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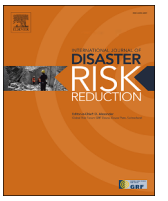

Individual differences in psychological rigidity and beliefs about system fitness predict attitudes about social determinants of disaster risk

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ABSTRACT

Although events triggered by phenomena such as earthquakes, hurricanes, and landslides are routinely referred to as "natural disasters", scholars have long argued that they are not natural at all; rather their disastrous consequences are a result of sociopolitical decisions surrounding the accumulation of risk. In the current work, we seek to understand who is more likely to accept or reject the importance of risk reduction by examining two constructs:1) perceived blamelessness in the face of disasters, and 2) lack of support for disaster risk reduction. Across two studies (combined $n = 1732$), higher perceived blamelessness and lower support for risk reduction via sociopolitical means were reliably related to individual difference measures of psychological rigidity as well as beliefs about socio-economic system fitness. Specifically, higher levels of system justification, belief in a just world, fair market ideology, need for cognitive closure, intolerance of ambiguity, social dominance orientation, and right-wing authoritarianism were consistently related to lower likelihood of assigning human blame for disaster damages as well as less endorsement of socio-political interventions to stem disaster risks. Both blamelessness and intervention-avoidance were also related positively to political conservatism. Importantly, observed relationships remained significant after controlling for political ideology which correlates with each of the measured variables. We argue that observed relationships between individual difference variables and support for risk reduction policies around natural hazards that are not reducible to co-relationships with political ideology may be particularly important to consider when crafting successful interventions.

1. Introduction

Disasters induced by hazards (e.g., earthquakes, hurricanes, and landslide) pose growing threats to human safety and economic wellbeing, especially to marginalized groups and communities [1]. A leading definition of disasters is, ''a serious disruption of the functioning of a community or a society at any scale due to hazardous events *interacting* with conditions of exposure, vulnerability, and capacity, leading to one or more of the following: human, material, economic and environmental losses and impacts'' [2]. Specif-

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ically, 30.7 million people worldwide were displaced from their homes due to disasters in 2020; in 2021 at least 126,000 people in the United States alone reported displacement due to a disaster [3].

As hazards become more pervasive alongside rising global temperatures, disaster risk—the likelihood of death, damage, or destruction stemming from a hazard—is accumulating [4]. Lending credence to those that claim that disaster risk is created by a neoliberal development model [5], the frequency and magnitude of disaster damages have risen greatly over the last 40 years in line with accelerations in planetary exploitation, consumption and human precarity; the number of disasters that involved damages in excess of a billion dollars, jumped from an average of just under three per year in the 1980s to just over 6 in the early 2000s to 16.2 in the last half-decade (2016–2020; NOAA [6,7]. The cost of disaster recovery has also meaningfully increased, even after adjusting for economic growth and inflation [8]; NOAA, 2021; USGCRP, 2017). Notably, the United States has spent over $800 billion to repair disaster damages across the last decade, spending over $95 billion on recovery from 22 disasters just in 2020 [7,9].

Disasters also involve costs above and beyond financial losses or property damages (e.g., cultural losses, social strains). Disasters result in increased rates of depression, anxiety, PTSD, substance abuse, divorce, and suicide [10,11]. The 2009 Australian Black Saturday bushfires created long-term emotional costs (i.e., mental health, substance abuse, chronic disease, family violence) estimated at a total of 3.9 billion Australian dollars (equivalent at that time to around 3.12 billion US dollars)—larger than the disaster's financial cost (e.g., property destruction, clean-up costs) of 3.1 billion [12]. Such negative socio-emotional residuals of disasters are especially compounded for marginalized populations (e.g., low-income individuals, the elderly, children, prisoners, and addicts), whose ability to avoid hazards (e.g., through evacuation) and whose social and material resources to bear the reverberating costs of hazard events are more limited [11,13]. Worse, the high cost of housing and housing shortages in hazard prone areas may exacerbate these disparities (e.g., increase displacement and other social/financial losses of low-income groups).

In contrast to common public perception, disaster scholars argue that disasters are not simply the product of hazards (e.g., earthquakes, hurricanes, landslides). Instead, they stem from longstanding socio-political inequalities and injustices in regions that are prone to hazard. That is, disasters are not singular events so much as an accumulating process in which hazards interact with spatially distributed socio-political and cultural factors (vulnerabilities). It is this interaction that creates disaster risk. So, when disasters are described as "natural" it is an inherently contentious claim. While hazards (such as floods, earthquakes, volcanic eruptions, hurricanes) are natural phenomena, they only become disasters when their impact threatens the lives and livelihoods of people. Disasters unevenly affect people that are vulnerable due to marginalization, discrimination, and inequitable access to resources, knowledge, and support. Importantly, the amplification of these vulnerabilities –intentionally or unintentionally – is not because information for dealing with hazards does not exist. Rather it is the result of those in power not using this information appropriately (or at all) [14].

Information regarding the increasing frequency with which natural hazards eventuate in human disasters and the growing size of those impacts is more and more a part of the media environment. In the current work, we are particularly interested in zeroing in on the cognitive styles of the people who are most likely to downplay the link between hazards and disasters. Notably, the general public may also prefer to view disasters as caused by hazards (e.g., floods, earthquakes, volcanic eruptions, hurricanes) rather than by socio-political decisions because blaming nature as the trigger of disasters obscures human responsibility. More specifically, blaming nature shields governments (and taxpayers) from having to address societal inequities that make some people more vulnerable during disasters than others [15]. From a functional perspective, blame is used to regulate individual's behavior in society based on social expectations [16,17]. Thus, blame has consequences for social behavior and norm violation specifically [18] theory of blame posits that once a norm violation occurs people make judgements about the causal source of the violation (i.e., who broke the social norm), and whether the cause of the violation was intentional or not. If the cause of the violation is not associated with a group or person, then the norm violation results in no blame. As applied to the current work, people may perceive disasters as events caused not by human actors but hazards and thus view people as blameless for a disaster's destructive consequences. Interestingly, past work has shown that when nature is perceived to be the cause of a disaster people are less likely to blame the victims of a disaster for their plight and more likely to donate to them then when a disaster is perceived to be caused by humans [19]. Additionally [19], argue that people view the victims of human caused disasters more negatively, as less willing to help themselves, and more blameworthy; these negative evaluations hold even when information about a victim's self-help action and blameworthiness are not provided. Thus, the perception of disaster as human or hazard-induced has direct implications for blame as well as willingness to help those affected. Given the mounting financial and emotional costs of disasters, as well as the awareness that governments prefer to use hazard-centric approaches (e.g., building sea walls) rather than addressing the long-established systems and ideological structures that underlie disaster risk, more research into the factors that shape people's beliefs about disasters and "vulnerability" creating socio-political systems is crucial [5]. While social scientists have focused efforts on studying factors that influence disaster-related trauma and recovery (see Refs. [20–22] less attention has been paid to psychological factors that shape people's beliefs (and the accompanying risk they create) *prior* to disaster. Thus, the current work aims to bridge these gaps in the existing literature by investigating the link between individual differences in system beliefs, psychological rigidity, and disaster risk accumulation. Specifically, we investigate the relationships between these individual differences, attributions about disaster causes, and attitudes towards social interventions to mitigate disaster risk. This line of inquiry represents an effort to encourage disaster risk-mitigating behavior changes.

1.1. Who supports and who doesn't support social change?

[23] highlight several individual difference measures (e.g., need for cognitive closure, social dominance orientation, system justification, intolerance for ambiguity and right-wing authoritarianism) that can be used to assess the extent to which people vary in their need to manage uncertainty, as well as threat and change to the sociopolitical system or the social hierarchy; these measures also have implications for political ideology, and conservative ideology specifically. Of note, researchers have not used these individual differences to predict disaster beliefs but have concentrated on the relationship between these individual difference variables and attitudes

toward climate change. As there is a dearth of literature on the psychology of disaster risk reduction through system and ideological structure change, we have used the climate change literature to help inform our predictions about which factors should be relevant to study in relation to disasters. As such, we review the relevant climate change literature on individual differences concerning the psychological management of uncertainty, as well as threat and change to the sociopolitical system or the social hierarchy.

1.2. Beliefs about socio-economic system fitness

There has been a long line of research indicating that environmental attitudes result from individual differences concerning the maintenance of the status quo [24–30]. That is, at an individual level people vary in their motivation to view national governments or economic systems as benign, fair, or just [28]. Specifically, in the presence of large existential threats like climate change or a disaster people may be particularly motivated to maintain a sense of certainty, and thus affiliate with long-standing stable social and economic systems [31,32]. Critically, it is this support for long-standing social and economic systems that may keep people from recognizing that disasters are the result of widescale socioeconomic inequities. Thus, to mitigate disaster risk is to threaten the status quo (e.g., wealth redistribution, social justice). Therefore, we suggest that tendencies to justify the sociopolitical system or the social hierarchy should relate to a lack of blame for disasters and a lack of support for disaster risk reduction. We highlight specific theories and measures below that align with this reasoning.

The theory of system justification proposes that people see the system as fair and just because of a need to feel safe and mitigate uncertainty in the environment [31]. Thus, for people who endorse system justification recognizing that institutional systems contribute to climate change, or the anthropomorphic causes of disasters could be challenging as such arguments identify problems with the status quo and the integrity of institutional systems to manage uncertainty in the environment [28]. Of note, past work has found that those high in system justification are more likely to deny climate change exists, the possibility of an ecological crisis, the limits of earth's resources, danger of disrupting the balance in nature, and to refuse to abide by the constraints of nature [28]. Additionally, recent work has shown that those higher in system justification and political conservatism are more likely to be skeptical of anthropogenic climate change [30,33].

