On the nature of ideological beliefs systems and how they shape the perception and reduction of context-specific threats and risks

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Summary

A large body of research supports the dominant view that compared to liberals, political conservatives are generally more fearful, risk-averse, sensitive to threats; and also, much more motivated to support public policies that aim at reducing threats and dangers. The present dissertation challenges this simple, yet dominant narrative by proposing that the psychological differences and similarities between conservatives and liberals depend on the nature of the threatening stimulus and the ideology measure used to assess individual differences. Based on recommendations from stimulus sampling, the ideas developed in this dissertation demonstrate that it is necessary to assess ideological differences with a broad range of context-specific threatening stimuli and ideology measures in order to achieve deeper insights into conservatives' and liberals' sensitivity to threats and how they cope with them. The three lines of research presented here support the view that conservatives and liberals exhibit similarities and differences in their sensitivity to fear, threat, and risk; and also differ in the public policies and behavioural strategies they adopt to manage threats and reduce uncertainties in social, economic and natural contexts.

The first line of research examined whether conservatives and liberals exhibit similarities and differences in the basic psychological processes underlying attitude formation via exploration. The findings revealed that conservatives exhibit more cautious behaviours and consequently form more negative attitudes in food foraging contexts in which there is potential for ill-health and death upon eating bad food, whereas liberals exhibit more exploratory behaviours in these contexts and thus form more positive attitudes. In contrast, liberals exhibit more cautious behaviours and consequently form more negative attitudes in stock market investment contexts in which there is the potential for losing money and incurring bankruptcy upon choosing bad stocks, whereas conservatives tend to exhibit more exploratory behaviours in these contexts and thus form more positive attitudes.

The second line of research examined whether conservatives and liberals differ in their perception of the stock market as a dangerous, threatening and risky place to invest money and the behavioural and policy implications of such differences. The findings revealed that liberals believe that the stock market is a dangerous, threatening and risky place whereas conservatives

believe that it is a safe, secure and predictable place. These ideological differences in perception of the stock market explain why liberals are less likely to participate in the stock market than conservatives. Also, ideological differences in perception of the stock market as dangerous and risky explain differences in policy preferences: liberals are more likely to support tighter regulation of the stock market and oppose government policies that seek to invest workers' Social Security benefits into the stock market, whereas conservatives tend to oppose regulation of the stock market and support privatization of Social Security.

The third line of research investigated whether the relationship between political ideology and self-reported fear of evolutionary, non-politicized threats, such as snakes, spiders, the dark, heights, blood, depend on specific dimensions of ideology measures used to assess individual differences. The findings showed that social conservatives are more fearful of the above threats than social liberals whereas economic liberals are more fearful of the above threats than economic conservatives. The findings imply that the evolved neuropsychological processes that detect and respond to ancestral threats may be equally present in conservatives and liberals but these processes are dependent on the ideology measures used to assess individual differences.

Taken together, the empirical findings and arguments developed in this dissertation suggest that conservatives and liberals exhibit similarities and differences in their sensitivity to social, economic and natural threats and dangers. This perspective deviates from the dominant narrative that conservatives are generally more sensitive to threats and dangers than liberals. The findings also imply that compared to liberals, conservatives are more concerned about street crimes, muggings, burglaries and terrorism because they believe that these physical threats make the social world a dangerous place. Consequently, relative to liberals, conservatives restrain themselves from social activities and situations (e.g., avoiding travelling, public places, and crowds) that may increase their chances of physical victimization; and also support stricter anti-immigration initiatives and harsher punitive measures because they believe that these policies can help neutralize the perceived threats and uncertainties created by immigration and crime.

On the other hand, compared to conservatives, liberals are more concerned about corporate misconducts and white-collar crimes because they believe that these economic threats make the economic world a dangerous place. Consequently, relative to conservatives, liberals

restrain themselves from economic activities and situations (e.g., avoiding investing in the stock market) that may increase their chances of economic victimization; and also support tighter regulation of the stock market and financial institutions because they believe that these policies can help avert the perceived threats and uncertainties (e.g., stock market crashes and financial crises) created by unregulated economic activities.

The current research program sheds light on how ideological worldviews and beliefs systems shape people's perception of context-specific threats and also how they help people to cope with perceived threats, dangers and uncertainties in social, economic and natural contexts. The findings suggest that investigating how individual differences and similarities wax and wane across different contexts can indeed provide deeper and more comprehensive insights into the psychology of conservative and liberal belief systems. Finally, the findings also support the view that both conservative and liberal belief systems confer palliative benefits to psychological well-being by helping people to satisfy their existential needs for threat management and epistemic needs for uncertainty reduction.

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Zusammenfassung

Zahlreiche Forschungsarbeiten unterstützen die tief verwurzelte Ansicht, dass politische Konservative im Vergleich zu Liberalen im Allgemeinen ängstlicher, risikoscheuer und empfindlicher auf Bedrohungen sind und auch viel motivierter sind, öffentliche Maßnahmen zu unterstützen, die darauf abzielen Bedrohungen und Gefahren zu verringern. Die vorliegende Dissertation stellt diese einfache, aber dominante Erklärung in Frage, indem sie vorschlägt, dass die psychologischen Unterschiede und Ähnlichkeiten zwischen Konservativen und Liberalen von der Art des bedrohlichen Stimulus und dem ideologischen Maß abhängen, das zur Bewertung individueller Unterschiede verwendet wird. Basierend auf Empfehlungen aus dem Stimulus Sampling zeigen die in dieser Dissertation entwickelten Ideen, dass es notwendig ist, ideologische Unterschiede mit einem breiten Spektrum kontextspezifischer Bedrohungsreize und Ideologiemaße zu bewerten, um tiefere Einblicke in die Bedrohungssensibilität von Konservativen und Liberalen zu erhalten und wie sie damit umgehen. Die drei hier vorgestellten Forschungslinien unterstützen die Ansicht, dass Konservative und Liberale Ähnlichkeiten und Unterschiede in ihrer Sensibilität für Angst, Bedrohung und Risiko aufweisen und sich auch in der öffentlichen Politik und Verhaltensstrategien unterscheiden, die sie anwenden, um Bedrohungen zu bewältigen und Unsicherheiten in sozialen, wirtschaftlichen und natürlichen Kontexten zu verringern.

Die erste Forschungslinie untersuchte, ob Konservative und Liberale Ähnlichkeiten und Unterschiede in den grundlegenden psychologischen Prozessen aufweisen, die der Einstellungsbildung durch Exploration zugrunde liegen. Die Ergebnisse zeigten, dass Konservative ein vorsichtigeres Verhalten zeigen und folglich in Kontexten der Nahrungssuche, in denen die Gefahr von Krankheiten und Tod durch schlechtes Essen besteht, eine negativere Einstellung entwickeln, während Liberale in diesen Kontexten ein eher exploratives Verhalten zeigen und somit eine positivere Einstellung bilden. Im Gegensatz dazu zeigen Liberale ein vorsichtigeres Verhalten und entwickeln folglich eine negativere Einstellung in Kontexten von Börseninvestitionen, in denen die Möglichkeit besteht, Geld zu verlieren und bei der Wahl schlechter Aktien Insolvenzen zu erleiden, während Konservative in diesen Kontexten tendenziell ein explorativeres Verhalten zeigen und daher positivere Formen annehmen Einstellungen.

Die zweite Forschungslinie untersuchte, ob sich Konservative und Liberale in ihrer Wahrnehmung des Aktienmarktes als gefährlichen, bedrohlichen und riskanten Ort, um Geld anzulegen, unterscheiden, und bewertete die verhaltensbezogenen und politischen Implikationen solcher Unterschiede. Die Ergebnisse zeigten, dass Liberale glauben, dass der Aktienmarkt einen gefährlichen, bedrohlichen und riskanten Ort halten, während Konservative glauben, dass er ein sicherer und vorhersehbarer Ort ist. Diese ideologischen Unterschiede in der Wahrnehmung des Aktienmarktes erklären, warum Liberale weniger wahrscheinlich am Aktienmarkt teilnehmen als Konservative. Auch ideologische Unterschiede in der Wahrnehmung des Aktienmarktes als gefährlich und riskant erklären Unterschiede in den politischen Präferenzen: Liberale unterstützen eher eine strengere Regulierung des Aktienmarktes und lehnen eine Regierungspolitik ab, die darauf abzielt, die Sozialversicherungsleistungen der Arbeitnehmer in den Aktienmarkt zu investieren, während Konservative eher gegen eine Regulierung des Aktienmarktes sind und die Privatisierung der Sozialversicherung unterstützen.

Die dritte Forschungslinie untersuchte, ob die Beziehung zwischen politischer Ideologie und selbstberichteter Angst vor evolutionären, nicht politisierten Bedrohungen wie Schlangen, Spinnen, Dunkelheit, Höhe, Blut usw. von bestimmten Dimensionen der zur Bewertung verwendeten ideologischen Maßnahmen abhängt individuelle Unterschiede. Die Ergebnisse zeigten, dass Sozialkonservative mehr Angst vor den oben genannten Bedrohungen haben als Sozialliberale, während Wirtschaftsliberale mehr Angst vor den oben genannten Bedrohungen haben als Wirtschaftskonservative. Die Ergebnisse implizieren, dass die weiterentwickelten neuropsychologischen Prozesse, die Bedrohungen der Vorfahren erkennen und darauf reagieren, bei Konservativen und Liberalen gleichermaßen vorhanden sein können, aber diese Prozesse von den ideologischen Maßnahmen abhängen, die zur Untersuchung individueller Unterschiede verwendet werden.

Zusammengenommen legen die hier entwickelten empirischen Ergebnisse und Argumente nahe, dass Konservative und Liberale Ähnlichkeiten und Unterschiede in ihrer Sensibilität für soziale, wirtschaftliche und natürliche Bedrohungen, Gefahren und Unsicherheiten aufweisen, was von der vorherrschenden Erklärung abweicht, dass Konservative im Allgemeinen empfindlicher auf Bedrohungen und Gefahren reagieren als Liberale. Die Ergebnisse deuten darauf hin, dass Konservative im Vergleich zu Liberalen mehr

besorgt über Straßenkriminalität, Überfälle, Einbrüche und Terrorismus sind, weil sie glauben, dass diese physischen Bedrohungen die soziale Welt zu einem gefährlichen Ort machen. Folglich halten sich Konservative im Vergleich zu Liberalen von sozialen Aktivitäten und Situationen zurück (z. B. Vermeidung von Reisen, öffentlichen Plätzen und Menschenmengen), die ihre Chancen auf körperliche Viktimisierung erhöhen könnten; und unterstützen auch strengere Anti-Einwanderungsinitiativen und härtere Strafmaßnahmen, weil sie glauben, dass diese Politiken dazu beitragen können, die durch Einwanderung und Kriminalität verursachten Bedrohungen und Unsicherheiten zu neutralisieren.

Auf der anderen Seite sind Liberale im Vergleich zu Konservativen mehr besorgt über Fehlverhalten von Unternehmen und Wirtschaftskriminalität, weil sie glauben, dass diese wirtschaftlichen Bedrohungen die Wirtschaftswelt zu einem gefährlichen Ort machen. Folglich halten sich Liberale im Vergleich zu Konservativen von wirtschaftlichen Aktivitäten und Situationen zurück (z. B. Vermeidung von Investitionen in den Aktienmarkt), die ihre Chancen einer wirtschaftlichen Viktimisierung erhöhen könnten; und unterstützen auch eine strengere Regulierung des Aktienmarktes und der Finanzinstitute, da sie glauben, dass diese Politik dazu beitragen kann, die Bedrohungen und Unsicherheiten (z. B. Börsencrashs und Finanzkrisen), die durch unregulierte Wirtschaftsaktivitäten entstehen, abzuwenden.

Das aktuelle Forschungsprogramm beleuchtet daher, wie ideologische Weltbilder und Glaubenssysteme die Wahrnehmung und Entscheidungsfindung in den sozialen, wirtschaftlichen und natürlichen Kontexten prägen und wie sie die Verhaltensstrategien und die öffentliche Politik beeinflussen, die Menschen ergreifen, um mit wahrgenommenen Bedrohungen, Gefahren und Unsicherheiten. Die Ergebnisse legen nahe, dass die Untersuchung, wie individuelle Unterschiede und Ähnlichkeiten in verschiedenen Kontexten zu- und abnehmen, in der Tat ein tieferes und umfassenderes Verständnis der Psychologie konservativer und liberaler Glaubenssysteme ermöglichen kann. Schließlich unterstützen die Ergebnisse auch die Ansicht, dass konservative und liberale Glaubenssysteme dem psychischen Wohlbefinden einen palliativen Nutzen verleihen, indem sie Menschen helfen, ihre existenziellen Bedürfnisse nach dem Umgang mit Bedrohungen zu befriedigen und ihren epistemischen Bedürfnissen nach Reduzierung von Unsicherheit gerecht zu werden.

CHAPTER ONE

1.0 General introduction

1.1 Background

When we think about the perennial threats and uncertainties that unfold globally, it is neither wrong nor surprising to declare that the world is indeed a dangerous place; and is even becoming more precarious with each passing day. We are continually reminded about the dangers of climate change and financial crises, notified about impending wars including domestic and foreign terrorism. We are also cautioned about the inevitability of epidemics and pandemics, and alerted to the rising levels of street and white-collar crimes. In addition to the asteroids and meteoroids lingering several miles in outer space that threaten the very existence of humanity, earthquakes, hurricane, assaults from wild and seemingly benign animals are also major natural causes of human suffering and death globally. Clearly, the social, economic, natural and environmental threats and dangers to which we are constantly exposed trigger existential fears and anxieties, which then have negative impacts on our physical and mental wellbeing. Despite this bleak perspective on the inevitability of human exposure to threats, there is some hope after all: for eons, our ancestors survived many of these threatening events and situations. Presently, we do not only continually cope with several threats and dangers, but it is also possible that we would survive some of them for several millennia to come.

How do we manage to live in world replete with uncertainties and threats and in what ways do we navigate the various risks and dangers with which we are constantly confronted? Do we all perceive the same dangerous events and situations as threatening or are some people generally more fearful and sensitive to threats and dangers than others? How do our political belief systems and ideological worldviews influence our perceptions of threats and dangers and how do they determine the public policies we adopt to manage and reduce perceived threats and uncertainties? What behaviours and strategies do we deploy to cope with and defend ourselves from threats? This dissertation provides a series of empirical studies to address these questions in the hope to better understand the nature of the relationship among political conservative and liberal belief systems and perception of threats and risks in social, economic

and natural contexts. The current research also provides insights into the ways in which these different belief systems and worldviews determine how we manage and reduce perceived threats and uncertainties in what is believed to be a dangerous world.

On the one hand, insights from evolutionary science indicates that fear, anxiety and sensitivity to threats and dangers are predetermined by our genetic make-up as a consequence of evolutionary pressures faced by our early human ancestors who lived and survived in precarious environments (Bracha, 2006; Marks & Nesse, 1994; Ohman & Mineka, 2001; Seligman, 1971). Consequently, modern humans are not only endowed with the essential neurobiological "machinery" to detect and respond to threats and dangers, we are also inclined to defend ourselves and motivated to escape from dangerous and threatening events and situations; or even find ways of coping with them when there seem to be no escape route.

On the other hand, there is also evidence that our sensitivity to threats and dangers is not only determined by biopsychological factors but also shaped by demands of the environment in which we live (Loken, Hettema, Aggen, & Kendler, 2013; Rutter et al., 1997). That is to say, different personality traits—for example, neuroticism and extraversion—may predispose individuals to be sensitive to the same or different kinds of threat and dangers peculiar to their environments. Such individual differences in sensitivity to threats and dangers also appear to be related to our political and ideological worldviews (Altemeyer, 1981; Duckitt, 2001; Jost, Glaser, Kruglanski, & Sulloway, 2003b; Sloan et al., 2020).

The view that ideological worldviews are related to our sensitivity to threat is not far-fetched. If political conservatives and liberals were *equally* fearful and concerned about the same threats, we would expect that they would make concerted efforts to eradicate the threat of climate change, enact laws to reduce the spate of crime, implement regulatory mechanisms to avert global financial crises and/or support more government spending to build defence systems to absorb the impact of natural disasters. However, sensitivity to threats and solutions to local and global dangers are polarized along ideological lines. For example, when political liberals and left-wing governments highlight the threat of poverty, the spate of corporate crimes and the dangers of climate change, they tend to face a push-back from conservatives and right-wing governments who sometimes seem not perceive these events as threatening, or even when they do, are relatively less concerned about them.

Conversely, when political conservatives and right-wing governments stress the dangers of street-crimes and the potential negative impact of immigration, liberals and left-wing governments tend to look the other way as they are relatively less concerned about these kinds of threats. Even in situations where there is clearly an objective threat, say a pandemic, conservatives and liberals may fail to give equal weight to it, thus creating a political stalemate regarding which public policies to adopt to effectively address the threat. Thus, political gridlocks can emerge from the differential weighting of threats and from the concomitant disagreements about the means to address them.

In fact, it appears that political polarization has become intense and rampant because people on the left and right sides of the ideological divide have become sorted into different "ideological bubbles" where they have little to no opportunity to interact and share their different perspectives. This illustration truly evokes a visual imagery reminiscent of Plato's "Allegory of the Cave". In *The Republic,* Plato describes a group of prisoners chained in a cave, where they are forced to view shadows projected on the wall in front of them and nothing else. By being constantly forced-fed with the same pieces of information and prevented from interacting with the real world, the prisoners gradually acquire a shared reality shaped only by shadows in the cave. In fact, they come to believe the reflections on the wall to be real objects, which leads them to think that their perspectives and worldviews are the one and only objective truth.

Upon exiting the cave and interacting with the real world, a prisoner refuses to accept perspectives that deviate from their prior experiences. The painful process of engaging with opposing views forces the prisoner to return to the comfort of their cave, where they cope with and find solace in their safe, yet subjective worldviews. Here, fellow prisoners may get upset if the now "enlightened" prisoner attempts to share their experiences of reality outside the cave. For fear of being reprimanded, the "enlightened" prisoner discards his new knowledge, conforms to the ideas in the cave and gradually adopts the shared reality of their fellow prisoners.

Plato's allegory of the cave is an apt metaphor of the current widespread political polarization. It appears as if people reside in their respective conservative and liberal "caves", where they only see the world through their respective conservative or liberal "lenses", refuse to find common ground on issues and decline opportunities to discuss or accept divergent perspectives; lest their pre-existing worldview is destroyed. Consequently, in the case of threat

perception, what a conservative may perceive as objectively threatening and requires immediate attention may be interpreted through a liberal lens as less harmful and vice versa.

Thus far, the illustrations above suggest that ideological belief systems do not only shape perception of different aspects of the world as dangerous and threatening, but they also demonstrate that conservatives and liberals may adopt different strategies to cope with their respective threats and insecurities. This dissertation, therefore seeks to understand the actual psychological differences and similarities between conservative and liberal beliefs systems and the origins of these differences and similarities. The dissertation examines the psychological processes underlying conservatives' and liberals' sensitivities to threats in order to provide novel insights to how conservatives and liberals cope with different types of perceived threats and dangers.

Existing research suggests that political ideology shapes beliefs about whether human nature is essentially good or hopelessly evil, influences perceptions about whether the world is a dangerous and threatening place or a safe and secure place and determines behavioural strategies and public policies that people adopt to cope with perceived threats and dangers in the world (Altemeyer, 1981; Duckitt, 2001; Jost et al., 2003b; Sloan et al., 2020). These studies imply that viewing the world through a political or ideological lens breeds cognitive and perceptual distortions about the causes of events, creates subjective interpretations about the world and how it operates, which consequently generate negative or positive biases (Caparos, Fortier-St-Pierre, Gosselin, Blanchette, & Brisson, 2015; Carraro, Castelli, & Negri, 2016; Shook & Fazio, 2009). Such biases in turn shape political beliefs and personal behaviours, impact approach-avoidance dispositions and consequently affect how people form attitudes (Fazio, Pietri, Rocklage, & Shook, 2015).

Negative and pessimistic views about the world promote closemindedness and greater cautiousness, which drive people to seek and adopt strategies that can help to neutralize perceived threats and dangers. Sensitivity to threats and dangers also motivates people to support public policies that are perceived to provide safety, security and certainty (Jost et al., 2003b). In contrast, positive and optimistic views about the world promote more exploratory behaviours, leading to more open-mindedness and better learning about one's immediate environment and the world at large.

Despite the dominant narrative that politically conservative belief systems are generally associated with greater sensitivity to threat and negative information than liberal belief systems (Hibbing, Smith, & Alford, 2014a; Jost et al., 2003b), a growing body of research suggests that both conservative and liberal belief systems are equally associated with negativity biases, loss and risk aversion, fear and anxiety, sensitivity to threats, dangers and intolerance of uncertainty (Brandt et al., 2020; Choma, Hanoch, Gummerum, & Hodson, 2013; Choma, Hanoch, Hodson, & Gummerum, 2014; Elad-Strenger, Proch, & Kessler, 2020; Kaustia & Torstila, 2011; Proch, Elad-Strenger, & Kessler, 2019). These findings suggest the psychological processes underlying threat sensitivity and uncertainty intolerance are similar for political conservatives and liberals. The findings also anticipate that conservatives and liberals should be equally motivated to adopt specific behaviours and support public policies that they believe can help them to manage and reduce perceived threats and uncertainties.

However, relatively little is known about the mechanisms underlying threat sensitivity in conservatives and liberals. Also, it is unclear how conservatives and liberals cope with perceived threats and dangers. Filling this research gap would not only illuminate the psychological processes that mediate threat perception and negative biases in conservatives and liberals but it could clarify the behavioural strategies and public policies that conservatives and liberals embrace to cope with different kinds of perceived threats and dangers.

Political ideology can be defined as a an "organization of opinions, attitudes, and values – a way of thinking about man and society" (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950, p. 2) or "an interrelated set of moral and political attitudes that possess cognitive, affective and motivational components" (Jost, 2006a, p. 653). Although there are different political ideologies, one's political orientation or their self-identification with one or the other political ideology is *generally* believed to exist along a continuum, ranging from left-wing (or liberalism) at the one end and right-wing (conservatism) at the other end. Conservative ideologies and belief systems are associated with resistance to social change and acceptance of inequality, whereas liberal ideologies and beliefs systems are associated with eagerness for social change and support for dismantling institutions and age-old traditions that perpetuate inequality (Jost et al., 2003b; Jost, Glaser, Kruglanski, & Sulloway, 2003a).

Political ideology can also be *specifically* conceptualized along social (or cultural) and economic issue dimensions. Individuals who hold socially conservative views are more concerned about maintaining traditional, cultural and moral lifestyles, values and norms and

therefore support policies and initiatives that restrict same-sex marriages, abortion, divorce and immigration; social liberals (left-wing) tend to me more permissive towards these polices. On the other hand, economic conservatives tend to reject government intervention in reducing inequality, emphasize individual responsibility, and oppose policies and initiatives such as government regulation of businesses, social security provision, provision of universal health care and universal basic income; economic liberals tend to support these initiatives (Feldman & Johnston, 2014; Johnson & Tamney, 2001; Malka, Lelkes, & Soto, 2017; A. Malka, C. J. Soto, M. Inzlicht, & Y. Lelkes, 2014b).

The psychological forces that draw people to conservative and liberal ideologies and binds them to these belief systems have been a subject of intense research among psychologists and political scientists. A large and growing body of research spanning over half a century converges on the view that ideological beliefs are rooted in basic personality traits, cognitive styles, motivational orientations, as well as genetic neurobiological predispositions (Alford, Funk, & Hibbing, 2005; Altemeyer, 1998; Duckitt, 2001; Hibbing, Smith, et al., 2014a; Jost, 2017; Jost et al., 2003b). The prevailing narrative to have emerged from this body of work is that individuals who are more fearful, threat-sensitive, intolerant of uncertainty are more likely to adopt conservative than liberal values and beliefs. These findings have led to the notion that conservatives' greater resistance to change and opposition to equality helps them to cope with perceived uncertainties and social disorder that may be brought about by social change and equality. Overall, much of the current body of literature suggests that psychological motives underlying threat management and uncertainty reduction explain support for conservative than liberal belief systems.

