this in the sense that Adcock and Collier (2001) defined background concepts as a "broad constellation of meanings and understandings associated with a given concept" (531). The systematized concept is the definition of "threat" stated earlier as "perception of something or someone as likely to cause damage or be dangerous," which excludes specifically the related but distinct concept of threat perception as a signaling and information problem.

[8] Feeling threatened is not equivalent to feeling fearful. I disambiguate threat from fear over the course of this paper.

and Freitas 2005; Rickert 2002), disgust sensitivity (Aarøe, Petersen, and Arceneaux 2017; Kam and Estes 2016), and dispositional fear (Hatemi et al. 2013; Lilienfeld and Latzman 2014). The causal direction varies within in these examples, but the core argument is that these sources of individual difference correlate with the perceived dangerousness of particular targets (e.g., immigrants).

A second strand of explanations focuses on the properties of the target, in addition to those of the individual perceiver. In particular, social scientists have considered when and why humans find one another to be dangerous. As a social species, the human tendency towards groupness is often cited as introducing an "us versus them" dichotomization of the environment, with knock-on consequences for political attitudes, behaviors, and preferences. By "groupness", I mean the phenomenon identified in Tajfel et al. (1971) by which humans exhibit ingroup chauvinism simply by virtue of being members of that group, even if the group itself has no meaningful identity content.

Social psychologists have developed theories that attempt to pinpoint the "real" sources of inter-group danger, given that chauvinism is so easily triggered (e.g., Tajfel and Turner 1979 and Social Identity Theory). Realistic Group Conflict Theory posits that competition over resources – and material outcomes in general – drives inter-group threat perception (Sherif et al. 1961; LeVine and Campbell 1972). Symbolic Threat Theory posits that competition over non-material resources – values and beliefs – can be more significant for inter-group conflict (Kinder and Sears 1981). Intergroup Threat Theory (ITT) argues that both "realistic" (i.e., material) and "symbolic" (i.e., non-material) threats play a role intergroup conflict (Stephan et al. 2002; Stephan and Stephan 2000; Stephan, Ybarra, and Morrison 2009).[9] Socio-functional theories of inter-group dynamics allow for a broader palette of threats, drawn from a range of evolutionarily salient social problems that needed solving. The most concise presentation and testing of this approach comes from Cottrell and Neuberg (2005), which

[9]In practice, it appears that operationalization of ITT's two threat types often yields nearly equivalent effects (e.g., McLaren 2003; for a review, see Riek, Mania, and Gaertner 2006). That is, these two categories of do not distinguish different kinds of danger from one another.

identifies ten different specific types of danger groups *could* pose to one another.[10] While these theories can be used to generate a rich set of hypotheses linking threat perception to political behavior, by restricting the target space of dangers to other humans, a set of important topics (e.g., climate change, AI technology) is implicitly or explicitly removed from the scope.

Political science has generally shared this focus on other humans as the center of attention and has been quick to integrate the one- and two-threat models into theories linking perceptions of intergroup threat to political outcomes. Most notable has been the integration of a non-material threat component into the political economy literature, particularly around trade and immigration preferences (e.g., Mansfield and Mutz 2009; Mayda and Rodrik 2005; McLaren 2003; Sniderman, Hagendoorn, and Prior 2004; Sides and Citrin 2007). But the theoretical treatment has been a "horse-racing" approach – an effort to pinpoint one *kind* of threat as the dominant influence on a given outcome (for an example in the case of immigration, see Hainmueller and Hopkins 2014). An alternative approach could take the position that *and* rather than *or* is a more plausible operator when it comes to understanding the influence of feeling threatened on human behavior.

This pluralist approach is theoretically more tractable than horse-racing because, by definition, adaptive psychological systems co-exist in the mind at any point in time. If two systems could plausibly be at work, their simultaneous operation cannot be ruled out. Presuming the relationship of two such mechanisms to be mutually exclusive is in and of itself a strong assumption. Thus, any exploration of threat perception, if it appeals to adaptationist logic in its mechanisms, must cast a wide net to consider what it means for humans to deal with

[10] Cottrell and Neuberg (2005) measured how European American college students evaluated the threats posed by various minority social groups to American citizens. The threats of interest were: jobs and economic opportunities, personal possessions, personal rights and freedoms, reciprocity relations (due to choice not to reciprocate), social coordination and functioning, trust violations, physical health, values inconsistent with the ingroup, physical safety, and reciprocity relations (due to inability to reciprocate). An eleventh threat (to ingroup morality) was not evaluated in the study but is integrated in the authors' theory. The authors note that their data support four threat classes (Obstacles to Ingroup Goals, Contamination to Ingroup, Endangered Group Physical Safety, and Threat to Reciprocity Relations), but note that they do not explore these relationships in depth as it was not the purpose of the study (773, 780 n. 8).

danger.

In the next section, I provide this broader perspective and generate a theory that accommodates the co-existence of multiple, adaptive systems of threat perception.

Threat-Heuristic Theory

What does it mean to determine that something in the world is (1) dangerous and (2) requires action? Danger is the possibility of suffering harm. What constitutes "harm" is essentially subjective and the scales on which people reason about danger range from the personal (affecting only the self) to the society- or species-level. Political science is largely concerned with dangers arising at the level of communities and societies, where addressing potential dangers requires coordination often manifesting as public policy, realized or merely debated. Might *how* humans conceive of danger have consequences for what they want to *do* about danger? Might these consequences include informing their preferences for danger-mitigating policies?

In this section, I lay out a new theory that integrates recent research in biology and cognitive science regarding the species-typical systems humans have for dealing with danger. I show how this new, bottom-up model can be used to re-conceptualize how policy debates are framed when the issue area is one where danger mitigation is an ultimate objective.

Adaptation and Dealing with Danger

Research in biology and psychology has found that humans have psychological, neurological, and physiological adaptations to avoid or mitigate dangers in their environment. These adaptive systems are broadly concerned with *detecting* danger and *responding to* danger.

Detection

Danger detection is prediction problem; it is the challenge of anticipating potential bad outcomes before they occur. One type of outcome to be avoided is harm to the body itself. Meta-analyses of the threat detection literature in biology and cognitive science have found evidence for two body-based, "functionally distinct threat management systems, one devoted to *self-protection* and the other to *disease avoidance*" (Neuberg, Kenrick, and Schaller 2011, 143, emphasis mine; see also Schaller, Park, and Faulkner 2003). The self-protection system is concerned with violent bodily harm, either from other humans, predators, or accidents (Öhman and Mineka 2001, 483). The disease avoidance system is concerned with pathogens, both as transmitted by other humans and due to exposure in the environment (i.e., spoiled food) (Oaten, Stevenson, and Case 2009, 305–7).

These systems consist of mental processes and physiological reactions linking the perception of potential harms in the environment (e.g., a snake in the grass) to behavioral responses (e.g., jumping away) through the activation of cognitive associations (e.g., curves among straight lines equal "snake") and emotional reactions (e.g., fear). But these systems are "crudely defined" and biased towards over-detection (Neuberg, Kenrick, and Schaller 2011, 147; see also Schaller et al. 2005, 232; LoBue 2014), so more stimuli are *perceived* as being dangerous than objectively *are* dangerous (e.g., jumping at the sight of a garden hose, not a snake).

The crudeness in the definitions of these bodily-protection systems also allows for an expansion of their domains.[11] For example, sensitivity to contaminants encompasses a bundle of physical cues, like unattractiveness or physical disability (Krendl et al. 2006, 12; Park, Faulkner, and Schaller 2003), as well as metaphysical constructs, like exposure to something "evil" or immoral (Nemeroff and Rozin 1994, 169–75; Siegal, Fadda, and Overton 2011, 3430). In healthy adults, physical cleansing has been shown to reduce self-reported *moral* contamination (e.g., Helzer and Pizarro 2011; Ritter and Preston 2011), suggesting mental models of physical

[11] For a discussion of this expansiveness as an example of preadaptation, see Rozin and Haidt (2013).

and metaphysical contamination have some overlap. Crude definition of these harm avoidance systems also affects our understanding of *why* things are dangerous. For example, human reasoning about contaminants behaves according to a precautionary folk-logic of contagion by contact, not a scientific understanding of transmission (Boyer and Bergstrom 2011, 2; Kalish 1996, 99–101; Rozin and Nemeroff 2002, 206–13; Siegal, Fadda, and Overton 2011, 3430). Indeed, our systems for *detecting* contaminants may be relatively independent of our *reasoning* about them (Nemeroff and Rozin 1994). The same case has been made for our bodily self-protection system operating independently from explicit cognitive control or deliberative reasoning (Mathews, Yiend, and Lawrence 2004; Öhman and Mineka 2001). This implies that the mental processes engaged in protecting our bodies can operate largely independently of our systems for deliberative reasoning. While adaptive and efficient, this independence has profound implications for how our beliefs about what is and what is not dangerous arise in the first place.

Human sociality also extends the boundaries of our concerns beyond our own bodies. First, humans can extend concerns of physical harm to others, in part by sharing some parts of the experience of pain (e.g., Lamm, Decety, and Singer 2011; Singer et al. 2004). Second, humans also extend concerns of bodily contamination to the purity of social groups (e.g., Haidt and Joseph 2004; Leeuwen et al. 2012). Third, humans have concerns that arise *primarily* from sociality itself. Sociality generates possessive concepts (i.e., "mine", "ours", "yours") and rules for conduct that take possession into account (Rakoczy and Schmidt 2013, 18–19). These rules also cover non-material "assets" that nevertheless can be gained, lost, and transferred, such as rights and freedoms (Fessler 2006, 102). This implies another kind of bad outcome to be avoided: loss.

Research suggests the mental architecture for detecting threats of losing material and non-material assets may be contained within other systems for social exchange and punishment (e.g., Cosmides and Tooby 2005; McCullough, Kurzban, and Tabak 2013). Fessler (2006)

suggests the protection of assets as different as land and honor engage the same evolved mechanisms for detecting and deterring transgression because they both can be vulnerable to loss or appropriation (107). Evidence for a distinction between how threats of loss and physical harm to the body are mentally processed comes from studies that isolate precautionary reasoning systems (i.e., reasoning about harm) in the brain from those responding to social contract reasoning (e.g., Fiddick, Spampinato, and Grafman 2005; Stone et al. 2002). Threats of contamination and loss can also be teased apart in the domain of moral and social violations. Violations of rights and freedoms, i.e., loss of autonomy, are distinct in their causes, and in their physiological and behavioral responses, from purity violations, for example (Hutcherson and Gross 2011; Rozin et al. 1999; Seidel and Prinz 2013).

In sum, research into evolved systems of threat detection suggests that humans distinguish between at least three relevant types of danger in the environment which differ based on *what is threatened*. The danger posed might be physical bodily harm, the loss of material and non-material assets, or physical or intrinsic contamination.

As a number of experiments also illustrate, the target being evaluated as dangerous need not be physically present to engage these detection systems. Passively viewing images can induce startle reflexes (e.g., Vaidyanathan, Patrick, and Bernat 2008), and changes in heart rate (Courtney et al. 2010), galvanic skin response (e.g., Bradley et al. 2001), pupil dilation (e.g., Bradley et al. 2008), and facial expression (e.g., Chapman et al. 2009). The instruction to think about a target stimulus, with and without prior encounter experience, also induces these effects (for the robustness of text compared to images, see Robinson and Clore 2001; for physiological responses to autobiographical memory retrieval, see Palomba, Angrilli, and Mini 1997; Salas, Radovic, and Turnbull 2012). Taken together, it is important to note that a target danger need not be physically present, temporally recent, or directly experienced to engage psychological and physiological systems of danger detection.

Some lessons from this body of research are thus: (1) systems for detecting different types

of danger co-exist in the mind and body; (2) those systems are triggered by subjective perception, which may or may not align with objective dangerousness; and (3) targets need not be present or personally experienced to trigger systems of danger detection.

Response Strategies

From an evolutionary perspective, sensitivity to different types of danger in the environment is only useful if it confers a fitness gain (Orr 2009, 531). Detection is thus only the first step in dealing with a threat; appropriate response is the other (Neuberg, Kenrick, and Schaller 2010, 766).

Behavior is an obvious feature of an organism's response to danger. Each threat type leaves room for a limited set of behaviors that can reduce or mitigate danger, depending on certain contextual conditions.[12] For example, there are several responses to a threat of physical harm – flight, fight, and freeze[13] – and the selection of one of these options is based on context (Maack, Buchanan, and Young 2015, 117). Experimental work in animals and humans suggests escape responses ("flight") are dominant with respect to threats of physical harm, if it is possible (Blanchard et al. 2001, 768; Schmidt et al. 2008, 292–94). Only when escape is impossible and attack seems inevitable is a defensive attack ("fight") the dominant response for an individual, though the form of attack can vary by gender in humans (Blanchard et al. 2001, 766–67).

The behavioral response to the threat of losing assets or rights is conditional on the desirability of the status quo and available resources. If loss has already occurred, aggression to reclaim what has been lost is preferred if possible. If the loss has not yet occurred (and, thus, the

[12] I do not use the term "action tendencies", which arises in the literature on emotions (e.g., Frijda 1987; R. D. Petersen 2011), because context still dictates the set of options available for danger mitigation.