There is also evidence to suggest that endorsing fair market ideology or the idea that financial systems and common business practices are fair and legitimate has implications for both protecting the status quo and climate change beliefs [23,34,35]. Experimental evidence suggests that threat to the market system and threat to the social system leads to increased endorsement of fair market ideology compared to control [23]. Additionally, those who endorse free-market ideology are more likely to believe that climate change is not occurring and is not caused by anthropomorphic causes [34]. Indeed, people who endorse economic forms of system justification are more likely to be politically conservative in general and endorse conservative climate change views [36]. For example, experimental evidence suggests that, in the United States, Republicans favor free market solutions (i.e., U.S. becoming a leader in green technology) to address climate change concerns rather than regulatory policy (i.e., U.S. becoming a leader in emission regulatory policies; [37]. Thus, when presented with a threat to financial systems, like climate change, those who are high in economic forms of system justification may be motivated to protect financial systems, and thus deny the existence of the threat, and furthermore the role that humans play in activating the threat.

Belief in a just world – the extent to which people are motivated to see the world as fair, orderly, and not without meaning – has also been linked to beliefs about climate change [23,38]. For example, experimental research indicates that messages about the dire consequences of climate change contradict beliefs about the world being fair and orderly resulting in increased skepticism toward climate change for people who are high in belief in a just world [39]. Similarly, highlighting the negative consequences of disasters may also challenge beliefs about the fairness and order of the world. Of note, recent work has suggested that people are more likely to feel they can mitigate the effects of climate change when exposed to dire climate changes messages as compared to messages that downplay climate change threat [40]. Importantly, this may be particularly true for those who are low in just world beliefs as research has suggested that efficacy beliefs are positively correlated with feelings of sadness and anxiety concerning climate change [41]. Thus, engagement in disaster mitigation efforts may be dependent on a person's endorsement of just world beliefs and if those beliefs are questioned.

Of interest, past work has argued that both justification of the status quo or system and justification of social hierarchies has important implications for climate change beliefs. For instance, past work has shown that social dominance orientation (SDO) is a stronger predictor of climate change denial than both political ideology and right-wing authoritarianism [42], and that group-based dominance (i.e., social dominance and nature dominance) fully mediates the relationship between system justification and climate change denial [42]. Meta-analytic results suggest a small to medium-sized negative relationship between SDO and pro-environmentalism [43] as well as belief in climate change and support for climate action [44]. In sum, people who are more likely to endorse system legitimizing beliefs are also more likely to deny climate change. Like anthropogenic climate change, disasters are in part the result of human activity, thus disasters may also present a threat to the social order. As such, people who endorse the social hierarchy or sociopolitical systems may be more likely to oppose disaster risk reduction interventions or reject the role that humans play in the creation of a disaster.

1.3. Psychological rigidity

Of note, it has been argued that although the general public may understand that climate change is occurring, the causes of climate change are considered to be somewhat ambiguous to the masses [45,46]. Thus, the extent to which a person is averse to ambiguous situations or information could be important for understanding climate change beliefs; we focus on two individual difference measures (i.e., need for cognitive closure, intolerance for ambiguity) in this regard [23]. Past work has shown that people who are more open minded and willing to engage in effortful thinking are more willing to take action to reduce climate change [47]. In addi-

tion, people with a higher tolerance for ambiguity are more likely to believe that climate change is a problem [46]. As such, there may be evidence to suggest that those who are more tolerant of ambiguous situations are more likely to recognize that climate change is an issue and is caused by humans. In a similar vein, the underlying causes of disasters are not well understood by the public, thus it is logical to investigate whether tolerance of uncertainty and ambiguity predict beliefs about disaster risk reduction interventions and the role that humans play in the creation of a disaster.

1.4. Political ideology as a third variable in potential relationships

In the current work, we must account for the observation that political ideology drives beliefs about climate change or disasters. For instance, political ideology has been shown to be a strong predictor of climate change beliefs and specifically that left leaning ideologies are more likely to recognize that climate change is due to anthropogenic causes [41,48,49]. Additionally, across multiple countries (i.e., Australia, Belgium, Canada, Germany, Greece, Italy, Netherlands, New Zealand, Sweden, and the United States) the ideological left is more willing to adjust their lifestyle to help reduce the anthropogenic effects of climate change, and to be concerned about personal harm due to climate change compared to the ideological right [50]. Specifically, conservatives may struggle to recognize the anthropogenic causes of climate change because conservative ideology is grounded in the idea that social systems must be protected and preserved against change (Baldwin & Lammers 2016; [51]. Additionally, conservatives see changes to the system as uncertain and threatening [23]. As such, conservatives may not be motivated to recognize that climate change and disasters are the result of existing inequities in a socio-political system. In contrast, liberals are more likely to question existing systems and believe that societal improvement does not stem from the past, but from changing existing structures to serve citizens more equitably [52]. Of note, people are drawn to political ideologies based on a combination of personality traits and situational variables [53,54] and no single predictor shares a one-to-one relationship with ideology. What that means is that although, on average, political liberals are more likely than political conservatives to believe that a financial system like capitalism needs to be changed, some conservatives will be more likely to believe that than some liberals. Thus, it is possible that individual beliefs about socio-economic fitness and psychological rigidity (i.e., comfortability with uncertainty and ambiguity) are unique predictors of disaster beliefs beyond their relationships with political ideology.

Of note, some past work has considered the effect of political ideology, socio-economic fitness, and psychological rigidity on climate change beliefs. However, effects have been inconsistent depending on the specific construct of interest. For example, research testing the effect of both political ideology and system justification on climate change beliefs finds that both political ideology and system justification predict unique variance in climate change beliefs (Feygina et al., 2010; [30]. Similarly, past work on SDO and political ideology has found that SDO is a stronger predictor of climate change beliefs then political ideology [42], and some work has suggested that political ideology becomes insignificant when both political ideology and the egalitarian subscale of SDO predict climate change beliefs [30]. Additionally, political orientation does not fully mediate the relationship between tolerance for ambiguity and climate change beliefs [46]. In contrast, research investigating fair market ideology and climate change beliefs does not test the effect of political ideology [34], or only tests the effect of political ideology on climate change beliefs [55,56]. Of note, there is research testing economic preferences to solve climate change by political party, however a measure of fair market ideology was not used in this research [37]; other scientists have called for more research investigating the relationship between political ideology, fair market ideology, and climate change beliefs [35]. Likewise, research investigating belief in a just world and climate change beliefs has neglected political ideology [39,57]. In sum, past work has not consistently tested the potential explanatory effect of political ideology when assessing the relationships between personality variables and support climate change beliefs; see Table 1. As such, the current work expands past work by simultaneously testing multiple individual difference measures in a new domain, disaster beliefs. Additionally, the current work tests whether socio-economic fitness and psychological rigidity are unique predictors of disaster beliefs beyond their relationships with political ideology.

2. Study 1

2.1. Method

2.1.1. Participants

Data for all studies were collected at a research website (https://implicit.harvard.edu) where participants can self-select to go and learn about their implicit biases around various topics (e.g., race, gender, sexuality, ethnicity). Participants in the current studies created a research account there and were randomly assigned to complete this from one of the handful of research studies in the pool at the time. Participants were volunteers who could choose to leave the study at any time by closing their web browser. Any participant who is part of the Project Implicit research pool (i.e., who has created an account and asked to begin a study) could be part of the study and there no were exclusion rules, except that participants could only participate in one of the studies in this manuscript.

The current sample was collected in September of 2019 and consisted of 507 participants from 40 countries[1] (United States 73.2%; United Kingdom 6.3%; Canada 2.9%, Germany 1.4%, Philippines 1.0%, all others $<1\%$). A majority of the sample reported their sex as female (69.4%) and the mean age was 32.87 years ($SD = 13.77$). Self-reported racial identity was as follows: 69.8% White, 9.3%

[1] Of note, except for the fair market ideology scale, the measures we used to assess individual differences in socio-economic fitness and psychological rigidity have been validated outside of U.S. samples (see Refs. [60–62,63–66,95]. As such, and because we much prefer our results and conclusions to include this country-level diversity rather than being restricted to people from the United States, we include the full sample of participants from 40 countries in our analyses. Results for the U.S.-only sample produced relationships highly similar in direction and magnitude and are included in the supplemental materials.

Table 1
Past literature examining constructs and covariates related to climate change and global warming beliefs and behavior.

Citation	Construct	Outcome	Covariates	Finding
[28]	System justification	Denial of global warming	Political ideology, national identification, gender	System justification predicts global warming denial and less pro-environmental behavior
[30]	System justification	Anthropogenic climate change skepticism	Political ideology, gender, SDO[a]	Political ideology, SDO[a] egalitarianism subscale, and system justification predict unique variance in climate change skepticism
[34]	Free market ideology	Climate change beliefs & behavioral intention	Environmental apathy, ecocentrism, self-efficacy	The relationship between free market ideology and climate change beliefs is medicated by environmental apathy
[37]	Economic preferences (free market vs. govt regulatory)	Solutions to climate change	Political party	Republicans are in favor of free market solutions (i.e., US becomes leader in green tech) to address climate change concerns rather than regulatory policy
[39]	Belief in a Just World	Belief in global warming	Consequences of global warming (dire vs. positive solutions)	Dire consequences of climate change contradict just world beliefs resulting in increased skepticism toward climate change
[57]	Belief in a Just World	Belief in global warming	Consequences of global warming (dire vs. positive solutions)	Preprint
[58]	SDO[a]	Climate change denial	Political ideology, RWA[b]	SDO[a] is a stronger predictor of climate change denial then political ideology and RWA[b]
[42]	Social dominance & Nature dominance	Climate change denial	System justification, domineering personality, empathy	SDO[a] mediates the relationship between system justification and climate change denial
[43]	SDO[a]	Environmentalist behavior	RWA[b]	SDO[a] is a stronger predictor of lower environmentalism over time
[44]	SDO[a]	Belief in climate change	None	SDO is negatively associated with belief in climate change ($r = -.32$), pro-environmental attitudes ($r = -.30$), and support for climate change action ($r = -20$)
[46]	Tolerance for ambiguity	Climate change beliefs	Political ideology	Political ideology does not fully mediate the relationship between tolerance for ambiguity and climate change beliefs
[47]	Need for cognitive closure	Willingness to reduce Anthropogenic climate change	Closed-mindedness	People who are open minded and willing to engage in effortful thinking are more willing to take action to reduce climate change

Note.
[a] Social dominance orientation.
[b] Right-wing authoritarianism.