Research linking political conservatism with needs for certainty and security has been supported by a great body of empirical evidence cutting across several research disciplines and has been the dominant narrative for many years. However, several commentators have argued that the conceptual and methodological flaws inherent in this dominant narrative may account for the observed relationship among conservatism, sensitivity to threat and uncertainty intolerance (Crawford, 2017; Greenberg & Jonas, 2003; Kessler, Proch, Hechler, & Nägler, 2014; Malka, Lelkes, & Holzer, 2017). Attempts to address these challenges have led to the emerging notion that motivations to achieve psychological certainty and security are equally associated with both conservative and liberal ideologies.

Specifically, right-wing social attitudes and left-wing economic attitudes are equally associated with needs for certainty and security (Malka, Lelkes, & Holzer, 2017; Malka & Soto, 2015; Malka et al., 2014b). This view proposes that conservatives are no more threat-sensitive and intolerant of uncertainty than liberals; rather the relationship among political ideology and threat-sensitivity and uncertainty intolerance depends on the nature of the threatening stimulus and the ideology dimension used to assess individual differences (Brandt et al., 2020; Elad-Strenger et al., 2020; Malka et al., 2014b; Proch et al., 2019). That is, motivations to manage different perceived threats and uncertainties are equally associated with different facets of conservative and liberal ideologies.

Despite evidence that sensitivity to threats and uncertainty exists on both sides of the ideological spectrum, broader questions remain as to what psychological processes underlie threat sensitivity in conservatives and liberals and the nature of the psychological stimuli that trigger these processes. For example, although there is some evidence that conservatives form more negative attitudes towards physically threatening stimuli than liberals (Shook & Fazio, 2009), this study used only "beans" as experimental stimuli, making it is unclear whether the findings are generalizable to stimuli other than beans. To address this question, it is useful to sample different kinds of physical and non-physical threats to better understand whether the relationship between political ideology and negative attitude formation depends on the psychological features of the attitude stimulus. Furthermore, understanding whether the psychological processes underlying attitude formation in conservatives and liberals are stimuli-dependent may provide a broader understanding into why conservatives and liberals react to different kinds of threatening stimuli

Furthermore, there is relatively less known about how conservatives' and liberals' cope with the different situations which they perceive as dangerous and threatening. Prior studies mostly showed that conservatives have heightened needs for certainty and security than liberals (Jost, 2017; Jost, Federico, & Napier, 2009; Jost et al., 2003b). However, the evidence has mostly been demonstrated within the context of the *social world* of physical threats such as street crimes and terrorism (Crawford, 2017; Eadeh & Chang, 2020), where it has been shown that conservatives exhibit more cautious behaviours in response to these threats than liberals. The evidence further reveals that compared to liberals, conservatives support tighter social control measures such as opposition to immigration and tougher punitive measures to minimize the existential threats of street-crimes and terrorism and their associated epistemic social

uncertainties (Haner et al., 2020; Haner, Sloan, Cullen, Kulig, & Jonson, 2019; Rudolph & Popp, 2009; Sloan et al., 2020; Unnerver, Benson, & Cullen, 2008). There is, comparatively, little research into how conservatives and liberals react to the *economic world* of white-collar and corporate crimes. Also, less is known about how they make personal economic decisions in the stock market, what behavioural strategies they use to cope with the perceived dangers and uncertainties in the stock market. Finally, the public policies that conservatives and liberals adopt to reduce and minimize the existential threats and epistemic uncertainties associated with the economic world is poorly understood.

Finally, it is not just enough to examine to what extent conservatives and liberals differ in their sensitivity to different kinds of threats emanating from the social or economic worlds. This is because threats, such as street-crime and white-collar crimes, are arguably politicized stimuli (Zimring & Hawkins, 1978, 1993). To achieve deeper insights into whether conservatives and liberals actually differ in their psychological dispositions to fear and threat, it is equally important to assess ideological differences with ideologically-neutral, non-politicized threats (e.g., snakes, the dark, spiders) sampled from the *natural world*. This approach could determine whether conservatives and liberals equally possess the evolved neuropsychological structures and processes underlying fear of naturally occurring threats and dangers that have been present across evolutionary time scales.

The overall objective of this dissertation is to contribute to current research on the relationship between political ideology and threat-sensitivity, to expand knowledge on the basic psychological differences between conservatives and liberals and to examine the psychological processes that mediate conservatives' and liberal's sensitivity to threats and dangers in the social, economic and natural worlds. To achieve this goal, three main research lines are presented to fill the existing research gaps. The *first line* of research examines how conservatives and liberals form attitudes in physically threatening food foraging contexts and economically threatening investment contexts. This study seeks to answer the question whether the relationship between political ideology and attitude formation via exploration depends on the nature of the attitude stimulus and the psychological context in which attitudes are formed. The *second research line* investigates whether conservatives and liberals actually differ in their perception of the stock market as a dangerous and threatening place and the behavioural and policy consequences that result from such differences. This study seeks to address how conservatives cope with economic threats and dangers. The *final research line* seeks to

ascertain the extent to which conservatives and liberals differ in their fear of evolutionary relevant, naturally occurring, non-politicized threats such as spiders, snakes, the dark and heights.

The purpose of this chapter is to provide a brief account of the early research on political ideology and to discuss the strengths and limitations of the current dominant accounts of ideology and threat sensitivity. The subsequent sections discuss the theoretical background and methodological framework and conclude with an overview of the empirical studies making up the dissertation.

1.2 Conceptual and theoretical framework

1.2.1 Psychological bases of political attitudes: A brief history

Attempts to explain the rise of Fascism, ethnocentrism, anti-Semitism and general prejudice in the mid-20th century led to the investigation of the origins, structure and functions of authoritarianism. Fromm (1941) was one of the early theorists to provide initial social psychological and psychoanalytic perspectives on how humans grapple with concepts such as freedom and authority. In his book *Escape from Freedom*, Fromm theorized that the rising wave of freedom and individualism in the modern era (compared to the Middle Ages), did not only provide strength and free will for individuals, but it also came with psychological costs such as feelings of alienation, isolation and anxiety, which were created by a lack of personal order and structure. Fromm understood authoritarianism to be one of the means by which individuals "evade freedom" in order to cope with their psychological insecurities. Authoritarianism, as formulated by Fromm, is "the tendency to give up the independence of one's own individual self and to fuse one's self with somebody or something outside of oneself in order to acquire strength which the individual self is lacking" (pp. 140-41).

Authoritarianism or the authoritarian character thus appears to be a symbiotic relationship between the *powerless* and the *powerful.* Convinced that life is determined by forces outside their control, the former chooses or is compelled to submit to the later (or an authority figure) in a desperate attempt to vicariously obtain some "secondary force" to deal with the exigencies of life. In doing so, the powerless hopes to attain a sense of meaning, order, structure and control of their lives. According to Fromm (1941) the authoritarian "admires

authority and tends to submit to it, but at the same time he wants to be an authority himself and have others submit to him" (p.162). Fromm also believed that the authoritarian character was the basis of Fascism because "[t]he Fascist systems call themselves authoritarian because of the dominant role of authority in their social and political structure." (p. 162).

Fromm further theorized that uncertainty and threat arising from social, economic and political instability, induce personal feelings of alienation and frustration, which in turn drive individuals to desire social conformity and submit to Fascist and authoritarian governments (Fromm, 1941). Although not supported by much empirical evidence, Fromm's observations provided early understanding of how macro-level social upheavals shift ideological attitudes and beliefs at the individual level. Subsequent research, following similar lines of reasoning, provided empirical evidence to support the relationship between situational threats and expression of authoritarian attitudes and behaviours (Doty, Peterson, & Winter, 1991; Sales, 1972, 1973; Sales & Friend, 1973). Following Fromm's speculations, a wave of empirical research began to elucidate the social-psychological and evolutionary origins of authoritarianism. Given the prevailing Fascist era, these research programs singled out right-wing political ideology as a core component of authoritarianism, while downplaying left-wing authoritarianism. A brief review of some of the most influential research programmes are provided below (for detailed reviews, see Altemeyer, 1981; Duckitt, 1989, 2015; Kessler & Cohrs, 2008; Martin, 2001).

I. The authoritarian personality

While the early researchers identified societal-level threats as the underlying cause of authoritarianism and prejudice, subsequent research claimed that authoritarianism is a manifestation of threatening childhood environments (Adorno et al., 1950). In their pioneering work on "*The Authoritarian Personality*", Adorno and colleagues laid the theoretical and empirical research foundations linking personality traits to ideological beliefs: "… political, economic and social convictions of an individual often form a broad and coherent pattern. …and that this pattern is an expression of deep-lying trends in his personality" (Adorno et al., 1950, p. 1). The "authoritarian personality" was understood as a covariation of nine traits that "form a single syndrome … [an] enduring structure in the person that renders him receptive to antidemocratic propaganda" (Adorno et al., 1950, p. 228).

Guided by Sigmund Freud's psychoanalytic framework, the authoritarian personality was understood as a reflection of deep-seated intra-psychic conflicts within the individual, stemming from a combination of rigid childrearing practices, unflinching demands for conformity and harsh punishment for nonconformity by authorities. The repressed hostility towards early authority figures was later displaced onto weaker societal figures, including ethnic groups, minorities, social deviants, and political dissidents. The authoritarian individual was therefore quick to submit to conventional authorities willing to seek security and conformity in social relations, showed exaggerated assertion of strength and dominance, exhibited intolerance towards those who deviate from established social norms and displayed the readiness to punish social deviants. The authors designed the F-scale, which was intended to tap into pre-Fascists personality traits considered to underlie authoritarianism. High scores on the F-scale correlated with measures of prejudice, intolerance and support for right-wing conservative views.

The programme of research initiated by Adorno and colleagues was riddled with several theoretical, empirical and methodological challenges. For example, although the F-scale was intended to measure "pure authoritarianism" as a character structure, the contents of the scale overlapped other scales intended to measure non-political attributes (such as rigidity and uncertainty intolerance), as well as with socio-cultural and economic components of political attitudes. Also, the F-scale was poorly constructed and susceptible to acquiescence biases (Bass, 1954; Herzon, 1972; Hyman & Sheatsley, 1954). Other critics drew attention to the inherent, but inadvertent biases in the programme of research. That is, the F-scale was designed to capture authoritarianism (i.e., pre-Fascist predispositions) on the political right (i.e., right-wing authoritarianism) while ignoring authoritarianism on the political left (i.e., pre-Communist predispositions; Barker, 1963; Shils, 1954).

II. Dogmatism – a measure of closed and open belief systems

Rokeach (1960), an early proponent of the notion that authoritarian character attributes are equally associated with both right-wing and left-wing belief systems, introduced an ideologically-neutral conceptualization of "authoritarianism" – which he called dogmatism – to capture authoritarian dispositions among conservatives and liberals. He defined dogmatism as "… a closed way of thinking which would be associated with any ideology regardless of

content, an authoritarian outlook on life, an intolerance toward those with opposing beliefs, and a sufferance of those with similar beliefs (Rokeach, 1960, pp. 4-5).

Dogmatism was understood as an individual difference variable representing how people organize their beliefs, attitudes, expectations and general approaches to thinking. The organized sets of beliefs were conceptualised as being on a continuum ranging from open-mined (undogmatic) beliefs at one end to closed-minded beliefs (dogmatic) at the opposite end. Rokeach (1960) theorized that threat was one of the main underlying psychological causes of dogmatism. Individuals who perceive the world as a threatening and uncertain place tend to narrow their beliefs and perspectives (i.e., become dogmatic or authoritarian) in order to ward off any conflicting and uncomfortable perceptual entities that might leave them vulnerable to threats. Thus, dogmatism was believed to fulfil an "ego defensive function" which helped individuals to protect and defend themselves from threatening environments and situations: "the closed system is nothing more than the total network of psychoanalytic defense mechanisms organized together to form a cognitive system and designed to shield a vulnerable mind" (Rokeach, 1960, p. 70).

Rokeach designed the Dogmatism (D) scale, which he argued was a new and general measure of authoritarianism, devoid of any ideological content and political bias. In his book the *Open and Closed Mind*, Rokeach (1960) provided empirical evidence showing that dogmatic individuals exhibited a broad range of personality and attitudinal patterns including low self-esteem, intolerance of uncertainty and resistance to change. These findings were corroborated by subsequent research. For instance, high levels of dogmatism were found to be associated with high feelings of insecurity, lack of innovation, cautiousness and risk-aversion (Durand, Davis, & Bearden, 1977; Ehrlich & Lee, 1969; Feather, 1969a, 1969b; Fillenbaum & Jackman, 1961; Jacoby, 1971; Korn & Giddan, 1964; Rapaport, 1979; Torcivia & Laughlin, 1968).

A feature common to both scales is that just like the F-scale, high scores on the D-scale were associated with prejudice towards outgroups, an indication of convergent validity (Maykovich, 1975). This similarity could reflect the fact that the D-scale contained items that overlapped with the F-scale, an indication that the D-scale was not a complete improvement over the F-scale; nor was it free of ideological bias. Others methodological challenges were that, just like the F-scale, the D-scale suffered from acquiescence biases and lacked internal consistency (Altemeyer, 1996). Consequently, interest in the D-scale also largely waned in the

1960s, culminating in further research in search of the nature and structure of authoritarian ideology.

III. The conservative personality syndrome

Wilson (1973) observed that the constellation of attitudes comprising authoritarianism and dogmatism measured similar aspects of a socio-political attitudes, which reflect a conservative personality predisposition. He, therefore, proposed a different concept of "authoritarianism", which he termed conservatism. According to Wilson, conservatism was "a general factor underlying the entire field of social attitudes much the same as intelligence is conceived as a general factor which partly determine ability in different areas"(Wilson, 1973, p. 3). The ideal conservative, Wilson argued, is someone who among other things, tends to have a right-wing political orientation, is likely pro-establishment, supportive of the status quo and justifies strict rules. He designed the C-scale measure to tap into a general factor of conservatism (Wilson & Patterson, 1968). The C-scale consisted of 50 items relating to socio-cultural, religious and moral issues such as death penalty, censorship, divorce, etc. Higher scores on the C-scale indicated greater conservatism whereas lower scores indicated greater liberalism.

Wilson (1973) believed that the conservatism was a product of genetic and environmental factors which determine feelings of insecurity and inferiority. The psychological characteristics underlying conservatism was understood to be a "generalized susceptibility to experience threat or anxiety in the face of uncertainty" (Wilson, 1973, p. 259). The conservative individual was, therefore, believed to be intolerant of uncertainty, which involves a general aversion to and avoidance of novel, complex, risky and ambiguous situations. Wilson (1973) argued that conservative attitudes and beliefs "serve ego-defensive serve function. … [which] arises as a means of simplifying, ordering, controlling, and rendering more secure, both the external world . . . and the internal world" (p. 261). He further stated that, "[o]rder is imposed upon inner needs and feelings by subjugating them to rigid and simplistic external codes of conduct (rules, laws, morals, duties, obligations, etc.), thus reducing conflict and averting the anxiety that would accompany awareness of the freedom among alternative modes to action" (p. 261-264).

Wilson's (1973) treatment of conservatism as a general factor underlying political attitudes had several similarities to the previous constructs of authoritarianism and dogmatism.

For instance, he argued that needs for order and control underlie conservatism and that these needs enable individuals to reduce feelings of anxiety and insecurity. These views are consistent with the Freudian view that authoritarianism reflects the need to control repressed sexual and aggressive impulses which are personally and socially unacceptable. Further, Wilson's proposal that conservatives are intolerant of uncertainty and unfamiliarity overlaps with previous perspectives that authoritarianism and dogmatism are associated with intolerance of ambiguity. Another advantage of Wilson' s (1973) programme of research is that the items on the C-scale were not only political stimuli (e.g., attitudes towards abortion, premarital sex), but the scale also contained non-politicized stimuli as well (e.g., attitudes towards music and pyjama parties). The inclusion of non-politicized stimuli was a unique strength of the C-scale because it meant that ideological differences were not restricted to controversial socio-moral topics, but could be expanded to include to topics devoid of any political content.

Besides its many strengths, Wilson's programme of research was too broad in its conceptual approach and too vague in its descriptions and measurements of "conservatism" This left the C-scale fraught with several psychometric difficulties. Further, the C-scale only tapped into a medley of socially conservative beliefs while excluding economic conservative beliefs; which negates the claim that it was tapping into a *general* measure of conservatism (Everett, 2013; Furnham, 1984). Moreover, several pieces of empirical evidence did not support the unidimensional structure of the C-scale, suggesting that conservatism is not a general factor underlying all socio-political attitudes (Feather, 1975; H. W. Hogan, 1975; Robertson & Cochrane, 1973).

IV. Right-wing authoritarianism

In the subsequent decades, another influential research programme attempted to clarify the nature of the authoritarian syndrome and to overcome the methodological challenges pertaining to its prior definitions and measurement (Altemeyer, 1981, 1988, 1996, 1998). Altemeyer's research culminated in a better conceptualization and understanding of authoritarianism, based on the more reliable and valid right-wing authoritarianism (RWA) scale. His approach identified three highly-interrelated components of authoritarianism, namely, conventionalism, authoritarian submission and authoritarian aggression. *Conventionalism* involves high degree of reverence and adherence to established traditions, social norms and moral values of the in-group as sanctioned by appropriate authorities.

Authoritarian submission refers to a high degree of obedience, trust and surrender to acknowledged authorities. *Authoritarian aggression* involves willingness to harm or chastise those who stray from the directives of established authorities. He devised the RWA scale to tap into these components of authoritarianism. High scores on the RWA scale correlated with right-wing attitudes and behaviours including prejudice towards minorities and outgroups, and harsher punitive measures towards "deviant" groups sanctioned by established authorities. Altemeyer aptly referred to his new construct as "right-wing" authoritarianism because his empirical findings did not show any clear evidence of the three defining attitudinal clusters on the political left (see also, Stone, 1980).

The theoretical framework underlying the concept of RWA was drawn from social learning theories rather than the Freudian psychoanalytic perspectives. Thus, authoritarianism was understood as a reflection of a wide admixture of "learned worldviews", early parental and religious socialization, peer networks and media instruction, which means that it did not stem from repressed early childhood hostility and hatred towards childhood authority figures as espoused by early psychodynamic approaches initiated by Adorno et. al (1950). Altemeyer further asserted that authoritarians' negative attitudes and behaviours stem from their personal beliefs that the world around them is dangerous and that outgroups are a threat to their cherished values and traditions. Thus, situational threats heighted adoption of authoritarian attitudes and values. Secondly, authoritarians hold their beliefs with greater self-righteousness, see themselves as morally superior to others, which makes them feel justified to derogate outgroups and other unconventional groups who are perceived to violate long-standing norms.

Despite its success and crucial role in promoting understanding of authoritarianism, there were concerns about whether Altermeyer's RWA-scale measured authoritarianism as a personality trait or as a social attitude. Other critics also questioned the extent to which findings based on the RWA-scale is generalizable to non-Western samples (van Hiel, Duriez, & Kossowska, 2006). Finally, just like the preceding research programs, Altemeyer also conflated RWA and mainstream conservative ideologies by asserting that the RWA "provides our most powerful measure of the liberal-conservatism dimension in politics" (Altemeyer, 1998, p. 53).

V. Social dominance theory

Another influential work on political ideology following the RWA program of research was undertaken by Sidanius and Pratto in the 1990s (Pratto, Sidanius, Stallworth, &

Malle, 1994; Sidanius & Pratto, 1999b, 1999a). This research program sought to provide insights into the psychological and evolutionary bases of intergroup conflict and ethnocentrism and the socio-political functions of hierarchy formation and maintenance among human societies. Social dominance theory postulates that "all human societies tend to be structured as systems of group-based social hierarchies" (Sidanius & Pratto, 1999a, p. 31), where dominant groups which occupy the top of the hierarchy enjoy a disproportionate amount of material resources, power and status relative to the subordinate groups at the bottom. Because social hierarchies benefit dominant groups, they are motivated to maintain their group privilege and advantage by supporting the status quo while opposing initiatives that promote group equality. Furthermore, social dominance theory postulates that societies minimize group conflict by promoting "legitimizing myths" in the form of ideologies, values, attitudes, that justify the existence of unequal social arrangements and intergroup inequality.

One of the central themes of social dominance theory is that individuals differ in their social dominance orientation (SDO), which refers to "a general attitudinal orientation toward intergroup relations, reflecting whether one generally prefers such relations to be equal, versus hierarchical" (Pratto et al., 1994, p. 742). Currently, different SDO-scales exist to tap into the SDO construct. High scores on these scales are associated with high levels of intergroup prejudice, ethnocentrism, racism, militarism, nationalism, etc. Highly social dominant individuals thus hold anti-egalitarian views and support intergroup dominance.

VI. Dual process model of ideology: two forms of authoritarian ideology

The two independent lines of research on RWA and SDO were largely successful and influential because these constructs were both well-operationalized and theoretically-grounded and the resulting measurement scales had very good psychometric properties. Researchers observed that RWA and SDO were generally not correlated in the United States (although highly correlated in European countries) but sometimes predicted right-wing attitudes, negative intergroup behaviours, including prejudice and support for authoritarian and anti-democratic forms of government in a similar direction; and sometimes predicted other psychological phenomena differently (Duckitt, 2001; Duriez & van Hiel, 2002; Duriez, Van Hiel, & Kossowska, 2005; Van Hiel & Mervelde, 2002). These observations led researches to suggest that RWA and SDO are *two* different manifestations of the authoritarianism and conservative beliefs: RWA emphasizes traditionalism, submission to perceived legitimate authorities and

resentment and aggression towards non-conformists, and outgroups; whereas SDO emphasizes intergroup inequality and group-based dominance. This revelation helped to explain why the *authoritarianism* concept had eluded previous researchers: the psychometric shortcomings and other conceptual difficulties faced by previous research programmes were due to attempts to measure authoritarianism as a unidimensional construct.

While the researchers believed that the RWA and SDO scales tapped into personality traits, careful assessment of the scale items led to the conclusion that they were actually assessing political attitudes or values. This criticism led other researchers to question the personality and situational factors that drove people to adopt these political attitudes or values. The dual process model (DPM) of ideology and prejudice sought to integrate the two lines of research on RWA and SDO in order to explain their psychological origins (Duckitt, 2001; Duckitt & Sibley, 2009; Duckitt, Wagner, du Plessis, & Birum, 2002). The DPM argues that RWA and SDO are *not* personality traits but two independent dimensions of social and ideological attitudes *shaped by* different personality traits, worldviews and socialization practices.

First, RWA is rooted in social conformity and social order as opposed to self-expression and personal freedom. Individuals who exhibit low openness to experience, have highly conscientious personality traits and belief that the world is an inherently dangerous and threatening place (as opposed to a safe and secure place) tend to adopt RWA values and beliefs because it enables them to express their values of collective security, cohesion and social stability. In contrast, SDO is rooted in tough-mindedness as opposed to tendermindedness. Individuals who have disagreeable personality traits and believe that the world is a ruthless competitive jungle where power and resources are preeminent (as opposed to a cooperative and harmonious place) tend to adopt SDO values and beliefs in order to express their goals of group-based dominance and inequality. A substantial body of literature based on the dual process model reveals that situational threats or experimental manipulations that increase the salience of social dangers (e.g., crime, terrorism) increase support for RWA more than SDO, whereas manipulations that threaten group resources increase support for SDO more than RWA (Asbrock, Christ, Duckitt, & Sibley, 2012; Asbrock & Fritsche, 2013; Cohrs & Asbrock, 2009; Duckitt & Fisher, 2003).