[13] Taylor et al. (2000) illustrate that females have also have a "tend and befriend" set of responses under stress, which involve nurturing and pro-social behaviors. I do not add these behaviors to the list of responses, primarily because the evidence on which Taylor et al. (2000) draws is on the broader space of stress response, rather than the response specifically to the danger of physical harm and death for oneself, which is the focus here.

status quo is acceptable) defensive protection is the dominant response (Cottrell and Neuberg 2005, 773). These conditions create a situation in which satisfaction with the status quo can change over time as losses accumulate to become more unacceptable. Threats that are more binary in nature (death, contamination) do not generally have this quality. Loss threats are also unique in that there is often bargaining space. That is, it is possible that losing half of something is a better outcome than losing all of it, so negotiation is a behavioral option, particularly for the weaker side (Sell, Tooby, and Cosmides 2009).

Contaminant threats also have a contextual factor. In many cases, isolation and aversion is the dominant strategy, where measures are also taken to monitor one's own internal purity or health (Olatunji and Sawchuk 2005, 937–38). However, humans have a preference for destroying contaminants where possible (for links between this impulse and some cases of genocide, see Chirot and McCauley 2010, 81–94). Neuberg, Kenrick, and Schaller (2011) argues this elimination behavior is conditioned on extreme power differentials: "We suspect this behavioral strategy becomes more likely as those confronted by the threat perceive themselves to have a significant upper-hand – when they believe they can effectively remove the contaminant without becoming infected in the process" (9-10). In sum, each type of problem – each potential bad outcome – has a strategy for mitigation that relies on a distinct set of behaviors that take a few contextual features into account.

For tailored responses to danger to be effective, they also need to be initiated relatively quickly. Experimental evidence suggests that responses to evolutionarily relevant stimuli (e.g., snakes, angry faces) are instantiated faster than conscious awareness of the threat (Butler et al. 2007; Kahneman 2003; Krendl et al. 2006; Levenson 2003; Lobue and DeLoache 2011; Öhman 2005; Schaller et al. 2005). Emotions seem to play a mobilizing role, linking this rapid mental processing to physical response (Neuberg, Kenrick, and Schaller 2011, 5; see also Butler et al. 2007; Darwin 1872; and Lang, Davis, and Öhman 2000).

Each type of threat has a primary emotional response: *fear* in the case of significant physical

threats; *anger* in the case of loss threats; and *disgust* in the case of contaminant threats. Fear and physical harm have a well-documented threat/emotion correspondence (for a review, see Adolphs 2013). Disgust and contaminant threats have almost as well-documented a correspondence (for a review, see Oaten, Stevenson, and Case 2009). Rozin et al. (1999) also show that violations of an individual's autonomy (i.e., freedoms and rights) elicit anger in cross-cultural experiments (575).

Table 1 summarizes the behavioral and emotional responses associated with the three threat types of interest identified in the biology and cognitive science literature (rows 1 and 2). I extend the logic of individual-level behavioral responses to hypothesize the appropriate response strategies at the level of large groups and communities (row 3), where certain options (e.g., flight) are not readily available. I treat the hypothesized response strategies (row 3) as canonical, generic policy options. That is, they are broadly the kind of solution that is required to mitigate the corresponding type of danger at the level of large communities.

Table 1: Affective and Behavioral Responses

	Physical Harm	Loss	Contamination
Affective Response	Fear	Anger	Disgust
Behavioral Response (for an individual)	Flight (or freeze). If attack is inevitable, fight.	Protect. If status quo is unacceptable, reclaim. Intermediate: bargain.	Expel and isolate. If power differential is significant, eliminate.
Response Strategy (for a large group)	Invest in defense. If attack is inevitable, preventive aggression.	Invest in defense and recourse measures. If status quo is unacceptable, reclaim. Intermediate: bargain.	Expel, isolate, self-monitor. If power differential is significant, eliminate.

It is worth noting here that, while response strategies may have objectively or normatively problematic consequences because the detection of, and responses to, danger privilege speed over accuracy or other considerations, arriving at preferred responses is not necessarily the result of a deliberative mental process. Rather, the formation of response preferences conforms to the model of intuitive operations characteristic of "System 1" thinking (Kahneman 2003, 1452). This does not mean individuals *cannot* reason about their preferences or change their minds, only that the original preference need not have been developed deliberatively.

Learning

It is important to note that the literature reviewed here provides evidence that it is the three threat detection *systems* that are species-typical, not necessarily the targets that trigger them. Instead, most, if not all, of the triggers appear to be *learned*, either from parents or other social contexts. Research into the developmental trajectory of sensitivity to dangers over the lifespan supports the notion that children learn stimulus/threat correspondence early in life, paired with learning the appropriate emotional response (e.g., Boyer and Bergstrom 2011; Kalish 1996; Olsson and Phelps 2007). Items triggering feelings of disgust in particular show variation at the individual level (Olatunji and Sawchuk 2005, 933; Pole 2013, 269) and at the level of societies (e.g., Murray and Schaller 2010; Hejmadi, Rozin, and Siegal 2004). Thus, while humans across cultural and social contexts possess the same ability to detect and parse danger, and to formulate efficient responses, there is no expectation that all humans will respond identically to a given target. The content of these threat categories instead varies at the individual level. Some triggers are shared by virtue of cultural practices and norms about what constitutes a danger (Murray and Schaller 2010). But others are specific to an individual's life experience (Britton et al. 2010). These differences are one reason why theories of a universal, dominant type of danger are unlikely to hold across populations and/or issue areas.

Theoretical Framework

I draw on the evidence for the three distinct systems of threat detection and response, and the evidence that the triggers of these systems are largely learned, to construct a unifying model of the psychological process connecting a target danger (a "stimulus") to policy preferences for mitigating that danger. Because the model is one of subjective perception, its core premise is that any stimulus could be classified as any kind of threat. Figure 1 provides a schematic view of the theory in its general terms.

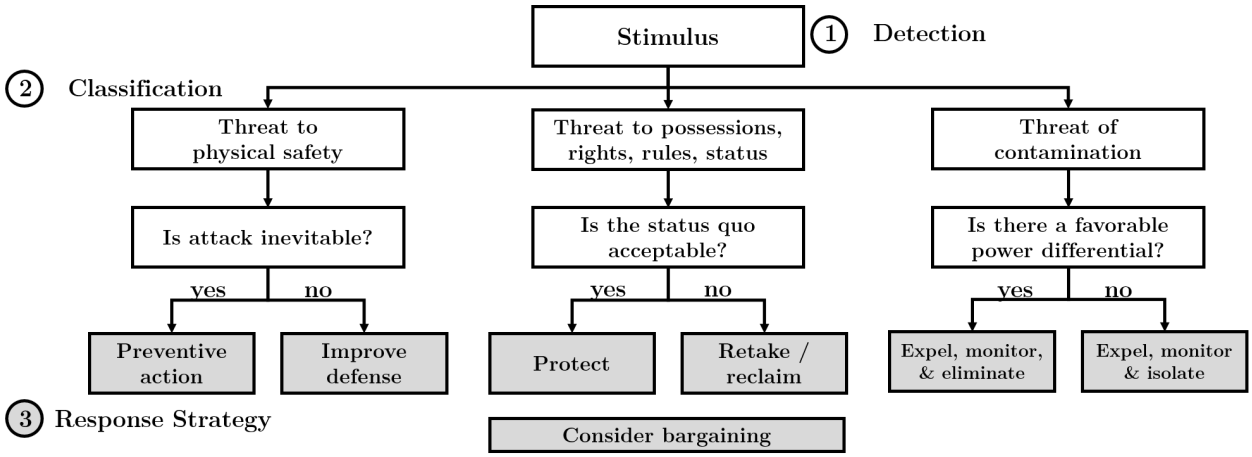

Figure 1: Threat-Heuristic Theory's Framework

The framework is structured around three phases: (1) *detecting* a stimulus as dangerous; (2) *classifying* it as a particular type of threat; and (3) forming a *response*. While this last phase can involve behavior, in the context of large-scale, societal dangers, preferred responses are often just that – preferences for what should be done. The cascade in Figure 1 is a linear process, response strategies (policy preferences) are the dependent variable and the explanatory variable is threat classification.

Once a threat is detected, *classification* is the mapping of that danger onto the bad outcome(s) of concern. It is equivalent to asking: which system(s) is/are processing the stimulus? Laid side by side, as in Figure 1, it is easier to see how a single stimulus (the prompt to think about "immigration" in a survey, for example) can simultaneously be evaluated as any one

of these problems (or not rise to the level of detection as a danger at all). Because the model permits any stimulus to be classified based on subjective perception, classification is a probabilistic process. I conceive of an individual's classification of a given stimulus as a distribution of concern over the three categories (or dimensions). Since response preferences arise from *classification*, it is possible for an individual seeing two dimensions of a danger as salient to prefer two distinct policies for mitigating it.

Once a particular stimulus has been classified, it is likely that the underlying distribution is relatively stable (e.g., Bouton 1994; Olatunji, Forsyth, and Cherian 2007). Individuals generally do not seem very sensitive to corrective information about a perceived threat (e.g., Park, Faulkner, and Schaller 2003, 73). That is, the *classification* of a given danger should be a slow-moving variable for a given stimulus. This is consistent with general models of the mental processes of categorization (e.g., Rosch et al. 1976), but includes both abstract concepts and natural objects.

Evidence

I developed the framework in Figure 1 based on studies that were essentially pairwise comparisons distinguishing between three broad categories of threats and their behavioral and affective responses. Only one study, Cottrell and Neuberg (2005), considered how to evaluate more than two dimensions of a given danger simultaneously, but focused solely on social outgroups. THT aims to be more general than a model that only defines danger in terms of other people. Its three-threat structure is essentially built from the bottom up to apply to *any* triggers of danger detection – animals, abstract concepts, or natural disasters. But is three the "right" number of threat categories?

I collected data from 297 workers on Amazon's Mechanical Turk platform in two waves (July 2017, March 2018) to evaluate how individuals conceptualized twenty potential dangers, ranging from simple, non-human concerns (bear attack, hurricanes) to abstract, politicized

ones (immigration, Islamic fundamentalism).[14] Participants rated both the overall "dangerousness" of four (out of 20) issues and provided classification of those issues along ten specific "considerations."[15] In addition to specific types of physical harm, loss, and contamination, the list included two items specific to inter-group relations. The inter-group items were included to determine whether inter-group threats are an additional category of threat missing from THT's framework. The Appendix contains a full discussion of the survey and the list of stimuli.

Dimensions

I pooled the threat ratings of all twenty stimuli in order to analyze the underlying relationships between the ten specific kinds of threat. Threat-Heuristic Theory suggests that the ten specific threats are actually members of three broad categories. I used an unsupervised, agglomerative method of hierarchical clustering to recover broader associations within the data. This type of model starts with the assumption that each observation constitutes its own cluster. A measure of distance (here, Euclidean) was used to find most-similar clusters.[16] The results are displayed in Figure 2. Numbers above each branch (Approximately Unbiased ρ-values (au)) indicate how strongly the cluster is supported in the data using multiscale

[14]This study was approved by MIT's Committee on the Use of Humans as Experimental Subjects (COUHES). The first wave of the study recruited 144 U.S. adults, 63 females and 81 males, between 18 and 71 years old (mean age 36.9, s.d.=10.4). 74% of the sample self-identified as White, 10% as Black, 5% Asian, and 2% as Latino. 27% of the final sample self-identified as Republican and 26% self-identified as Conservative. Wave 2 was collected to improve the study's statistical power. The second wave recruited 153 U.S. adults, 61 females and 92 males, between 21 and 72 (mean age 36.3, s.d.=10.9). 69% of the sample self-identified as White, 9% as Black, and 2% as Latino. 23% of the sample self-identified as Republican and 25% self-identified as Conservative. See the Appendix for a full discussion of the study sample and stimuli.

[15]The ten "considerations" are, by design, similar to those used in Cottrell and Neuberg (2005). I intentionally avoided calling the considerations "threats" in the survey itself, but as the wording in the Appendix indicates, that is what they are. Subjects could select any value between 0 and 100 for all ten specific considerations/threats and were not forced to rank-order them. The order in which the considerations/threats were presented was randomized. Ratings were of two kinds. Individuals who indicated seeing an issue as at least mildly dangerous (minimum Dangerousness score of 21-100) were asked to provide the "specific consideration" ratings for themselves (the Self-Ratings). Subjects who indicated an issue was not dangerous (score of 0-20) were asked to rate the "specific considerations" that they thought others worried about (the Other-Ratings). The relationship between Self- and Other- Ratings will be discussed in follow-on work. For now, all results reported include only the Self-Ratings.

[16]Ward's criterion (minimum within-cluster variance) was used as the clustering criterion.

bootstrap resampling (Suzuki and Shimodaira 2017). Support values range from 0 (not supported) to 100 (highly supported). Clusters whose ρ-values exceed 95 are indicated by the hashed lines. The three significant clusters in Figure 2 broadly conform to THT's expectations: a cluster associated with physical harm, one with material and non-material loss (e.g., losing a job or a right), and one with contamination/pollution (though not literal infection). "Status Loss", however, falls within the contamination cluster rather than the loss cluster, which is something that requires further consideration. The presence of both group-based threats in the contamination cluster suggests they do not capture a unique fourth kind of danger; it appears instead that concerns over the quality of group relations has an underlying purity/sanctity component.