Black, 5.5% more than one race – Other, 5.1% other or unknown, 3.4% South Asian, 2.0%, 1.2% more than one race – Black/White, East Asian, 1% American Indian or Alaskan Native, 0.1% Native Hawaiian or Pacific Islander.

2.1.2. Measures

2.1.2.1. Political ideology. Participants first responded to the item "When it comes to politics in general, please rate where you fall on the scale" with a scale ranging from *1 = very liberal* to *7 = very conservative*. Participants used the same scale for the following item: "In general, how liberal (left-wing) or conservative (right-wing) are you on social issues?" As these two items were highly correlated $r = 0.87$ ($p < .001$, 95% CI [0.859, 0.944]), we averaged them to create a single indicator of political ideology.

2.1.2.2. Disaster beliefs. We designed a set of 17 items related to beliefs about disasters (see Appendix); agreement with all items was assessed using a scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Two groupings of items are of central importance to the current work. Specifically, the following three items assessed a lack of blame in a disaster ($\alpha = 0.62$): "Too many people politicize disasters, when really it is nobody's fault.", "A large storm devastates an island and kills dozens of people. This kind of disaster is random – it affects everyone on the island equally." and "A major flood occurs in a non-tidal stretch of a river and inundates people's homes and businesses. It is unfortunate, but ultimately nobody is to blame for the damage and loss people experience." Another five items related to risk reduction ($\alpha = 0.78$):

"Political decisions can increase the impact of a disaster.", "Natural resources depletion and resource degradation heighten the risk of disaster occurring.", "Services to assist homeless people can reduce disaster risk.", "Social spending is a good way to reduce disaster impacts.", and "We need to reduce inequality in order to reduce disaster risk." The remaining nine items related to the extent to which age, gender, and a place's history contributed to disaster risk as well as the extent to which disasters are best handled via technocratic solutions (i.e., through built structures such as flood barriers or dams).

2.1.2.3. Fair market ideology (procedural fairness). Participants rated their agreement (*1 = strongly disagree* to *9 = strongly agree*) with 15 statements assessing perceptions of fairness of the procedures of the free market (e.g., "The free market system is a fair system"; [67]. A participant's ratings of the 15 statements were averaged to create a single score for fair market ideology ($\alpha = 0.78$).

2.1.2.4. Belief in a just world. Participants reported their agreement (*1 = strongly disagree* to 7 = *strongly agree*) with eight statements assessing belief in a just world (e.g., "People usually receive the outcomes that they deserve."; [68]. Ratings were highly-related ($\alpha = 0.90$) and were averaged to create a single score.

2.1.2.5. System justification. Participants indicated their agreement (*1 = strongly disagree to 9 = strongly agree*) with 17 statements assessing people's justifications of the current socio-economic system (e.g., "If people work hard, they almost always get what they want"; [69]. Ratings were highly related (α = 0.87) and were averaged create a single score.
2.1.2.6. Social dominance orientation. Participants reported their support for (*1 = strongly oppose* to *7 = strongly favor*) social dominance with 16 items (e.g., "Some groups of people must be kept in their place"; [70]. Ratings were highly related (α = 0.89) and were averaged to create a single score.
2.1.2.7. Need for cognitive closure. Participants rated their agreement (*1 = completely disagree* to *6 = completely agree*), with 15 statements (e.g., "I find that a well-ordered life with regular hours suits my temperament"; [71]. Ratings were highly related (α = 0.84) and were averaged to create a single score.
2.1.2.8. Intolerance for ambiguity. Participants reported their agreement *(1 = strongly disagree* to *5 = strongly agree)*, with 16 statements assessing tolerance for ambiguity (e.g., "I avoid settings where people don't share my values"; [72]. Ratings were averaged together to create a single score although, of note, reliability was not particularly high (α = 0.55).
2.1.2.9. Right-wing authoritarianism. Participants indicated their agreement *(1 = very strongly disagree to 9 = very strongly agree)* with 15 statements assessing right-wing authoritarianism (e.g., "The 'old-fashioned ways' and 'old-fashioned values' still show the best way to live"; [73]. Ratings were highly related (α = 0.83) and were averaged to create a single score.
2.1.2.10. Implicit measure of disaster causes. All participants completed a Single-Target Implicit Association Test (ST-IAT [74]; indexing the strength of mental relationships between disasters and the underlying cause of disasters (i.e., "human" versus "non-human"). This measure was included because participants at Project Implicit have an expectation that they will experience an implicit measure; we include the measure in the available data set, but do not include it in results reporting.

2.1.3. Procedure

Participants completed a set of demographic items at the time of registration. After being assigned to this study, they first read a consent form. All participants completed three blocks of measures in a random order; items were also randomized within each block: 1) political ideology, 2) items related to beliefs about disasters, and 3) three of the following seven measures: fair market ideology, belief in a just world, system justification, social dominance orientation, need for cognitive closure, tolerance for ambiguity, and right-wing authoritarianism. Finally, participants completed an implicit measure related to the underlying cause of disasters. Immediately thereafter, participants received feedback about their score on the implicit measure and were debriefed regarding the purpose of the study.

3. Results and discussion

3.1. Statistical analysis

Data for Study 1 and Study 2 were cleaned using SAS, the script for this is on the project page on the OSF. The regression analysis, correlations, descriptive statistics, exploratory and confirmatory factor analyses were conducted in SPSS.

Our approach in both studies was to first test the zero order correlations between our two concepts (i.e., perceptions of blamelessness and support for risk reduction) and each of the seven predictor variables; see Table 2. To assess whether observed relationships

Table 2
Correlation results for blamelessness, support for disaster risk reduction, political ideology, and individual difference measures Study 1.

Study 1 measure	Scale Alpha	1	2	3	4	5	6	7	8	9
1. Blamelessness	.62	–								
2. Support risk reduction	.78	−.53*** [-.60, −.46]	–							
3. Political ideology	.87	.43*** [.36, .51]	−.52*** [-.58, −.45]	–						
4. Fair Market ideology	.78	.45*** [.34, .56]	−.45*** [-.56, −.34]	.50*** [.39, .61]	–					
5. Belief in a just world	.90	.50*** [.39, .61]	−.38*** [-.49, −.24]	.38*** [.26, .49]	.60*** [.40, .76]	–				
6. Need for cognitive closure	.84	.17** [.04, .29]	−.30*** [-.42, −.19]	.113 [-.02, .24]	.27* [.05, .47]	.10 [-.12, .31]	–			
7. Intolerance for ambiguity	.55	.38*** [.28, .48]	−.38*** [-.48, −.27]	.26*** [.10, .39]	.29* [.06, .50]	.26* [.01, .48]	.58*** [.38, .71]	–		
8. SDO[a]	.89	.36*** [.23, .47]	−.48*** [-.59, −.35]	.52*** [.38, .64]	.30* [.03, .55]	.46*** [.26, .65]	.44*** [.26, .59]	.36** [.17, .57]	–	
9. System justification	.87	.53*** [.43, .62]	−.67*** [-.73, −.61]	.64*** [.55, .72]	.55*** [.34, .71]	.73*** [.62, .81]	.25* [.03, .46]	.40*** [.20, .59]	.65*** [.53, .76]	–
10. RWA[b]	.83	.34*** [.21, .46]	−.50*** [-.59, −.40]	.62*** [.51, .71]	.51*** [.28, .68]	.50*** [.27, .72]	.30** [.13, .47]	.56*** [.38, .75]	.53*** [.39, .68]	.73*** [.60, .83]

Note.
*$p < .05$, **$p < .01$, ***$p < .001$.
[a] Social dominance orientation.
[b] Right-wing authoritarianism.

explain variance above that potentially explained by political orientation, we then regressed any significant variables onto the predictor variable while controlling for ideology, in other words conducting a partial correlation analysis. Because we created both of our dependent measures for the purposes of this research and are using them for the first time, we additionally conducted an exploratory factors analysis to determine whether our two outcome measures (i.e., perceptions of blamelessness and support for risk reduction) were composed of items that loaded well with one another on two statistically different constructs.

Participants were randomly assigned to complete three of seven individual difference measures so the number of data points per measure varies (Study 1 range: 192 to 240; Study 2 range: 189 to 233). Analyses include data from all participants with a valid score on each measure in a specific analysis; participants could choose not to answer individual items and measures are considered "valid" when a participant had completed all items. The level of missing data was low, with the highest of the 19 scales used being 4.8% (System Justification in Study 2).