Thus far, the various research programmes reviewed above provide a brief historical overview of the early research on socio-political attitudes and how they have been refined and

advanced over the years. Clearly, the early research programmes were beset with conceptual and psychometric challenges because of researchers' failure to, for example, sufficiently disentangle authoritarianism from personality traits and main stream conservative ideologies. However, it is now evident that, for example, dogmatism, which was used interchangeably with authoritarianism in the early years, is a distinct construct that assesses individual differences in cognitive rigidity (Altemeyer, 1996).

Moreover, there is now sufficient evidence demonstrating that the two forms of authoritarianism – right-wing authoritarianism (RWA) and social dominance orientation (SDO) – which for many years had eluded researchers, have different motivational antecedents and psychological consequences. Finally, while conservativism was conceived as a unidimensional construct interchangeable with authoritarianism, RWA and SDO have been used as the basis for differentiating social and economic conservative ideologies, respectively (Crowson, 2009; Feldman & Johnston, 2014). The motivational bases and psychological consequences of social and economic political ideologies are discussed in-depth in the subsequent sections.

1.2.2 Dominant accounts of ideology and threat sensitivity

Several methodological and theoretical challenges faced by early ideology research in the 1950s resulted in the view that ideological worldviews lacked any coherent structural and psychological significance (for reviews see, Jost, 2006a). Several pieces of research did not provide clarity on the nature of the different but inter-related components of authoritarianism and mainstream conservative and liberal beliefs systems. For example, although RWA and SDO are two dimensions that underlie authoritarian attitudes they are theoretically and methodologically related but distinct from conservative (or right-wing) and liberal (or left-wing) worldviews (Feldman & Johnston, 2014; Malka, Lelkes, & Soto, 2017). However, in the early years both constructs were used interchangeably because of the fuzzy boundary between authoritarianism and conservatism.

Another observation is that the earlier studies failed to clearly delineate pre-political personality traits and psychological variables (e.g., dogmatism, rigidity, intolerance of ambiguity, risk-aversion, etc.) from pure political attitudes and values. For example, Wilson believed that all these constructs were indicators of a broader conservative or authoritarian ideology and thus conflated them with political and religious values in his programme of research. To overcome these challenges, Jost et. al (2003a, 2003b) proposed *the motivated*

social cognition, an influential model which seeks to address the limitations of previous research, provide better understanding of the cognitive and motivational bases of conservative and liberal belief systems and establish an overarching theme that would unify the disparate pieces of research on the social-psychological underpinnings of political attitudes.

Moreover, Hibbing et al. (2005, 2014a, 2014b) proposed the *negativity bias hypothesis* to illuminate the evolutionary and genetic bases of conservative belief systems. The basic idea underlying these models is that one of the basic differences between conservatives and liberals is conservatives' greater sensitivity to threat and intolerance of negative and aversive stimuli. That is, needs to attain order, security and certainty are more strongly expressed by conservatives than liberals. This assertion is not only supported by a broad array of interdisciplinary research raging from genetics to cognitive neuroscience, it has become one of the most dominant narratives in research on political ideology (Hibbing, Smith, Peterson, & Feher, 2014; Jost & Amodio, 2011).

I. Motivated social cognition

The motivated social cognition is a theoretically-driven and empirically-grounded model which seeks to characterize and describe the psychological differences between conservatives and liberals and highlight the personality, cognitive and motivational reasons underlying support for conservative and liberal belief systems (Jost, 2006a; Jost et al., 2009; Jost et al., 2003b; Jost et al., 2007). The model is based on a meta-analytic integration of findings from almost five decades of research on the psychological antecedents and consequences of political ideology. The motivated social cognition conceptualizes political conservatism (vs. liberalism) as an ideological belief system consisting of two core components, namely resistance (vs. openness) to change and acceptance (vs. opposition) to inequality.

The meta-analytic evidence supporting the motivated social cognition model suggests that conservatives are generally more fearful and anxious about death and exhibit greater sensitivity to threats, dangers and losses than liberals. Furthermore, societal-level threats such as terrorism, crime and economic insecurity also tend to drive people to adopt conservative than liberal policies, a phenomenon that is termed a *conservative shift* in political attitudes. These pieces of evidence led to the suggestion that conservative beliefs systems are likely to satisfy existential needs related to threat management than liberal belief systems (Jost, 2017; Jost et

al., 2003b; Jost et al., 2007). In order words, individuals who have greater desires for security and protection from danger are more likely to adopt politically conservative than liberal attitudes and beliefs. Similarly, the meta-analytic evidence also argued that individuals who have greater needs to exert control over their environment in order to attain certainty and predictably tend to adopt conservative than liberal belief systems. For example, epistemic motives such as intolerance of ambiguity and unfamiliarity, higher needs for closure, lower open-mindedness, dogmatism and risk-aversion are more likely to be expressed by conservatives than liberals (Amodio, Jost, Master, & Yee, 2007; Jost et al., 2009; Jost et al., 2003b; Jost et al., 2007).

In sum, the motivated social cognition model suggests that conservative belief systems are better at helping people to cope with existential anxieties and insecurities and do a better job of providing a sense of predictability and certainty in a rather chaotic and dangerous world than liberal belief systems. Motives to reduce uncertainty and manage threats are associated with conservatism than liberalism because preserving the status quo creates a stable social arrangement and averts upsetting long-established hierarchical systems. These two attributes provide people with assurance and security and also enables them to maintain their familiar and accustomed attitudes, beliefs and behaviours. On the other hand, the progressive nature of liberal belief systems – which are supposedly characterised by support for social change and opposition to inequality – create a great deal of social uncertainty, disorder and unpredictability (which may emerge from the rejection long-established traditions and desperate attempts seeking equality for different social groups) and are therefore unlikely to help people with chronic and dispositional needs to manage threats and minimize uncertainties (Amodio et al., 2007; Jost et al., 2009; Jost et al., 2003b; Jost et al., 2007).

II. Negativity bias hypothesis

While the motivated social cognition mostly relies heavily on verbal self-reports, the negativity bias hypothesis uses behavioural paradigms as a complementary approach to examine psychological differences between conservatives and liberals. The negativity bias hypothesis reviews evidence from several different research disciplines to conclude that conservatives are generally more vigilant and attuned to negative stimuli than liberals (Hibbing, Smith, et al., 2014a; Hibbing, Smith, Peterson, et al., 2014). For instance, neuroimaging studies reveal that neural structures (e.g., the amygdala and the cingulate cortex) involved in the

processing of uncertainty and threat are relatively larger in conservatives than liberals (Kanai, Feilden, Firth, & Rees, 2011).

Also, compared to liberals, conservatives exhibit stronger memory and attentional biases (Carraro, Castelli, & Macchiella, 2011; Mills et al., 2016), greater physiological responses (Ahn et al., 2014; Dodd, Hibbing, & Smith, 2011; Oxley et al., 2008; Smith, Oxley, Hibbing, Alford, & Hibbing, 2011) and enhanced neural sensitivities (Amodio et al., 2007; Pedersen, Muftuler, & Larson, 2018; Schreiber et al., 2013) to a wide range of threatening, negative, disgusting and aversive stimuli than liberals. These findings suggest that there are hard-wired psychological differences between conservatives and liberals that surpass the self-reported differences demonstrated by the motivated social cognition model.

Hibbing and colleagues further argue that although differences in negativity bias "reflects the fact that humans generally tend to respond more strongly, to be more attentive, and to give more weight to negative elements of their environment" (Hibbing, Smith, et al., 2014a, p. 303), it is conservatives rather than liberals who exhibit greater negativity bias. In other words, the psychological and neurobiological processes that mediate differential weighting of negative and positive stimuli are far more prominent and responsive in conservatives than liberals. Based on the evidence reviewed, the negative bias hypothesis proposes an evolutionary basis for political conservatism: early human ancestors who exhibited more "conservative" traits (i.e., caution and risk-aversion as opposed to exploration and adventurousness) in their behaviours, beliefs and attitudes were able to adapt to precarious ancestral environments and thus passed on their threat-sensitive genes to their off-springs. Accordingly, this explains the tight link between conservatism and threat-sensitivity and also why societies adopt more conservative attitudes, beliefs and behaviours in response to threatening events (Hibbing, Smith, et al., 2014a; Hibbing, Smith, & Alford, 2014b; Hibbing, Smith, Peterson, et al., 2014).

Evidence supporting the view that the evolutionary basis of conservatism can be traced to individual differences in asymmetric weighting of negative and positive stimuli is consistent with the "negativity dominance theory" (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001; Rozin & Royzman, 2001); which proposes negativity bias has evolutionary significance because it allowed early humans to survive in precarious ancestral environments. That is, natural selection favoured early human ancestors who were more sensitive to negative stimuli and avoided potential deadly environments; and these individuals survived and passed on those vigilant genes and traits to their off-springs. Although all humans exhibit asymmetric weighting

of negative and positive information, individuals differ in their negativity bias tendencies such that some individuals are more sensitive to negative stimuli than others (Norris, 2019; Skowronski & Carlston, 1989). The fact that Hibbing and colleagues propose a link between individual differences in negativity bias and conservatism is indeed an important addition to the existing literature on ideological differences.

Nevertheless, there are some criticisms to the negativity bias hypothesis. For example, it does not clarify the evolutionary roots of political beliefs in general. In other words, while it emphasizes the evolutionary roots of conservatism, it is silent on whether political liberalism could also have evolutionary significance. However, research linking political ideology and attachment theory suggests that conservatism and liberalism may both have evolutionary basis (Koleva & Rip, 2009; Thornhill & Fincher, 2007). Attachment theory posits that humans have an innate psychobiological system (i.e., the "attachment behavioural system") that motivates them to seek proximity to their primary care-givers (i.e. the attachment figure) in order to protect themselves from threats and establish a sense of security (Bowlby, 1988). Existing evidence shows that the quality of parents-child interactions determines individuals' subsequent responses to threat and political worldviews (Thornhill & Fincher, 2007; Wegemer & Vandell, 2020). Insecure attachment styles characterized by unresponsive parenting increases fear and anxious tendencies whereas reliable parenting provides the foundation for children do develop exploratory and novelty seeking behaviours. Moreover, insecure attachment styles are linked to conservative political beliefs whereas secure attachments styles characterised are linked to liberal political beliefs (Mikulincer, 1997; Mikulincer & Shaver, 2001).

It is believed that both secure and insecure attachment styles evolved to provide adaptive benefits such as ensuring the survival and efficient functioning of social groups (Ein-Dor, Mikulincer, Doron, & Shaver, 2010; Simpson & Belsky, 2008). According to this view, although highly secured individuals exhibit advantages such as exploration and risk taking, they may underestimate threatening situations or fail to recognise and response quickly to threats, which could then endanger group members. In contrast, although high levels of insecure attachment are associated with disadvantages such as hyper-vigilance and overly reactive threat-detection systems and less exploration, these same qualities may cause insecure individuals to react quickly to threats and signal the need to escape from them, thereby ensuring the survival and integrity of the group. Consequently, a heterogeneous group composed of securely attached and insecurely attached individuals has a better chance of survival than a

homogenous group comprising individuals with only one set of attachment style. By extension, since liberalism and conservatism are linked to secure and insecure attachment styles, it follows that both political beliefs may equally have evolutionary bases and were probably selected to confer survival functions for social groups (e.g., Claessens, Fischer, Chaudhuri, Sibley, & Atkinson, 2020)

Despite their limitations, the contributions of the motivation social cognition and the negativity bias hypothesis are notable in several ways. The former highlights the importance of differentiating personality, cognitive and motivational characteristics from pure ideological variables. Secondly, Jost's program of research reignited interest in ideology research, drew attention to the cognitive and motivational impact of ideological worldviews and how and why they are influenced by dispositional and situational forces. Thirdly, whereas most researchers had relied on ideologically-laden, politicized stimuli (e.g., crime, terrorism) to assess individual differences, the negativity bias hypothesis ushered in a new era of research whereby non-politicized stimuli (e.g., animals, blood, food, etc.) are used to assess ideological differences. The quest to understand the deeper sources of ideological worldviews has now open new branches of interdisciplinary research focussed on unravelling the genetic, neural and physiological bases of liberal and conservative beliefs systems.

1.3 Research gaps and methodological challenges

Despite their major contributions in advancing knowledge about ideological differences, the motivated social cognition and negative bias hypothesis are not without limitations. Researchers have generally focussed on why conservative beliefs are tightly linked with threat-sensitivity and uncertainty intolerance, while ignoring the conditions under which liberals could also exhibit threat-sensitivity and uncertainty intolerance. Also, singling out conservatism has led to biases in current research such that conservatism is mostly associated with negative attributes whereas liberals are associated with positive attributes. These limitations may reflect the fact that the motivated social cognition and negativity bias hypothesis have relied on narrow operationalization of *threat* and *ideology* and mostly examined dispositional traits, while ignoring the contextual and environmental factors that could potentially moderate the so-called deep-seated differences between conservatives and liberals. The following section provides an in-depth discussion of some of these limitations.

1.3.1 Narrow operationalization and assessment of threat

The negativity bias hypothesis (Hibbing, Smith, et al., 2014a) and the motivated social cognition models (Jost et al., 2003b) are very selective in their definition of what constituents a *threatening stimulus*. A threatening stimulus may refer to any negative, aversive, or dangerous entity that has the potential to cause physical or non-physical harm. Based on this working definition, a broad range of different kinds of stimuli can be classified as threatening as long as they can potentially create physical or psychological discomfort. One important observation is that the current models have mostly examined physical threatening stimuli, while disregarding non-physically threatening stimuli (Crawford, 2017; Eadeh & Chang, 2020). For example, one analysis showed that a large proportion of threats examined by the motivated social cognition model focussed on terrorism threats and street-crimes such as xenophobic attacks, burglary and muggings (Eadeh & Chang, 2020), which may explain why conservatives believe that the social world of street-crimes is a more dangerous, threatening and unsafe place (Altemeyer, 1998; Duckitt & Sibley, 2010; Duckitt et al., 2002; Jost et al., 2003b; van Leeuwen & Park, 2009).

Even studies that have relied on politically-neutral (or non-politicized) threats have been very selective in the range of stimuli used to assess ideological differences (Hibbing, Smith, et al., 2014a). For example, compared to liberals, conservatives are more sensitive to snakes, spiders and blood-related stimuli (Oxley et al., 2008; Smith et al., 2011). Also, compared to liberals, conservatives are more cautious in food foraging contexts, which makes them form more negative attitudes towards beans (Shook & Fazio, 2009). At first blush, it appears that these stimuli are psychological different. However, arguably, they could still be subsumed under the general category of physical threats. Since majority of past research used mostly physically threatening stimuli to assess ideological differences, there is limited understanding of whether conservatives and liberals also exhibit different sensitivities to other types of threats. In other words, assessment of individual differences with narrow range of stimuli limits understanding of whether ideological differences in threat sensitivity generalizes to a broad range of threatening stimuli.

Moreover, although theoretical and empirical evidence suggests that liberals are more concerned about economic issues such as corporate and white-collar crimes than conservatives (Kroska, Schmidt, & Schleifer, 2019; Zimring & Hawkins, 1978, 1993), it is unclear to what extent these types of crimes influence liberals' perception of the economic world as a dangerous place. Similarly, although past studies reveal that conservatives are generally more negatively

biased than liberals (Shook & Fazio, 2009), to date, it is unclear whether such negativity biases extend to other animal threats or are generalizable to non-food foraging contexts, or other non-politicized threats. Addressing these issues could provide some insight into ideological differences and similarities in perception of different types of threats.

1.3.2 Narrow operationalization and assessment of ideology

In the negativity bias hypothesis (Hibbing, Smith, et al., 2014a) and the motivated social cognition models (Jost et al., 2003b), political ideology is mostly characterized as a unidimensional construct measured along a single continuum of *liberal* or *left-wing* on one side of the spectrum and *conservative* or *right-wing* on the other side of the spectrum using the ideological self-identification (or self-placement) scale. Proponents of this view of ideology have described the scale as "the single most useful and parsimonious way to classify political attitudes for more than 200 years" (Jost, 2006a, p. 654). Empirical evidence shows that "[r]esponses to this single ideological self-placement item explain 85% of the statistical variance in self-reported voting behaviour …" (Jost, 2006b, p. 82). The unidimensional conceptualization of ideology is believed to be suitable for assessing ideological beliefs because it potently captures core social (resistance to change) and economic (opposition to inequality) dimensions of ideology. Furthermore, several pieces of cogent arguments and empirical evidence support the idea that people's socio-political attitudes and beliefs are sufficiently characterised along a single liberal-conservative continuum (Jost et al., 2009; Judd, Krosnick, & Milburn, 1981; Moskowitz & Jenkins, 2004; Peffley & Hurwitz, 1985; Sidanius & Duffy, 1988).

The unidimensional conceptualization of ideology has enabled researchers to conveniently treat different dimensions of political attitudes as interchangeable (Azevedo, Jost, Rothmund, & Sterling, 2019; Jost, 2006a; Jost et al., 2003b; Nilsson & Jost, 2020). For example, in their meta-analysis, Jost et al (2003) used the F-scale, C-scale, RWA and SDO scales interchangeably, as indicators or direct measures of political conservatism. However, as discussed previously, these scales do not only have several psychometric flaws, but also their contents overlaps with several attitudes such as religiosity, authoritarianism and non-political psychological contents (for reveiws see Malka, Lelkes, & Holzer, 2017). Similarly, although there is evidence that RWA and SDO are distinct measures of right-wing attitudes which have little or no correlation with mainstream political conservatism (Duckitt, Bizumic, Krauss, &

Heled, 2010; Pratto et al., 1994; Saucier, 2000), the motivation social cognition relied on these scales as indicators of conservatism. The overemphasis of the single-item conceptualization of ideology and the conflation of different political ideologies, obscures the psychological and structural distinctions between issues-based economic and social measures of mainstream conservative and liberal ideologies (Feldman & Johnston, 2014; Malka, Lelkes, & Soto, 2017).

1.3.3 Inadequate attention to multidimensional accounts of ideology

In spite of the consistency with which the single-item ideological self-identification measure predicts various psychological variables, it does not sufficiently capture the broad and complex issues underlying political attitudes and beliefs. Empirical research has consistently supported a two-dimensional rather than unidimensional view of ideology (Carmines & D'Amico, 2015; Carmines, Ensley, & Wagner, 2012; Duckitt & Sibley, 2009; Feldman & Johnston, 2014; Malka, Lelkes, & Soto, 2017; Malka et al., 2014b; Treier & Hillygus, 2009). These studies have shown that the broad diversity of ideological views can be captured along, at least two dimensions, namely, social/cultural and economic ideology. The social/cultural dimension taps into peoples' preferences for tradition and preservation of the entrenched socio-cultural norms and moral conventions. For example, individuals who support abortion, traditional marriage, established gender roles are *social or cultural conservatives*, whereas those who have more positive attitudes towards these issues *are social or cultural liberals*. In contrast, the economic dimension of ideology taps into people's attitudes towards equality and social welfare. For example, *economic conservatives* oppose government role in providing of social welfare and redistribution whereas *economic liberals* support government role in dismantling established hierarchical systems in order to promote equality.

The distinction between the social and economic ideology dimensions is consistent with the main tenet of the motivated social cognition, which is that conservatism is characterised by opposition to change and acceptance of inequality (Jost et al., 2003b). Clearly, the indicators of social/cultural ideology dimension (e.g., traditional views about sex, the family unit and gender roles) tap into attitudes towards social change, whereas the indicators of economic ideology dimension (e.g., government intervention and redistribution) assess attitudes towards economic equality. That is, according to the two-dimensional view of political ideology, socially conservative (right-wing) attitudes are associated opposition to social change whereas social liberal (left-wing) attitudes are associated with acceptance of social change.

On the other hand, economically conservative (right-wing) attitudes are associated with acceptance of inequality whereas economic liberal (left-wing) attitudes are associated with opposition to inequality. The extent to which the social/cultural and economic ideology dimensions correlate still remains unclear, although, it is well-known that both dimensions positively correlate in the United States, for example, especially among political interested individuals (Federico & Schneider, 2007; Feldman & Johnston, 2014). It has also been observed that the correlation ranges from negative to even zero in other regions around the world (e.g., Eastern and Western Europe), and the relationship is moderated by political engagement; which indicates that social and economic ideology dimensions may not always go be hand in hand (Malka, Lelkes, & Soto, 2017)

Furthermore, it is important to distinguish the two-dimensional views of political ideology from Duckitt's (2001) dual process model of socio-political attitudes. Indeed, from a broad perspective, it is easy to observe that the socio-cultural ideology dimensions correspond to RWA whereas economic ideological dimensions correspond to SDO. However, a more fine-grained observation can illuminate their differences. Malka et al. (2014, p. 1046.) observes that RWA is "a measure of culturally conservative attitudes but one that includes elements of hostility and aggression in addition to straightforward opinions about cultural matters" whereas SDO is a blend of "cultural content (e.g., equality for homosexuals, domination of ethnic minorities) with economic content (e.g., efforts to promote income equality)". Thus, the two-dimensional view of political ideology and the DPM although complementary and consistent with each other, tap into different measures of social and economic political attitudes and therefore cannot be used interchangeably.

1.4 A representative design perspective on ideology and threat

Thus far, it is clear that the conclusion advocated by the negativity bias hypothesis (Hibbing, Smith, et al., 2014a) and the motivated social cognition (Jost et al., 2003b) that conservatives are *generally* more threat-sensitive than liberals is not valid because the supporting pieces of evidence mostly rely on narrow operationalization of ideology and threat. Although investigating one ideological group (i.e., conservatives and liberals who are captured by the single item ideology measure) has been very informative, it is not clear from the motivated social cognition and the negativity bias hypothesis whether the findings can be

generalized to other ideological groups (i.e., individuals who are captured by social and economic political issues).

Similarly, although there is some evidence (albeit underexplored and inconclusive) suggesting that conservatives are usually more sensitive to physical threats than liberals (e.g., Crawford, 2017; Eadeh & Chang, 2020), the extent to which these findings generalize to, for example, non-physically threatening stimuli remains to be determined. Since most of the findings supporting the motivated social cognition and negativity bias hypothesis are based on a narrow ideology and threat measures, inferences about the larger population of different participants (or ideological) groups and threatening stimuli categories cannot be drawn from current studies (Crawford, 2017; Malka, Lelkes, & Holzer, 2017). The MSC and the NBH therefore lack population and ecological validity.

Issues concerning population and ecological validity can be addressed with representative designs. Brunswik (1947, 1959) introduced the concept of representative designs to stress the need for random sampling along two dimensions – participant and stimuli groups. To establish the validity of findings, populations to which researchers want to generalize their findings must be specified and randomly sampled to ensure that the intended generalization is achieved. Thus, in the case of political ideology research, to generalize findings to different ideological groups, all ideology measures (single-item and issue-based measures) must be used to investigate individual differences to ensure that the intended generalization is achieved; that is, research findings should be generalized to general conservatives and liberals as well as social and economic conservatives and liberals. Similarly, to establish ecological validity, the threatening environment situations and stimuli to which researchers want to generalize their findings must be randomly sampled to ensure that the desired generalization is accomplished.

Thus, it is necessary to observe human behaviour or examine psychological processes across a broad range of different situations and contexts to ascertain to what extent the behaviour is recurrent or the psychological process is consistent across these situations or contexts (or across psychological domains or stimuli Brunswik, 1943; Brunswik, 1947). If the behaviour or psychological process appears robust irrespective of the situations and contexts then it could be described as *independent* of the ecological features, that is, context/stimuli/domain/situational-general). In contrast, if the behaviour or psychological process changes with respect to the situations and contexts or is *dependent* on the psychological domains and stimuli features, then the behaviour or psychological process can be described as

context/stimuli/domain/situation-specific. Studying ideological differences and similarities across different situations and contexts could provide deeper understanding into whether the specific behaviours or psychological processes under investigation are being influenced by innate or environmental factors (or both) and could also unravel the specific psychological mechanism(s) instigating the nature-nurture influences.