Thus, the three broad categories of threat posited by THT also find support in observational data reflecting the relationships between more specific measures.[17]

Complexity

Do individuals use a three-dimensional model of threat classification in issue areas of interest to political science? If not, then existing models of how threat perception operates might well suffice. Figure 3 shows the share of raters who gave each consideration/threat their maximum score when evaluating four political issues.[18] As indicated in the figure, the most significant dimensions of threat classification vary for nuclear proliferation, Islamic fundamentalism, climate change, and illegal immigration. Nuclear proliferation (and nuclear war, not shown) provides an example of a relatively unambiguous case. Approximately 80% of respondents indicated a primary concern for their physical safety (and, slightly less, for that of their

[17]Parallel analysis of the data also supported a three-factor solution. However, no rotation (orthogonal or correlated) yielded a simple structure for factoring (i.e., it was not possible to identify a solution without items having significant loadings on multiple factors). Therefore, I present the hierarchical clustering analysis here instead.

[18]I include the highest-scoring dimensions for each individual, with a tolerance of 5 points on a 100-point scoring scale. Thus, if someone rated Harm to Self as 100 and Harm to Loved Ones as 96, both would be included as "Highest Rated Considerations". However, if Harm to Loved Ones was scored as 94, it would not be included. This is admittedly somewhat arbitrary.

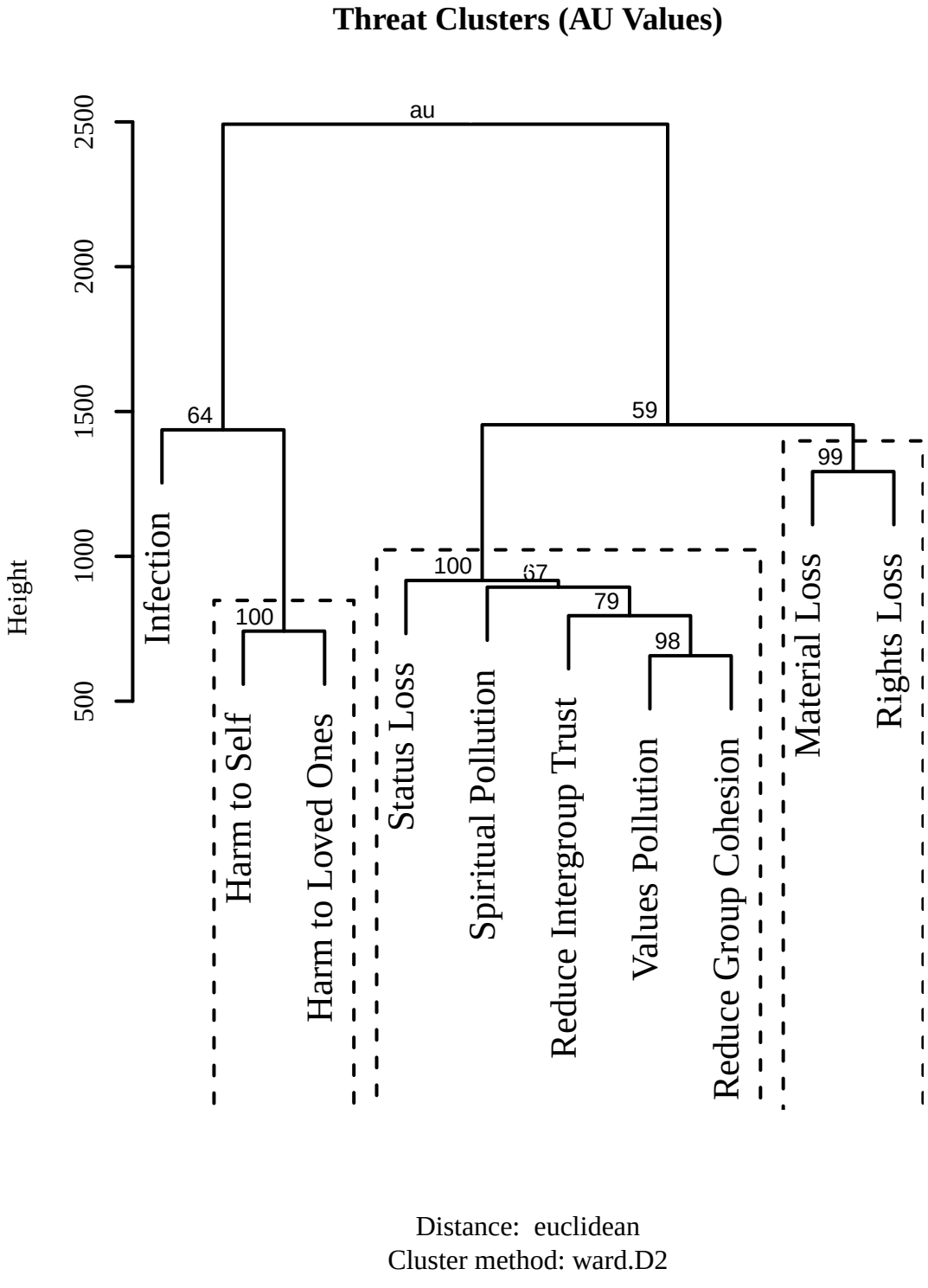

Figure 2: Hierarchical Clustering of Threat Types

loved ones). Models that assume physical danger is paramount would do well explaining how individuals conceive of the danger of proliferation. But the other issue areas illustrate *complex* dangers, where more than one dimension of the danger is salient, and, with the exception of Harm to Loved Ones for Islamic Fundamentalism, there is no single characterization of the other dangers about which a majority of respondents agree. Any model focusing on a single dimension of threat would fail to capture how most individuals characterize these issues.

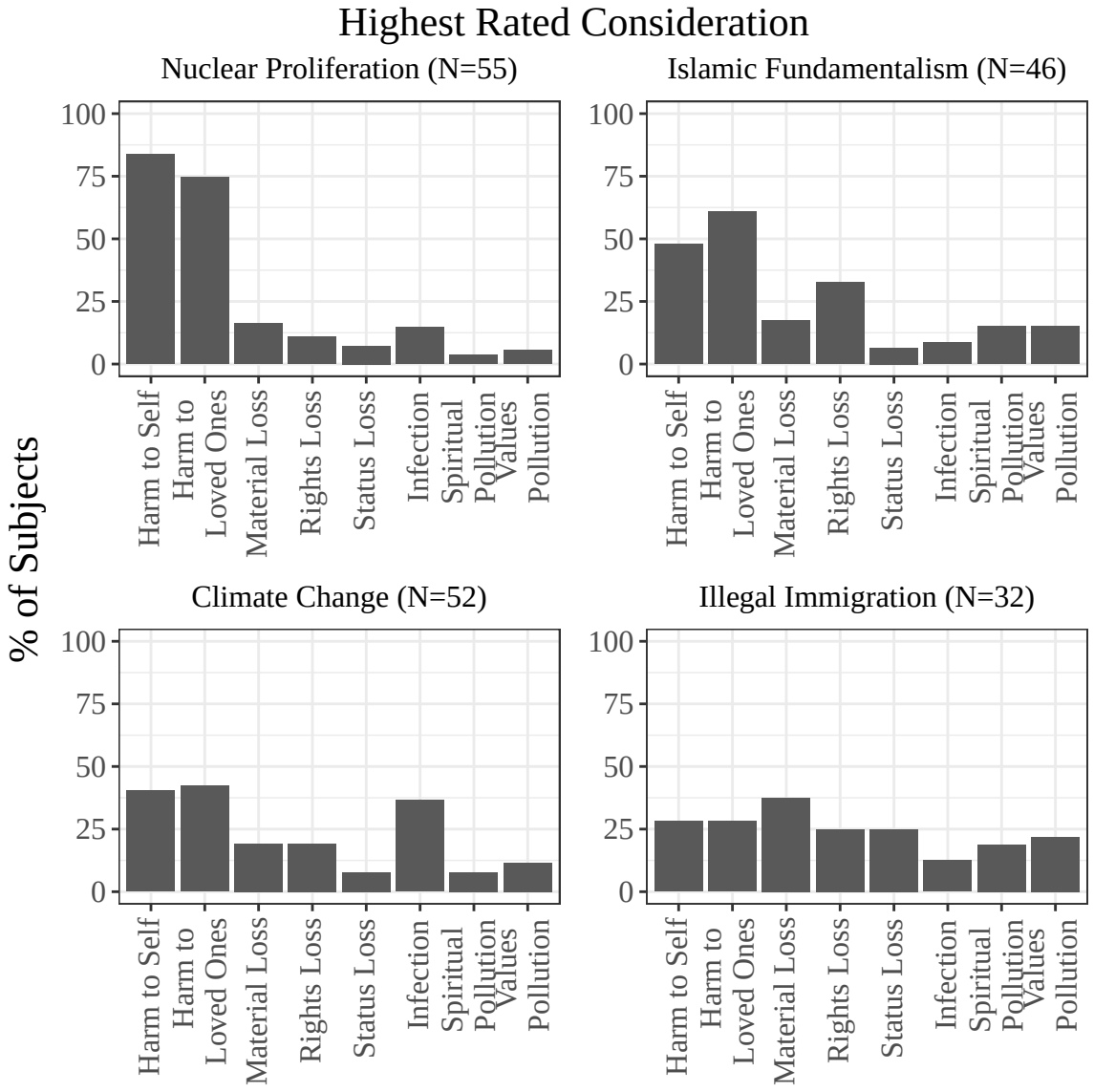

Figure 3: Threat Classification Self-Rating Examples

While these data come from a convenience sample, they illustrate that THT's three-threat model captures a set of distinct, though broad, categories of danger. Research in biology and cognitive science suggests these distinctions are important if we want to know what drives preferences for dealing with a given target – whether that be nuclear proliferation or immigration. The data also indicate that some dangers are indeed *complex*, such that more than one dimension of threat is salient.

General Hypotheses

From the THT framework, several general hypotheses arise. These hypotheses all center on the connection between threat classification, the theory's contextual considerations, and the dependent variable of interest, policy preferences.

H1a. Individuals who see a threat as having a physical (even existential) harm dimension, where attack *is not* inevitable, will prefer strong, physical, defensive measures.

H1b. Individuals who see a threat as having a physical (even existential) harm dimension, where attack *is* inevitable, will prefer preventive physical aggression.

H2a. Individuals who see a threat as having a dimension of material or non-material loss, where the status quo *is* acceptable, will prefer strong protective measures, though not limited to physical protection.

H2b. Individuals who see a threat as having a dimension of material or non-material loss, where the status quo *is not* acceptable, will prefer to reclaim the asset.[19]

H2c. Individuals who see a threat as having a dimension of material or non-material loss may consider bargaining with the adversary.

[19]Reclaiming actions are not limited to physical aggression. Legal claims and other appeals to community rules of ownership and possession are also tools that may be employed, unlike the options in H1b. Where physical aggression is used, it can be distinguished from the response predicted in H1b by its objective. H1b seeks to annihilate or cripple an opponent's capacity for physical violence, whereas reclamation focuses on regaining an asset.

H3a. Individuals who see a threat as having a contaminant dimension, where *the power differential is small or in favor of the adversary*, will prefer expelling the contaminant, isolating the healthy/pure from the vector of contamination, and self-monitoring.

H3b. Individuals who see a threat as having a contaminant dimension, where *the power differential is strongly in their favor*, will prefer isolating the healthy/pure and destroying the contaminant.

A number of auxiliary hypotheses also arise from the theory, which I investigate elsewhere. Here I have focused only on the theory's main claims.

Measurement

Any application of Threat-Heuristic Theory requires measures of the dependent variable (policy preference) and independent variables (measures of threat detection and classification) at the individual level.

An individual's policy preference with respect to some potential threat of interest can be elicited by direct questioning in surveys and interviews or extracted from documents (e.g., position memos). Instability and deception are both concerns with policy preference measures (for policy preference stability generally, see Ansolabehere, Rodden, and Snyder 2008; for deception concerns, see Nederhof 1985), but these issues are not unique to the application of Threat-Heuristic Theory.

Threat classification is a more challenging concept for several reasons. Threat perception is an event (*detection*) and a conceptual association (heuristic *classification*), both of which take place in an individual's mind (and body). A limited number of implicit measures can be used to detect aspects of the process in real time within a lab, including skin conductance change, startle reflex, and changes in patterns of neurological activation, which can serve as

a proxy for the mental process of classification (for physiological options, see Williams et al. 2005; Levenson 2003; Susskind et al. 2008; Bradley et al. 2001; for neurological options, see Kassam et al. 2013; Saarimäki et al. 2016; Vytal and Hamann 2010). Neuroimaging may also capture other aspects of threat stimulus interpretation, such as salience (relevant, perhaps, to detection in the first place), in brain regions associated with value and attention (Lim, O'Doherty, and Rangel 2011; Bartra, McGuire, and Kable 2013).