3.2. Perceptions of blamelessness for a disaster

Blamelessness was significantly related to each of the seven predictors; see Table 2. In support of H1a, assignations of blamelessness in a disaster were higher for people who were higher in support of existing systems as indicated by fair market ideology ($r = 0.45$, $p < .001$), belief in a just world ($r = 0.50$, $p < .001$), system justification ($r = 0.53$, $p < .001$), social dominance ($r = 0.36$, $p < .001$), and right-wing authoritarianism ($r = 0.34$, $p < .001$). In support of H1b, assignations of blamelessness in a disaster were higher among people higher in need for cognitive closure ($r = 0.17$, $p = .0084$) and intolerance for ambiguity ($r = 0.38$, $p < .001$).

3.3. Support for sociopolitical methods of disaster risk reduction

Support for disaster risk reduction was also significantly related to each of the seven predictors (see Table 2). In support of H2a, support for social methods of disaster risk reduction were lower for people higher in fair market ideology ($r = -0.45$, $p < .001$), belief in a just world ($r = -0.38$, $p < .001$), system justification ($r = -0.67$, $p < .001$), social dominance ($r = -0.48$, $p < .001$), and right-wing authoritarianism ($r = -0.50$, $p < .001$). In support of H2b, support for social methods of disaster risk reduction were lower for people higher in need for cognitive closure ($r = -0.30$, $p < .001$) and intolerance for ambiguity ($r = -0.38$, $p < .001$),

1.5. Current research

The goal of the current research is to investigate the extent to which measures of support for the current sociopolitical system and psychological rigidity will predict greater support for disaster risk accumulation, operationalized as being lower in support for disaster risk reduction interventions and viewing disasters as being devoid of blame. While there are extensive (and as noted, limited) studies of climate change beliefs and behaviors, disaster scholarship has often demonstrated the close and complex relationship between studies of climate change and disasters [59]. Further, we are particularly interested in measuring people's views at the intersection of hazards and disasters – of assessing who holds beliefs that are most (and least) likely to lead hazards to become disasters. Finally, given the potential explanatory power of political ideology in this work we statistically control for it in order to increase the likelihood that observed relationship are due to the construct of interest rather than variance shared with political ideology.

We conducted two studies to address these research questions; both studies were approved by the Department of Psychology ethics committees at the University of Florida. The first study was exploratory in that it was not pre-registered and relied on newly developed ad hoc measures of blamelessness and support for risk reductions intervention. Based on the results of the initial study, we conducted a replication study after preregistering hypotheses, methods, and analysis. All materials and data for both studies are available at the project page (https://osf.io/j8qy2/?view_only=10b323f9da5f46339ad5ad0a9e3e95f6). In Study 2, we made additional predictions for any individual differences scales that also included subscales. In both studies, we made the following set of predictions:

H1a. People who support the socio-economic status quo will avoid assigning blame for disasters.

H1b. People high in psychological rigidity will avoid assigning blame for disasters.

H2a. People who support the socio-economic status quo will oppose risk reduction interventions.

H2b. People high in psychological rigidity will oppose risk reduction interventions.

We expected above predictions to hold after statistically controlling for political ideology.

3.4. Statistically controlling for political ideology's relationship to observed variables

With the sole exception of need for cognitive closure ($r = .11$, $p = .083$), every observed variable was significantly related to political ideology; see Table 2. Specifically, more conservative people had greater belief in a just world ($r = 0.38$, $p < .001$), fair market ideology ($r = 0.49$, $p < .001$), system justification ($r = 0.62$, $p < .001$), social dominance ($r = 0.51$, $p < .001$), intolerance for ambiguity ($r = 0.23$, $p = .0009$), and right-wing authoritarianism ($r = 0.58$, $p < .001$). Additionally, the more that participants reported being politically conservative, the more likely they were to view disasters as being blameless ($r = 0.43$, $p < .001$). Finally, political conservatism was negatively related to support for sociopolitical methods of disaster risk reduction ($r = -0.52$, $p < .001$). Given the observation that ideology was related to nearly all measured variables, it is important to test whether the relationship between blamelessness for a disaster and disaster risk reduction and each of the seven predictor variables holds after controlling for political ideology. As such, we next conducted a series of simultaneous regressions after including political ideology in the model. In

every case, controlling for political ideology did not change the pattern of significance. Again, assignations of blamelessness as well as lack of support for fixes were lower for people higher in fair market ideology, belief in a just world, system justification, social dominance, right-wing authoritarianism, need for cognitive closure, and intolerance for ambiguity; see Table 3. Additionally, multicollinearity tests between political ideology and each of the individual difference variables fell within an acceptable range (VIF: 1.01–1.69), thus regression coefficients in our models operate as independent predictors of our outcome variables. Notably, the R^2 coefficient for each of the fourteen multiple regressions range from moderate to large in size (i.e., 0.17 to 0.45; [75], as such our predictors explain a good amount of variance in our outcome variables. Finally, the effect sizes for each of the fourteen multiple regressions range from moderate to large $f^2 = 0.20$ to 0.82 [75], thus effects are sizeable not just significant; see Table 3.

In this first study, both perceptions of blamelessness in a disaster as well as perceptions related to the (dis)utility of socioeconomic solutions were related to higher scores on measures of fair market ideology, belief in a just world, social dominance orientation, system justification, right-wing authoritarianism, need for cognitive closure, and intolerance for ambiguity. Further, the size of these relationships was non-trivial. The smallest was that between need for cognitive closure and blamelessness ($r = 0.17$), but the other six relationships are moderate to large with *r*s ranging between 0.34 and 0.53. Critically, although political ideology was related to each of the individual difference measures (except for need for cognitive closure) as well as perceptions of blamelessness and utility of sociopolitical solutions, when statistically controlling for variance shared by political ideology, each of the individual difference variables remained a significant predictor of both blamelessness and risk reduction perceptions. The observation that results hold over and above contributions of political ideology is important because results indicate, for example, that belief in fair market ideology relates to less support for risk reduction strategies holding constant shared variance of political ideology. Thus, liberals high in fair market ideology will be less likely to support risk reduction strategies, and in turn, conservatives low in fair market ideology will be more likely to support risk reduction strategies. This suggests that interventions can be tailored to individual differences that are relatively apolitical in nature, which is likely useful in avoiding "culture war" narratives and, thereby, bringing a larger segment of the population on board. In sum, Study 1 provides strong initial evidence (i.e., effect sizes range from moderate to large) that people's attitudes about both risk reduction perceptions and blamelessness following a disaster are not simply the product of political ideology but are also based on people's beliefs about the fitness of current sociopolitical systems and psychological rigidity.

That is, people who justify the status quo and dislike uncertainty may not place blame on people for the destructive consequences of a disaster because blaming people acknowledges that the system may require significant changes, and that socio-political decisions can have an impact on the outcome of disaster events.

Given that these findings were largely exploratory in nature, we ran a second confirmatory study for which we pre-registered our design including sample size and hypotheses. Further, the 17-item battery used in Study 1 was constructed in an ad-hoc manner. Therefore, before presenting Study 2, we first describe an exploratory factor analysis conducted on the eight items that composed the two constructs retained from the original 17-item battery.

3.5. Exploratory factor analysis

To determine whether shared variance in the eight individual items could be used to create higher level factors, we conducted an Exploratory Factor Analysis (EFA) using promax oblique rotation. We tested both a two-factor and three-factor model and chose the two-factor solution because only one item loaded strongly onto the third factor. Additionally, the standardized root mean square residual (SRMR) of the two-factor model ($SRMR = 0.03$), was below the critical value (0.08) and is therefore acceptable [76]. Of note, loadings of $|0.3|$ and higher in a sample $n = 175$ are considered salient [77,78]. In our sample, the three items assessing blame-

Table 3
Simultaneous regression results predicting blamelessness and support for disaster risk reduction from individual differences and political ideology Study 1.

Predictor	Blamelessness							Support for disaster risk reduction					
	Scale Alpha	β	*b*	*p*	*95% CI*$_B$	*VIF*	f^2	β	*b*	*p*	*95% CI*$_B$	*VIF*	f^2
Fair market ideology	.78	.33	.47	<.001	.26, .67	1.34	.33	−.26	−.31	<.001	−.45, −.15	1.34	.47
Political Ideology	.87	.25	.25	.001	.12, .40	1.34		−.39	−.34	<.001	−.46, −.23	1.34	
Belief in a just world	.90	.40	.52	<.001	.36, .68	1.16	.45	−.21	−.23	.001	−.38, −.08	1.16	.47
Political Ideology		.26	.25	<.001	.13, .38	1.16		−.46	−.37	<.001	−.48, −.28	1.16	
Need for cognitive closure	.84	.12	.25	.037	.01, .51	1.01	.28	−.25	−.45	<.001	−.63, −.24	1.01	.59
Political Ideology		.44	.44	<.001	.32, .55	1.01		−.53	−.46	<.001	−.55, −.38	1.01	
Intolerance for ambiguity	.55	.31	.78	<.001	.48, 1.08	1.06	.32	−.27	−.63	<.001	−.90, −.37	1.06	.49
Political Ideology		.32	.31	<.001	.19, .42	1.06		−.44	−.38	<.001	−.48, −.27	1.06	
SDO[a]	.89	.16	.27	.037	.04, .51	1.36	.30	−.25	−.37	<.001	−.58, −.15	1.38	.59
Political Ideology		.38	.39	<.001	.24, .54	1.36		−.45	−.39	<.001	−.52, −.25	1.38	
System justification	.87	.38	.45	<.001	.26, .64	1.69	.47	−.61	−.63	<.001	−.76, −.51	1.69	.82
Political Ideology		.24	.25	.001	.09, .43	1.69		−.06	−.09	.137	−.22, .03	1.69	
RWA[b]	.83	.33	.47	<.001	.26, .67	1.61	.20	−.37	−.39	<.001	−.57, −.21	1.60	.39
Political Ideology		.25	.25	.001	.12, .40	1.61		−.22	−.19	.005	−.33, −.04	1.60	

Note. Fourteen regressions were conducted. Specifically, one individual difference measure and the political ideology measure were regressed on to blamelessness. This same analysis strategy was used to predict support for disaster risk reduction.