Based on recommendations from the representative designs, several researchers and commenters have argued that psychological characteristics such as fear, threat-sensitivity and negativity biases can be found at both sides of the ideological spectrum depending on how threat and ideology are defined (Crawford, 2017; Eadeh & Chang, 2020; Greenberg & Jonas, 2003; Kessler et al., 2014; van Prooijen, Krouwel, Boiten, & Eendebak, 2015). A common thread linking these studies is the recommendation that researchers must expand their repertoire of threat stimuli and ideological measures used to investigate individual differences (Kessler et al., 2014; Wells & Windschitl, 1999). This recommendation is predicated on the view that the perhaps the mechanisms (i.e., the internal neuropsychological architecture) underlying threat-sensitivity and uncertainty intolerance might be similar for conservatives and liberals but these processes and structures might be evoked by different contexts or situations or stimuli. If true, then ideological similarities and differences can be observed when stimuli are sufficiently expanded. Admittedly, it is almost impractically and logistically impossible to observe how conservatives and liberals react to threats across *all* situations. However, it may be sufficient for researchers to assess ideological differences with a *broad* sample of stimuli with qualitatively different psychological features. For example, terrorism and street crimes may appear to differ in the qualitative features, but they can all be categorized as physical threats. It may be more reasonable to compare these physical threats to financial threats, as the latter appear to differ qualitatively from the former.

1.4.1 Investigating psychological mechanisms underlying threat-sensitivity

Increasing efforts to apply the stimulus sampling approach to examine whether ideological differences in threat-sensitivity can be generalized to a broader sample of different threatening and negative situations and contexts has yielded major findings that have moved the field forward. An increasing body of research reveals that conservatives are no more threat-sensitive than liberals; rather conservatives and liberals are equally threat-sensitive, risk-averse, and cautious depending on the psychological features of the threatening stimuli used to assess

ideological differences (Bai & Federico, 2020; Brandt et al., 2020; Choma et al., 2013; Choma et al., 2014; Choma & Hodson, 2017; Elad-Strenger et al., 2020; Hirschberger, Ein-Dor, Leidner, & Saguy, 2016; Proch et al., 2019). In spite of the progress, these studies mostly rely on self-reported sensitivity to threats and also ignore the specific psychological processes underlying ideological similarities in threat-sensitivity.

I. Context-specificity in processes underlying attitude formation

If conservatives and liberals are equally threat-sensitive, then it is imperative to probe the mechanisms underlying ideological differences and similarities in sensitivity to different kinds of threats. One approach to achieve this aim is to investigate how conservatives and liberals form negative and positive attitudes towards novel stimuli. In their behavioural study, Shook and Fazio (2009) established that cautious exploration explains why conservatives form more negative attitudes than liberals. In the study, attitude formation via exploration was examined with a food foraging game called BeanFest. The study revealed that conservatives are less likely to approach bean stimuli whereas liberals are more exploratory towards bean stimuli. Consequently, conservatives formed more negative attitudes towards the beans than liberals.

Shook and Fazio's (2009) findings are taken as strong evidence supporting the negativity bias hypothesis (Hibbing, Smith, et al., 2014a). The findings also imply that cautious exploration, which is the specific psychological process underlying negative attitude formation in the BeanFest game, is most likely exhibited by conservatives than liberals. This assumption, however, is yet to be empirically tested. One may ask: to what extent does the BeanFest findings generalize to other attitude formation contexts, or more generally to other kinds of stimuli? That is, are conservatives *generally* more cautious in all attitude formation contexts or is their cautious behaviour a function of the *specific* food foraging context simulated in the BeanFest game? To answer this question, psychological features of the BeanFest game could be carefully examined to understand why conservatives exhibited greater cautiousness in the game than liberals.

In the BeanFest game participants are required to eat good or bad beans. Given that conservatives are more sensitive to physical threats than liberals, the prospect of eating potentially bad food may have triggered greater caution in conservatives than in liberals. In order words, conservatives would be less likely to approach stimuli that may potential cause

ill-health and possible death, such as bad foods. This is because conservatives are more fearful of death than liberals (Jost et al., 2003b). It is possible then, that conservatives could have interpreted the game context as negative and physically threatening than liberals. If correct, then this may explain why compared to liberals, conservatives were more cautious and formed more negative attitudes towards the beans in the game. Because liberals are less sensitive to physical threats than conservatives, they exhibited greater exploration and therefore formed more positive attitudes towards the beans.

Based on the stimulus sampling strategy, one may ask: in what psychological situations and contexts could one observe a reversal of behaviour such that liberals would exhibit more cautious exploration and consequently form more negative attitudes than conservatives? One approach to answer this question is to examine how conservatives and liberals explore and thus form attitudes in non-physically threatening contexts. Studies have shown that liberals are more cautious and risk-averse in financial decision than conservatives (Choma et al., 2013; Choma et al., 2014). Specifically, researchers have revealed a stock market aversion showing that liberals are less likely to participate in the stock market than conservatives (Han, Jung, Mittal, Zyung, & Adam, 2019; Kaustia & Torstila, 2011; Moore, Felton, & Wright, 2010). One research question that can be gleaned from these findings is: *would liberal form negative attitudes when exploring novel financial (i.e., stock market investment) contexts than conservatives?*

Given that liberals are more financially risk-averse (Han et al., 2019; Kaustia & Torstila, 2011; Moore et al., 2010), it can be argued that in a stock market context where liberals are faced with choosing good or bad stocks, they would exhibit greater caution and consequently form more negative attitudes toward the stocks. In contrast, since conservatives are less financially risk-averse, when choosing good or bad stocks, they would exhibit more exploratory behaviours and consequently form more positive attitudes towards the stocks. In view of this hypothesis, it is of theoretical and practical importance to investigate whether in a simulated stock market context, conservatives and liberals would exhibit different exploratory behaviours and thus form different attitudes towards stocks. If this hypothesis is correct, then it would imply the psychological processes underlying attitude formation via exploration in conservatives and liberals are similar, but these processes are dependent on the psychological features of the attitude stimulus. This hypothesis is tested in Chapter 2.

II. Context-specificity in coping with social and economic dangers

The view that conservatives and liberals are equally threat-sensitive (Bai & Federico, 2020; Brandt et al., 2020; Choma et al., 2013; Choma et al., 2014; Choma & Hodson, 2017; Elad-Strenger et al., 2020; Hirschberger et al., 2016; Proch et al., 2019), implies that they would both adopt behaviours and also support policy initiatives that would help them cope with perceived threats and dangers. Consequently, one would expect that the psychological processes that activate these coping behaviours would be similar for conservatives and liberals, but these processes would be context-dependent. For example, it is well-established that compared to liberals, conservatives engage in more cautious social behaviours such as avoiding situations and places that would increase their vulnerability to terrorism and crime (e.g., avoiding travelling and crowds; Reinhart, 2017; Sloan et al., 2020). This is because conservatives perceive the social world of crime and terrorism as a more dangerous and fearful place than liberals (Jöckel & Früh, 2016; van Leeuwen & Park, 2009). Also, studies that have shown that fear of terrorism and crime explains why conservatives tend to support harsher punishments (e.g., the death penalty) and anti-immigration policies (Haner et al., 2020; Haner et al., 2019; McCann, 2008; Sloan et al., 2020). That is, greater perception of social dangers is the psychological mechanism underlying conservatives' cautious social behaviours and protective policy preferences.

There is some sparse evidence suggesting that compared to conservatives, liberals exhibit more cautious economic behaviours (such as owning less stocks ; Kaustia & Torstila, 2011), support tighter regulation of the stock market, businesses and financial institutions and oppose government proposals to invest workers' Social Security benefits in the stock market (Ha, 2012; Rudolph & Popp, 2009). However, the specific psychological mechanism(s) underlying ideological differences in stock market participation is yet to be determined. The question therefore arises*: does perception of the stock market as a dangerous place to invest money explain liberals' stock market aversion?* To resolve this question, one has to turn attention from the dangerous *social world* filled with street-crimes and terrorism to the equally dangerous and threatening *economic world* filled with corporate and white-collar crimes, financial scandals and stock market crashes.

The economic world can be broadly defined as comprising corporate institutions, financial markets their associated activities including the human agents that work therein (e.g., business leaders, CEOs, stock brokers, hedge fund managers, etc.). The economic world is

believed to be rife with corporate scandals and white-collar crimes, which do not only precipitate stock market crashes and financial recessions (Shover & Grabosky, 2010) but also reduce participation in the stock market (Giannetti & Wang, 2016; Sane, 2019). Stock market crashes also cause large-scale social harms such as unemployment, illness, suicide and social inequality (Pfeffer, Danziger, & Schoeni, 2013; Rheinhart & Rogoff, 2009; Yilmazer, Babiarz, & Liu, 2015). While it has been shown that liberals are more sensitive to corporate and white-collar crimes, concerned about financial scandals and misconducts and more likely to call for tighter regulation of the stock market and business than conservatives (Kroska et al., 2019; Unnerver et al., 2008; Zimring & Hawkins, 1978, 1993), to date no study has explicitly examined ideological differences in perception of the economic world as dangerous; nor has there been research on the psychological mechanisms mediating political liberalism and regulation of the stock market.

The present dissertation seeks to understand whether conservatives and liberals differ in their evaluation of the stock market, why they differ in their participation in the stock market and also why liberals support tighter regulation of the stock market than conservatives. It is possible that liberals' greater sensitivity to harmful economic activities that precipitate stock market crashes may cause them to perceive the stock market as a more dangerous place whereas conservatives lesser concern about these activities may cause them to perceive the stock market as a relatively safe and secure place. This difference in perception of the stock market may possibly explain the existing ideological differences in stock market participation (Kaustia & Torstila, 2011).

Also, given the ideological difference in sensitivity to harmful economic activities, liberals may perceive regulation of the stock market as a protective policy that could mitigate the excesses of the economic world. The questions arise*: does perception of the stock market as a dangerous and threatening place explain liberals' aversion to invest the stock market and their preference for tighter regulation of the stock market?* The body of literature reviewed above provides the basis for hypothesizing that liberals would perceive the stock market as a more dangerous and threatening place to invest money than conservatives. The asymmetry would explain liberals' lower stock ownership, their support for tighter regulation of stock market and their greater opposition to investing Social Security benefits in the stock market. These hypotheses are tested in Chapter 3.

III. Fear of evolutionary-relevant, non-politicized context-specific threats

While the stimulus sampling approach has shown that conservatives and liberals are equally threat-sensitive, most of the previous studies used modern, ideologically-laden, threats such as terrorism and street-crimes to examine individual differences (Crawford, 2017; Eadeh & Chang, 2020). Terrorism and street-crimes are largely politicized threats (Zimring & Hawkins, 1978). For example, terrorism and street crimes are perceived to be committed by groups which conservatives do not like (e.g., poor people), whereas corporate misconducts and white-collar crime are committed by groups which liberals dislike (e.g., rich people, large corporations). There is little research on conservatives' and liberals' emotional responses to non-politicized stimuli such as evolutionary fear-relevant threats.

Evolutionary fear-relevant threats are believed to have been prevalent in early ancestral environments and may have posed survival dangers to early humans (Mineka & Öhman, 2002; Ohman, 2005, 2009; Öhman & Mineka, 2003). Accordingly, in response to evolutionary pressures, humans evolved neurophysiological structures that quickly detect and respond to these threats. Evolutionary fear-relevant threats are ideologically-neutral, non-politicized threats and are also among the most commonly reported clinical fears and phobias in humans (Bracha, 2006; Marks & Nesse, 1994). These stimuli are usually classified along four groups, namely: 1. animal (e.g., snakes, spiders.), 2. natural environment (e.g., heights, the dark), 3. situational (e.g., enclosed spaces) 4. blood-injection-injury (blood/needles/injection).

One major claim of the negativity bias hypothesis (Hibbing, Smith, et al., 2014a) is that the tight link between conservatism and threat-sensitivity is a response to evolutionary pressures endured by early humans in precarious ancestral environments. Accordingly, early human ancestors who become more conservative and cautious in threatening ancestral environments were favoured by natural selection and this might explain political conservatives' greater sensitivity to negative and threating information in present times. To support this claim, studies have shown that compared to liberals, conservatives are more sensitive to some evolutionary fear-relevant stimuli such as snakes and spiders (for reviews see Ahn et al., 2014; Hibbing, Smith, et al., 2014a, 2014b). Given that most of these studies are based on neuroscientific and physiological evidence, proponents of the negativity bias hypothesis have concluded that perhaps the neurophysiological structures and processes that mediate threat-sensitivity are much more enhanced in conservatives than in liberals.

Recent research studies have, however, failed to replicate previously observed neurophysiological differences in sensitive to the fear of ancestral threats (Bakker, Schumacher, Gothreau, & Arceneaux, 2020; Osmundsen, Hendry, Laustsen, Smith, & Petersen, in press) suggesting that conservatives and liberals may be equally sensitive to evolutionary fear-relevant threats. These studies, however, assessed ideological differences in sensitivity to evolutionary fear-relevant threats with physiological measures and with a relatively narrow range of evolutionary fear-relevant stimuli. To complement and extend these studies, there is the need to examine ideological differences with a broad range of evolutionary fear-relevant threatening stimuli. Since there is currently no research on political ideology and self-reported fear responses to non-politicized threats the question arises: *do conservatives and liberals differ in their fear responses to evolutionary fear-relevant threats?*

Self-report studies still remain the most essential method to assess clinical fears and phobias. Thus, investigating ideological differences and similarities in self-reported fear responses to ancestral threats would complement and extend existing physiological studies. Also, to understand conservatives' and liberals' emotional responses to threats, it is important to examine their fear responses across a broad sample of evolutionary fear-relevant threats sampled across the four main fear domains. This would provide a better understanding into whether the relationship between political ideology and fear of evolutionary fear-relevant threats depends on the specific stimuli used to assess individual differences.

1.5 Overview and scope of studies

The three lines of research presented in the current dissertation seek to examine whether conservatives and liberals fundamentally differ in their sensitivity to different kinds of social, economic and naturally occurring threats and dangers. The current research also aims to establish whether conservatives and liberals possess similar psychological mechanisms for processing threats and how they cope with different kinds of threats and dangers.

The *first line of research* in Chapter 2 aims to determine whether the psychological processes underlying attitude formation via exploration are similar for conservatives and liberals and to examine whether these processes depend on the nature of the attitude stimulus. Chapter 2 provides an in-depth review of the literature on political ideology and attitude formation with particular attention to context-specific nature of attitude formation via

exploration. The study is a laboratory experiment conducted with participants from a midsized university in Germany. The specific hypothesis tested in this study is that conservatives form more negative attitudes in a physically-threatening food foraging context than liberals whereas liberals form more negative attitudes in a financially-threatening stock market context than conservatives. Chapter 2 is based on research published in the peer-reviewed journal *British Journal of Psychology* with co-authors Dr. Jutta Proch and Prof. Dr. Thomas Kessler. The research ideas were developed by the author of this dissertation in collaboration with the co-authors. The author of this dissertation programmed the experiments, collected, analysed and interpreted the data, and wrote the manuscript. The co-authors contributed to the theoretical framework and discussion and approved the final manuscript.

The *second line of research* presented in Chapter 3 seeks to elucidate the psychological mechanisms underlying conservatives' and liberals' economic decisions and policy preferences. The chapter focusses on whether conservatives and liberals differ in their perception of the stock market as a dangerous and risky place to invest money and whether this asymmetry explains ideological differences in stock market participation and support for economic welfare enhancing policies. The chapter is based on five studies using a large nationally representative survey data from the United States. Studies 1 and 2 examine whether liberals perceive the stock market as a dangerous and risky place to invest money and whether this explains their lower participation in the stock market compared to conservatives. Studies 3 and 4 examine whether liberals' greater perception of the stock market as a dangerous and risky place explains their greater support for regulation of the stock market and their greater opposition to investment of Social Security benefits in the stock market. Study 5 examines whether results from Studies 1-4 hold when issue-based ideology measures are used to assess individual differences.

The research in Chapter 3 begins with a thorough review of the literature on ideological differences in sensitivity to social and economic dangers. The specific hypothesis examined is that liberals would perceive the stock market as a more dangerous and riskier place than conservatives. These differences would reduce liberals' stock ownership, increase their support for tighter regulation of the stock market and enhance their opposition to investing Social Security benefits in the stock market. Chapter 3 is based on research published in the peer-reviewed journal *Political Psychology* with co-author Prof. Dr. Thomas Kessler. The research ideas were developed by the author of this dissertation in collaboration with the co-

author. The author of this dissertation compiled the datasets, analysed and interpreted the data, and wrote the paper. The co-author contributed to the theoretical framework and discussion and approved the final manuscript.

The *third and final line of research* presented in Chapter 4 investigates the relationship between political ideology and self-reported fear of evolutionary fear-relevant threats. The chapter expatiates on the existing literature on the evolutionary basis of phobic fears and how they relate to ideological differences in negativity bias and threat sensitivity. The chapter provides empirical evidence from nine large nationally representative studies conducted in the United States from 1972 to 2018. A meta-analytic study based on the independent survey, tests the main hypothesis that social conservatives would report greater fear of evolutionary fear-relevant threats than social liberals whereas economic conservatives would report less fear of evolutionary fear-relevant threats than economic liberals. Chapter 4 is based on research currently under-review in a peer-reviewed journal. The research ideas in Chapter 4 were developed by the author of this dissertation in collaboration with the dissertation supervisor Prof. Dr. Thomas Kessler. The author of this dissertation collated the data, analysed them, interpreted the results and wrote the manuscript with the supervision of Prof. Dr. Thomas Kessler.

CHAPTER TWO

2.0 Political ideology and domain-specific attitude formation in food foraging and stock market contexts

2.1 Background

It is commonly believed that conservatives and liberals differ in their psychological dispositions, which are assumed to explain their differences in political attitudes (Hibbing, Smith, et al., 2014a; Hibbing, Smith, Peterson, et al., 2014; Jost, 2017; Jost et al., 2003b). Whereas evidence for these differences mostly comes from self-report measures, there is also evidence from basic cognitive functioning demonstrating that conservatives seem to explore and process negative information and, thereby, develop attitudes differently than liberals (Shook & Fazio, 2009).

In the current study, we argue that the difference in attitude formation could reflect the nature of the stimuli or task, rather than actual psychological differences between liberals and conservatives. To examine whether psychological processes are independent of the nature of the stimuli, one would have to vary the experimental stimuli as recommended by the representative stimuli sampling approach (Brunswik, 1947, 1955; Wells & Windschitl, 1999). Based on this recommendation, we examine whether the assumed differences between liberals and conservatives are general differences or whether they are contingent on the nature of the stimuli. This procedure allows us to evaluate whether differences between liberals and conservatives are stimulus unspecific (i.e., domain general) or stimulus specific (i.e., domain-specific). Our study contributes to the existing literature by assessing for the first time whether basic cognitive processes of attitude formation through exploration of novel stimuli actually, reflects fundamental psychological differences between liberals and conservatives when the stimuli are varied.

The Negativity Bias Hypothesis (NBH) is a recent influential proposal that links political attitudes to basic psychological and physiological reactions to negative information (Hibbing, Smith, et al., 2014a). After reviewing a large body of evidence, the NBH suggests that the basic psychological difference is conservatives' greater sensitivity to negative stimuli compared to liberals. For example, conservatives exhibit stronger attentional biases (Carraro et al., 2011), physiological (Dodd et al., 2011; Oxley et al., 2008) and neural responses to negative words, images, and sounds than liberals (Ahn et al., 2014; Amodio et al., 2007; Kanai et al., 2011). The NBH further argues that differences in negativity biases explain conservative's greater support for protective policies, because they satisfy underlying needs to manage existential anxieties, a notion that has been echoed in many other studies (see Jost et al., 2003; Jost, 2017, for reviews).

Beyond evidence from self-report measures, strong support for the NBH comes from the intriguing study on the relationship among political ideology, information gain by exploration, and subsequent attitude formation (Shook & Fazio, 2009). The researchers argued that ideological differences in openness to experience may influence how conservatives and liberals explore their social world and form attitudes towards novel stimuli. They predicted that conservatives would exhibit greater caution in exploring novel stimuli that signal potential exposure to negative information. In contrast, liberals would tend to ignore signs of negativity and explore novel situations more indiscriminately. Conservatives' cautious exploratory strategy would reduce their gain of information and, thereby, decrease correction of any potential negative attitudes towards the stimuli. Consequently, conservatives would exhibit a learning asymmetry and would overestimate the distribution of negative compared to positive stimuli. In contrast, liberal's greater exploration will facilitate information gain, correction of negative attitudes towards the stimuli, and consequently a balanced estimation of negative and positive stimuli.

To examine their hypothesis, Shook and Fazio (2009) used a performance task (called BeanFest) in which participants form attitudes based on the exploration of information about novel objects (Fazio, Eiser, & Shook, 2004). The game assesses how individuals explore their environment and form attitudes towards differently shaped and marked visual patterns of stimuli referred to as "beans". The game requires participants to approach different beans in order to learn which are positive (i.e., good beans that increase points) and which are negative (i.e., bad beans that decrease points). If they approach a bean, they receive feedback that reveals

whether the bean was negative or positive. If they avoid a bean, they do not receive feedback about the value of the bean. This means that only approach behaviour leads to gain or loss of points.

The findings from Shook and Fazio show that conservatives and liberals act differently in the game. Conservatives adopt a more cautious strategy by exploring fewer beans than liberals, whereas liberals adopt a more open strategy by exploring more beans than conservatives. Differences in exploration produce an asymmetry in learning as a consequence. Conservatives learn bad beans better than good beans (i.e., form more negative than positive attitudes), whereas liberals learn both bad and good beans equally well (i.e., form balanced attitudes). These findings are taken as strong evidence supporting the NBH (Hibbing, Smith, et al., 2014a; Shook & Fazio, 2009).

The NBH argues that "in many respects, compared with liberals, conservatives tend to be more psychologically and physiologically sensitive to environmental stimuli generally but in particular to stimuli that are of negatively valenced, whether threatening or merely unexpected and unstructured" (Hibbing et al., 2014, p. 303). Such a broad statement anticipates that conservatives would generally exhibit greater sensitivity to *all* kinds of negatively valenced stimuli than liberals. If this is true, then the relationship between political ideology and negativity bias is *domain-general* (i.e., does not depend on the type of negative stimuli).

However, one potential limitation of the NBH is that it conceptualizes negative valence very broadly but operationalizes this broad concept too narrowly. Critics have noted that most of the negative stimuli supporting the NBH may be subsumed under a general category of stimuli that have potential to cause direct physical or bodily harm (Crawford, 2017; Eadeh & Chang, 2020). Consequently, the functional stimuli sample size for the studies supporting the NBH is $N = 1$ (Wells & Windschitl, 1999). For instance, in the case of Shook and Fazio's study (2009), only one instance of negative stimuli (i.e., bad or "poisonous" beans) was used as experimental stimuli. This stimulus, arguably, falls under the category of food/health or the more general category of physically threatening stimuli. Besides these threats, there are other negative stimuli such as loss of money, poverty, financial scams, bankruptcy, etc. The NBH assumes, without explicitly testing, that conservatives would exhibit greater sensitivity to these categories of negative stimuli as well.

Under-sampling of a broad range of negative stimuli from non-physical domains poses a challenge for the NBH. First, stimuli under-sampling may overstate negativity bias in conservatives and understate negativity bias in liberals. For example, it is possible that liberals also exhibit greater negativity bias towards other stimuli besides physically threatening stimuli. But this may only be observed if other negative stimuli domains are included in research designs. Secondly, stimuli under-sampling precludes the generalizability of the findings to other stimuli domains (Brunswik, 1947; Kenny, 1985; Wells & Windschitl, 1999). For example, is negativity bias in conservatives restricted to physically harmful stimuli or does this phenomenon generalize to non-physically harmful domains as well?