But lab-based research is not essential. There are two options for more practical measures, one explicit and one implicit. As with Study 1, and following Cottrell and Neuberg (2005) and Cottrell, Richards, and Nichols (2010), it is possible to directly ask about threat classification. This question-and-answer measure may suffer from bias, either where individuals are reluctant or unable to report their concern about a given danger at all (under-detection) or when some types of threat (i.e., physical harm/fear) are felt to be more acceptable than others (i.e., contamination/disgust). Either source of bias could be personally or socially motivated, intentional or unconscious, and the extent of their effects is an empirical question open to investigation.[20]

A second option for measurement relies on the "cognitive associations" aspect of threat classification highlighted by Neuberg, Kenrick, and Schaller (2011) (143). One of the most ubiquitous measures of cognitive association is word choice. Semantic choices provide data about how an individual interprets the world (Pinker 2007, 1–13). An individual's use of language, both spoken and written, can also provide measurements of threat classification. The use of metaphor – describing communism as "a virus" or "enslavement", for example – involves choices about how a target domain (an ideology) should be understood (as a contaminant or the loss of freedoms) (Lakoff and Johnson 2003, 236–37). This feature of language usage holds for political communication as much as any other type (Thibodeau

[20]I consider these empirical problems because neuroimaging offers a way to capture both under-detection and mis-classification, if they indeed occur. The technique also offers a way to measure the gap these biases introduce between self-reported threat classification and implicit threat classification, and to assess which is the more reliable predictor of policy preferences. I explore these possibilities elsewhere.

and Boroditsky 2011). The text individuals, including political elites, generate can therefore provide another source of threat classification measures.

Despite its inherently unobservable nature, a number of options thus exist for measuring threat classification. And, returning to one of the inherent advantages in adaptive theories of political behavior, this is a space where the prospects for external validity and for making inferences across sub-populations are relatively good because the same fundamental psychological process is being investigated in every case. Therefore, these various methods should be treated as complementary ways in which to test aspects of the theory.

In the next section, I consider whether threat classification is at all innovative, or simply captures an explanatory variable already deployed in political science.

Relation to Existing Constructs

Is it worth the trouble to measure threat classification when trying to understand policy preferences? Is there anything new about this variable, or is it simply a stand-in for well-established correlates (and potential drivers) of policy preferences, such as party affiliation, ideology, personality traits or dispositional measures? In particular, given the emotions associated with threat classification, is trait-based sensitivity to experiencing particular emotions the same underlying phenomenon as threat classification?[21] And what role do factors like age and gender, which have been linked to sensitivity to particular types of danger, play (Hatemi et al. 2013)?

I tested (1) the distinctiveness of both threat *detection* and *classification* from other constructs and (2) the relative influence of threat *classification* on policy preferences in a second study

[21]Trait-based sensitivities can manifest as feeling a particular emotion with greater intensity (Gross, Sutton, and Ketelaar 1998, 7–8; Larsen and Ketelaar 1991, 138) or as a greater propensity to process ambiguous cues as emotion-inducing (Hadwin et al. 1997, 488; Wilkowski et al. 2007, 661). Trait sensitivity to experiencing fear, disgust or anger could conceivably drive the processes of threat *detection* or *classification*. For example, an individual high in disgust sensitivity might be more likely to classify anything as a potential contaminant than someone low in that trait or simply to view the world as filled with more dangers generally.

on the MTurk platform. I asked 110 MTurk workers to classify two sets of stimuli, after which they completed several batteries of personality and trait measures, along with standard demographic and political affiliation questions.[22]

The first set of stimuli consisted of three novel dangers represented by nonwords. Nonwords are a group of letters that look and sound like a word in a given language (English, in this case) but are not accepted as words by native speakers.[23] That is, they are meant to sound like plausible words but they have no inherent meaning. Participants were informed about these novel dangers using three different prompts, all of which indicated that these dangers were likely to arise in the near future, and asked to imagine them.[24] Participants then indicated the type of threat they were concerned that these novel dangers would pose (classification) and what they believed the government should do (response). Following the novel dangers, participants were then asked to classify a set of familiar issues: climate change, immigration, and terrorism. For familiar issues, participants were also able to indicate that they did not consider the issue to be problematic at all (i.e., not a threat of any kind).

Demographic measures included age, gender, race/ethnicity, income, and education. Personality and trait measures included many of the variables previously associated with danger detection in the political psychology literature: the Big 5 (10 item short form, Mondak et al. (2010)), Social Dominance Orientation (8-item form, Ho et al. (2015)), disgust sensitivity (core and contaminant sub-scales, Olatunji et al. (2008)), trait fear (9 items from a non-proprietary scale developed by Kramer et al. (2012)), anger (temperament and reactivity subscales of the Spielberger State-Trait Anger Scale, Mick et al. (2014)), and anxiety (reduced items from the Spielberger State-Trait Anxiety Inventory identified in Tenenbaum, Furst, and Weingarten

[22]This study was approved by MIT COUHES. The study recruited 110 U.S. adults, 44 females and 66 males, between 20 and 70 years old (mean age 36.2, s.d.=11.1). 69% of the sample self-identified as White, 10% as Asian, 8% as Black, and 3% as Latino or Hispanic. 24% of the final sample self-identified as Republican and 27% as Conservative. See the Appendix for a full discussion of the study sample and stimuli.

[23]The nonwords "sprait", "phrume", and "traith" were selected from the ARC Nonwords Database (Rastle, Harrington, and Coltheart 2002). The selections were matched on word length (6 letters) and on two measures of potential familiarity, the number of lexical neighbors (0-2) and the number of phonological neighbors (6-9).

[24]Prompt/nonword pairs were counterbalanced across participants.

(1985)). Three measures in particular – disgust sensitivity, trait fear, and trait anger – bear directly on the emotions elicited by the three threat categories in THT. These trait-based sensitivities, therefore, seem most likely to be proxies for the classification processes identified in the theory.

Distinctiveness

I first tested the distinctiveness of both threat *detection* and threat *classification* using simple bivariate correlations on the familiar issues. If either the first or second stage of THT's framework is equivalent to an existing construct, they should be highly correlated. I found that, while partisanship and ideology can be correlated with threat *detection*[25], as shown in Figure 4, the constructs do not appear to be equivalent. Specifically, neither partisanship nor ideology are correlated with the detection of terrorism as a threat (partisanship corr.= 0.14, p=0.14; ideology corr.=0.13, p=0.16). Both partisanship and ideology are negatively correlated with detecting climate change as a threat (partisanship corr.= -0.30, p<0.01; ideology corr.= -0.35, p<0.001) and positively correlated with detecting immigration as a threat (partisanship corr.= 0.43, p<0.001; ideology corr.= 0.46, p<0.001). This suggests that perceived dangerousness *can* be tied to political variables, but not that it *must* be. Of the trait measures, SDO Anger (Reaction), Disgust (Core) are correlated with detecting the three potential dangers, but their effects are also inconsistent.[26]

I also modeled threat detection as a multivariate function of these factors to understand their independent contributions. Once basic demographics (age, gender, and education), party affiliation, conservatism, and other traits are taken into account, only Anger (Reaction)

[25]I define *detection* here as indicating that an issue represents any of the three kinds of danger. Thus, it is a binary variable in this case.

[26]For terrorism, SDO corr.= -0.05, p=0.60; Anger (Reacting) corr.=0.17, p=0.07; Disgust(Core) corr.=0.20, p=0.04. For climate change, SDO corr.= -0.18, p=0.05; Anger (Reacting) corr.= -0.02, p=0.86; Disgust(Core) corr.=0.03, p=0.77. For immigration, SDO corr.= 0.35, p<0.001; Anger (Reacting) corr.=0.19, p=0.05; Disgust(Core) corr.=0.15, p=0.12. All other trait and demographic variables did not correlate with threat detection at conventional levels of statistical significance.

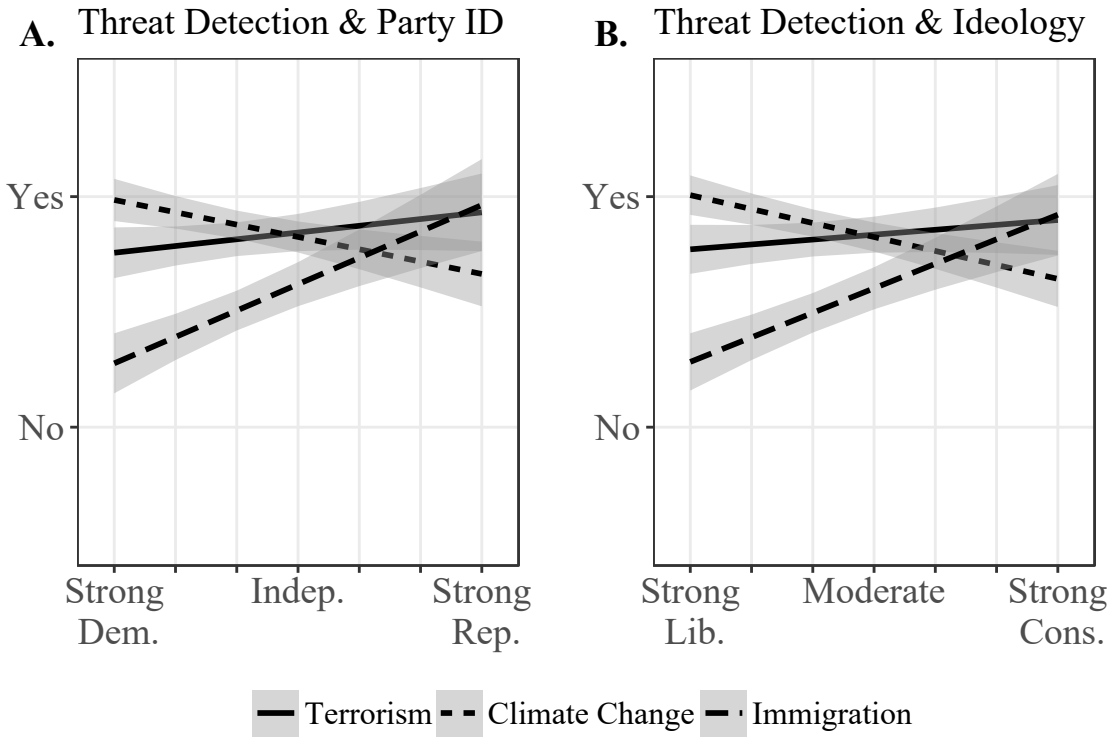

Figure 4: Bivariate Correlations in the Detection of Familiar Issues

significantly affects the probability of detecting terrorism as any kind of threat; ideology, SDO, and Disgust (Core) all remain predictors of detecting climate change as a threat; and only SDO remains a (weak) predictor of detecting immigration as any kind of threat. The magnitude of these effects is generally small (see Figure 5); that is, increasing one unit in any of the scales (moving from Moderate to Weak Conservative, for example) does not greatly affect the probability of threat detection.[27]

These findings suggest that threat detection is not simply an extension of conservatism or the manifestation of a particular disposition or trait sensitivity. That is, the start of the cascade outlined in Figure 1 is not consistently driven by one of these other considerations. This suggests that THT's psychological model is not a proxy for a worldview model drawing on one of these other constructs, such as conservatism (e.g., Jost et al. 2003; Zavala, Cislak, and

[27]See the Appendix for the full logistic regression results. The predicted probabilities in Figure 5 are generated by holding all other model covariates at their means.

Wesolowska 2010).

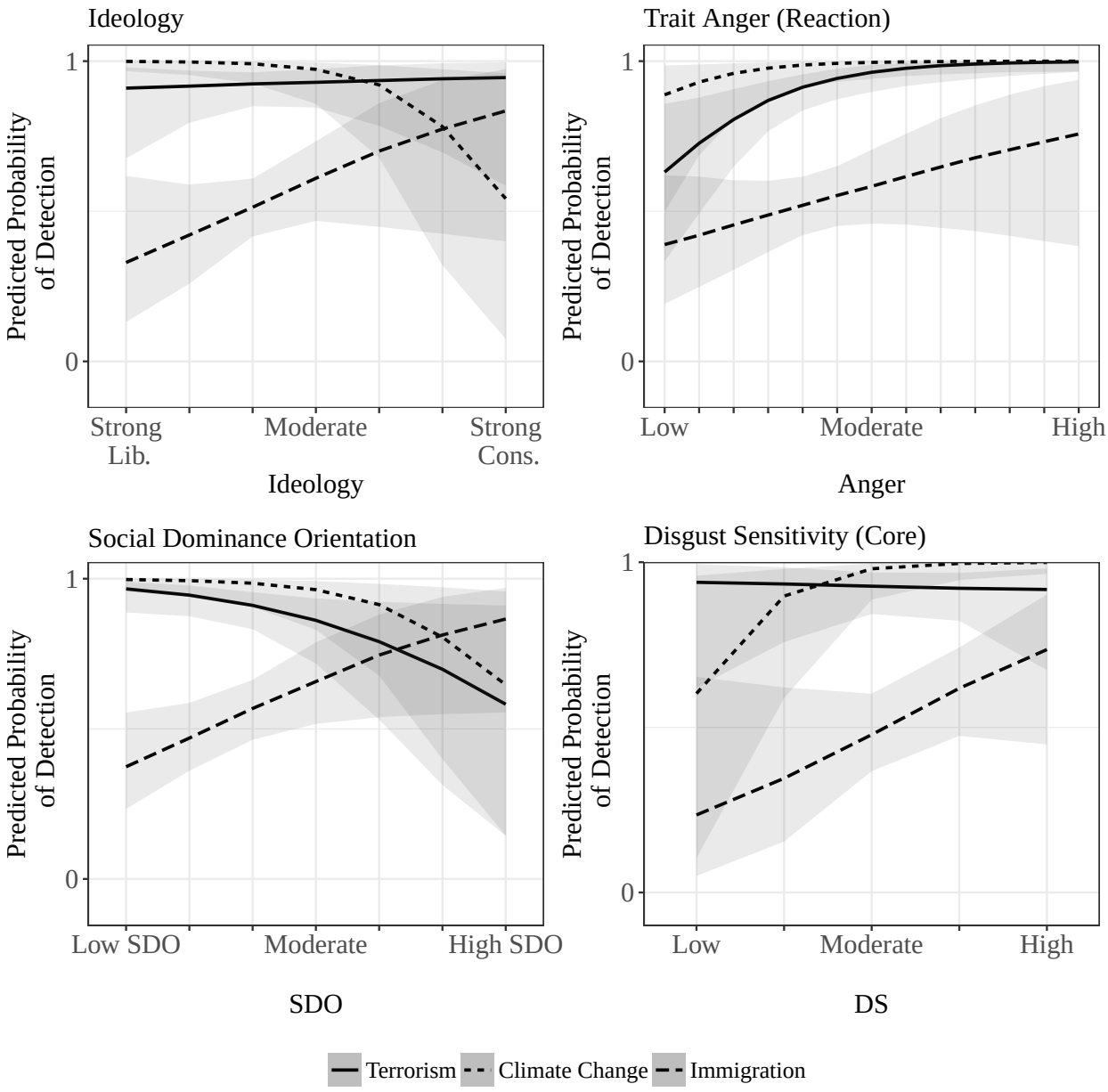

Figure 5: Predicted Probability of Detecting Familiar Issues as Dangerous

What about threat *classification*? Do these constructs intervene between stages 1 and 2 of the model to inform *how* individuals classify the dangers they have detected? Classification of familiar issues as either a concern of physical harm, loss, or contamination does not consistently co-vary with political variables, demographics, or trait variables in a multivariate