[a] Social dominance orientation.

[b] Right-wing authoritarianism.

lessness had loadings >0.60 on a first factor and the five items assessing risk reduction had loadings >0.49 on a second factor; see Table 4. The two factors were related to one another at $r = -0.51$.

4. Study 2

In Study 1, we provided initial evidence that justifying current sociopolitical and social hierarchal systems relates to both blamelessness following a disaster and lower support for social methods of disaster risk reduction. To increase our confidence in the observed pattern of effects, we ran a second study after pre-registering the design, hypotheses, planned analyses, and sample size (https://aspredicted.org/blind.php?x=PYR_GPJ). Specifically, the sample size was determined by conducting a power analysis using a small effect size (i.e., $r = 0.10$) and an alpha of .05; the estimated sample size was 369. We additionally examined whether subscales from belief in a just world, need for cognitive closure, intolerance for ambiguity, and social dominance orientation related to support for blamelessness and risk reduction strategies.

4.1. Method

4.1.1. Participants

Participants were again recruited through the Project Implicit website. The obtained sample was collected in April of 2021 and consisted of 415 participants from 28 countries (United States 83.4%, Canada 4.1%, United Kingdom 1.7%, Mexico 1.2%, India 1.0%, Italy 1.0%, all others <1%). A majority of the sample reported their sex as female (65.5%), and the mean age was 32.87 years ($SD = 13.77$). Self-reported racial identity was as follows: 64.8% White, 12.3% Hispanic, 7.5% Black, 7.2% more than one race, 7.0% Asian, 1.0% American Indian or Alaskan Native, 0.2% Middle eastern.

4.1.2. Measures

4.1.2.1. Political ideology. Participants reported ideology in general and on social issues using the same items as Study 1. In Study 2, participants also indicated their political ideology related to economic issues with the following item: "Overall, how liberal (left-wing) or conservative (right-wing) are you on fiscal/financial issues?" using the identical reporting scale in which *1 = very liberal* and *7 = very conservative*. We averaged the three items together to create a single indicator of political ideology ($\alpha = 0.92$). The inclusion of this third item constitutes a more conservative test of our hypotheses given that a measure of ideology that also includes fiscal elements ideology is more likely to explain additional variance that would then not be available to our theoretical variables of interest.

4.1.2.2. Fair market ideology. Participants used the short version of the FMI scale (see Ref. [23] used in Study 1 to rate their agreement with statements assessing fair market ideology. Ratings on the six items were averaged to create a single score for fair market ideology ($\alpha = 0.79$).

4.1.2.3. Belief in a just world. Belief in a just world was measured exactly as in Study 1. Again, the eight responses were averaged to create a single score ($\alpha = 0.90$) with higher scores indicating a greater belief in a just world. The belief in a just world scale is argued to be composed of two factors, a distributive justice factor and a procedural justice factor [68] both of which are composed of four items. The distributive justice factor (e.g., "People generally deserve the things that they are accorded") displayed acceptable internal reliability ($\alpha = 0.88$) as did the procedural justice factor (e.g., "People usually use fair procedures in dealing with others"; $\alpha = 0.84$).

4.1.2.4. Need for cognitive closure. Participants' need for cognitive closure was measured exactly as in Study 1. Again, ratings of the 15 statements were averaged to create a single score ($\alpha = 0.84$). The need for cognitive closure scale is argued to be composed of the following five factors [71] each of which includes three items: preference for order (e.g., "I enjoy having a clear and structured mode of life"; $\alpha = 0.81$); preference for predictability (e.g., I dislike unpredictable situations; $\alpha = 0.72$); decisiveness (e.g., "When I have made a decision, I feel relieved"; $\alpha = 0.55$); discomfort with ambiguity (e.g., "I dislike it when a person's statement could mean many

Table 4
Exploratory Factor Analysis and Confirmatory Factor analysis results for blamelessness and risk reduction.

		EFA Results		CFA Results	
		Blamelessness	Risk Reduction	Blamelessness	Risk Reduction
1	A major flood occurs in a non-tidal stretch of a River and inundates people's homes and businesses. It is unfortunate, but ultimately nobody is to blame for the damage and loss people experience due to this disaster	.606	−.010	.678	
2	A large storm devastates an island and kills dozens of people. This kind of disaster is random – it affects everyone on the island equally	.695	.096	.399	
3	Too many people politicize disasters, when really it is nobody's fault	.616	−.138	.693	
4	Political decisions can increase the impact of a disaster	−.012	.549		.502
5	Natural resource depletion and resource degradation heighten the risk of disaster occurring	−.040	.496		.576
6	Services to assist homeless people can reduce disaster risk	.057	.700		.703
7	Social spending is a good way to reduce disaster impacts	−.037	.587		.586
8	We need to reduce inequality in order to reduce disaster risk	.019	.675		.697

Note. The EFA was run on Study 1 data. CFA results come from a data collection in which we manipulated whether the term "disasters" or "natural disasters" was used in the item. Specifically, the CFA was run on the control condition (i.e., disaster condition). The impact of that manipulation was not conclusive enough to build on; we use these data in the interests of resource management. CFA loadings are significant at $p < .001$.

different things"; α = 0.61); and closed-mindedness (e.g., "I dislike questions which could be answered in many different ways"; α = 0.43).

4.1.2.5. Intolerance for ambiguity. Participants' intolerance for ambiguity was measured exactly as in Study 1. Again, ratings of the 16 statements were averaged to create a single score for ambiguity intolerance (α = 0.56). The tolerance of ambiguity scale is argued to be composed of the following four factors [79]: predictability (five items including "What we are used to is always preferable to what is unfamiliar"; α = 0.47; originality (five items including "Many of our most important decisions are based upon insufficient information"; α = 0.49; clarity (three items including "A good job is one where what is to be done and how it is to be done are always clear"; α = 0.37); and a regularity factor (three items including "There is really no such thing as a problem that can't be solved"; α = −0.18).

4.1.2.6. Social dominance orientation. Participants' social dominance orientation was measured exactly as in Study 1. Ratings of the 16 items were averaged to create a single score for social dominance orientation (α = 0.87) with higher scores indicating a stronger acceptance of inequality among social groups [80]. The social dominance orientation scale is argued to be composed of two factors, a dominance factor, and an egalitarian factor [69,70]. Both the dominance factor (e.g., "Some groups of people are simply inferior to other groups"; α = 0.83) and the egalitarian factor (e.g., "Group equality should be our ideal"; α = 0.82) are composed of eight items.

4.1.2.7. System justification. Participants' justification of the current socioeconomic systems was measured exactly as in Study 1. Ratings of the 17 statements were averaged to create a single score for system justification (α = 0.87).

4.1.2.8. Implicit measure of disaster causes. All participants completed an ST-IAT as in Study 1 to assess the strength of associations between the category "Disasters" and "Human causes" versus "Non-human causes". The ST-IAT split-half reliability was $r = 0.35$, $p < .001$; we did not examine data from 13 participants (3.1%) because of too-high error rates (greater than 40% in a single block or greater than 30% overall). As with Study 1, data from this measure are available for interested researchers, but we do not include any analyses herein.

4.1.2.9. Perceptions of blamelessness for a disaster. The three items used in Study 1 and included in the exploratory factor analysis assessed beliefs related to lack of blame in disasters. Ratings on the three items were averaged to create a single score of blamelessness (α = 0.60).

4.1.2.10. Support for sociopolitical methods of disaster risk reduction. Participants rated their agreement with the same five statements related to assessing to what degree politics, natural resources, social spending, and inequality impact disaster risk. A participant's ratings on the 5 items were averaged to create a single score for risk accumulation (α = 0.74).

4.1.3. Procedure

After completing informed consent procedures, participants responded to eight items measuring beliefs about disasters; three items measured blamelessness after a disaster and five items assessed risk accumulation following a disaster. The eight items were presented in a random order. Participants then completed the six individual difference measures: fair market ideology, belief in a just world, system justification, social dominance orientation, need for cognitive closure, and tolerance for ambiguity with the order of measures randomized across participants and order of items randomized within each measure. Next, participants completed the disasters ST-IAT followed by the three-item measure of political ideology. Finally, participants received feedback on their ST-IAT as well as information about the study.

5. Results

5.1. Confirmatory factor analysis

A confirmatory factor analysis (CFA) was conducted on the eight items measuring blamelessness and risk reduction to test our proposed two factor solution; see Table 4. The model estimated 25 unique parameters using an oblique solution and maximum likelihood. The three items assessing blamelessness had significant loadings $0.399 \leq 0.693$ on the first factor and the five items assessing risk reduction had loadings $0.502 \leq 0.703$ on the second factor; loadings of $< |0.4|$ are considered weak and loadings $\geq |0.6|$ are strong [81]. Additionally, the fit of the model was acceptable $\chi^2(19) = 25.63$, $p = .141$, *CFI* = 0.99, *TLI* = *0.98*, *NFI* = 0.96, *RFI* = 0.93, *IFI* = 0.99, *RMSEA* = 0.029 [76,82]. The correlation between factors was $r = -0.52$ with critical ratio of −5.42 and is therefore significant [83].