There is some indication that the relationship between ideology and negativity bias could be *domain-specific* (i.e., depends on the type of negative stimuli) rather than domain-general. Prior self-report studies demonstrate that the relationship between ideology and risk attitudes differs depending on the risk domain (Choma et al., 2013; Choma et al., 2014; Choma & Hodson, 2017). Using the domain-specific risk taking (DOSPERT) scale, Choma et al. (2014) showed that, compared to liberals, conservatives report less risk propensity in ethical and social domains, whereas a trend of higher risk propensity for conservatives emerges in the financial domain. However, in the financial domain, a more complex pattern emerges (three-way interaction) as conservatives show higher risk propensity when expected benefits and risk perceptions are high. In a recent study, Choma and Hodson (2017) demonstrated that risk perception may also vary according to the conceptualization of ideology. They differentiate between social and economic conservatism and show that social conservatism (measured as right-wing authoritarianism) tends to be positively related to risk perception, whereas economic conservatism (measured via social dominance orientation) tends to be negatively related to risk perception (see also Choma et al., 2013).

Furthermore, recent studies using simulated stock markets and real-world investment portfolios have demonstrated that liberals are less likely to participate in the stock market (Han et al., 2019; Kaustia & Torstila, 2011; Moore et al., 2010), because they perceive the stock market to be a more dangerous and riskier place to invest money than conservatives. These findings reveal that conservatives may not be generally risk-averse than liberals as they report higher risk propensity in the financial domain.

Despite the above evidence, the NBH is still broadly accepted. In their most current meta-analytic evidence in support of the NBH, Jost et. al. (2017, p. 345) emphasized that

researchers should "agree on the basic fact" … "that conservatives are somewhat more sensitive than liberals to potentially threatening stimuli". Moreover, proponents of the NBH suggest that Shook and Fazio (2009) provide a convincing argument in support of the NBH because the findings reveal the basic learning and memory processes underlying how conservatives form negative attitudes more than liberals.

Although previous studies (Choma et al. 2013; 2014; 2017; Han et al., 2019) have shown that liberals report greater risk aversion in the financial domain than conservatives, differences in the basic processes of exploration and attitude formation remain to be examined with respect to broader stimuli sampling. If the NBH is valid, conservatives should equally show cautious exploratory behaviour and a learning asymmetry across a variety of stimuli. In contrast, if cautious exploration of novel stimuli and learning asymmetry depend on the quality of the stimuli, then liberals and conservatives should equally exhibit cautiousness and learning asymmetry towards different kinds of stimuli.

The aim of the current study is to examine whether the relationship among political ideology, exploration of novel stimuli, and attitude formation is domain-specific or domain-general. The BeanFest paradigm is suitable for examining our competing hypotheses because it is amenable to framing. Previous studies have shown that the BeanFest can be framed as a neutral game whereby participants play for points, or as a life and death game whereby participants play for energy points in order to survive and to avoid dying (Fazio et al., 2004). Whereas Shook and Fazio (2009) used the bland or neutral version, we decided to use the negative version in order to examine how negative framing influences attitude formation as a function of political ideology. Consequently, in addition to the BeanFest, we considered a different variant of the game, which we call StockFest. StockFest is a wealth-bankruptcy game in which participants learn about the same visual patterns referred to as "stocks". Buying good stocks increases wealth points whereas buying bad stocks decreases wealth and results in bankruptcy. Both StockFest and BeanFest have exactly the same structure and are represented by the same visual patterns, but only differ by how they are framed.

Both games are suitable for investigating whether the relationship between political ideology, exploration and attitude formation depends on the nature of the attitude stimuli or not. The *domain-general* hypothesis predicts that in both games, conservatives would show more cautious exploration and would consequently form more negative attitudes than liberals whereas liberals would exhibit greater exploration and would form more positive attitudes than

conservatives. Alternatively, *the domain-specific* hypothesis predicts that in BeanFest, conservatives would exhibit greater caution and form more negative attitudes whereas liberals will more exploratory and would form more positive attitudes as a consequence. A reverse pattern is expected in StockFest whereby conservatives would exhibit greater exploratory behaviour and form more positive attitudes whereas liberals would be more cautious and therefore form more negative attitudes.

2.2 Method

2.2.1 Participants

Two hundred and forty undergraduates from a medium-sized university in Germany were randomly assigned to play BeanFest (N = 115, 72% female, $M(SD)$ = 22.14(3.36), range = 18–34) or StockFest (N = 110, 72% female, $M(SD)$ = 21.75(3.26), range = 17–34). We aimed at increasing the statistical power of our study in order to detect the small to medium effects sizes reported by Shook and Fazio. Thus, for each game condition, we chose in advance to collect about twice (i.e., N = 120) the sample size used in the original BeanFest study. We terminated data collection as soon as the planned sample size was reached. Data from 8 participants were excluded because of computer glitches during the learning or test phases of the experiment and another 7 participants were excluded because of missing ideology scores.

2.2.2 Measures and Procedure

BeanFest consists of a virtual world filled with visual patterns called "beans," (see Figure 1.1). The appearance of the beans varies along two attributes: shape (10 levels from round to oblong) and number of speckles (1 to 10). The levels of each attribute are combined to form a 10 × 10 matrix of 100 beans. BeanFest consists of a game (or learning) phase and a test phase. The game phase consists of 36 beans that are carefully selected from different regions of the matrix (for details regarding the matrix see Fazio et al., 2004). Of these, 18 are chosen as good beans and assigned a point value of +10 and 18 are bad beans with a point value of -10. The game requires learning to associate each type of bean with its value. All 36 game beans are presented individually in three blocks, making a total of 108 trials. In the test phase, all 100 beans are presented to test how well the games beans were learned.

The goal of the game phase is to accumulate survival points by making good decisions about which beans to eat (approach) and which beans to reject (avoid). Survival in the game is represented by current energy level shown on the lower left of the screen. The energy level ranges from on 0 to 100 points. Reaching 0 indicates a loss and death, whereas reaching 100 indicates a win and survival. The energy level is adjusted according to the point value of the bean approached. Approaching a good bean increases energy by 10 points, whereas approaching a bad bean depletes energy by 10 points. Feedback about the value of a bean approached is immediately provided in the form of gain and loss of points. There is no loss or gain of energy when a bean is rejected. Thus, learning about a bean's value is contingent upon approach behaviour.

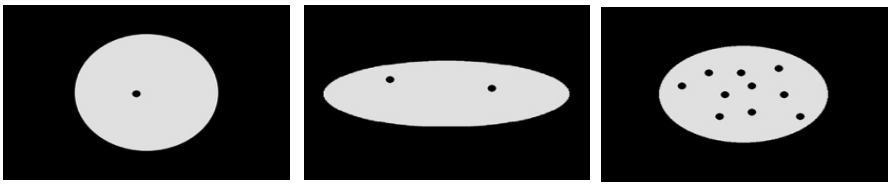

Figure 1. 1 Some samples of stimuli in the BeanFest and StockFest games

The instructions (see Appendix A) for the BeanFest game followed previous studies (Fazio, Eiser, & Shook, 2004; Shook & Fazio, 2009). After reading instructions, participants began the game with 6 practice trials. On each trial, each bean was randomly presented on the computer screen and participants pressed two keys corresponding to approach or avoid on a keyboard. Each participant began the game with 50 energy points. This was intended to provide a neutral point with respect to gain versus loss framing. Participants were notified after each win or loss and the game restarted at 50 points. They completed all 108 trials regardless of how many times they won or lost.

StockFest retained the same game structure as BeanFest. The same visual patterns of "beans" were now referred to as "stocks". In addition, StockFest was stripped of all references to food, eating, beans, and survival/death (see Appendix A for instructions). Participants were instructed that StockFest was about foraging for stocks in a virtual stock market consisting of good and bad stocks. The goal is to accumulate wealth by making good decisions about which stocks to buy (approach) and which to reject (avoid). The current financial level is shown on the screen. Reaching 0 financial points represents a loss and bankruptcy whereas reaching 100 financial points represents a win and solvency. To foster task engagement, a payoff scheme

similar to Shook and Fazio's study was provided. Participants received €1 for each win and 50 cents was deducted for each loss. Participants could win €0–€10.

After the game phase, participants completed the test phase, which assessed their learning of the beans or stocks. Each of the 100 stimuli was randomly presented and participants indicated which beans or stocks they believed to be helpful (i.e., increased energy points or financial points respectively) or harmful (depleted energy points or financial points respectively).

Following this, participants reported their political identity on a scale ranging from political left (1) to political right (5) (BeanFest: *M*(*SD*) = 3.40(1.13); StockFest: *M*(*SD*) = 3.45(1.31)). They also rated 24 political issues (e.g., "homosexuality", "abortion", etc.,) ranging from disapproval (1) to approval (5) from the German version of the well-known Wilson-Patterson Conservatism Scale (Schiebel, Riemann, & Mummendey, 1984): (BeanFest, α = .72, *M* = 3.19, *SD* = 0.35; StockFest, α = .79, *M* = 3.61, *SD* = .40). The single- item political identity measure and the political issue scores were correlated, in the BeanFest, $r(113) = .60$, $p < .001$, and the StockFest, $r(108) = .65$, $p < .001$. Thus, for each game condition we averaged the two scores to create a single index of political ideology, with higher scores indicating greater conservatism. A similar pattern of results was obtained, using either measure by itself.

2.3 Results

2.3.1 BeanFest and StockFest game indices

Amount won. There was no difference in average amount of money won in BeanFest (*M* = 2.30€) and StockFest (*M* = 2.38€), $t(222) = .37$, $p = .708$, *95% CI* = [-.49, .33].

Approach behaviour. The average proportion of beans (*M* = .55) and stocks (*M* = .57) approached by participants did not differ as a function of framing, $t(223) = 1.16$, $p = .247$, *95% CI* = [-.07, .02].

Learning. To examine whether participants learned the beans and stocks, we computed the phi coefficient, a standard procedure used by previous BeanFest studies. The phi coefficient indexes the strength of the relationship between the actual valence of the stimuli and responses to the stimuli during the test phase. The average phi coefficient for beans was .39, which was

much better than chance $t(114) = 16.4$, $p < .001$, *95% CI* = [.35, .44]. The average phi coefficient for stocks was .41, which was also much better than chance $t(109) = 17.9$, $p < .001$, *95% CI* = [.37, .46]. This indicates that participants did learn the beans and stocks rather than randomly responding to them. The average phi coefficient did not significantly differ for beans and stocks, $t(223) = .59$, $p = .555$, *95% CI* = [-.08, .05], indicating that the beans and stocks were learned equally well.

Learning asymmetry. Overall learning was above chance for bad beans ($M = 0.76$), $t(114) = 14.65$, $p < .001$, *95% CI* = [.73, Inf], and bad stocks (M = 0.75), $t(109) = 13.58$, $p < .001$, 95% CI = [.72, Inf], as well as for good beans ($M = 0.59$), $t(114) = 5.73$, $p < .001$, *95% CI* = [.57, Inf] and good stocks ($M = 0.63$), $t(109) = 7.92$, $p < .001$, *95% CI* = [.59, Inf]. However, a 2 (Framing: BeanFest vs. StockFest) × 2 (Stimuli valence: bad vs. good) ANOVA with stimuli valence entered as a repeated measure revealed better learning of bad than good stimuli, $F(1, 223) = 66.11$, $p < .001$, $\eta^2 = 0.22$, *95% CI* = [.16, .31]. This indicates that a learning asymmetry emerged. The learning asymmetry did not differ as a function of framing, $F(1, 223) = 0.65$, $p = .421$, nor did framing moderate the learning asymmetry, $F(1, 223) = 1.28$, $p = .259$.

2.3.2 Political Ideology and game indices

Correlations. First, we examined the relationship between game indices and political ideology. Bivariate correlations are shown in Table 1.1. Average approach behaviour significantly correlated negatively with learning asymmetry in the BeanFest, $r(113) = -.56$, $p < .001$, *95% CI* = [-.68, -.42], and in the StockFest, $r(108) = -.69$, $p < .001$, *95% CI* = [-.77, -.57], indicating that the more participants approached the beans or stocks, the smaller their learning asymmetry. Moreover, ideology significantly correlated negatively with average approach behaviour in the BeanFest, $r(113) = -.24$, $p = .011$, *95% CI* = [-.40, -.06], an indication that conservatives adopted a more cautious strategy by exploring fewer beans, whereas liberals adopted a more exploratory strategy by exploring more beans. In contrast, ideology significantly correlated positively with average approach behaviour in the StockFest, demonstrating that conservatives adopted a more exploratory strategy by exploring more stocks whereas liberals adopted a more cautious strategy by exploring fewer stocks, $r(108) = .26$, $p = .005$, 95% CI = [.07, .43]. The two correlation coefficients were not significantly different, $z = .15$, $p = .875$, indicating that conservatives and liberals approached the beans and stocks to the same extent in both games.

Furthermore, ideology significantly correlated positively with learning asymmetry in the BeanFest, $r(113) = .23$, $p = .014$, *95% CI* = [.05, .39], an indication that the learning of positive and negative beans varies as a function of political ideology. However, a reverse pattern emerged whereby ideology significantly correlated negatively with learning asymmetry in StockFest, $r(108) = -.22$, $p = .022$, *95% CI* = [-.39, -.03], demonstrating that the learning of positive and negative stocks varies as a function of political ideology. The two correlation coefficients did not differ significantly from each other, $z = 0.08$, $p = .938$, indicating that the magnitude of the learning asymmetry was similar for conservatives and liberals in both games.

Simple mediation. To examine the role of approach behaviour as a mediator in the relationship between ideology and learning asymmetry, we conducted, separate mediation analyses for the BeanFest and the StockFest using PROCESS macro Model 4 (Hayes, 2013). The analyses revealed that the indirect effect of ideology on learning asymmetry through approach behaviour was significant in the BeanFest, $b = .05$, SE = .01, *95% CI* [.01, .09], as well as in StockFest, $b = -.06$, SE = .01, *95% CI* [-.11, -.02]. These results replicate previous findings of the BeanFest, but reveal an opposite pattern in the StockFest game.

Moderated mediation. The analyses above suggest that the indirect effect of ideology on learning asymmetry through approach behaviour depends on the moderator (i.e., game framing). However, to demonstrate this formally, we examined whether Ideology, Framing (BeanFest vs. StockFest; effects coded -1 and 1, respectively) and their interaction, significantly predicted approach behaviour and learning asymmetry. The moderation analysis showed that, neither Framing ($b = .01$, SE = .01, $t(221) = 1.19$, $p = .235$, *95% CI* [-.01, .03]), nor Ideology predicted approach behaviour ($b = .00$, SE = .02, $t(221) = .28$, $p = .779$, *95% CI* [-.04, .03]). Similarly, Framing ($b = .02$, SE = .02, $t(221) = 1.15$, $p = .250$, *95% CI* [-.05, .01]), or Ideology ($b = .01$, SE = .02, $t(221) = .32$, $p = 0.751$, *95% CI* [-.04, .06]), did not predict learning asymmetry.

Table 1. 1 Correlations between game indices and political ideology scores as a function of game framing

	Political Ideology [a]	
	BeanFest	StockFest
Game Indices		
Average approach behaviour	-.24**	.26**
Block 1 approach	-.28**	.22*
Block 2 approach	-.16	.20*
Block 3 approach	-.22*	.27**
Overall learning [b]	.03	.01
Learning asymmetry [c]	.23*	-.22**

Note.
[a]Higher scores indicate greater conservatism.
[b]Phi coefficient between actual valence of bean (or stocks) and classification of the bean (or stocks) during the test phase.
[c]Proportion of negative beans correctly classified minus proportion of positive correctly classified.
*$p < .05$. **$p < .01$.

However, Ideology × Framing significantly predicted approach behaviour ($b = .06$, SE = .02, $t(221) = 3.79$, $p < .001$, *95% CI* [.03, .09]) and learning asymmetry ($b = -.08$, SE = .02, $t(221) = 3.40$, $p = .001$, *95% CI* [-.13, -.03]). Test for conditional effects across game framing revealed that in BeanFest, average approach behaviour decreased significantly for conservatives (+1 SD above mean) compared to liberals (-1 SD below mean) ($b = -.06$, $p = .007$, *95% CI* [-.11, -.02]; see Figure 1.2). The opposite pattern emerged in StockFest whereby approach behaviour increased significantly for conservatives compared to liberals ($b = .05$, $p = .008$, *95% CI* [-.01, .09,]). Likewise, the learning asymmetry increased significantly for conservatives compared to liberals in BeanFest ($b = .09$, SE = .01, $p = .014$, *95% CI* [.02, .16]), but significantly decreased for conservatives compared to liberals in StockFest ($b = -.07$, SE = .01, $p = .019$, *95% CI* [-.14, -.01]; see Figure 1.2.).

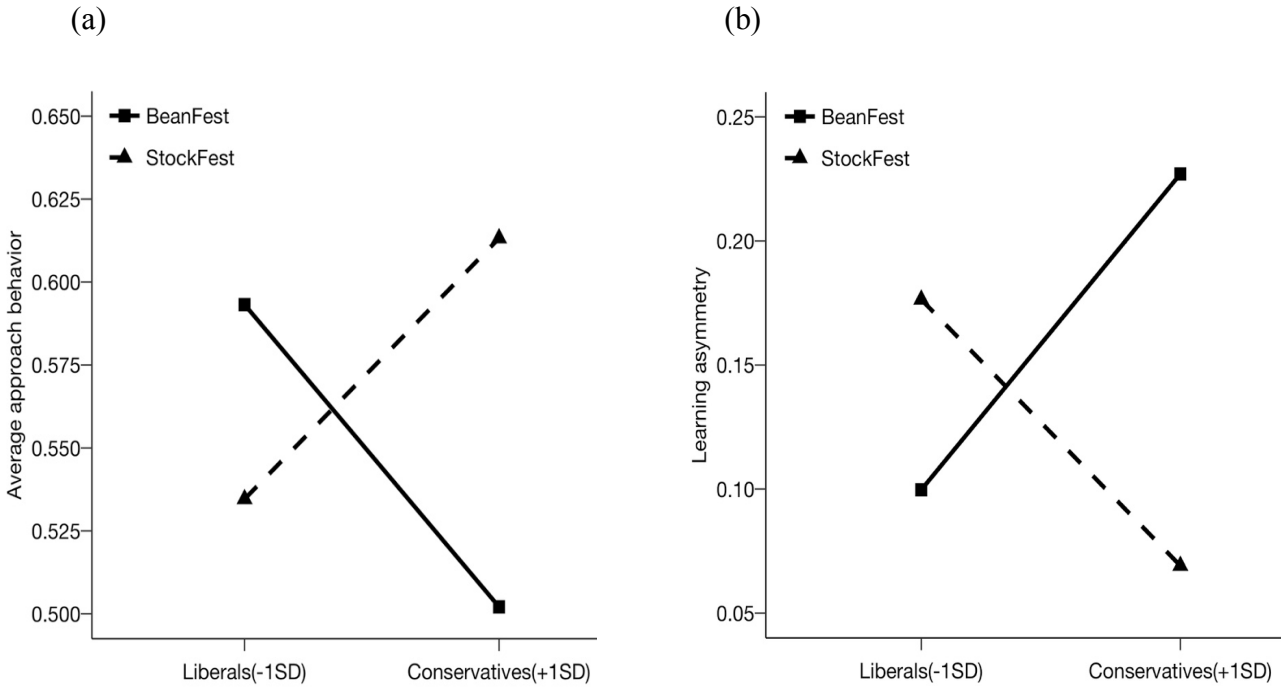

Figure 1. 2 Results of the moderation analyses. Average approach behaviour (a) and learning asymmetry (b) as a function of ideology and game framing

2.4 Discussion

In the current study, we presented an attitude formation task in two framings (BeanFest and StockFest) and examined the information exploration and attitude formation of liberals and conservatives. The different framings examined two competing hypotheses: 1). conservatives generally react more strongly to negative stimuli from all domains than liberals (Hibbing, Smith, et al., 2014a; Jost et al., 2003b) and 2). both conservatives and liberals react to negative information but within specific domains (Choma et al., 2014; Choma & Hodson, 2017). Consistent with previous findings (e.g., Shook & Fazio, 2009), the results show in the BeanFest condition that conservatives are more cautious in exploring novel information and consequently form more negative attitudes than liberals. This evidence supports the Negativity Bias Hypothesis (Hibbing, Smith, et al., 2014a). However, in the StockFest condition, the pattern reverses. Here, conservatives are less cautious in exploring novel information and consequently form less negative attitudes than liberals, which contradicts the Negativity Bias Hypothesis.

Taken together, the current findings support the idea that the relationship between ideology and negativity bias depends on the domain of the negative stimuli. Conservatives did not reveal a general tendency to form more negative attitudes toward beans and stocks than liberals. Rather, conservatives were more cautious in the BeanFest game, but more exploratory in the StockFest game. The reverse is true for liberals. Consequently, these findings reveal for the first time that the basic learning and memory mechanisms involved in attitude formation via exploration of novel stimuli are similar for conservatives and liberals, but such processes are evoked by different stimuli.

Conservatives' greater fear of loss and intolerance of uncertainty (Jost et al., 2003b) were revealed in the life-death situation simulated in BeanFest. Their greater reluctance to explore the beans reflects their greater tendency to avoid situations that signal potential threat to physical safety. In contrast, liberals' greater exploration of the beans suggests that they are more open to approaching situations that may potentially violate their physical safety. These findings directly replicate previous results from Shook and Fazio (2009) and are also consistent with studies showing that conservatives are more sensitive to physical threats than liberals (Hibbing, Smith, et al., 2014a; Jost et al., 2003b).

However, a reverse pattern of behaviour was observed when the task was framed as wealth-bankruptcy game as simulated in StockFest. Here, conservatives explored more stocks than liberals, indicating that in novel situations where there is a possibility to accumulate wealth, conservatives are more willing to expose themselves to potentially threatening information than liberals. In contrast, liberals adopted a more cautious strategy by exploring fewer stocks than conservatives, indicating that liberals are less willing to explore novel financial situations because of their greater fear of potential financial harm than conservatives. These findings are consistent with studies showing that liberals and conservatives differ in their reported risk propensity across domains (e.g., health, finance; (Choma et al., 2014; Kaustia & Torstila, 2011). It is also consistent with conservatives' greater affinity and interest in money (Sheldon & Nichols, 2009) and business-related themes relative to liberals (Kemmelmeier, Danielson, & Basten, 2005).

Our domain-specific account concurs with the previous domain-general account espoused by the NBH because it acknowledges deep-seated ideological differences between liberals and conservatives. However, it is inconsistent with the domain-general account because it suggests that ideological differences are often malleable and influenced by different

contextual features. Consequently, the current findings build on previous studies that suggest that ideology and context interact. One may argue that the interactionist approach enriches our understanding indeed, regarding how and what makes ideological differences and similarities wax and wane across different situations.

The findings also illustrate the value of stimuli sampling in political psychology. Wells and Windschitl (1999), stressed that insufficient stimuli sampling (i.e., "the use of multiple instances of a stimulus category in research", p. 1115), is a "serious problem that plagues a surprising number of experiments" (p. 1115). The present study extends this argument to assess ideological differences in threat perception. The examination of individual differences with a limited selection of stimuli may lead to spurious findings of differences that may actually reflect the selection of the stimuli used in the studies. For example, the assumption that conservatives are more resistant to social change than liberals is true only with some political and societal issues but reverses with other issues (Proch et al., 2019) Similarly, higher disgust sensitivity of conservatives reflects the selection of items used in disgust scales rather than actual differences between liberals and conservatives (Elad-Strenger et al., 2020)

One important extension of the present study is that stimulus sampling also affects basic processes of information exploration and attitude formation in addition to self-reported opinions and attitudes. Although the present study did not randomly sample stimuli, we have been successful in using two instances (i.e., financial threat and physical threat) of a stimuli category (i.e., negative) to demonstrate that the relationship between political ideology and negativity bias depends on characteristics of the stimuli category. By doing so, our study is the first to show that the basic cognitive processes underlying political ideology, exploration and attitude formation depend to the nature of the attitude stimuli.