context.[28] After accounting for traits and demographic variables, ideology is only strongly correlated with classification of climate change, as it was for detection. Specifically, a one-unit increase in conservatism (as measured with the ANES 7-point scale) is associated with 5.6x increase (CI: 1.1, 28.2) in the odds that an individual classifies climate change as an economic rather than existential danger, when all other variables are held constant. A unit-change in conservatism also increases the relative odds of classifying climate change as a contaminant rather than existential danger. However, as Figure 6 indicates, both of these effects can be offset by party identification, where identifying as more Republican *decreases* those classification odds at roughly the same magnitude. For immigration and terrorism, few variables have strong marginal influences on the odds of how a danger is classified. In the terrorism case, just as detection was a-political, so too is classification. No variable has a substantial impact in a multivariate model.[29] For immigration, political and demographic variables do not have independent effects on classification, but both Disgust (Core) and Openness strongly affect the relative odds of classifying immigration as a contaminant threat, though in opposing directions.[30]

Thus, for issues in the real world, threat classification *can* be correlated with existing constructs, but does not appear to be wholly synonymous with them. However, it is impossible to infer any causal relationship by examining terrorism, climate change, and immigration because threat classification almost certainly did not occur for the first time during the study. To understand potential causal effects, I also analyzed the classification of

[28]The threat classification measure was structured as one un-ordered, forced choice response per topic, where there were options to indicate that the potential danger was not a concern or to add a free response. After reviewing and categorizing the free response text, I modeled the choices between "Not a Problem" and the three types of threat using one multinomial logistic regression for each topic (immigration, climate change, and terrorism).

[29]In models of each trait or trait group on their own, Openness is correlated with the classification of terrorism as a threat of physical harm over contamination and Disgust (Contaminant) is correlated with classification as a threat of physical harm over economic loss. These correlations do not maintain statistical significance when both the Big 5 and disgust are included together in a model, however.

[30]A one-unit increase in Disgust (Core) *increases* the odds of classifying immigrants as economic threats rather than contaminant threats, whereas a one-unit increase in Openness *decreases* those same odds. The directions of these effects are somewhat counter-intuitive, though their off-setting nature is not.

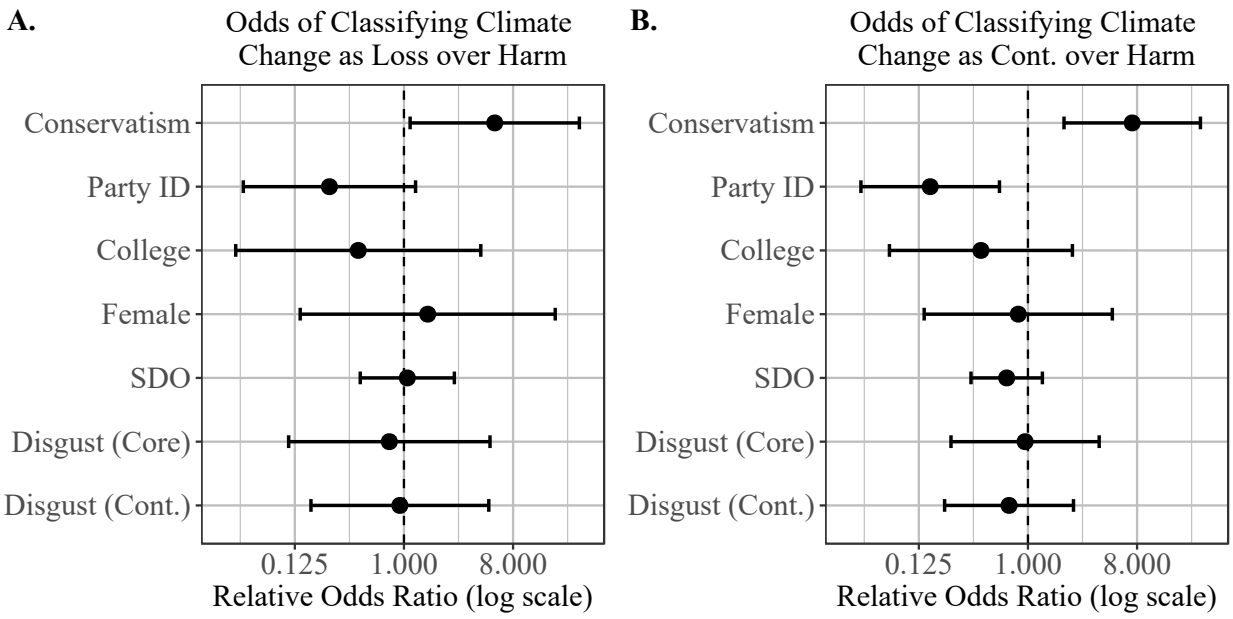

Figure 6: Effects on Threat Classification of Climate Change

novel dangers, which by definition were classified for the first time when participants were asked about them because they were signified by nonwords with no inherent meaning.[31] While traits and demographic features could not be randomly assigned, they were developed temporally prior to the evaluation of novel dangers. This temporal ordering at least addresses concerns about threat classification having an endogenous relationship with these variables.

Regressing political, demographic, and trait variables on binary measures of threat classification for novel threats (i.e., Physical Harm: Yes or No?) yields null results for all explanatory variables of interest.[32] Only the nonwords themselves had significant effects on classification.

[31]See the Appendix for a detailed discussion of this portion of Study 2. Subjects were not given the "Not a Problem" option for novel dangers in order to force them to consider the nonwords as some sort of danger. However, there was an "Other" option used to elicit any alternative suggestions. Nine subjects selected "Other" at least once for a total of 12 "Other" responses out of 330. Several of these responses can be hand-coded for inclusion in the next iteration of this analysis as they include responses broadly consistent with one of the three categories, but for now they have been dropped.

[32]This analysis examines three models of binary threat classification of all three nonwords. Since each respondent classified three novel dangers, confidence intervals and p-values were calculated using pairs cluster bootstrapped t-statistics (500 iterations) to account for repeated measurement of the same respondent. Nonwords were embedded in three prompts, and the combination of nonwords and prompts was counterbalanced over the sample. Dummy variables in the model accounted for the nonwords themselves (for two out of three possibilities), as well as dummy variables for the prompts in which the nonwords were embedded (also for two of three possibilities).

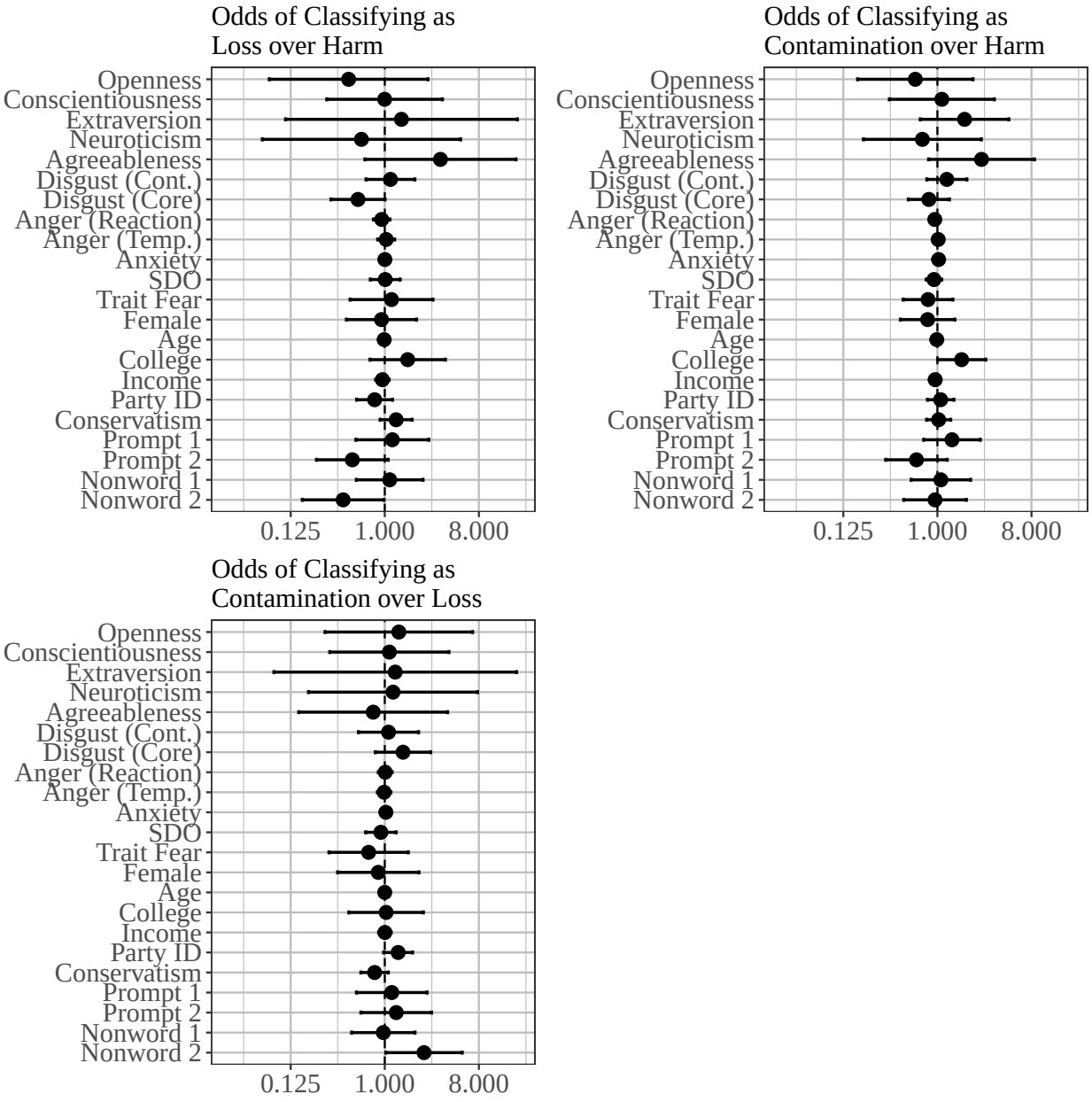

Figure 7: Relative Odds of Threat Classification (Novel Dangers)

Figure 7 digs deeper in to the choice of particular classifications by asking whether any variables predict particular *choices* of how to classify novel threats (i.e., Physical Harm or Loss?).[33] There are no robust effects of traits, political variables, or demographics on classification choice, but there are still nonword-level effects, which suggests that the mental associations being made, even for imaginary dangers, might be important. In particular, the nonword "phrume" appears to affect classification over the baseline nonword ("traith"). The only model which fits the data significantly better than a null model with no covariates is one which takes into account only the nonword used and the prompts into which the nonwords were embedded.[34]

This suggests that the mental associations invoked by imagining a novel danger, guided by the prompts and the nonwords themselves, mattered more for threat classification than priors derived from partisan, ideological, demographic, or personality factors. To verify that conceptual associations mapped on to expected classifications, I also analyzed the free responses participants gave when asked "what, if anything, came to mind" when imagining each novel danger. Descriptors that distinguished novel dangers classified as *economic* threats appear at the top of Panel A in Figure 8. Words that distinguished dangers classified as *contaminants* appear at the top of Panel B.[35] While not all words were chosen frequently enough to attain statistical significance (i.e., fall beyond the dashed lines), the collection of words evoked appear consistent with expectations.