5.2. Perceptions of blamelessness for a disaster

As predicted, blamelessness was significantly related to each of the six predictors; see Table 5. In support of H1a, assignations of blame in a disaster were lower for people higher in fair market ideology ($r = 0.50$, $p < .001$), belief in a just world ($r = 0.45$, $p < .001$), social dominance ($r = 0.39$, $p < .001$), and system justification ($r = 0.48$, $p < .001$). In support of H1b, assignations of blamelessness in a disaster were higher among people higher in need for cognitive closure ($r = 0.16$, $p = .002$) and intolerance for ambiguity ($r = 0.32$, $p < .001$). We also examined correlations between blamelessness and the thirteen subscales discussed in the methods section above .[2]

[2] Critically, several of the subscales had relatively low reliability estimates. Thus, we present all regression results with scale alphas; all correlational relations are in the Supplement Table S9.

Table 5
Correlation results for blamelessness, support for disaster risk reduction, political ideology, and individual difference measures Study 2.

Study 2 measure	Scale Alpha	1	2	3	4	5	6	7	8
1. Blamelessness	.60	–							
2. Support risk reduction	.74	−.41*** [-.50, −.30]	–						
3. Political ideology	.92	.44*** [.34, .53]	−.47*** [-.57, −.37]	–					
4. Fair market ideology	.79	.50*** [.43, .58]	−.43*** [-.52, −.33]	.53*** [.44, .60]	–				
5. Belief in a just world	.90	.45*** [.36, .53]	−.38*** [-.48, −.26]	.38*** [.29, .47]	.61*** [.53, .68]	–			
6. Need for cognitive closure	.84	.16** [.04, .27]	−.041 [-.14, .06]	.08 [-.02, .19]	.24*** [.14, .34]	.18*** [.08, .29]	–		
7. Intolerance for ambiguity	.56	.32*** [.23, .42]	−.27*** [-.37, −.17]	.27*** [.18, .36]	.45*** [.36, .54]	.32*** [.23, .42]	.49*** [.41, .57]	–	
8. SDO[a]	.87	.39*** [.30, .48]	−.44*** [-.51, −.34]	.49*** [.39, .57]	.51*** [.44, .59]	.43*** [.33, .51]	.10 [.01, .21]	.28*** [.19, .37]	–
9. System justification	.87	.48*** [.39, .56]	−.54*** [-.62, −.45]	.66*** [.59, .72]	.69*** [.64, .74]	.56*** [.49, .63]	.15** [.04, .26]	.39*** [.30, .48]	.65*** [.58, .70]

Note.
*$p < .05$, **$p < .01$, ***$p < .001$.
[a] Social dominance orientation.

5.3. Support for sociopolitical methods of disaster risk reduction

Support for disaster risk reduction was significantly related to five predictors see Table 5. In support of H2a, support for social methods of disaster risk reduction were lower for people higher in fair market ideology ($r = -0.43$, $p < .001$), belief in a just world ($r = -0.38$, $p < .001$), system justification ($r = -0.54$, $p < .001$), and social dominance ($r = -0.44$, $p < .001$). In support of H2b, support for social methods of disaster risk reduction were lower for people higher in intolerance for ambiguity ($r = -0.27$, $p < .001$). In contrast, risk reduction was not significantly related to need for cognitive closure ($r = -0.04$, $p = .69$). We also examined the relationship between the thirteen subscales and risk reduction; see Supplement Table S9.

5.4. Political ideology's relationship to observed variables

With the sole exception of need for cognitive closure ($r = .11$, $p = .083$), every observed variable was significantly related to political ideology; see Table 5. As in Study 1, conservative people were higher in fair market ideology ($r = 0.53$, $p < .001$), belief in a just world ($r = 0.38$, $p < .001$), system justification ($r = 0.66$, $p < .001$), social dominance ($r = 0.49$, $p < .001$), and intolerance for ambiguity ($r = 0.27$, $p < .001$). Additionally, as people leaned more politically conservative, they were more likely to view disasters as being blameless ($r = 0.44$, $p < .001$). Additionally, political conservatism was negatively related to support for sociopolitical methods of disaster risk reduction ($r = -0.47$, $p < .001$). The correlational relationships between political ideology and each of the 13 subscales appear in the Supplement Table S9.

5.5. Perceptions of blamelessness for a disaster and controlling for political ideology

We used the same analysis strategy employed in Study 1 to test whether relationships observed between our predictor variables and blamelessness after a disaster and support for risk reduction strategies held when statistically controlling for political ideology. In this case, each of the six predictor variables explained significant unique variance in blamelessness over and above that explained by political ideology; effect sizes range from moderate to large (i.e., $f^2 = 0.23$–0.41). Specifically, assignations of blame in a disaster were lower for people higher in fair market ideology, belief in a just world, system justification, social dominance, need for cognitive closure, intolerance for ambiguity, and conservatives. In addition, several subscales were also significant predictors of blamelessness after controlling for political ideology. For instance, distributive justice, procedural justice, need for order, need for decisiveness, predictability as measured by the intolerance for ambiguity scale, clarity, dominance, and egalitarianism were all significant predictors of blamelessness; effect sizes range from moderate to large (i.e., $f^2 = 0.22$–0.37). Of note, need for ambiguity, need for predictability as measured by the need for cognitive closure scale, need for closemindedness, need for originality, and intolerance for regularity were not significant predictors; see Table 6.

5.6. Support for sociopolitical methods of disaster risk reduction controlling for political ideology

After controlling for political ideology, five predictor variables explained significant variance in support for disaster risk reduction strategies. Of note, these relationships are negative such that liberals and those who are less likely to endorse fair market ideology, beliefs in a just world, intolerance for ambiguity, social dominance, and system justification were more likely to support disaster risk reduction efforts; effect sizes are large (i.e., $f^2 = 0.32$–0.47). Contrary to prediction, need for cognitive closure was not a significant predictor of risk reduction. Additionally, six subscales significantly predicted risk reduction after controlling for political ideology. Specifically, distributive justice, procedural justice, need for originality, predictability as measured by the intolerance for ambiguity scale, dominance, and egalitarianism were all significant predictors of risk reduction; effect sizes are large (i.e., $f^2 = 0.32$–0.39). Of

Table 6
Simultaneous regression results predicting blamelessness and support for disaster risk reduction from individual differences and political ideology Study 2.

Predictor	Blamelessness							Support for disaster risk reduction					
	Scale Alpha	β	*b*	*p*	*95% CI$_B$*	*VIF*	f^2	β	*b*	*p*	*95% CI$_B$*	*VIF*	f^2
Fair market ideology	.79	.23	.37	<.001	.28, .47	1.40	.41	−.26	−.21	<.001	−.28, −.13	1.41	.37
Political Ideology	.92	.23	.23	.001	.13, .33	1.40		−.33	−.25	<.001	−.33, −.18	1.41	
Belief in a just world	.90	.31	.38	<.001	.26, .50	1.17	.37	−.24	−.23	<.001	−.33, −.14	1.18	.37
Political Ideology		.31	.30	<.001	.22, .39	1.17		−.38	−.29	<.001	−.37, −.21	1.18	
Distributive justice	.88	.31	.34	<.001	.24, .44	1.18	.37	−.20	−.18	<.001	−.26, −.08	1.18	.35
Political Ideology		.31	.30	<.001	.21, .39	1.18		−.39	−.30	<.001	−.38, −.22	1.18	
Procedural justice	.84	.24	.28	<.001	.17, .39	1.11	.30	−.22	−.21	<.001	−.30, −.12	1.11	.37
Political Ideology		.35	.33	<.001	.24, .42	1.11		−.41	−.31	<.001	−.38, −.24	1.11	
Need for cognitive closure	.84	.12	.24	.008	.05, .44	1.01	.23	.01	.01	.912	−.14, .16	1.01	.30
Political Ideology		.41	.40	<.001	.31, .48	1.01		−.48	−.37	<.001	−.44, −.30	1.01	
Need for order	.81	.15	.21	.001	.08, .32	1.02	.25	.08	.08	.088	−.01, .19	1.03	.30
Political Ideology		.39	.38	<.001	.29, .47	1.02		−.49	−.37	<.001	−.44, −.30	1.03	
Need for decisiveness	.55	.12	.18	.010	.03, .33	1.00	.23	−.02	−.03	.648	−.13, .09	1.00	.30
Political Ideology		.42	.40	<.001	.32, .49	1.00		−.48	−.36	<.001	−.44, −.29	1.00	
Discomfort with ambiguity	.61	.09	.13	.050	−.04, .27	1.00	.22	.03	.03	.525	−.08, .14	1.00	.30
Political Ideology		.42	.40	<.001	.32, .48	1.00		−.47	−.37	<.001	−.43, −.29	1.00	
Predictability	.72	.03	.04	.497	−.09, .19	1.01	.22	.017	.02	.702	−.08, .12	1.01	.30
Political Ideology		.42	.40	<.001	.32, .48	1.01		−.48	−.37	<.001	−.44, −.30	1.01	
Close-mindedness	.43	.06	.09	.214	−.06, .23	1.01	.22	−.08	−.10	.089	−.21, .03	1.01	.30
Political Ideology		.41	.40	<.001	.31, .48	1.01		−.47	−.36	<.001	−.45, −.29	1.01	
Intolerance for ambiguity	.56	.24	.60	<.001	.37, .82	1.08	.30	−.15	−.33	<.001	−.40, −.26	1.09	.32
Political Ideology		.36	.35	<.001	.27, .44	1.08		−0.43	−.37	<.001	−.48, −.8	1.09	
Need for predictability	.47	.28	.44	<.001	.31, .58	1.05	.34	−0.15	−.20	.001	−.31, −.07	1.06	.34
Political Ideology		.35	.34	<.001	.25, .42	1.05		−0.44	−.32	<.001	−.41, −.26	1.06	
Need for originality	.49	.04	.07	.405	−.13, .27	1.04	.22	−0.13	−.18	.005	−.31, −.04	1.04	.32
Political Ideology		.42	.40	<.001	.32, .49	1.04		−0.45	−.34	<.001	−.42, −.28	1.04	
Need for clarity	.37	.15	.21	.001	.08, .33	1.03	.23	−0.01	−.01	.885	−.12, .11	1.03	.28
Political Ideology		.39	.37	<.001	.28, .46	1.03		−0.47	−.36	<.001	−.43, −.29	1.03	
Intolerance for regularity	−.18	.04	.06	.444	−.10, .21	1.00	.20	−0.02	−.03	.634	−.15, .11	1.00	.28
Political Ideology		.41	.40	<.001	.32, .48	1.00		−0.02	−.03	<.001	−.43, −.29	1.00	
SDO[a]	.87	.21	.38	<.001	.20, .55	1.31	.27	−0.30	−.43	<.001	−.56, −.29	1.32	.41
Political Ideology		.31	.30	<.001	.21, .40	1.31		−0.32	−.25	<.001	−.34, −.17	1.32	
Dominance	.83	.20	.31	<.001	.15, .46	1.16	.27	−0.22	−.28	<.001	−.39, −.17	1.13	.37
Political Ideology		.35	.34	<.001	.24, .43	1.16		−0.40	−.31	<.001	−.38, −.23	1.13	
Egalitarianism	.82	.13	.20	.017	.04, .36	1.36	.22	−0.27	−.34	<.001	−.46, −.22	1.36	.39
Political Ideology		.35	.34	<.001	.23, .43	1.36		−0.33	−.25	<.001	−.34, −.17	1.36	
System justification	.87	.31	.36	<.001	.22, .50	1.81	.30	−0.41	−.38	<.001	−.48, −.28	1.81	.47
Political Ideology		.22	.22	<.001	.10, .33	1.81		−0.20	−.16	<.001	−.24, −.06	1.81	