The current study has some limitations that raise questions for future research. Choma and Hodson (2017) showed that right-wing authoritarianism is positively related to risk perception, whereas social dominance orientation is negatively related to risk perception. However, in many situations both scales are highly correlated which may render differential predictions unstable (Roccato & Ricolfi, 2005). Moreover, whereas Choma and Hodson (2017) directly measured risk attitudes of participants, our experimental procedure assessed how attitudes are formed via information exploration of novel stimuli, which may not necessarily be related to risk-taking (Fazio et al., 2004).

Secondly, in contrast to Shook and Fazio (2009), we did not examine ideological differences in attitude formation in a "neutral" context. It is therefore unclear whether results observed by Shook and Fazio in the "neutral" BeanFest would also emerge in a "neutral" StockFest. However, since all framings relate to some content, it is not clear whether there can actually be a neutral framing context. This is a reason to use stimulus sampling as a method to examine whether assumed differences between liberals and conservatives are domain general or domain specific.

Finally, whereas the present study shows that task framing influences the relationship between ideology and attitude formation, it does not address mechanisms behind the reversal of attitude formation in conservatives and liberals. However, we hope that the current findings would encourage increased scrutiny of whether other presumed differences between liberals and conservatives are due to the nature of the stimuli with which these differences are assessed.

CHAPTER THREE

3.0 Political liberalism is associated with economic threat perception and uncertainty reduction

3.1 Background

Despite evidence that conservatives are generally more threat-sensitive than liberals, (for reviews, see Altemeyer, 1998; Duckitt, 2001; Hibbing, Smith, et al., 2014a; Jost et al., 2003b; Jost et al., 2007), a number of critics have argued that this observation may not be a true reflection of the real world. For example, some researchers have noted that "[p]erhaps the differences among conservatives, [and] liberals. … have nothing to do with levels of concern about threats, uncertainties, and fears but rather. … reflect a focus on different types of threats and uncertainties." (Greenberg & Jonas, 2003, p. 378; see also Kessler et al., 2014). Consistent with this view, a growing body of research reveals that the relationship between political ideology and threat-sensitivity depends on several factors including the type of the threatening stimulus, the psychological content of the threatening stimulus (i.e., the kind of harm it evokes such as whether physical, economic, etc.) or the ideology measure used to assess individual differences (Bai & Federico, 2020; Brandt et al., 2020; Choma et al., 2013; Crawford, 2014; Eadeh & Chang, 2020; Elad-Strenger et al., 2020; Fiagbenu, Proch, & Kessler, 2021a; Hirschberger et al., 2016; Jost, Stern, Rule, & Sterling, 2017, p. 344 ; A. Malka, C. J. Soto, M. Inzlicht, & Y. Lelkes, 2014a; Proch et al., 2019).

In spite of the recent advances in the research on ideology and threat-sensitivity, questions still remain regarding how conservatives and liberals cope with perceived threats, dangers and uncertainties in the world. Whereas most of the existing evidence suggests that motivations to manage threats and reduce uncertainties are mostly expressed by conservatives than liberals (Jost et al., 2003b; Jost et al., 2007), there is relatively little known about how liberals manage specific threats and uncertainties. In the current study, we argue that, given that conservatives and liberals are equally threat-sensitive, they should be equally capable of coping with the respective stimuli and situations they find threatening. That is, one would expect that

conservatives and liberals would adopt unique behavioural coping strategies and embrace distinct public policies that they believe are well-suited to managing and reducing perceived threats and uncertainties. These strategies and policies should, however, depend on the psychological content of the threats and uncertainties to be managed and reduced (e.g., Eadeh & Chang, 2020).

To appreciate the relationship among political ideology, threat management and uncertainty reduction, it may be useful to take into account the psychological contexts (i.e., situations or origins) from which some of the threatening stimuli and events examined in previous research were sampled to assess individual differences. For instance, whereas previous researchers suggested that conservatives *generally* perceive the world as a more dangerous, threatening, and unpredictable (vs. a secure, safe and stable) place than liberals (Altemeyer, 1998; Duckitt, 2001; Jost et al., 2003b), it is becoming increasingly evident that they mostly examined a narrow and *specific* part of the world – described as a "social world or context" – where there is a high chance of physical victimization by street criminals (e.g., Duckitt & Fisher, 2003).

Conservatives' greater appraisal of the social world as a dangerous and threatening place, therefore, partly reflects their greater concerns about the dangers of street crimes and terrorism (which occur during social interactions and in public places and are the threatening stimuli of which the social world is believed to be mostly comprised, see Duckitt, Wagner, du Plessis, & Birum, 2002, p. 92), which explains why they are more cautious in their social behaviours (e.g., seeking safety in response to terrorism; Sloan et al., 2020), more resistant to social change (e.g., anti-immigration; Doosje, Zimmermann, Küpper, Zick, & Meertens, 2009), and more supportive of tougher punitive measures (e.g., death penalty; McCann, 2008). Focussing on physically threatening stimuli limits our understanding regarding the extent to which non-physically threatening stimuli shape conservatives' and liberals' perception of other parts of the world as a dangerous, threatening and unpredictable place; and restricts our knowledge regarding what personal behaviours and public policies liberals and conservatives adopt to cope with non-physical threats.

Our interest here is to characterize the specific aspect of the world that liberals evaluate as more threatening than conservatives and to highlight the specific situations and events that make this aspect of the world to be perceived as threatening. To this end, we first distinguish

how conservatives and liberals navigate the "social world" where physical victimization by street crimes and terrorism is prevalent, from how they navigate the "economic world" – broadly defined as corporate institutions, financial markets and the people (e.g., CEOs. hedge fund managers, accountants, etc.) who work therein – where victimization by white-collar and corporate crimes is widespread. This distinction can provide better insights into the similarities and differences between conservatives and liberals with respect to their motivations to manage and reduce perceived threats and uncertainties in different aspects of the world.

Specifically, we aim to ascertain whether conservatives and liberals differ in their evaluation of the economic world as a dangerous and threatening place, and whether such perceptions influence behaviours and public policies that they adopt to cope with perceived threats and uncertainties in the economic world. While it is well-known that liberals are more concerned about the dangers of corporate and white-collar crimes than conservatives (Dearden, 2017; Isenring, 2008; Kroska et al., 2019; Unnerver et al., 2008), it is unclear whether they perceive the economic world as a more dangerous and unpredictable place than conservatives. The dearth of research on beliefs about the dangers of the economic world is indeed surprising, because there are reasons to suspect that ideological differences in perception of the economic world as dangerous and threatening may potentially explain existing ideological asymmetries in economic behaviours (e.g., stock market participation; Kaustia & Torstila, 2011), economic policy reforms (e.g., Social Security privatization; Rudolph & Popp, 2009), and economic regulation of the stock market and corporate institutions (Potrafke, 2009; Unnerver et al., 2008).

Using the stock market as a metaphor and a representative entity of the economic world, we examine whether conservatives and liberals differ in their perception of the stock market as a dangerous and risky place. Further, we investigate whether differences in perception of the stock market as dangerous and risky explain ideological asymmetries in i). stock market participation, ii). opposition to privatization of Social Security, and iii). support for tighter regulation of the stock market. Our findings demonstrate that the more liberals perceive the stock market as a dangerous and risky place to invest money, i). the less likely they participate in the stock market, ii). the greater their opposition to investment of Social Security benefits in the stock market and iii). the greater their support for tighter regulation of the stock market. The reverse is true for conservatives. Taken together, the findings challenge the commonly held notion that epistemic motives to reduce uncertainty and existential motives to manage threat are mostly expressed by conservatives than liberals (Jost et al., 2003b).

3.1.1 Similar psychological processes but distinct psychological contents and contexts underlie threat-sensitivity

It is becoming increasingly evident that the long-standing notion that conservatives are generally more threat-sensitive than liberals was based on the use of a narrow range of threatening stimuli to assess individual differences (Crawford, 2017; Eadeh & Chang, 2020). Existing research shows that conservatives and liberals are equally threat-sensitive, fearful, and disgusted, when individual differences are assessed with a broad range of threatening stimuli with qualitatively different psychological features (e.g., Brandt et al., 2020; Eadeh & Chang, 2020; Elad-Strenger et al., 2020; Fiagbenu et al., 2021a; Jost et al., 2017; Kessler et al., 2014; Proch et al., 2019). These findings suggest that the "internal" psychological processes underlying threat-sensitivity may be similar for conservatives and liberals, but these processes may be activated by different types of threatening stimuli. One piece of evidence supporting ideological similarities in threat sensitivity comes from a recent study by Bakker, Schumacher, Gothreau and Arceneaux, (2020), who found that conservatives and liberals do not significantly differ in their electrodermal (skin conductance) responses to a broad range of threatening and negative stimuli. Their finding suggests that the psychophysiological processes that mediate electrodermal responses to threats may be similar for conservatives and liberals.

Fiagbenu et. al (2021) demonstrated that the psychological processes that mediate attitude formation via exploration are similar for conservatives and liberals, but these processes are dependent on the psychological content of the threatening stimulus – that is whether it potentially evokes the threat of physical or economic harm. For example, Shook and Fazio (2009) used an attitude formation task to demonstrate that compared to liberals, conservatives are more cautious when exploring bean stimuli and form more negative attitudes as a consequence; which is taken as evidence that conservatives are generally more sensitive to negative information than liberals.

Since beans belong to the broader category of food stimuli, Fiagbenu et al. (2021) asked whether conservatives form more negative attitudes towards stimuli irrespective of the category from which the stimulus is sampled. To address this issue, the researchers randomly assigned participants to play two incentivised attitude formation games which simulated a food foraging game (i.e., BeanFest) or investment game (i.e., StockFest). In BeanFest, participants explored novel beans to learn which beans are good to eat (resulting in health and survival) and

which are bad to avoid (resulting in sickness and death). Participants in the StockFest explored novel stocks to learn which stocks are good to buy (resulting in profits and wealth) and which are bad to buy (resulting in loss of money and bankruptcy).

The results from Fiagbenu et al. (2021) showed that conservatives (vs. liberals) were more cautious in exploring the beans, which led them to learn more bad than good beans and consequently formed more negative attitudes towards the beans. A reverse pattern of results was observed in the StockFest game: liberals (vs. conservatives) were more cautious in exploring the stocks, which led them to learn more bad than good stocks and thus formed more negative attitudes towards the stocks. Based on these findings, Fiagbenu et al. (2021) argued that the psychological processes that mediate attitude formation via exploration are similar for conservatives and liberals, but these processes depend on the psychological content of the stimulus used to assess individual differences. Although their study suggests that conservatives and liberals differ in their propensity to explore physically and economically harmful situations, the extent to which their findings generalize to other types of stimuli beyond the beans and stocks examined remains to be established (for a detailed discussion see Fiagbenu, Proch, & Kessler, 2021b; Ruisch, Shook, & Fazio, 2021).

3.1.2 Sensitivity to dangers in the social and economic world

The content-dependent relationship between ideology and threat-sensitivity observed by Fiagbenu et al (2021), can also help illuminate how conservatives and liberals react to different types of criminal threats with different psychological contents. Crime is a very broad concept usually believed to comprise two broad types (e.g., Sanchez, 2019), namely, conventional "street" crimes (e.g., muggings, burglary, rape, murder) and white-collar or corporate crimes (e.g., fraud, Ponzi schemes, bribery, price fixing, embezzlements). Earlier research into how conservatives and liberals react to threatening information mostly relied on street crimes and terrorism (for reviews see Crawford, 2017; Eadeh & Chang, 2019). Even the commonly used "Belief in a Dangerous World Scale" which assesses beliefs about the uncertainties and dangers of social life, characterizes the social world as a dangerous place where bad people are out to rob, assault and murder good and law-abiding citizens (Duckitt et al., 2002, p. 92). These findings have led to the conclusion that conservatives are generally more threat-sensitive and perceive the world as a more dangerous place than liberals. However, existing evidence suggests that conservatives may be particularly sensitive to physically

threatening crimes and stimuli than liberals, whereas liberals are perhaps more sensitive to non-physically threating crimes and stimuli than conservatives (e.g., Crawford, 2017; Eadeh & Chang, 2020; Fiagbenu et al., 2021a).

Street crimes potentially cause immediate and direct bodily harm, which pose a threat to life. In some cases, property crimes such as burglaries can result in physical harm when the perpetrator encounters the potential victim (Culp, Kopp, & McCoy, 2015; Kopp, 2019). Even in cases when burglaries occur without physical harm, the resultant feeling of victimization can trigger psychological and emotional states similar to those experienced by victims of physical assaults (Janoff-Bulman & Frieze, 1983). Further, the feeling of physical vulnerability to future offences experienced by burglary victims can compel them to seek temporary or permanent refuge in a safer location. It is, indeed, true that street crime victimization may sometimes create negative economic impacts on livelihood (by threatening the means of sustaining life or health) in the form of replacing expensive stolen property, paying huge medical bills or unemployment due to injury.

However, one may argue that people's sensitivity to street crimes is probably shaped by their perceived risks of physical rather than economic victimisation. In order words, people's fears and concerns are probably much more determined by the proximal effects of street crime (which involve violation of bodily integrity) rather than its distal effects (which involve loss of money or property). By extension, conservatives' greater perception of the social world as a dangerous, threatening and unpredictable place (Jöckel & Früh, 2016; van Leeuwen & Park, 2009) may partly reflect their greater sensitivity to physical victimization whereas liberals greater perception of the social world as a safe, secure and predictable place may partly reflect their relative lesser sensitivity to physical victimization.

On the other hand, there is some evidence that liberals are more concerned about white-collar or corporate crimes and perceive them as more serious than conservatives (Dearden, 2017; Isenring, 2008; Kroska et al., 2019; Michel, Heide, & Cochran, 2014; Rebovich, Layne, Jiandani, & Hage, 2000). But it is unclear whether these differences shapes liberals' perception of the economic world as a more dangerous and threatening place. White-collar and corporate crimes commonly occur during interactions with the economic world. These crimes typically have immediate economic impacts on livelihoods (e.g., debt, bankruptcies, homelessness) but may also have secondary outcomes such as illness, injury, or

even death (Lynch & Stretesky, 2001; Michel, 2015). Although white-collar crimes are sometimes perceived as equally dangerous as street crimes, there is some evidence that they are demonstrably socially and economically more harmful than street crimes (Cohen, 2016; Dodge, Bosick, & van Antwerp, 2013; Friedrichs, 2010; Lynch & Stretesky, 2001; Michel, 2015; Perri, 2011; Piquero, 2018; Piquero, Carmichael, & Piquero, 2008; Schoepfer, Carmichael, & Piquero, 2007; Zohny, Douglas, & Savulescu, 2018).

The socioeconomic harms created by white-collar and corporate crimes differ qualitatively from street crimes. For example, abusive and unethical corporate practices intensify the inherent uncertainties in the economic world sometimes leading to corporate bankruptcies, financial market failures and/or full-blown financial crises (Greenglass et al., 2014; Schoen, 2016; Shover & Grabosky, 2010). These negative events cause immediate widespread economic harms (e.g., unemployment, financial losses, home foreclosures, etc.), which endanger livelihoods (Pfeffer et al., 2013; Rheinhart & Rogoff, 2009; Yilmazer et al., 2015). Further, it is also true that economic adversity can cause ill-health and even suicides (Chang, Stuckler, Yip, & Gunnell, 2013; Seeman et al., 2021; Yilmazer et al., 2015). But these physical outcomes are usually mediated by proximate financial victimization and moderated by factors such as socio-economic status, pre-existing physical or mental illness or even seasonal timing (Ballester, Robine, Herrmann, & Rodó, 2019; Haw, Hawton, Gunnell, & Platt, 2014; Margerison-Zilko, Goldman-Mellor, Falconi, & Downing, 2016). It can thus be argued that people's sensitivity to white-collar and corporate crime is probably shaped by their perceived risks of economic rather than physical victimisation. Finally, corporate scandals and financial crises decrease trust in financial institutions, increase fear, anxiety and risk perception about financial markets, which in turn drive people to withdraw their investments or reduce their participation in stock market (Arrondel & Masson, 2017; Giannetti & Wang, 2016; Keller & Siegrist, 2006; Kuvvet, 2018; Lim & Kim, 2018; Nguyen, Gallery, & Newton, 2017; Sane, 2019; Sitkin & Weingart, 1995; Zhou, 2020).

The above studies, taken together, suggest that conservatives and liberals are sensitive to different types of crimes, which is consistent with previous theoretical observations (Zimring & Hawkins, 1978, 1993). Overall, the existing literature implies that the psychological processes underlying sensitivity to crime might be similar for conservatives and liberals, but these processes depend on the psychological content of the crime. While it is well-known that conservatives' sensitivity to crime with physically threatening contents explains why they

perceive the social world as a dangerous and threatening, it is unclear whether liberals' greater concerns about financially harmful crimes cause them to perceive the economic world as a dangerous and threatening place. In the current study, we examine whether conservatives and liberals differ in their perception of the stock market – an important aspect of the economic world – as a dangerous, threatening, and risky place.

3.1.3 Threat management and uncertainty reduction in a dangerous social world

Given that conservatives and liberals differ in their sensitivities to physically threatening stimuli and situations, the question arises how do they navigate and cope with the threats and dangers in the social world. Relative to liberals, conservatives typically exhibit more cautious behaviours, such as amending their lifestyles and restraining their behaviours to safe spaces to minimize their perceived risk of victimization (e.g., reducing travel, avoiding crowds and unsafe places; Reinhart, 2017; Sloan et al., 2020). Conservatives also support harsher punitive policies (Jacobs & Carmichael, 2002, 2004; McCann, 2008), more government spending on public safety and street crime prevention (Rebovich et al., 2000; Ren, Zhao, & Lovrich, 2008) and also endorse tighter anti-immigration policies than liberals (Canetti, Snider, Pedersen, & Hall, 2016; Canetti-Nisim, Halperin, Sharvit, & Hobfoll, 2009; Doosje et al., 2009; Haner et al., 2019; Stewart, Gulzaib, & Morris, 2019). The overarching aims of these policies are to resist perceived harmful social changes, regulate behaviours that are perceived to increase social disorder and avert demographic shifts.

3.1.4 Threat management and uncertainty reduction in a dangerous economic world

Although the literature is relatively limited, there is some evidence that relative to conservatives, liberals also engage in behaviours, which may help them manage and minimize threats from the economic world. One such behaviour is participation in the stock market. Real-world investments show that liberals exhibit a stock market aversion – they are less likely to participate in the stock market and thus own fewer stocks than conservatives (Kaustia & Torstila, 2011). This asymmetry has been replicated in different laboratory experiments. For example, relative to conservatives, liberals exhibit greater cautiousness in hypothetical stock market games, which makes them form more negative attitudes towards stocks than conservatives (Fiagbenu et al., 2021a). In other investment games, liberals engage in lower stock trading and diversify in portfolios of lower risk, whereas conservatives engage in higher trading and diversify in portfolios of higher risk, which suggests that liberals are more intolerant of financial uncertainties than conservatives (Moore et al., 2010).

Although liberals are less likely to participate in real and hypothetical stock market investments than conservatives, the effect sizes are, however, small or insignificant, (r = .01-.20; and the relationship is moderated by general and financial self-efficacy, such that conservatives' stock ownership increases with increase in their self-efficacy, whereas liberals' stock ownership does not depend on their self-efficacy (Han et al., 2019). Taken together, these findings imply that relative to conservatives, liberals limit their participation in the stock market presumably because they perceive it as a threatening place. But empirical evidence in support of this assertion remains to be established.

Liberals also adopt an array of policies that help them to cope with the threats and dangers in the economic world. First, experimental manipulations that increase the salience of corporate scandals increases support for regulation of financial institutions to protect investors (Eadeh & Chang, 2020). Furthermore, compared to conservatives, liberals are more likely to support punishment of white-collar and corporate crimes and also call for more government spending on white-collar crime prevention than conservatives (Kroska et al., 2019; Michel et al., 2014; Rebovich et al., 2000). Liberals are also more likely to support tighter regulation of the stock market and corporate institutions than conservatives (Potrafke, 2009; Unnerver et al., 2008). Finally, to protect low income workers, the disabled and other vulnerable groups, liberals (vs.

conservatives) oppose risky economic policy reforms such as partial privatization of Social Security, which requires investing a portion of workers' retirement contributions in the stock market (Rudolph & Popp, 2009). Thus, relative to conservatives, liberals' support for these policies can be interpreted as a motivation to reduce the perceived socioeconomic harms caused by unregulated practices in the economic world.

3.2 Overview of the studies

The body of literature reviewed so far suggests that liberals are more concerned about perceived threats emanating from the economic world than conservatives. The cautious behaviours exhibited by liberals in financial investments also suggest that they are more willing to minimize personal investment risks in the stock market than conservatives. Moreover, the nature of the political policies supported by liberals suggests they are more willing to protect the general public from the harms of the economic world than conservatives. However, it is still unclear what accounts for these differences. We hypothesize that perception of the stock market as a dangerous and risky place will mediate the relationship between political ideology and i). stock market participation ii). tighter regulation the stock market and iii) opposition to Social Security privatization. To test these hypotheses, we analysed five nationally representative US surveys obtained from The Roper Centre for Public Opinion Research https://ropercenter.cornell.edu/.

In Study 1, we primarily examine the mediating effect of perception of the stock market as a dangerous place on the relationship between political ideology and stock ownership. Moreover, we predict that paying attention to the stock market may be a competing explanation for ideological difference in stock ownership. Attention to the stock market increases stock market participation (Barber & Odean, 2008). Attention may promote interest in the stock market (or vice versa), which may further increase knowlegde about market activities and participation (Brown, Veld, & Veld-Merkoulova, 2018). Given that conservatives have more interest in money and business activities than liberals (Kemmelmeier et al., 2005; Sheldon & Nichols, 2009), we predict that conservatives would pay greater attention to the stock market than liberals, which would increase conservatives' stock ownership, but decrease liberals' stock ownership. We therefore conducted a parallel mediation model to test the extent to which our primary and secondary mediators explain ideological differences in stock ownership.

In Study 2, we primarily examine the mediating effect of perception of the stock market as a risky place on the relationship between political ideology and stock ownership. Secondly, we examine whether financial self-efficacy moderates this relationship, consistent with previous studies showing a moderation effect (Han et al., 2019). In Study 3, using a parallel mediation model, we examine the competing mediating effects of perception of the stock market as dangerous and attention to the stock market on the relationship between political ideology and opposition of Social Security privatization. Finally, in Study 4, we examine whether perception of the stock market as a risky place mediates the relationship between political ideology and support for more regulation of the stock market on one the hand, and political ideology and opposition to Social Security privatization on the other hand.

3.3 Data analyses

We performed all analyses with the R statistical software (R Core Team, 2021). We conducted mediation analyses with the *lavaan* package in R (Rosseel, 2012). Power analysis with *MedPower* (Kenny, 2017) indicated that a minimum sample size of 312 participants provides 90% power ($\alpha = .05$, two-tailed) to detect a small, simple, standardized indirect effect size of .04. We estimated all indirect effects with 5000 bootstrap samples to generate bias-corrected confidence intervals. We used the probit link in *lavaan* to model all binary mediator and outcome variables. In all the mediation models, we adjusted for potential demographic confounders (i.e., age, sex, education, and income).

We used the *mediation* package (Tingley, Yamamoto, Hirose, Keele, & Imai, 2014) to conduct sensitivity analyses (Imai, Keele, & Tingley, 2010) for the primary mediators to assess the robustness of the indirect effects to unmeasured confounding. Because the potential influence of unmeasured confounding variables cannot be assessed directly, sensitivity analysis estimates how strong the influence of a potential confounding variable has to be to reduce the estimated indirect effect to non-significant. The sensitivity to potential confounding variables is denoted by the parameter ρ (rho; a single value ranging between -1 and 1), which represents the correlation between the residuals of the mediator-outcome models. Mediation analyses assumes that $\rho = 0$, which means that the residuals of the mediator-outcome model are uncorrelated. Sensitivity analysis assesses the robustness of the indirect effects to violations of this assumption by estimating the level of ρ for which the indirect effects will become

insignificant. A larger absolute value of ρ denotes a more robust effect (see Imai, Keele, Tingley, & Yamamoto, 2011). Unlike other statistical indices, there are no conventional cut-off points for determining thresholds for an acceptable ρ. Instead, ρ is interpreted with respect to similar studies in the field (Imai & Yamamoto, 2013, p. 151).