In sum, threat classification is not simply another measure of an existing psychological or political construct. Rather, it is the measure of a conceptual association, which appears to

[33]This multinomial logistic regression also bootstraps the p-values and confidence intervals to account for multiple responses per individual.

[34]A comparison of the full model with a null model using the Likelihood Ratio Test yields $\chi^2(42)=39.4$, p=0.58. Models of each variable alone are similarly no different from the null. A model including only the nonwords and prompts, using dummy variables for each condition (and no interactions, as these effects were not significant), was significantly better than the null, however (LRT $\chi^2(8)=16.5$, p=0.035).

[35]I removed words that appeared in the threat classification choice text (e.g., "economic"), as well as English stopwords, fillers (e.g., "stuff", "like") and the nonwords themselves. The identical chi-squared values in the figure are driven by the relatively small number of total words and identical incidence rates of the key words (usually less than 10 instances).

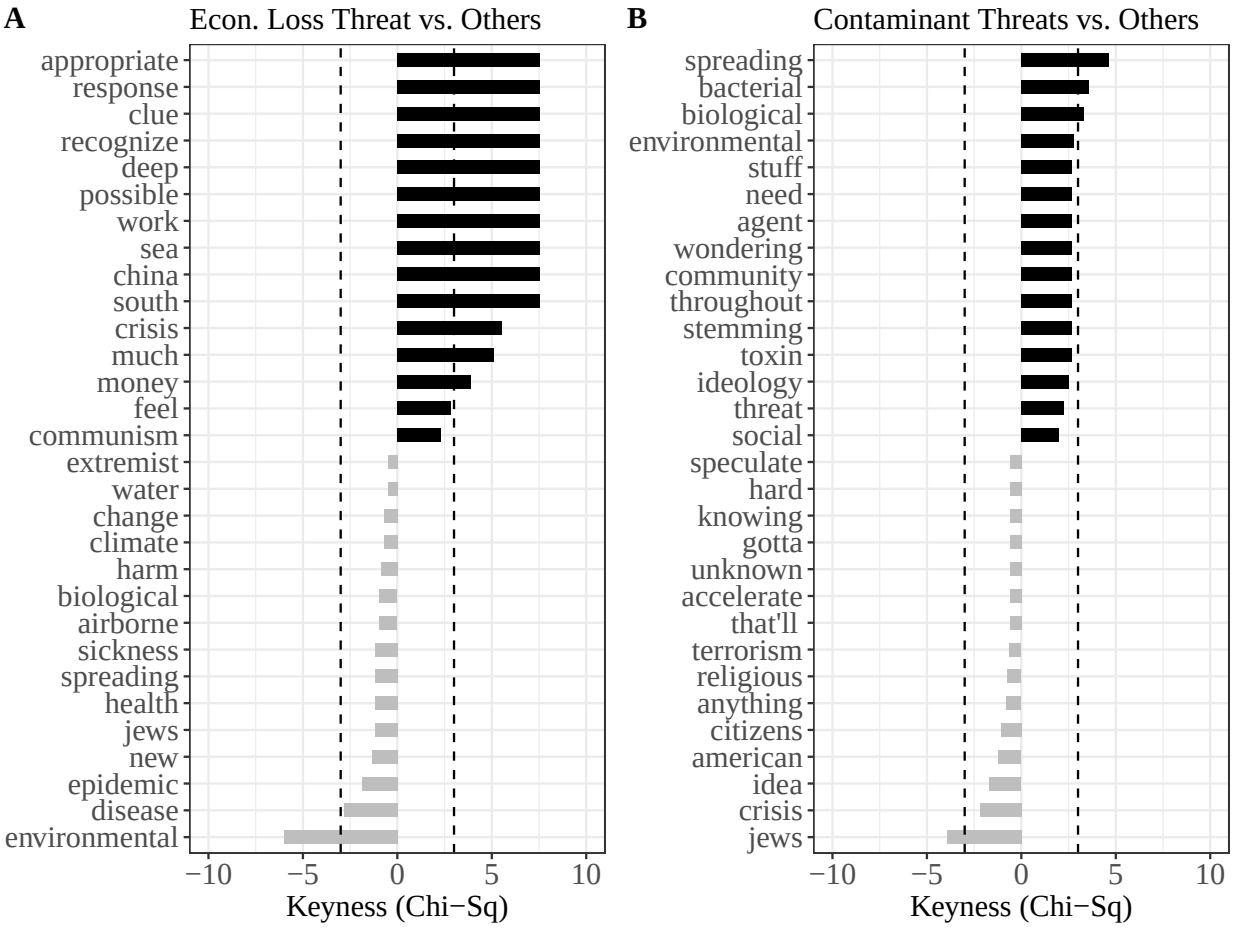

Figure 8: Word Use in Free Responses

arise from a mental mapping process, though the details of this process require additional investigation to better define.

Policy Congruence

Given that threat classification is a measure of something distinct from existing political and psychological constructs, does it provide additional purchase in explaining policy preferences? The basic premise of Threat-Heuristic Theory is that if an individual's threat classification is known, the probability of correctly predicting that individual's policy preferences is substantially improved.

In the case of novel dangers, threat classification variables generally have the expected effect on the probability of selecting corresponding policies. When an individual indicates they consider a novel danger to be a threat to their physical safety, then they are 1.6 times more likely to say that the appropriate solution is for the government to invest in protecting lives than when they have adopted another classification.[36] Moreover, the classification variables are the only ones to meet standards of statistical significance in a multivariate model. Similarly, when an individual classifies a novel danger as a potential threat of loss, they are 2.4 times more likely to want governments to shield them from economic consequences of the danger than adopting any other protective measure. In this case, threat classification is one of two significant predictors of this preference; the other is Trait Fear, where a one unit change in score is associated with being 3 times *less* likely to opt for economic protection. The relationship between contaminant threat perception and endorsement of a policy for values and culture protection is less clear. This is likely because some interpreted the contamination risk to be environmental (see word use above) and, therefore, saw a cultural protection

[36]The results reported here are from logistic regression models in which demographic, political, and trait variables are also considered as predictors of endorsing a particular policy over its two alternatives. P-values are calculated using pairs cluster bootstrapped t-statistics (500 iterations) to take into account the multiple threat measures for each respondent. The results of all three models are not substantively or statistically different from the results of models using only threat classification and no controls. See the Appendix for a table of model coefficients and confidence intervals.

policy as irrelevant. In any case, none of the variables in the model maintained statistical significance after multiple measures per individual were taken into account.

Threat classification appears to provide purchase on novel dangers where other variables do not. Does the same hold for more familiar, known issues? Here, the influence of threat classification might easily be diminished by political affiliation, which may contain cues about not only what constitutes a danger, but also about the appropriate solutions.

In general, respondents heavily favored policies for protecting lives in the cases of both terrorism (64% favored) and climate change (63% favored). Policy preferences were more distributed for immigration (26% favored economic protection; 18% cultural protection; and 40% endorsed the status quo).

Does threat classification align with these preferences? In the cases of terrorism and climate change, the preference for one kind of policy (Protect Lives) over all others is the only possible choice with enough support in the data to consider. In both cases, classifying each of these issues as a threat of physical harm significantly increases the odds that an individual will endorse the Protect Lives option over all other choices. This effect holds after controlling for political, demographic, and trait variables.[37] For terrorism, harm classification is associated with a 10.8x increase in the odds of selecting a Protect Lives policy.[38] For climate change, a similar association exists. Harm classification is associated with a 19.2x increase in the odds of selecting the Protect Lives policy over the other options.[39]

In the case of immigration, several policies were considered viable, including the status quo, but there was not enough support in the data to consider all combinations of choices.[40] I

[37]These findings also hold in models with no controls, though the magnitude in both cases is smaller: a 5.6x change in the odds of selecting the policy in the case of terrorism; and a 10.1x increase in the odds in the case of climate change.

[38]Other significant predictors of this choice are: being female (6.0 times more likely to choose) and age (1.1 times more likely for an incremental year). Predictors of *not* choosing this policy are Anger (Temperament) and Conscientiousness (reducing the odds of choosing this policy by 1.4 and 16.6 times, respectively).

[39]The only other significant predictor in this model is Anxiety, where a 1 unit increase in the score is associated with a 1.2x increase in the odds of selecting the policy.

[40]Thirteen respondents provided free text responses that broadly advocated being more rather than less

thus compared the choices for policies to protect either economic assets or American values and culture against all alternatives. In both cases, the corresponding threat classification, of loss and of contamination, respectively, was a strong predictor of policy choice. Specifically, after controlling for all other covariates, classifying immigrants as threats of economic loss corresponded an individual being 70.5 times more likely to choose economic protection over other policy options.[41] Similarly, classifying immigrants as social contaminants corresponded to an individual being 30.4 times more likely to choose the Values and Culture protection policy.[42]

Thus, even with highly politicized dangers, threat classification variables still provide independent leverage on predicting the policies an individual will endorse in a manner consistent with the expectations of Threat-Heuristic Theory.

Preliminary evidence thus supports both the distinctiveness and utility of Threat-Heuristic Theory's primary independent variable, threat classification.

Conclusion

This paper has made several arguments. First, that the integration of findings regarding the breadth of human systems for dealing with danger can add new insight into the psychological processes of threat perception and response. Second, that doing so pays dividends for political science because it illuminates a set of issue areas where traditional models assuming a single

welcoming of immigrants. Eleven of them indicated that immigration is not any kind of threat, which is consistent with the expectations of THT. I consider this view more systematically in the second paper.

[41] The only other significant predictor in this model is Anxiety, where a 1 unit increase in the score is associated with a 1.3x decrease in the odds of selecting the policy.

[42] All covariates could not be modeled simultaneously in this case. Traits and threats together provided a better model than threats and demographic or political variables. Considering the traits and threats model, Openness is also a strong predictor of choosing Values and Culture protection. A one-unit increase in SDO also increases those odds by 5.3 times. Anxiety decreases the odds by 1.7 times.

dimension of danger can be misleading. Third, that threat classification in particular is a new and valuable concept for understanding danger-related policy preferences.

In developing and arguing for the significance of Threat-Heuristic Theory, I have claimed that the psychological processes modeled by the theory are species-typical. That is, the mechanisms of the theory – the underlying systems for detecting and distinguishing between different kinds of danger – are basic features of the human mind. This underpins the theory's claims to flexibility across issue areas and to generalizability over different individuals, including ordinary citizens and political elites. However, the only tests presented here are on samples of ordinary citizens. I investigate the model's application to elites elsewhere.

I have also provided data supporting the interpretation that how individuals classify danger is subject to variation and idiosyncrasy, and not fully determined by ideology, partisanship, or personality traits. This is precisely why there is value in *measuring*, not *assuming*, how an individual conceives of a given danger.

This paper serves as a proof-of-concept for theorizing the space of dangers – even new, abstract, and politicized issues – within a single model as a *kind* of thing. This paper also sheds light on a common thread within political science, the role of threat perception, a thread sometimes obscured by subfield boundaries. Political psychology is an ideal vantage point from which to spot these kinds of common threads, but doing so also requires accepting both the breadth and limitations of leaning on adaptive mechanisms to explain political outcomes in the rapidly changing present.

Appendix

MTurk Study 1: Summary

The objective of this study was to demonstrate that THT's approach to treating "dangers" as a coherent category that leverages shared cognitive processes has some validity. The study was also designed to test whether THT's three broad categories of threat – physical harm, loss, and contamination – are sufficient for describing the space of "dangers." In its design, study builds on and extends the structure used by Cottrell and Neuberg (2005), which demonstrated that different emotions and threats are associated with different social outgroups. However, this study was designed with a broader scope than group-based threats. The study serves as a way to generate a preliminary map of the issues for which Threat-Heuristic Theory can provide useful insight into the drivers of individual-level policy preferences.

Subjects

Wave 1 of the study recruited 144 U.S. adults in July 2017. 63 females and 81 males, between 18 and 71 years old (mean age 36.9, s.d. = 10.4) were recruited on Amazon's Mechanical Turk platform to complete a survey (hosted on the Qualtrics online platform). Wave 2 of the study recruited 153 U.S. adults in March 2018. Wave 2 consisted of 61 females and 92 males between 21 and 72 (mean age 36.3, s.d.=10.9).[43] Subjects in both Waves were paid $1.50 and completed the survey on average in 8.5 minutes.

In the combined sample, 75% self-identified as White, 11% as Black, 5% as Asian, and 4%

[43]The research protocol was approved by MIT's Committee on the Use of Humans as Experimental Subjects (MIT COUHES). Data reported here include only individuals whose responses were accepted and paid for. Consistent with MIT COUHES policy, there were two reasons for rejection of a response. First, an attention check was embedded in the survey which asked individuals to identify the topics of the survey. There were four possible correct answers for each individual. Responses were rejected if a subject failed to successfully identify any of the survey topics (0 out of 4). The average number of correct responses for individuals who identified at least one correct topic was 3.8 across both Waves. Subjects were also warned prior to taking the survey that they would be paid only for one response. Four individuals re-took the survey in Wave 1 and their second responses were rejected. In Wave 2, a qualification was used to prevent re-takes.

as Latino. 25% of the final sample self-identified as Republican and 26% self-identified as Conservative.[44]

Dangerousness Ratings

Subjects were randomly assigned to answer questions about four potential dangers out of a list of twenty. The full list is provided in Table 2. Several items in the "Concrete" category were selected to anchor the categories of physical harm, loss, and contamination ("Grizzly Bear", "Serial Killer", "Losing a Home/Job", and "The Flu Virus"). Incest is a common item in moral scales as a purity violation and so was used to as an example of intrinsic contamination (e.g., Pizarro, Inbar, and Helion 2011; Young and Saxe 2011). The "Abstract" category items were drawn from topics in public opinion surveys on threats (e.g., Smeltz et al. 2016), identities that are seen as threatening by some, ideas that have been considered problematic, and other issues of relevance to contemporary political debates in the U.S. Each subject saw two items from the Concrete category and two from the Abstract category. Subjects were asked to rate each of the for items on a scale of 0 ("Not dangerous at all") to 100 ("Extremely dangerous").[45] Items were placed into four groups of five and one stimulus drawn from each group. Groups were constructed to avoid subjects rating two closely related stimuli (e.g., domestic and international terrorism). Results of the dangerousness questions will be reported elsewhere.