Note.
Nineteen regressions were conducted. Specifically, one individual difference measure and the political ideology measure were regressed on to blamelessness. This same analysis strategy was used to predict support for risk reduction.
[a] Social dominance orientation.

note, need for clarity, intolerance for regularity, and all the need for cognitive closure subscales were not significant predictors; see Table 6.

6. Discussion

In Study 2, we closely replicated the pattern of relationships observed in Study 1. Specifically, we again found that fair market ideology, belief in a just world, intolerance for ambiguity, social dominance orientation, and system justification, each related to higher perceptions that solutions related to the social system are not useful in minimizing disaster impacts and that no one is to blame when a disaster strikes; all these relationships are $r > |0.25|$. Additionally, need for cognitive closure was significantly related to blamelessness although the relationship was small ($r = 0.16$). Contrary to Study 1 results, need for cognitive closure did not significantly relate to support for risk reduction strategies. Again, replicating results of Study 1, political ideology was related to each of the individual difference variables, such that as people leaned more conservative, they were also higher in all individual difference measures, each of which related in some way to support for the existing system or psychological rigidity; this relationship was not found for need for cognitive closure. Similarly, political ideology was also a significant predictor of both outcome variables such that as people leaned more conservative, they were more likely to believe that no one is to blame following a disaster, and less likely to support strategies for disaster risk reduction. As in Study 1, after controlling for political ideology, each of the individual difference variables remained a significant predictor of blamelessness. Similarly, all individual difference variables except need for cognitive closure remained significant predictors of disaster risk reduction after controlling for political ideology.

In Study 2, we also explored the relationships between blamelessness, risk reduction and 13 subscales that underly four of the tested individual difference measures. Specifically, the subscales from belief in a just world, three of the subscales from intolerance for ambiguity, and social dominance orientation all significantly correlated with blamelessness such that each related to higher perceptions that no one is to blame when a disaster strikes; these relationships are small to moderate $r > 0.10$. It should be noted that scale reliabilities of the intolerance for ambiguity subscales are lower and therefore those results should be treated with lower confidence. Additionally, the subscales from belief in a just world and social dominance orientation significantly correlated with support for risk reduction, such that, each related to higher perceptions that solutions related to the social system are not useful in minimizing disaster impacts; these relationships are moderate $r > 0.30$.

The 13 subscales were also used to predict blamelessness and risk reduction after controlling for political ideology. Specifically, both subscales from belief in a just world, and social dominance orientation were significant predictors of blamelessness and support for risk reduction. Need for order and need for decisiveness from the need for cognitive closure scale were significant predictors of blamelessness. Finally, from the intolerance for ambiguity scale, predictability and originality were significant predictors of blamelessness and risk reduction. It should be noted that the reliabilities of the decisiveness, predictability, and originality subscales are lower and therefore results may be less trustworthy.

In sum, Study 2 replicates the overall pattern of findings in Study 1, and further extends these findings by exploring the relationship between blamelessness, risk reduction, and 13 subscales that underly the previously explored individual difference measures. Of note, the R^2 coefficient for each of the nineteen multiple regressions range from moderate to large in size (i.e., 0.17 to 0.32; [75], as such our predictors explain a large amount of variance in our outcome variables. Additionally, the effect sizes for each of the nineteen multiple regressions range from moderate to large $f^2 = 0.20$ to 0.47 [75], thus effects are notable not just significant; see Table 6. Finally, in Study 2 we also investigated the factor structure of blamelessness and risk reduction and found support for our proposed two factor solution with good fit.

7. General discussion

In our two studies, higher perceived blamelessness for disasters and lower support for disaster risk reduction via socio-political means were reliably related to belief in the fitness of current systems of politics and finance as well as measures of psychological rigidity. Specifically, higher levels of system justification, belief in a just world, fair market ideology, need for cognitive closure, intolerance of ambiguity, social dominance orientation, and right-wing authoritarianism were consistently related to lower likelihood of assigning human blame for disaster damages as well as lower endorsement of socio-political interventions to mitigate disaster risks. This is some of the first work to show that views related to disasters covary with these constructs.

Before discussing the results in detail, we want to underscore three observations. The first is that almost all of the research upon which we relied to form our hypotheses was conducted with regard to views of climate change rather than disasters. Although these phenomena are likely to be related in the minds of our participants, they are not the same thing. As such, further research needs to accumulate around disaster attitudes and beliefs – this will enable disaster scholars to better preempt criticism from those that appear to believe that the "absence of evidence is evidence of absence." Claims that the use of "natural disaster" have social, political and psychological impacts have sometimes been previously brushed off by the "fathers" of disaster studies [84]. Second, although the direction of observed effects was, perhaps, not highly surprising, the magnitude of most of the observed relationships was somewhat larger than we expected. Finally, it is important to reiterate that these relationships predicted unique variance above and beyond concurrent relationships with political ideology. As such, it is important to understand individual differences in, for example, intolerance of ambiguity when considering whether people are likely to view a disaster as occurring at random.

7.1. Applied value of these findings

In addition to being of theoretical value, these observations have critical applications, particularly for messaging around disaster prevention. For example, our evidence suggests that those who seek to maintain psychological and societal stability may be less prone to investing in disaster mitigation via social interventions. Further work could investigate whether this reluctance extends to more technocratic disaster mitigation interventions (e.g., building flooding barriers and dams) or remains specific to mitigation that could exert social change. This is particularly important as the actual practical efforts supported by governments and international non-governmental organizations towards disaster risk reduction (DRR) largely treat disasters as a one-off 'event' [85]. That is, governments and international non-governmental organizations use hazard-centric approaches (e.g., building flooding barriers and dams) to address disasters, however these approaches only temporarily address disasters but leave the underlying factors that created the risk and precipitated the disaster unaddressed [84]. Interestingly, it may be that those who are high in psychological and societal stability are more likely to support hazard-centric approaches specifically because they do not threaten the social system. In addition, hazard-centric solutions may reaffirm the belief that nature is to blame as the cause of a disaster rather than recognizing that socio-political decisions impact the outcomes of disaster events.

Additionally, the current work lays foundations for potential intervention studies – highlighting that messaging that appeals to the ways in which social disaster mitigation policies might aid facets of stability could be employed to appeal to those higher in psychological rigidity. For instance, past work on climate change has shown that persuasive texts about the anthropogenic causes of climate change can increase people's willingness to reduce their carbon footprint; results hold among those who are higher in need for cognitive closure and closemindedness [47]. As such, disaster response organizations may benefit from using arguments that counter current beliefs by using a person's existing knowledge, as well as using language that is not ambiguous [47]. For example, by making statements about how scientists agree that there is no argument about the anthropogenic causes of disasters. Additionally, making ar-

guments that address the uncertainty people might feel about changing the system would be highly beneficial. Slogans like "Build Back Better" (BBB) are pervasively used after disasters occur,[3] showing that messaging that highlights stability may already exist, however BBB language in practice is so varied in defining risk, who is at risk, and in providing solutions that BBB does not result in changes to the social and political system (i.e., the cause of disasters; [5]. Crucially, using language and interventions that highlight stability may increase people's support of social disaster mitigation policies, however it is important that the policies themselves address the causes of disasters (i.e., structural inequalities and infrastructure issues).

Of note, the United Nations' Global Assessment Report on Disaster Risk Reduction from last year makes several recommendations for effectively framing the presentation of risk to the public such as extending the timelines when discussing the threat of disaster (e.g., "over the next 25 years, there is a greater than 1 in 5 chance of having one disaster") instead of describing the likelihood of a disaster in 1 year and using fear messaging (e.g., horrific descriptions) only when accompanied by messages that promote self and collective efficacy, hope, and motivation [86]. Finally, we note that the second of three points from the call to action in their report was to "Design systems to factor in how human minds make decisions about risk." Our data suggest that any systems we design around communicating risk should take into account variability in the extent to which people are psychologically rigid vs. open as well as understanding views of current systems as being fair and fit.