S1 Study 1

In Study 1, we conducted a parallel mediation analysis where we hypothesized that perception of stock market as a dangerous place and attention to the stock market would both mediate the effect of political ideology on stock ownership.

S1.1 Participants

We analysed data from the 2002 Los Angeles Times survey consisting of 1372 nationally representative sample of US adults 18 year or older. We included only participants who responded to questions related to the stock market. The final sample consisted of 1157 participants comprising: 47.1% female, 81.1% White, 6.2% Black, 5.0% Latino, 1.2% Asian, 1.7% Other race/ethnic categories. Participants' age comprised: 11.7% 18-29, 30.1% 30-44, 36.9% 45-64 and 21.3% 65 or older; educational status: 24.4% high school graduate or less, 36.0% some college and 39.7% college graduate; and income: 11.1% below $20,000, 27.3% $20,000 - $40,000, 26.5% $40,000 - $60,000 and 35.0% above $60,000.

S1.2 Measures

Political ideology. Political ideology was assessed with a 5-point scale: 1. *very conservative*, 2. *somewhat conservative* 3. *middle-of-the-road*, 4. *somewhat liberal* 5. *very liberal*.

Perception of the stock market as a dangerous place. Participants indicated the extent to which they perceive the stock as a relatively safe or dangerous place to invest money, on a 3-point scale: 1. *safe*, 2. *depends*, 3. *dangerous*.

Table 2. 1 Demographic characteristics of participants (Studies 1-4)

Variable	Study 1	Study 2	Study 3	Study 4
Age	%	%	%	%
18-29	11.7	-	-	-
30-44	30.1	-	-	-
45-64	36.9	-	-	-
65 or older	21.3	-	-	-
Race/ethnicity				
White	81.1	86.3	78.0	81.9
Black	6.2	9.5	10.0	7.7
White Latino/Hispanic	-	-	-	3.5
Black Latino/Hispanic	-	-	-	0.4
Latino/Hispanic	5.0	-	6.4	1.3
Asian	1.2	.10		
Other race/ethnicity	1.7	3.4	5.4	5.2
Education				
High school or less	24.4	32	36.4	34.30
Some college	36	26.7	27.9	65.7
College graduate	39.7	21.5	35.8	-
Post graduate degree	39.7	19.8		
Income				
< $20,000	11.1	-	-	-
20,000 - $40,000	27.3	-	-	-
$40,000 - $60,000	26.5	-	-	-
> $60,000	35.0	-	-	-
< $15,000	-	9.	-	-
$15,000 - $30,000	-	17.2	-	-
$30,000 - $50,000	-	26.1	-	-
> $75,000	-	28.9	-	-
< $30,000	-	-	27.6	21.7
$30,000 - $50,000	-	-	23.9	21.4
$50,000 - $75,000	-	-	18.6	24.3
$75,000 - $100,000	-	-	13.3	15.2
> $100,000	-	-	16.5	17.4

Attention to the stock market. Participants indicated how closely they follow the stock market, on a 2-point scale: 1. *not closely*, 2. *closely*.

Stock ownership. Participants indicated whether they owned stocks, on a 2-point scale: 1. *no stocks*, 2. *own stocks*.

S1.3 Results and discussion

Descriptive statistics and zero-order correlations are shown in Table 2.2. The results of the parallel mediation analysis (Figure 2.1) revealed that, although there is no significant ideological difference in stock ownership, liberals' perception of the stock market as a dangerous place indirectly reduces their stock ownership, whereas conservatives' perception of the stock market as a safe place indirectly increases their stock ownership, indirect effect: β = -.018, *95%CI* = [-.031, -.006], p = .013. Attention to the stock market did not significantly mediate the relationship between political ideology and stock ownership, β = -.006, *95%CI* = [-.025, .012], p = .514. Note that although education was correlated with stock ownership, it was not correlated with political ideology, an indication that education may not be a potential mediator of the relationship between political ideology and stock ownership.

Sensitivity analysis revealed that the simple indirect effect of perception of the stock markets as dangerous was significant, β = -.026, *95%CI* = [-.045, -.009], p = .008, with a sensitivity parameter, ρ = -.25. After adjusting for demographic covariates including attention to the stock market, the sensitivity parameter dropped to, ρ = -.15. This suggests that the indirect effect has a small degree of robustness to potential confounding by unmeasured variables.

Table 2. 2 Descriptive statistics, zero-order point-biserial and Pearson's correlation among variables in Study 1

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Political ideology (Liberalism)	2.85	1.06							
2. Perception of the stock market as a dangerous place	2.27	.90	.09**						
3. Attention to the stock market	1.55	.50	-.05	-.17**					
4. Stock ownership	1.67	.47	-.04	-.23**	.37**				
5. Age	2.68	.94	-.07*	.05	.12**	.03			
6. Sex ($M = 1$, $F = 0$)	.47	.50	-.12**	-.08**	.13**	.01	-.08**		
7. Education	3.10	.90	.05	-.16**	.22**	.28**	-.14**	.02	
8. Income	2.85	1.02	-.05	-.19**	.25**	.39**	-.14**	.17**	.43**

* $p < .05$, ** $p < .01$.

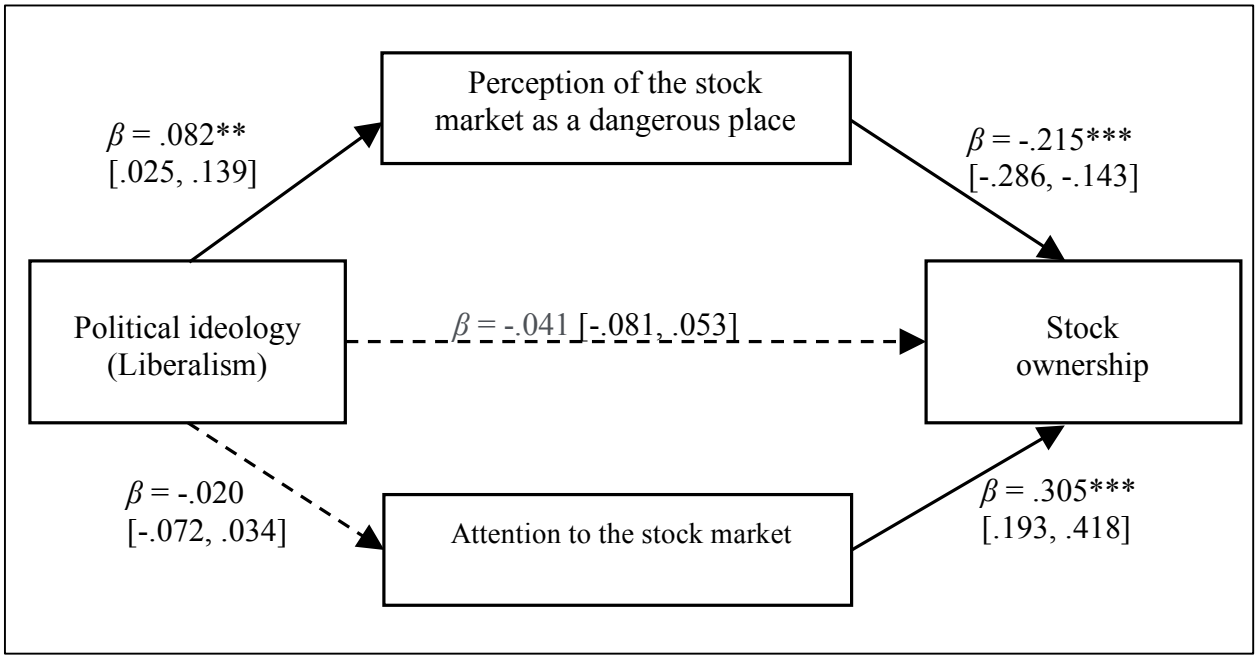

Figure 2. 1 Multiple parallel mediation model showing standardized path coefficients with 95% confidence intervals in Study 1

S2 Study 2

In Study 2, we hypothesised that perception of the stock market as risky would mediate the relationship between political ideology and stock ownership. Also, we predicted that financial self-efficacy would moderate the relationship between political ideology and stock ownership, consistent with Han et al. (2019) who found a moderating effect.

S2.1 Participants

We analysed data from 2005 CBS News/New York Times Social Security, Retirement and Investments survey, a nationally representative sample of 1111 US adults 18 years or older. We analyzed data for only participants who responded to all the questions related to the stock market. The final sample was 901 and comprised mostly females 59.4%, with age ranging from 18-90 years (M_{age} = 49.16; *SD* =17.03). The sample consisted of 86.3% White, 9.5% Black, .10 % Asian and 3.4% Other; educational status: 32.0% high school graduate or less, 26.7% some college and 21.5% college graduates and 19.8% post graduate degree; and income: 9.5% below $15,000, 17.2% $15,000 - $30,000, 26.1% $30,000 - $50,000, 18.3% $30,000 - $50,000 and 28.9% above $75,000.

S2.2 Measures

Political ideology. Political ideology was assessed with a 3-point scale: 1. *conservative*, 2. *moderate*, 3. *liberal*.

Perception of the stock market as a risky place. Participants indicated whether they thought of investment in the stock market as safe or risky, on a 2-point scale: 1. *safe*, 2. *risky*.

Financial self-efficacy. Participants indicated how confident they were in their ability to make good investment decisions in the stock market, on a 4-point scale: 1. *not at all confident*, 2. *not very confident*, 3. *somewhat confident*, 4. *very confident*.

Stock ownership. Participants indicated whether they currently, personally or jointly with a spouse, have any money invested in the stock market, on a 2-point scale:1. *no*, 2. *yes*.

S2.3 Results and discussion

Descriptive statistics and zero-order correlations are shown in Table 2.3. The hypothesized simple mediation analysis, adjusting for covariates, revealed that although there is no significant ideological difference in stock ownership, perception of the stock market as risky indirectly reduces liberals' stock ownership, but increases conservatives' stock ownership, indirect effect: β = -.084, *95%CI* = [-.123, -.046], p < .001. The hypothesized moderation analysis revealed that the main effect of political ideology on stock ownership was not significant β = .062, *95%CI* = [-.100, .225], p = .455, but the main effect of financial self-efficacy on stock ownership was significant, β = .639, *95%CI* = [.562, .912], p < .001. However, the political ideology × financial self-efficacy interaction on stock ownership was not significant, β = .034, 95%*CI* = [-.135, .203], p = .695; which shows that contrary to Han et al., (2019), conservatives' and liberals' stock ownership does not depend on their financial self-efficacy.

Given that financial self-efficacy and education were both correlated with political ideology and stock ownership, we explored whether they would both mediate the relationship between political ideology and stock ownership. We, therefore, conducted a parallel mediation analysis (Figure 2.2) to examine the competing indirect effects of our primary mediator, that is, perception of the stock market as risky and the secondary (exploratory) mediators namely, financial self-efficacy and education. The indirect effect of perception of the stock market as risky was significant, β = -.079, 95%*CI* = [-.116, -.042], p < .001 but the indirect effect of education was not significant: β = .004, *95%CI* = [-.007, .015], p < .001. Also, financial self-efficacy indirectly reduces liberals' stock ownership but enhances conservatives' stock ownership, indirect effect*:* β = -.143, 95%*CI* = [-.197, -.089], p < .001, were significant. Sensitivity analysis revealed that the simple indirect effect of perception of the stock market as risky was significant, β = -.123, *95%CI* = [-.172, -.074], p < .001, and robust, ρ = -.25. After adjusting for all covariates and financial self-efficacy, the indirect effect dropped to ρ = -.20, which suggests that the indirect effect of perception of the stock market as risky has a small degree of robustness to potential confounding by some unmeasured variables.

Table 2. 3 Descriptive statistics, zero-order point-biserial and Pearson's correlation among variables in Study 2

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Political ideology (Liberalism)	1.90	.74							
2. Perception of the stock market as a risky place	1.75	.43	.20**						
3. Financial self-efficacy	2.45	1.01	-.14**	-.39**					
4. Stock ownership	1.56	.50	.01	-.24**	.38**				
5. Age	49.16	17.25	-.04	.01	-.09*	.11**			
6. Sex ($M = 1$, $F = 0$)	.41	.49	-.10**	-.12**	.14**	.07*	-.03		
7. Education	2.29	1.11	.13**	-.12**	.23**	.33**	-.05	.02	
8. Income	3.40	1.32	.04	-.21**	.32**	.41**	-.12**	.07*	.41**

* $p < .05$, ** $p < .01$.

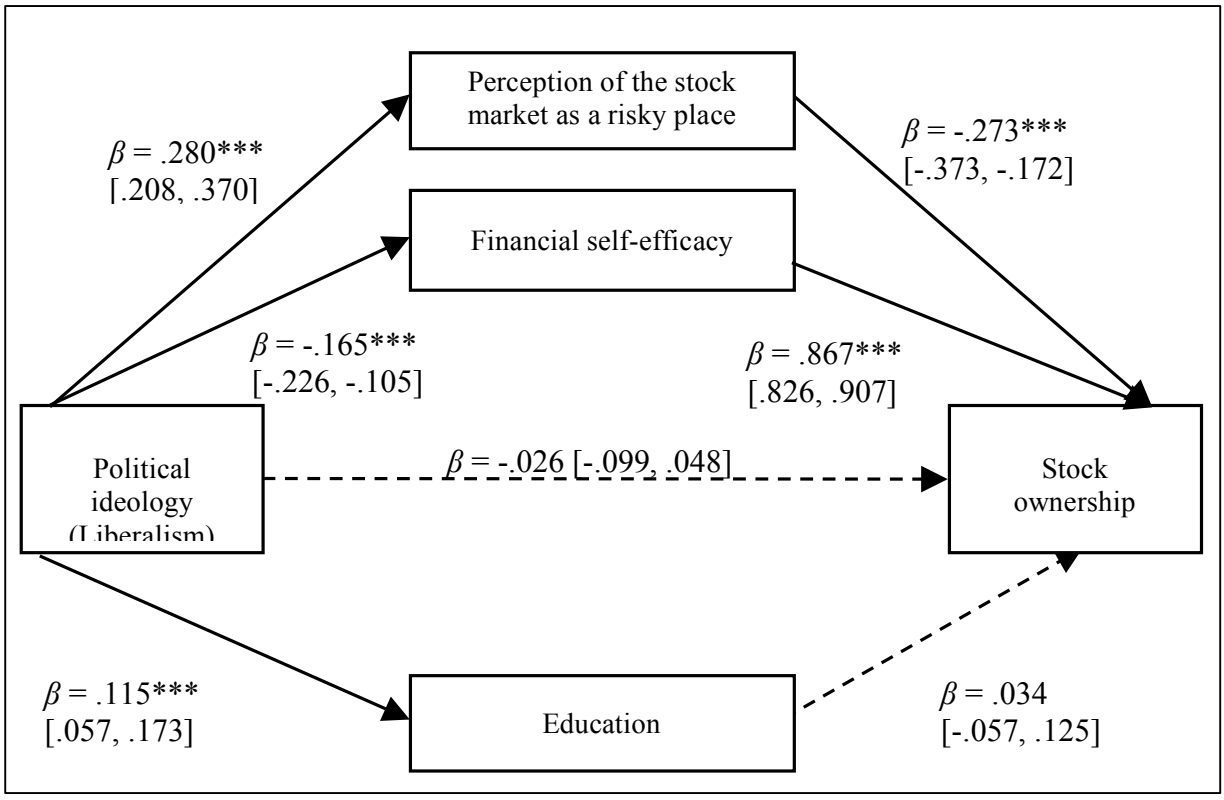

Figure 2. 2 Multiple parallel mediation model showing standardized path coefficients with 95% confidence intervals in Study 2

S3.0 Study 3

In Study 3, we hypothesized that perception of the stock market as a dangerous place and attention to the stock market would both mediate the relationship between political ideology and support for Social Security privatization.

S3.1 Participants

We analysed data from the 2005 PEW Research Centre's Politics, Social Security and Stock Market survey, consisting of 1502 nationally representative sample of US adults 18 year or older. We included only participants who responded to questions related to stock market and Social Security privatization. The final sample comprised 998 participants who were 49.1% female, 78.0% White, 10.0% Black, 6.4% Hispanic and 5.4% Other ethnicity/race; Participants' age ranged from 18-92 years, (M_{age} = 48.05; *SD* =16.56); educational status comprised: 36.4% high school graduate or less, 27.9% some college and 35.8% college graduate and income comprised: 27.6% less than $30,000, 23.9% $30,000 - $50,000, 18.6% $50,000 - $75,000, 13.3% < $75,000 - $100,000, and 16.5% above $100,000.

S3.2 Measures

Political ideology. Political ideology was assessed with a 5-point scale: 1. *very conservative*, 2. *conservative* 3. *moderate*, 4. *liberal*, 5. *very liberal*.

Perception of the stock market as a dangerous place. Participants indicated whether they perceived the stock market as a relatively safe or dangerous place to invest money, on a 3-point scale: 1. *safe*, 2. *depends*, 3. *dangerous*.

Attention to the stock market. Participant indicated how closely they followed the stock market, on a 2-point scale: 1. *not closely*, 2. *closely*.

Support for Social Security privatization. Participants were asked: "Generally, do you favour or oppose the proposal which would allow younger workers to invest a portion of their Social Security taxes in private retirement accounts, which might include stocks or mutual funds?" Participants responded on a 2-point scale: 1. *favour*, 2. *oppose*.

S3.3 Results and discussion

Descriptive statistics and zero-order correlations are shown in Table 2.4. The hypothesized parallel mediation analysis (Figure 2.3) revealed that perception of the stock market as a dangerous place indirectly increases liberals' opposition to Social Security privatization but decreases conservatives' opposition to Social Security privatization, β = -.036, *95%CI* = [.020, .053], $p < .001$. The was no significant ideological difference in attention to the stock market and the indirect effect of attention to the stock market on the relationship between political ideology and stock ownership was also not significant, β = -.004, *95%CI* = [-.001, .010], $p = .140$.

Sensitivity analysis revealed that the simple indirect effect of perception of the stock market as dangerous was significant, $\beta = .037$, *95%CI* = [.020, .056], $p < .001$, and robust, ρ = .30. After adjusting for covariates and attention to the stock market, the sensitivity parameter dropped to, ρ = .25. This suggests that the indirect effect of perception of the stock market as dangerous has a small degree of robustness to potential confounding by some unmeasured variables.

Table 2. 4 Descriptive statistics, zero-order point-biserial and Pearson's correlation among variables in Study 3

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Political ideology (Liberalism)	2.80	.93							
2. Perception of the stock market as a dangerous place	2.00	.94	.13**						
3. Attention to the stock market	1.31	.46	-.06	-.18**					
4. Opposition to privatizing Social Security	1.46	.50	.24**	.32**	-.11**				
5. Age	48.05	16.56	-.06*	.11**	.13**	.28**			
6. Sex (*M*=1, *F*=0)	.51	.50	-.06	-.06*	.14**	-.09**	-.02		
7. Education	2.93	.95	.14**	-.15**	.22**	-.02	-.04	-.03	
8. Income	2.67	1.43	-.02	-.14**	.28**	-.14**	-.10**	.12**	.40**

* $p < .05$, ** $p < .01$.

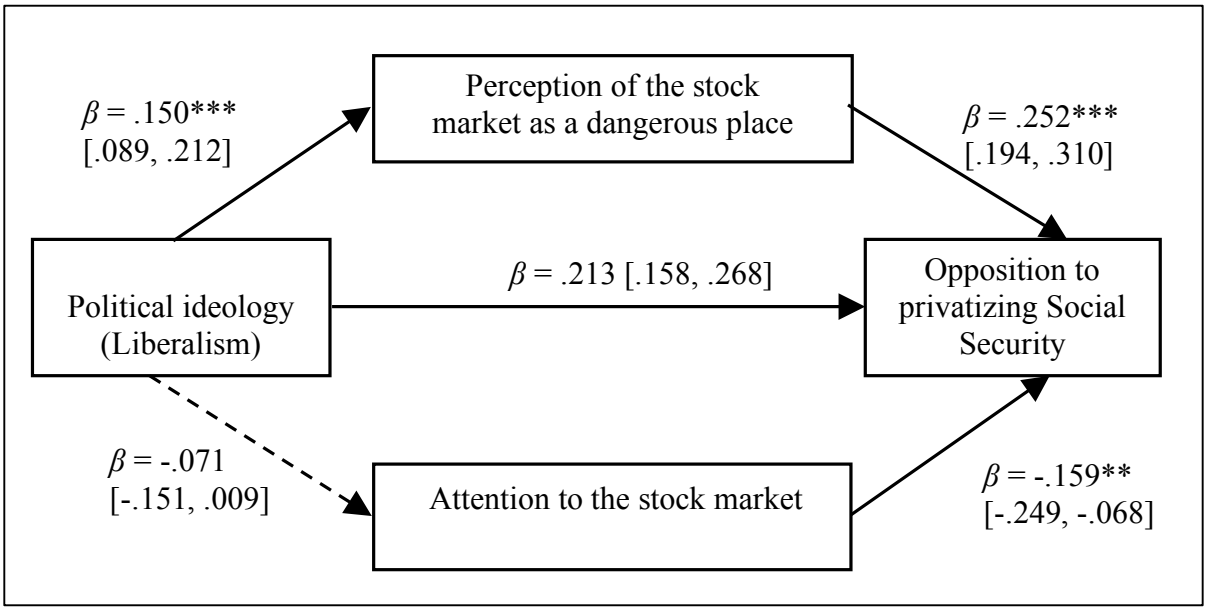

Figure 2. 3 Multiple parallel mediation model showing standardized path coefficients with 95% confidence intervals in Study 3

S4.0 Study 4

In Study 4 we tested two main hypotheses. First, we predicted that perception of the stock market as risky would mediate the relationship between political ideology and support for more regulation of the stock market. Secondly, we expected that perception of the stock market as risky would mediate the relationship between political ideology and opposition to Social Security privatization.

S4.1 Participants

We analysed data from ABC News/Washington Post Poll's Politics, Economy and Social Security survey fielded in 2002 consisting of 1512 nationally representative US adults 18 year or older. We included only participants who responded to items related to the stock market and Social Security. The final sample was 1242, comprising 50.6% female, 81.9% White, 7.7% Black or African-American, 3.5% White Hispanic, 0.4% Black Hispanic, 1.3% Hispanic, and 5.2% Other race/ethnicity. Participants' age ranged from 18-90, (M_{age} = 44.43, *SD* = 15.05); educational status: 34.30% high school graduates or less, and 65.7% some college or beyond; and income comprised: 21.7% less than $30,000, 21.4% $30,000 - $50,000, 24.3% $50,000 - $75,000, 15.2% $75,000 - $100,000 and 17.4% above $100,000.

S4.2 Measures

Political ideology. Political ideology was assessed with a 3-point scale: 1. *conservative*, 2. *moderate*, 3. *liberal*.

Perception that stock market is risky. Participants indicated whether they think the stock market is a safe or a risky investment, on a 2-point scale: 1. *safe*, 2. *risky*.

Stock market regulation. Participants indicated whether they think there should be more government regulation of the stock market or not, on a 3-point: 1. *less*, 2. *stay the same*, 3. *more*.

Support for Social Security privatization. Participants were asked: "Would you support or oppose a plan in which people who chose to could invest some of their Social Security contributions in the stock market?" Participants responded on a 2-point scale: 1. *support*, 2. *oppose*.