[44]These include all individuals who score as Strong, Weak, or Independent Republican/Democrat and Extremely, Conservative/Liberal, or Slightly on the standard 7-point ANES scale.

[45]Items were presented one at a time. The order in which items were presented from each of the four blocks was randomized between subjects.

Table 2: Potential Dangers

Concrete	Abstract
Being attacked by a grizzly bear	Transgender individuals
Being hunted by a serial killer	African-American men
Nuclear war between the U.S. and China	The proliferation of nuclear weapons
International terrorism	Illegal immigration
Domestic terrorism	Legal immigration
The flu virus	Communism
Incest	Islamic fundamentalism
Having your home destroyed by a hurricane while you are away	Climate change
Losing a job because the company needs to cut costs	Introduction of a new language into schools, in addition to English
Losing the freedom to criticize your government	Losing some authority when your company hires someone to oversee you

Threat Dimension and Emotion Ratings

Each subject then answered two further rating questions regarding their four stimuli. One rating question asked for "specific considerations" about the item. The other asked about "specific emotions" associated with the item. The "specific considerations" list included ten threat dimensions. Table 3 provides the specific threat list and the list of emotions. Option order was randomized across subjects. The results of the emotions questions will be reported elsewhere.

Table 3: Rating Task Items

Specific Threat List	Emotion List
Physical bodily harm to myself/themselves	Fear
Physical bodily harm to my/their loved ones	Anger
Losing material assets (a job, a possession, etc.)	Disgust
Losing my/their rights and freedoms	Pity
Losing my/their personal or social group status	Resentment
Being infected by a disease or pathogen	Contempt
Having my/their moral or spiritual purity corrupted	Sadness
Pollution of my/their group's values and identity	Happiness
Reduced cohesion of my/their social group	Envy
Reduced trust between social groups	Anxiety

Rating questions were delivered in two ways. Subjects who provided Dangerousness Ratings of greater than 20 (out of 100) were prompted to identify *how relevant* the "specific considerations" were *for them* on a scale of 0 ("Not relevant at all") to 100 ("Extremely Relevant") (the Self-Ratings). Subjects were then asked to identify the "specific emotions" *they felt* when thinking about that same danger on a scale of 0 ("Do not feel at all") to 100 ("Feel strongly").

Subjects who gave Dangerousness Ratings of 20 or less (out of 100) received a variation on these two tasks. Instead of providing relevance assessments for themselves, subjects were asked to rate *how relevant* they thought the same "specific considerations" were *for other people* who thought the item was actually dangerous (the Other-Ratings). The emotions rating followed the same format. Subjects were asked to rate how much they thought *other people felt* the specific emotions for that particular item. The results of the Self versus Other Ratings will be reported elsewhere.

If subjects rated some dangers above 20 and some below, then they received the question format appropriate to each danger. In practice, this means some subjects answered questions about themselves and about others.

Following the rating tasks, subjects saw an attention check. The attention check asked them to identify the four dangers about which they had just answered questions from the list of twenty possibilities. After the attention check, subjects answered basic demographic questions (gender, age, education, race/ethnicity, religious affiliation, and income) and the standard 7-point ANES questions for ideology and party identification.

MTurk Study 2: Summary

The objective of this study was to assess the relationship between demographic variables, political variables, personality trait measures and measures of threat detection and classification for both known and novel dangers. In particular, the study was designed to address the concern that threat classification is equivalent to an existing construct. The study was also designed to gain some causal purchase on the drivers of threat classification.

Subjects

Study 2 recruited 110 U.S. adults in August 2017 from Amazon's Mechanical Turk Platform to complete a survey (hosted on the Qualtrics online platform). The sample consisted of 44 females and 66 males, between 20 and 70 years old (mean age 33.0, s.d. = 11.1).[46] Subjects were paid $1.85 and completed the survey on average in 13 minutes.

69% of the sample self-identified as White, 10% as Asian/Pacific Islander, 8% as Black, and 5% as Latino. 24% of the final sample self-identified as Republican and 27% self-identified as Conservative.

Novel Dangers

To avoid priming, all novel danger questions were asked in the first block of the survey. Subjects were prompted to "think about dangers that might emerge in the world in the near future." They were told that the might not recognize the name of the danger itself but should do their best to "imagine it and answer a few questions". Each subject then received one of three prompts with a nonword embedded as the novel danger. Nonwords and prompts are

[46]The research protocol was approved by MIT's Committee on the Use of Humans as Experimental Subjects (MIT COUHES). Data reported here include only individuals whose responses were accepted and paid for. Rules for exclusion were identical to Wave 1 of Study 1, except that the attention check only called for identifying three topics instead of four. The three topics were the three Known Dangers. The average number of correct responses was 2.99 out of 3.

listed in Table 4. The combinations of nonwords and prompts were counterbalanced across subjects. Nonwords were generated using the ARC Nonwords Database (Rastle, Harrington, and Coltheart 2002). They were selected to be of the same length (six letters), to have few lexical neighbors (0-2), but a reasonable number of phonological neighbors (6-9). This procedure yields words that *sound* like real words without looking like anything too familiar.

Table 4: Nonwords and Prompts

Prompts	Nonwords
[—]-ism could be extremely dangerous in the near future.	Sprait
Some are concerned [—] will become a significant threat.	Traith
We will probably have to deal with the danger of [—] in less than five years.	Phrume

For each novel danger, subjects were asked three questions. The first was to classify the danger: "Without any other information, what would concern you most about [—]?" The second was to provide a policy preference: "Without any other information, what do you think the government should focus on to address [—]?" Options for these two questions are provided in Table 5. With the exception of the "Other" field, the option orders were randomized. Participants were only able to select one answer per question. Finally, subjects were asked "What, if anything, came to mind when you were imagining [—]?" Their responses were recorded in a text box.

Table 5: Classification and Preference Options

Classification Choices	Policy Choices
The possibility that it could physically harm or kill me	Invest in measures to protect the lives of American citizens
The possibility that it might be economically costly to me or my family	Shield American citizens from potential economic costs
The possibility that it might contaminate my physical or social environment	Protect American values and culture
Other [—]	Other [—]

Familiar Issues

The second block of the survey asked subjects to classify three known issues: immigration, climate change, and terrorism. The order of the presentation of these issues was randomized across subjects. Classification questions ("What concerns you most about [—]?") were followed by policy preferences ("What is the most important thing the government can do to address [—]?"). Wording for the options is identical to that for novel dangers in Table 5, except that subjects could also indicate not detecting the issue as a threat at all ("I'm not concerned about this problem") and a preference for no policy change ("I think current government policies are enough to deal with this problem"). Following the final set of questions on known issues, subjects were asked to identify those issues from a list of 20 possibilities. This served as an attention check.

Personality & Trait Measures

Following the collection of demographic information, subjects were given six personality measurement questionnaires. The order of the questionnaires was randomized across subjects. The measures and their sources are listed in Table 6, along with the scoring range.

Table 6: Personality Measures

	Scales Used	Scoring	Source of Scale Items
Big 5	Short form (2-items per trait)	0 to 1, for each	Mondak et al. (2010)
Social Dominance Orientation	Short form (8 items)	1 to 7	Ho et al. (2015)
Disgust Sensitivity	Core and Contaminant subscales	0 to 4, for each	Olatunji et al. (2008)
Trait Fear	9 items covering Courage, Social Assurance, Uncertainty, and Intrepidness	0 to 3	Kramer et al. (2012), Nelson et al. (2016)
Trait Anger	Temperament and Reaction subscales	4 to 16, for each	Mick et al. (2014)
Trait Anxiety	Reduced items of STAI trait subscale	7 to 28	Tenenbaum, Furst, and Weingarten (1985)

Table 7: Descriptive Statistics

	Sample Mean	S.D.
Openness	0.38	0.22
Conscientiousness	0.44	0.28
Extraversion	0.25	0.27
Agreeableness	0.5	0.26
Neuroticism	0.43	0.28
SDO	2.63	1.58
Disgust (Core)	2.37	0.82
Disgust (Cont.)	1.57	0.83
Trait Fear	1.64	0.69
Anger (Temp.)	6.14	2.64
Anger (Reac.)	8.37	2.94
Trait Anxiety	15.1	5.26

Table 7 shows the mean and standard deviation of the sample for each measure.

Regression Tables

Please note, the coefficients in these tables are not directly interpretable. See the main text for the relevant predicted probabilities and effect sizes.

All novel danger responses were pooled. Confidence intervals and p-values were calculated using pairs cluster bootstrapped t-statistics (500 iterations).

Table 8: Threat Detection (Logistic Regression)

	Dependent variable:		
	Terrorism	Climate Change	Immigration
	(1)	(2)	(3)
Openness	−2.55 (1.90)	−1.30 (2.64)	−1.49 (1.36)
Extraversion	4.26* (2.12)	5.90* (2.83)	−1.38 (1.07)
Conscientiousness	−1.46 (1.71)	3.21 (1.89)	0.85 (1.18)
Agreeableness	0.90 (1.84)	−2.89 (2.60)	3.38* (1.51)
Neuroticism	6.57* (2.76)	3.53 (3.01)	−4.06* (1.75)
Disgust (Core)	−0.05 (0.56)	1.49 (0.81)	0.60 (0.46)
Disgust (Cont.)	0.39 (0.51)	−0.60 (0.71)	0.07 (0.40)
Anger (Temp.)	0.46* (0.18)	0.52 (0.33)	0.13 (0.12)
Anger (Reac.)	0.08 (0.18)	−0.35 (0.25)	−0.05 (0.13)
Trait Anxiety	0.14 (0.14)	0.39 (0.22)	−0.14 (0.09)
SDO	−0.54 (0.29)	−0.91* (0.46)	0.42 (0.22)
Trait Fear	1.06 (0.93)	−0.07 (1.24)	−0.81 (0.71)
Female	0.79 (0.77)	−1.12 (1.06)	−0.97 (0.61)
Age	−0.06 (0.03)	−0.08 (0.04)	−0.04 (0.03)
College	−0.32 (0.75)	1.40 (1.07)	0.42 (0.56)
Income	0.08 (0.10)	−0.09 (0.16)	0.05 (0.08)
PartyID	0.25 (0.43)	0.63 (0.47)	0.14 (0.31)
Ideology	0.13 (0.39)	−1.12* (0.50)	0.34 (0.29)
Constant	−7.17* (3.29)	−1.59 (4.17)	0.65 (2.35)
Observations	110	110	110
Log Likelihood	−34.56	−22.86	−53.84
Akaike Inf. Crit.	107.12	83.73	145.68

Note: *p<0.05; **p<0.01; ***p<0.001

Table 9: Threat Classification of Nonwords (Logistic Regression)

	Dependent variable:		
	Death	Loss	Contamination
	(1)	(2)	(3)
Openness	0.59 (−0.60, 1.78)	−0.55 (−2.02, 0.93)	−0.21 (−1.39, 0.97)
Conscientiousness	−0.12 (−1.19, 0.96)	−0.08 (−1.40, 1.25)	−0.01 (−1.02, 1.01)
Extraversion	−0.54 (−1.58, 0.49)	0.03 (−2.72, 2.78)	0.44 (−0.86, 1.75)
Neuroticism	0.45 (−0.77, 1.66)	−0.34 (−2.12, 1.43)	−0.03 (−1.12, 1.05)
Agreeableness	−1.05 (−2.23, 0.13)	0.72 (−0.90, 2.35)	0.56 (−0.56, 1.69)
Disgust (Cont.)	−0.19 (−0.57, 0.20)	0.02 (−0.53, 0.57)	0.16 (−0.27, 0.58)
Disgust (Core)	0.33 (−0.11, 0.77)	−0.50 (−1.09, 0.10)	0.05 (−0.36, 0.46)
Anger (Reac.)	0.06 (−0.05, 0.17)	−0.04 (−0.18, 0.11)	−0.04 (−0.11, 0.04)
Anger (Temp.)	−0.02 (−0.15, 0.10)	0.02 (−0.11, 0.16)	0.01 (−0.08, 0.10)
Trait Anxiety	−0.02 (−0.09, 0.05)	−0.01 (−0.12, 0.09)	0.03 (−0.05, 0.11)
SDO	0.05 (−0.13, 0.23)	0.05 (−0.28, 0.37)	−0.07 (−0.23, 0.10)
Trait Fear	0.09 (−0.47, 0.65)	0.25 (−0.60, 1.10)	−0.27 (−0.79, 0.25)
Female	0.17 (−0.32, 0.67)	0.04 (−0.74, 0.82)	−0.16 (−0.74, 0.41)
Age	0.01 (−0.01, 0.04)	−0.01 (−0.05, 0.04)	−0.01 (−0.03, 0.01)
College	−0.52 (−1.08, 0.05)	0.23 (−0.59, 1.05)	0.36 (−0.16, 0.88)
Income	0.05 (−0.03, 0.13)	−0.03 (−0.16, 0.11)	−0.03 (−0.12, 0.06)
PartyID	0.04 (−0.29, 0.36)	−0.25 (−0.61, 0.10)	0.18 (−0.06, 0.41)
Ideology	−0.11 (−0.38, 0.16)	0.23 (−0.09, 0.56)	−0.09 (−0.28, 0.11)
pr_ism	−0.27 (−0.85, 0.31)	−0.01 (−0.67, 0.66)	0.26 (−0.31, 0.83)
pr_sigth	0.54 (−0.05, 1.13)	−0.50 (−1.15, 0.16)	−0.26 (−0.89, 0.37)
nw_sprait	−0.09 (−0.71, 0.54)	0.07 (−0.54, 0.69)	0.04 (−0.54, 0.62)
nw_phrume	0.31 (−0.38, 1.01)	−0.90* (−1.70, −0.09)	0.22 (−0.37, 0.81)
Constant	−1.47 (−3.80, 0.86)	0.27 (−2.69, 3.22)	−0.70 (−3.06, 1.66)
Observations	318	318	318
Log Likelihood	−200.97	−151.27	−204.37
Akaike Inf. Crit.	447.94	348.54	454.74