7.2. What implications does this have for our understanding of disasters?

Disasters are commonly spoken of as something that occur to unlucky people, disrupting their normal functioning. Arguably, however, disaster impact is a continuation of harm experienced disproportionately by people and groups for whom the traumas of violence, displacement and maldevelopment accumulate daily. Yet assigning blame onto 'nature' allows people – often those bearing significant responsibility for risk "creation" - to obscure human involvement in disasters and portray disasters as unexpected external shocks that are inevitable. Even for the most oppressed, seeing a lack of blame in disasters may be comforting. Of note, disaster scholarship and disaster risk reduction policy (see Ref. [84] remains largely hazard-centric and, consequently, postures as apolitical and 'objective'. In contrast, the current work suggests that the understanding of disasters is subjective and shaped by individual differences in system beliefs and psychological rigidity. Views of risk accumulation and blame related to disasters are not monoliths to be understood from the top down. In brief, different people conceptualize disasters differently thereby presenting both barriers and opportunities for anyone seeking to predict how real people will react in real situations.

Finally, although two of the three items in the Blamelessness scale refer to a storm or flooding, we mean the concept of "disaster" in a broad sense. In a recent example, the COVID-19 pandemic can also be considered as a disaster. As such, we would expect that people high in a belief that current systems are fair and fit and who are high in rigid thinking styles to would perceive a lack of blame around the pandemic as well as being resistant to sociopolitical interventions.

7.3. Limitations and future directions

This work is one of the first quantitative investigations into what thinking styles might be most related to perceptions that no one is to blame for a disaster and that socio-political solutions are not needed. The current studies expand the literature on determinants of disaster beliefs and relevant policy attitudes, but these data are preliminary and leave room for further expansion. As such, we point to several potential weaknesses in the current work and give recommendations for ways in which future work can improve on this foundation.

First, we used online surveys to assess people's beliefs about disasters, psychological rigidity, and system defense. Thus, people may have responded with low attention and/or in socially desirable ways which could reduce the reliability and validity of our measures and, thereby, our conclusions. Online surveys do often provide generalizable and reliable samples (see Ref. [87], but certainly these results should be replicated in additional settings and with a qualitative approach that gives participants the opportunity to use their own words to name and describe the phenomena of interest.

Second, the current data are correlational and, as such, we cannot make causal claims regarding the relationship between people's thinking styles and their views of disasters. Throughout the manuscript, and in our thinking about it, we have implied a causal direction whereby people's psychological profile leads them to view disasters as blameless and to express lesser support for social interventions to mitigate human-created disaster risk. Although this is theoretically-derived and seems logical, we again underscore that the implied pathway is untested in the current context. Future work should, at minimum, manipulate blame in a disaster and test whether support for reducing risk accumulation increases when blameworthiness has been established. It is more difficult to manipulate the trait-level indicators, but the full model would best be tested by manipulating, for example, belief in a just world and testing whether that impacts levels of blame and then support for social interventions along a causal chain.

Of note, our choice of variables was driven by a desire to capture constructs related to psychological rigidity and system defense but was far from exhaustive. Future data collections can continue to flesh out those constructs with additional measures that have also been pinpointed as potentially important predictors of disaster beliefs, environmental attitudes, or pro-social orientations more broadly (e.g., empathy; [42]. Certainly, support for the system and psychological rigidity are only two of an infinite universe of possible variables that meaningfully increase the proportion of variance explained in understanding views around disasters. There are many additional possibilities and we urge others to follow up on this work. In addition, there may be third variables that explain the observed relationships. We showed that our effects obtained when statistically controlling for political ideology. For the interested

[3] For example, BBB has been used by the [89]; the Economic [90]; President Joe [91]; and UK Prime Minister Boris [92] and Canada's Prime Minster Justin [93] to outline plans to form a more resilient economy in response to the COVID-19 pandemic; President Obama's 10th anniversary Hurricane Katrina speech is tacit with BBB language [94]..

reader, additional analyses available in the Supplemental materials control also for age and sex; the overall pattern is one of stability of effects, although six of 52 comparisons (all on the Blamelessness variable) do cross over the (in)significance cut-off when taking into account additional variance explained by those demographic variables. In addition, there is a whole suite of unmeasured psychological variables that may do a better job of explaining our findings as well as alternate explanations for the observed effects. Further, we only discuss one type of disaster mitigation (i.e., social aid); we did not measure disaster risk mitigation via more technocratic (e.g., dams, seawalls), management (e.g., better warning communication systems), or individual (e.g., building a hurricane kit) efforts. Thus, it is possible that people who are avoidant of social restructuring are willing to support technocratic solutions while ignoring the social issues that create disaster risk and vulnerability. Additionally, we do not know whether people in our sample have previous experience with disasters or what their level of knowledge is around risk accumulation.

Of note, our samples are relatively diverse in terms of country of origin which could suggest that effects hold across multiple contexts, however we do not directly test this assumption. Thus, future work could investigate how people's beliefs about disaster risk are shaped by local context and begin to unpack the influence of these larger contextual factors on disaster belief formation and maintenance. To be clear, although we collect data from citizens of 40 countries in Study 1 and 28 in Study 2, there are many countries not represented in these data and, even more crucially, these self-selected samples are not likely to be representative of any country. For example, visitors to Project Implicit are more likely to be older and more educated and are composed of a higher proportion of women than the United States population [88]. Of additional relevance to country-of-origin, the majority of participants in our data were from the United States so results should likely be considered with that socio-political context most in mind. As is evident in the Supplemental Analyses, correlation and multiple regressions estimates based on the US-only sample are highly similar to those of the full sample included in the manuscript. This implies that these effects may be relatively general in nature. However, more data – preferably from representative samples – is needed before we make firm conclusions on this point.

This study generates a fresh look at public understandings of disasters and how those may covary with constructs in use in the discipline of psychology. We view the approach as a valuable one because it establishes that these relationships exist, setting the stage for tests of directionality, as well as allowing for the potential of interventions tailored to specific thinking styles. For example, we now know that those higher in the belief in a just world tend to view disasters as more random and blameless. That suggests that interventions that focus on how bad things happen to good people in a disaster might be particularly effective in shifting those high in belief in a just world. For example, experimental research indicates that negative messages about the dire consequences of climate change contradict beliefs about the world being fair and orderly resulting in increased skepticism toward climate change [39]. Given this evidence, it is likely that messaging plays an important role in the way people perceive disasters. While the public is confronted by the misnomer “natural disaster” consistently, we must find ways to communicate more clearly using messaging that does not contradict specific thinking styles.

7.4. Conclusion

Attempting to keep natural hazards from turning into disasters is one of the single greatest challenges of our time. Our success in that endeavor will require all manner of contributions. In our view, an important point of entry is to measure views around the accumulation of risk related to disaster impacts and relate those views to different styles of thinking. As an example of this approach, in the current work we measured differences in viewing disasters as 1) involving blame, and 2) being solvable via sociopolitical means. We tested hypotheses relating those two constructs to individual difference measures that, in various ways, index support for current systems and rigid thinking styles. Across two studies we found consistent evidence that people who are more supportive of current systems and have more rigid thinking styles are less likely to see fault in people for disaster risk accumulation and less likely to support sociopolitical solutions to reducing those risks. Notably, the general public may prefer to view disasters as caused by hazards (e.g., floods, earthquakes, volcanic eruptions, hurricanes) rather than by socio-political decisions because blaming nature shields governments (and taxpayers) from having to address societal inequities that make some people more vulnerable during disasters than others [15]. Additionally, controlling for political ideology, a third variable that correlated significantly with nearly all constructs in the work does not render support for current systems and rigid thinking styles statistically non-significant. As such, we can consider individual differences among people and how they think about disaster risk accumulation without falling into the dead end of political culture war narratives.

Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Dr. Colin T. Smith. reports a relationship with Project Implicit inc. that includes: consulting or advisory.

Data availability

The data is available on the OSF: https://osf.io/j8qy2/?view_only=10b323f9da5f46339ad5ad0a9e3e95f6

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.ijdrr.2023.103876.

Appendix

Table 1A
Disaster Belief scale items

Blamelessness	**1**	Too many people politicize disasters, when really it is nobody's fault.
	2	A large storm devastates an island and kills dozens of people. This kind of disaster is random – it affects everyone on the island equally.
	3	A major flood occurs in a non-tidal stretch of a River and inundates people's homes and businesses. It is unfortunate, but ultimately nobody is to blame for the damage and loss people experience due to this disaster.
Support for Disaster Risk Reduction	**1**	Political decisions can increase the impact of a disaster.
	2	Natural resource depletion and resource degradation heighten the risk of disaster occurring.
	3	Services to assist homeless people can reduce disaster risk.
	4	Social spending is a good way to reduce disaster impacts.
	5	We need to reduce inequality in order to reduce disaster risk.
Understanding Risk	**1**	Gender is a significant factor in determining your risk in a disaster.
	2	Age is a significant factor in determining your risk in a disaster.
	3	The history of a place is a critical part of understanding why a disaster happens.
Technocratic Solutions	**1**	Using innovative technologies and engineering solutions, it is possible to stop a disaster from happening.
	2	Building a flood barrier is the most appropriate solution to mitigate flooding.
	3	Sometimes the only way not to be affected by a disaster is by moving all of the population elsewhere.
	4	The main cause of flash flooding is too much rain.
	5	To prevent disasters, our government should prioritize spending on infrastructure like dams.
	6	Disasters are caused by God.

Note. Participants saw items in a random order; agreement with all items was assessed using a scale ranging from 1 = *strongly disagree* to 7 = *strongly agree*. Although participants saw all items, only the bolded scales were used in analysis.

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