Note: *p<0.05; **p<0.01; ***p<0.001

Table 10: Threat Classification of Nonwords (Logistic Regression)

	Dependent variable:		
	Death	Loss	Contamination
	(1)	(2)	(3)
nw_sprait	−0.09 (−0.63, 0.45)	0.07 (−0.52, 0.66)	0.03 (−0.54, 0.61)
nw_phrume	0.28 (−0.35, 0.91)	−0.82* (−1.59, −0.05)	0.21 (−0.37, 0.79)
pr_ism	−0.25 (−0.82, 0.31)	−0.02 (−0.64, 0.60)	0.25 (−0.28, 0.79)
pr_sig	0.52 (−0.04, 1.09)	−0.48 (−1.08, 0.13)	−0.25 (−0.81, 0.32)
Constant	−0.54* (−1.04, −0.04)	−0.99** (−1.50, −0.47)	−0.56* (−1.06, −0.07)
Observations	318	318	318
Log Likelihood	−209.88	−157.22	−210.02
Akaike Inf. Crit.	429.75	324.45	430.04
Note:			*p<0.05; **p<0.01; ***p<0.001

Table 11: Policy Preference for Novel Danger (Logistic Regression)

	Dependent variable:		
	Protect Lives	Shield Costs	Protect Culture
	(1)	(2)	(3)
Death	0.45*** (0.19, 0.71)		
Loss		0.87*** (0.47, 1.27)	
Contamination			0.34 (−0.27, 0.94)
nw_sprait	−0.03 (−0.11, 0.05)	−0.02 (−0.14, 0.09)	0.05 (−0.05, 0.14)
nw_phrume	−0.06 (−0.14, 0.02)	0.12 (−0.02, 0.26)	0.004 (−0.06, 0.07)
pr_ism	0.03 (−0.04, 0.10)	0.01 (−0.11, 0.13)	−0.03 (−0.13, 0.07)
pr_sig	−0.08 (−0.17, 0.01)	0.06 (−0.05, 0.18)	0.05 (−0.05, 0.15)
Openness	0.99 (−0.22, 2.21)	−1.13 (−2.61, 0.34)	−0.58 (−3.23, 2.06)
Conscientiousness	0.11 (−1.16, 1.38)	0.67 (−0.45, 1.79)	−1.47 (−3.38, 0.45)
Extraversion	0.57 (−0.55, 1.69)	−0.05 (−1.19, 1.08)	−1.18 (−3.18, 0.81)
Neuroticism	−0.19 (−1.83, 1.45)	−1.32 (−2.86, 0.23)	2.11 (−0.96, 5.18)
Agreeableness	−0.57 (−1.82, 0.69)	0.39 (−0.81, 1.59)	0.60 (−1.83, 3.03)
Disgust (Cont.)	0.003 (−0.53, 0.54)	0.01 (−0.34, 0.36)	−0.05 (−1.68, 1.58)
Disgust (Core)	0.13 (−0.38, 0.63)	−0.09 (−0.68, 0.49)	−0.08 (−0.78, 0.63)
Anger (Reac.)	−0.01 (−0.14, 0.13)	0.02 (−0.08, 0.12)	0.04 (−0.14, 0.21)
Anger (Temp.)	−0.05 (−0.19, 0.09)	−0.02 (−0.16, 0.12)	0.10 (−0.07, 0.27)
Trait Anxiety	−0.01 (−0.11, 0.10)	0.07 (−0.05, 0.18)	−0.09 (−0.32, 0.13)
SDO	−0.08 (−0.32, 0.15)	−0.06 (−0.35, 0.22)	0.22 (−0.21, 0.65)
Trait Fear	0.50 (−0.17, 1.17)	−1.10** (−1.82, −0.38)	0.40 (−0.79, 1.58)
PartyID	0.19 (−0.13, 0.51)	−0.16 (−0.46, 0.14)	−0.13 (−0.70, 0.45)
Ideology	−0.21 (−0.54, 0.11)	0.16 (−0.09, 0.41)	0.17 (−0.39, 0.73)
Female	−0.48 (−1.11, 0.14)	0.20 (−0.43, 0.83)	0.65 (−0.43, 1.74)
Age	0.02 (−0.003, 0.05)	−0.01 (−0.04, 0.01)	−0.02 (−0.08, 0.03)
Income	−0.004 (−0.09, 0.09)	0.04 (−0.06, 0.14)	−0.06 (−0.20, 0.08)
College	0.26 (−0.28, 0.81)	−0.37 (−0.89, 0.14)	0.12 (−0.92, 1.16)
Constant	−0.89 (−2.94, 1.17)	0.50 (−2.51, 3.51)	−2.02 (−6.35, 2.31)
Observations	919	919	919
Log Likelihood	−580.86	−458.91	−348.49
Akaike Inf. Crit.	1,209.72	965.82	744.98
Note:			*p<0.05; **p<0.01; ***p<0.001

Both terrorism and climate change had dominant policy selections (Protect Lives). The models below consider the choice for Protect Lives versus all other options. The models for immigration consider the choice for Shield from Costs and Protect Values.

Table 12: Policy Preferences (Terrorism and Climate Change)

	Dependent variable:	
	Protect Lives (Terr.)	Protect Lives (Climate)
	(1)	(2)
Phys. Harm	2.38*** (0.71)	2.95* (1.19)
Openness	2.34 (1.43)	0.35 (1.23)
Extraversion	−2.81* (1.26)	0.73 (1.14)
Conscientiousness	−0.23 (1.37)	1.27 (1.14)
Agreeableness	−1.19 (1.50)	−0.03 (1.35)
Neuroticism	1.47 (1.41)	−0.48 (1.21)
Disgust (Core)	−0.33 (0.43)	−0.39 (0.36)
Disgust (Cont.)	0.93 (0.48)	0.08 (0.42)
Anger (Temp.)	0.12 (0.13)	0.05 (0.12)
Anger (Reac.)	−0.35* (0.15)	−0.22 (0.14)
Trait Anxiety	−0.01 (0.09)	0.18* (0.09)
SDO	0.06 (0.25)	−0.27 (0.21)
Trait Fear	−0.70 (0.77)	−0.54 (0.66)
Female	1.79** (0.69)	−0.36 (0.55)
Age	−0.09** (0.03)	−0.03 (0.02)
College	0.19 (0.57)	−0.56 (0.52)
Income	0.13 (0.09)	0.06 (0.08)
PartyID	0.35 (0.39)	−0.45 (0.32)
Ideology	0.16 (0.35)	0.41 (0.31)
Constant	−0.14 (2.23)	1.55 (2.12)
Observations	110	110
Log Likelihood	−47.32	−59.81
Akaike Inf. Crit.	134.64	159.62

Note: *p<0.05; **p<0.01; ***p<0.001

Table 13: Policy Preferences (Terrorism and Climate Change)

	Dependent variable:	
	Protect Lives (Terr.)	Protect Lives (Climate)
	(1)	(2)
Phys. Harm	3.24*** (0.87)	4.76*** (1.38)
Loss	1.90 (1.60)	2.35 (1.23)
Cont.	2.53 (1.31)	2.36*** (0.69)
Openness	1.95 (1.51)	0.81 (1.41)
Extraversion	−2.29 (1.33)	−0.25 (1.32)
Conscientiousness	−0.99 (1.39)	0.68 (1.27)
Agreeableness	−1.52 (1.60)	−0.12 (1.40)
Neuroticism	1.54 (1.46)	−0.72 (1.33)
Disgust (Core)	−0.24 (0.44)	−0.30 (0.38)
Disgust (Cont.)	1.01* (0.49)	−0.21 (0.45)
Anger (Temp.)	0.14 (0.14)	0.03 (0.13)
Anger (Reac.)	−0.39* (0.16)	−0.19 (0.15)
Trait Anxiety	−0.03 (0.10)	0.17 (0.09)
SDO	0.10 (0.26)	−0.14 (0.24)
Trait Fear	−0.98 (0.86)	−0.70 (0.74)
Female	1.84* (0.75)	−0.03 (0.61)
Age	−0.10** (0.03)	−0.03 (0.03)
College	0.40 (0.61)	−0.89 (0.58)
Income	0.09 (0.10)	0.08 (0.09)
PartyID	0.28 (0.40)	−0.46 (0.35)
Ideology	0.21 (0.36)	0.51 (0.35)
Constant	0.12 (2.31)	0.41 (2.27)
Observations	110	110
Log Likelihood	−44.93	−52.59
Akaike Inf. Crit.	133.85	149.17
Note:		*p<0.05; **p<0.01; ***p<0.001

Table 14: Policy Preferences (Immigration)

	Dependent variable:	
	Shield from Costs	Values and Culture
	(1)	(2)
Loss	5.07*** (1.21)	
Contamination		4.25* (2.10)
Openness	1.15 (1.96)	6.18* (3.08)
Extraversion	0.02 (1.49)	0.22 (1.97)
Conscientiousness	1.58 (1.87)	−7.08* (3.23)
Agreeableness	−2.41 (2.31)	−7.74* (3.73)
Neuroticism	−0.33 (1.98)	3.09 (2.62)
Disgust (Core)	−0.77 (0.60)	1.37 (0.74)
Disgust (Cont.)	−0.04 (0.62)	0.64 (0.96)
Anger (Temp.)	0.12 (0.19)	−0.43 (0.29)
Anger (Reac.)	−0.11 (0.19)	0.29 (0.23)
Trait Anxiety	−0.29* (0.14)	−0.54* (0.24)
SDO	−0.25 (0.34)	1.67*** (0.48)
Trait Fear	0.89 (0.93)	2.27 (1.39)
Female	0.29 (0.80)	
Age	0.001 (0.04)	
College	−0.20 (0.12)	
Income	−0.09 (0.77)	
PartyID	−0.48 (0.49)	
Ideology	0.19 (0.43)	
Constant	2.64 (3.70)	−5.27 (4.76)
Observations	110	110
Log Likelihood	−32.15	−18.72
Akaike Inf. Crit.	104.31	65.44

Note: *p<0.05; **p<0.01; ***p<0.001

Table 15: Policy Preferences (Immigration)

	Dependent variable:	
	Shield from Costs	Values and Culture
	(1)	(2)
Phys. Harm	−12.90 (1,527.00)	2.46 (2.76)
Loss	5.42*** (1.37)	1.55 (1.27)
Contamination	1.88 (1.64)	6.26* (3.05)
Openness	1.04 (2.01)	6.93* (3.52)
Extraversion	0.29 (1.57)	−1.50 (2.45)
Conscientiousness	1.13 (1.93)	−7.13 (3.72)
Agreeableness	−2.16 (2.35)	−5.07 (3.63)
Neuroticism	−0.52 (2.02)	4.63 (3.63)
Disgust (Core)	−0.74 (0.58)	1.63 (0.95)
Disgust (Cont.)	−0.05 (0.64)	0.66 (1.12)
Anger (Temp.)	0.10 (0.19)	−0.32 (0.33)
Anger (Reac.)	−0.09 (0.19)	0.29 (0.25)
Trait Anxiety	−0.28* (0.14)	−0.50 (0.28)
SDO	−0.30 (0.36)	1.89** (0.63)
Trait Fear	0.81 (0.96)	2.20 (1.49)
Female	0.41 (0.84)	
Age	0.01 (0.04)	
College	−0.20 (0.12)	
Income	0.01 (0.78)	
PartyID	−0.43 (0.51)	
Ideology	0.16 (0.45)	
Constant	2.16 (3.72)	−12.19 (6.42)
Observations	110	110
Log Likelihood	−31.44	−16.33
Akaike Inf. Crit.	106.88	66.66
Note:		*p<0.05; **p<0.01; ***p<0.001

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