S4.3 Results and discussion

Descriptive statistics and zero-order correlations are shown in Table 2.5. The hypothesized mediation analysis (Figure 2.4) shows that perception of the stock market as risky increases liberals' support for more regulation of the stock market but decreases conservatives' support for more regulation of the stock market, indirect effect: $\beta = .028$, *95%CI* = [.008, .047], $p = .005$. Sensitivity analysis revealed that the simple indirect effect of perception of the stock market as dangerous was significant, $\beta = .025$, *95%CI* = [.006, .045], $p =. 005$, and robust, $\rho = .20$. After adjusting for covariates, the sensitivity parameter dropped to, $\rho = .15$. This suggests that the indirect effect of perception of the stock market as risky has a small degree of robustness to potential confounding by some unmeasured variables.

Furthermore, the findings show that perception of the stock market as risky increases liberals' opposition to Social Security privatization but decreases conservatives' opposition to Social Security privatization, $\beta = .044$, *95%CI* = [.017, .070], $p = .001$. Sensitivity analysis revealed that the simple indirect effect of perception of the stock market as risky was significant, $\beta = .047$, *95%CI* = [.018, .076], $p = .002$, and robust, $\rho = .20$. After adjusting for covariates, the sensitivity parameter dropped to, $\rho = .15$. This suggests that the indirect effect of perception of the stock market as risky has a small degree of robustness to potential confounding by some unmeasured variables.

Table 2. 5 Descriptive statistics, zero-order point-biserial and Pearson's correlation among variables in Study 4

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Political ideology (Liberalism)	1.86	.74							
2. Perception of the stock market as a risky place	1.78	.42	.10**						
3. Stock market regulation	2.30	.58	.13**	.14**					
4. Opposition to privatizing Social Security	1.45	.50	.10**	.19**	.16**				
5. Age	44.54	15.04	-.05	.01	.01	.19**			
6. Sex (*M*=1, *F*=0)	.50	.50	-.02	-.09**	-.06*	-.10**	-.04		
7. Education	2.61	.58	.08**	-.13**	-.05	-.06*	-.04	-.02	
8. Income	2.87	1.38	.00	-.16**	-.01	-.09**	-.05	.13**	.35**

* $p < .05$, ** $p < .01$.

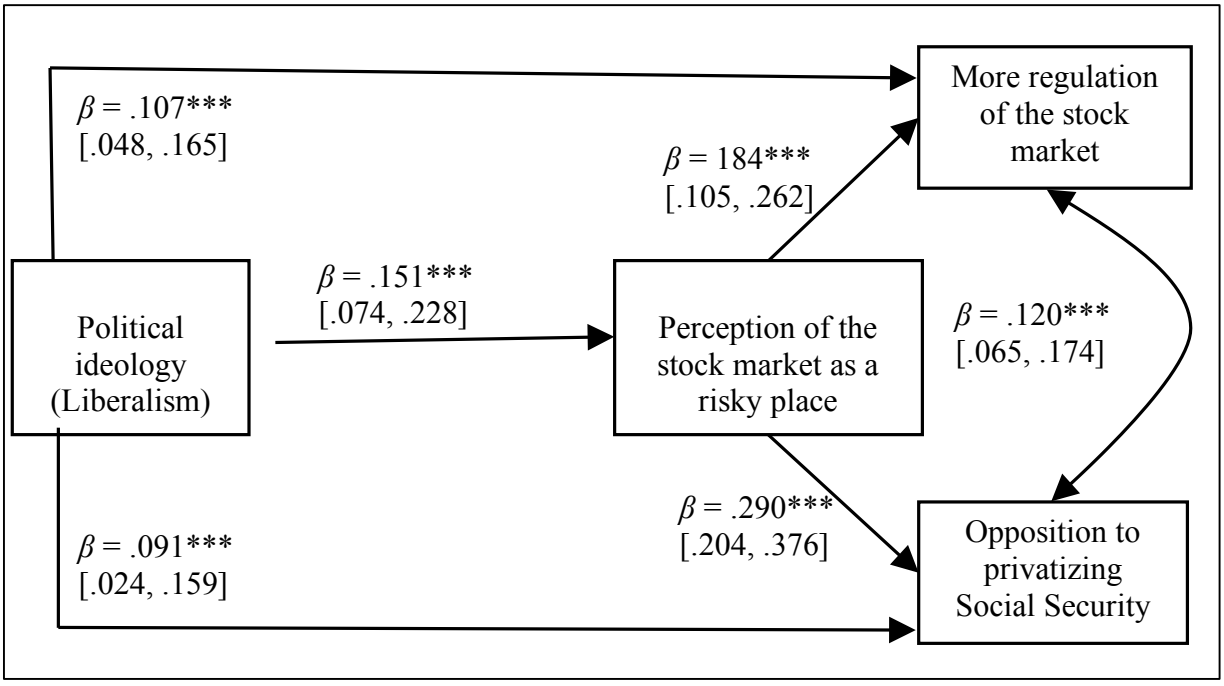

Figure 2. 4 Multiple parallel mediation model showing standardized path coefficients with 95% confidence intervals in Study 4

S5.0 Study 5

In Studies 1 to 4, ideology was assessed with the single item liberal-conservativism measures which taps into people's general ideological self-identification. However, there is evidence that political ideology is best conceptualized along at least two dimensions (e.g., Duckitt & Sibley, 2009; Feldman & Johnston, 2014; Malka, Lelkes, & Soto, 2017). The social ideology dimension taps into attitudes toward traditional/moral norms and social control (e.g., death penalty, immigration etc.) whereas the economic ideology dimension taps into attitudes towards practices that uphold existing inequality (e.g., government spending, etc.). Study 5 was aimed to replicate the previous studies with single item general political ideology measure vs. issue-specific social and economic ideology measures.

S5.1 Participants

We analysed data from the 2001 CBS News Poll #08C, which consisted of 800 nationally representative sample of US adults 18 years or older. We included only participants who responded to questions related to the stock market and ideology measures. The final sample consisted of 304 participants comprising 53.6% female, age ranging from 18-93 years (M_{age} = 47.81; SD =17.03), 85.2% White, 8.9% Black, 1.0% Asian, and 4.9% Other race/ethnicity. Participants' educational status comprised: 38.4% high school graduate or less, 27.2% some college and 34.4% college or postgraduate degree; and income: 10.2% below $15,000, 18.7% $15,000 - $30,000, 27.2% $30,000 - $50,000, 17.8% $50,000 - $75,000 and 20.4% above $75,000.

S5.2 Measures

Political ideology. Political ideology was assessed with a 3-point scale: 1. *conservative*, 3. *moderate*, 4. *liberal*.

Attitudes towards death penalty. Participants were asked whether they were in favour of the death penalty for convicted murderers:1. *yes*, 2. *no*.

Attitudes towards government spending. Participants indicated whether cutbacks in government spending on domestic programmes would be a good or bad thing: 1. *good*, 2. *bad*.

Attitudes towards military spending. Participants indicated whether federal spending on military and defence programs be increased, decreased, or kept about the same: 1. *increased* 2. *same* 3. *decreased*.

Perception of the stock market as a risky place. Participants indicated the extent to which they perceive the stock as a relatively safe or risky place to invest money: 1. *safe*, 2. *risky*.

Attention to the stock market. Participants indicated how much attention they paid to what happens in the stock market: 1. *no attention at all*, 2. *some*, 3. *not much*, 4. *a lot*.

Willingness to invest Social Security taxes in the stock market. Participants were asked "If you were permitted to invest some of your Social Security taxes in the stock market, how likely would you be to do so - would you be very likely to invest your Social Security taxes in the market, somewhat likely, not very likely, or not at all likely to do so? Participants responded on a 4-point scale 1. *not at all likely*, 2. *not very likely*, 3. *somewhat likely*, 4. *very likely.*

Stock ownership. Participants indicated whether they owned stocks: 1. *no stocks*, 2. *own stocks.*

Support for Social Security privatization. Participants were asked "Some people have suggested allowing individuals to invest portions of their Social Security taxes on their own, which might allow them to make more money for their retirement, but would involve greater risk. Do you think allowing individuals to invest a portion of their Social Security taxes on their own is a good idea or a bad idea": Participants responded on a 2-point scale: 1. *good idea* 2. *bad idea*.

S5.3 Results and discussion

Descriptive statistics and zero-order correlations and mediation results are shown in Tables 2.6 and 2.7, respectively. From Table 2.6, we see that liberalism (whether assessed by the single item measure or with issue-specific measures) was significantly positively correlated with perception of the stock market as a risky place and also significantly positively correlated with opposition to Social Security privatization. The reverse applies for conservatism. Furthermore, mediation results from Table 2.7 show that there was a significant indirect effect of ideology (whether assessed by the single item measure or with issue-specific measures) on stock market participation. This implies that liberals' perception of the stock market as a riskier place indirectly reduces their participation in the stock market whereas conservatives' perception of the stock market as a relatively safe place indirectly increases their participation in the stock market.

Similarly, there was a significant indirect effect of ideology (whether assessed by the single item measure or with issue-specific social and economic measures) on opposition to Social Security privatization. This implies that liberals' perception of the stock market as a riskier place indirectly increases their opposition to Social Security privatization whereas conservatives' perception of the stock market as a relatively safe place indirectly reduces their opposition to Social Security privatization. Taken together, the exploratory findings are consistent with results in the main study. That is, social liberals (vs. conservatives) and economic liberals (vs. conservatives) perceive the stock market as a risky place, which reduces their participation in the stock market and also increases their opposition for Social Security privatization.

What we learn from this exploratory study is that the findings based on the use of single item general ideology measures are largely generalizable to issue-specific social and economic ideology measures. But the exploratory findings are only suggestive not conclusive. This is because social ideology was assessed with *only* one item, that is, attitudes towards the death penalty, making it unclear how the results would generalize to other measures such as attitudes towards homosexuality and immigration, among others. Another limitation is that, just like in the main studies, all the measures in the exploratory study were single items, which may lead to downward bias estimates of the effect sizes. We hope further studies would make use of more valid and reliable measures to provide more accurate and stronger effect sizes.

Table 2. 6 Descriptive statistics, zero-order point-biserial and Pearson's correlation among variables in Study 5

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12
1. Political ideology (General liberalism)	1.81	.73												
2. Anti-death penalty (Social liberalism)	1.25	.43	.20**											
3. Anti-government spending cutback (Economic liberalism)	1.52	.50	.27**	.10										
4. Anti-increase in military spending (Economic liberalism)	1.81	.62	.16**	.14*	.23**									
5. Attention to the stock market	2.95	.89	.00	-.04	-.01	-.05								
6. Perception of the SM as risky	1.82	.39	.15*	.11*	.15**	.13*	-.21**							
7. Willing to invest SS taxes in SM	2.35	1.14	-.01	-.12*	-.19**	-.11	.22**	-.45**						
8. Stock ownership	1.58	.49	-.02	-.08	-.07	-.03	.49**	-.28**	.35**					
9. Opposition to SS privatization	1.44	.50	.16**	.20**	.24**	.14*	-.07	.34**	-.53**	-.18**				
10. Age	47.81	17.04	-.01	-.09	-.01	-.12*	.18**	.13*	-.29**	.06	.25**			
11. Sex	.46	.50	-.02	-.01	-.05	-.09	.04	-.02	.18**	.05	-.11	.01		
12. Education	1.99	.86	.09	.02	-.03	-.00	.21**	-.20**	.33**	.43**	-.13*	-.04	.15*	
13. Income	3.13	1.30	.05	-.10	-.07	-.08	.30**	-.17**	.36**	.46**	-.20**	-.14*	.23**	.45**

Note. * $p < .05$, ** $p < .01$. SS = Social Security; SM = Stock market

Table 2. 7 Results of regression and mediation analyses showing direct and indirect effects in Study 5

			Effect of IV on Mediator	Effect of Mediator on DV	Direct effect of IV On DV	Indirect effect of IV on DV
IV	*Mediator*	*DV*	*β*	*β*	*β*	*β*
Political ideology (General liberalism)	Risk perception	Stock ownership	.218 [.060, .377]	-.460 [-.738, -.395]	-.100 [-.052, .253]	-.124 [-.223. -.024]
Anti-death penalty (Social liberalism)	Risk perception	Stock ownership	.185 [.012, .358]	-.546 [-.712. -.380]	-.003 [-.163, .156]	-.101 [-.200, -.004]
Anti-government spending cutbacks (Economic liberalism)	Risk perception	Stock ownership	.219 [.063, .374]	-.553 [-.725. -.382]	.039 [-.111, .188]	-.121 [-.217, -.026]
Anti-increase in military spending (Economic liberalism)	Risk perception	Stock ownership	.175 [.037, .314]	-.559 [-.731. -.388]	.059 [-.089, .207]	-.098 [-.182, -.014]
Political ideology (General liberalism)	Risk perception	Social Security Privatization	.218 [.068, .377]	.634 [.488, .780]	.056 [-.093, .206]	.138 [.035, .242]
Anti-death penalty (Social liberalism)	Risk perception	Social Security Privatization	.185 [.012, .358]	.627 [.468, .786]	.128 [-.019, .274]	.116 [.003, .014]
Anti-government spending cutbacks (Economic liberalism)	Risk perception	Social Security Privatization	.219 [.063, .374]	.624 [.466, .782]	.153 [.104, .293]	.137 [.035, .238]
Anti-increase in military spending (Economic liberalism)	Risk perception	Social Security Privatization	.175 [.037, .314]	.639 [.480. .799]	.064 [-.076, .204]	.112 [.018, .206]

Table 2. 8 Summary of standardized indirect effects and sensitivity parameters across Studies 1-4

Study	Predictor	Mediator	Outcome	β [95% CI], ρ (without covariates)	β [95% CI], ρ (with covariates)
1	Political ideology	Perception of the stock market as a dangerous place	Stock ownership	-.026 [-.045, -.009], -.25	-.018 [-.036, -.006], -.20
2	Political ideology	Perception of the stock market as a risky place	Stock ownership	-.123 [-.172, -.074], -.25	-.037 [-.066, -.008], -.10
3	Political ideology	Perception of the stock market as a dangerous place	Social Security Privatization	.044 [.020, .070], .30	.040 [.018, .062], .25
4	Political ideology	Perception of the stock market as a risky place	Social Security Privatization	.027 [.008, .045], .15	.028 [.009, .046], .10
4	Political ideology	Perception of the stock market as a risky place	Social Security Privatization	.047 [.018, .076], .20	.046 [.018, .073], .15

3.4 Sensitivity analyses

As outlined in the analytical strategy section, we conducted sensitivity analyses to determine the robustness of the primary indirect effects to potential unmeasured confounding variables. Recall that robustness of the results is determined by the sensitivity parameter ρ, which represents how strong the effect of unmeasured confounding would have to be to invalidate the evidence for an indirect effect (Imai et al., 2011). The simple indirect effects and sensitivity parameters with and without covariates are shown in Table 5.

While there are currently no similar studies with which our results can be compared, one previous study interpreted $\rho = .43$ as moderately robust to unmeasured confounding (Imai & Yamamoto, 2013), whereas another study interpreted $\rho = .10$ as not very robust to unmeasured confounding (Columbus, Münich, & Gerpott, 2020). In reference to these previous findings, overall, the current results indicate that the ρs for which the indirect effects would be zero are relatively small. In other words, across all four studies, a potential confounder would have to induce a relatively small correlation (ranging from .10-.25) between the residuals of the mediator-outcome models to invalidate the evidence for a mediation effect. This suggests that our results may not be very robust to unmeasured confounding. However, given the variations in the observed ρs, it is worth noting (based on comparisons across similar studies) that results in Study 1 are relatively more robust than in Study 2 whereas results in Study 3 are relatively more robust than in Study 4.

3.5 General discussion

The current study reveals four potentially significant contributions to the literature on political ideology, threat-sensitivity and coping with threats and dangers. First, the findings establish for the first time that liberals perceive the economic world (i.e., stock market) as a dangerous, threatening and an unpredictable place, whereas conservatives perceive it as a safe, secure and stable place. This asymmetry indirectly affects personal investment behaviours and shapes support for public policies such that, the more liberals perceive the stock market as a dangerous and risky place to invest money, i). the less likely they participate in the stock market, ii). the greater their opposition to investment of Social Security benefits in the stock market and

iii). the greater their support for tighter regulation of the stock market. The reverse is true for conservatives. These findings suggest that existential and epistemic motives to manage and reduce economic threats and uncertainties are much more expressed by liberals than conservatives.

White-collar and corporate crimes are known to destabilize the stock market, which in turn causes large scale economic instability, leading to negative personal and societal outcomes (Schoen, 2016; Shover & Grabosky, 2010). Liberals are more sensitive to white-collar and corporate crimes than conservatives (Dearden, 2017; Isenring, 2008; Kroska et al., 2019; Unnerver et al., 2008), which might explain why liberals believe that the stock market is a more dangerous and threatening place to invest money than conservatives. Furthermore, feelings of uncertainty and threat create negative cognitive and emotional states, which in turn motivates people to engage in safe, cautious or preventative behaviours that aim to avert negative events or reduce their impact (Clark & Isen, 1982; Janoff-Bulman & Frieze, 1983; Kagan, 1972).

For example, sensitivity to corporate scandals and fraudulent practices reduces participation in the stock market (Giannetti & Wang, 2016; Kuvvet, 2018; Sane, 2019). With respect to political ideology, the more liberals perceive the stock market as a dangerous and risky place to invest money, the less likely they are to own stocks. This asymmetry may reflect liberals' greater concerns about losing their personal investments in what they perceive to be a dangerous and risky stock market. In contrast, the more conservatives believe that the stock market is a safe and secure place to invest money, the more they participate in it.

People do not only cope with threatening events and situations by changing their behaviours, they also embrace public policies that they believe can help manage and reduce perceived threats and uncertainties (Jost et al., 2003b; Jost et al., 2007; Jost et al., 2017). The present findings suggest that ideological asymmetries in perception of the stock market as a dangerous and risky place seems to explain why conservatives and liberals significantly differ in their attitudes towards regulation of the stock market and privatization of Social Security.

In the US, Social Security is a government-funded program that provides retirement income for the elderly. Whereas in the current system, workers' Social Security contributions are invested in government bonds, there have been proposals for a new partially privatized system, which would require workers to pay a portion of their contributions into individual

retirement accounts, which would then be invested into the stock market and managed by private equity firms (Ellis & Stimson, 2012, p. xii).

Conservatives believe that privatizing Social Security would provide workers with more autonomy over their investments (with minimal government interference) and can help them take advantage of different investment options on the stock market in order to increase the return on their investments; whereas liberals believe that privatization defeats the purpose of social insurance because it would harm low income workers, the disabled and other vulnerable groups (Rudolph & Popp, 2009; Williamson, 1997). It is known that people become sceptical about privatization of Social Security when trends in the stock market remind them of investment risks (Barabas, 2006). Consistent with this finding, the current study shows that the more liberals perceive the stock market as a dangerous and risky place to invest money, the more they oppose Social Security privatization. Because liberals are more concerned about social welfare than conservatives, their opposition to Social Security privatization enables may help avert the socioeconomic harms that may befall the elderly and vulnerable people if their retirement benefits or the returns on their contributions are not recouped from the stock market.

To avert the negative societal impact of financial misconducts, policy makers enact regulatory reforms that monitor and control the activities of the economic world. Support for economic regulation is, however, polarized along ideology lines: conservatives extoll the virtues of the free market and believe that the economic world should operate with minimal or no government interference; whereas liberals believe that part of government's responsibility is to bring order and stability to a rather chaotic economic world by creating reforms that can mitigate abusive practices and protect investors (Ellis & Stimson, 2012; Ha, 2012; Harrington, 2009; Marti & Scherer, 2016; Potrafke, 2009). Sensitivity to the harms of corporate scandals and greater risk perception are known to increase attitudes towards government regulation of financial institutions (Eadeh & Chang, 2019; Eichler et al., 2013; Laidi, 2010). Consistent with these findings, the current study shows that the more liberals perceive the stock market as a dangerous and threatening place to invest money, the more they support government regulation of the stock market. Since conservatives believe the stock market is a safe and secure place to invest money, they tend to support less government regulation of the stock market.

The present findings add to a growing body of studies that seek to characterize the differences and similarities between conservatives and liberals with respect to threat-sensitivity

(Bakker et al., 2020; Brandt et al., 2020; Eadeh & Chang, 2020; Fiagbenu et al., 2021a). Here, we show that to reduce the risks of economic victimization and to minimize perceived uncertainty in a dangerous economic world of white-collar and corporate crimes, liberals display greater cautiousness in their investment behaviours, support more regulation of the stock market and oppose privatization of Social Security. Similarly, past studies have shown that to minimize the risks of physical victimization and to reduce perceived social disorder and insecurity in a dangerous world of street crime and terrorism, conservatives exhibit greater cautiousness in their social lives, support more exclusionary immigration policies and endorse harsher punitive measures than liberals (Doosje et al., 2009; Eadeh & Chang, 2020; Jost et al., 2003b; McCann, 2008; Sloan et al., 2020). Taken together, these findings support the notion that liberal and conservative political beliefs shape how people appraisal the social and economic world and perceive threats and dangers therein; and further influences the behavioural responses and public policies that they adopt to cope with different kinds of threats and dangers. In other words, conservatives and liberals are equally attuned to different kinds of threatening events in different aspects of the world and are equally motivated to minimize personal victimizations and socioeconomic harms created by perceived threats and dangers.

Prior self-report and laboratory studies suggest that liberals hold more negative attitudes towards stocks and trade less in hypothetical stock markets than conservatives. (Choma et al., 2013; Fiagbenu et al., 2021a; Moore et al., 2010). One would thus expect that liberals would participate less in real-world stock markets than conservatives. However, we we found a null direct effect (but a significant indirect effect) of political ideology on stock ownership. The null direct effect (and significant indirect effect) was also observed when ideology was assessed with social (i.e., dealth penalty) and economic (government spending) measures, suggesting that these effects may generalize to specific dimensions of political ideology. In the case of the US, the null effect is not surprising because Han et al. (2019) showed that the direct effect sizes range from relatively small to insignificant among US participants. Kaustia and Torstila (2011), however, found a significant direct effect in their Finnish sample, which suggests that the direct effect of political ideology on stock ownership may be country-specific. It would be interesting to see whether the indirect effect reported here would be observed in other countries.

Moreover, it would be hasty, based on the current findings, to conclude that conservatives and liberals do not significantly differ in real-world stock ownership in the US. This is because in the current study we only asked whether conservatives own stocks or not.

We did not examine how many stocks they hold and how risky these stocks are or how much money they have invested in the stock market. Future studies should examine the extent to which political ideology is associated with these dimensions of stock ownership. Also, it is possible to expect that the relationship between political ideology and stock ownership may depend on the perceived environmental and societal impact of businesses and companies. Thus, another possible area of research is to examine whether conservatives and liberals differ in their investment in businesses whose activities run counter to their personal political and moral values. For example, one would expect that liberals would invest more in businesses which have perceived positive effects on the environment (e.g., solar and wind energy generating business) than perceived negative effects on the environment (e.g., oil and mining companies). Similarly, one would expect that liberals and conservatives would differ in owning stocks in weapon and defense industries.

To be clear, our findings reveal that political ideology has a significant indirect effect on stock ownership through perception of the stock market as a dangerous and risky place. Another novel finding is that, contrary to Han et al. (2019), financial self-efficacy (assessed as confidence in the ability to make good investment decisions in the stock market) is a mediating rather than a moderating variable in the relationship political ideology and stock ownership. However, education was not a significant mediating variable. Taken together, the findings suggest that perception of the stock market as a dangerous and risky place and financial efficacy (but not education) are the potential mechanisms through which political ideology indirectly affects stock market participation.

The current study has notable limitations. First, it is not clear why liberals and conservative differ in their perception of the stock market as dangerous and risky, although we assumed that these differences may stem from the ideological differences in concerns about white-collar and corporate crimes. Further studies are required to established a link between attitudes towards corporate crimes and perception of the economic world as a dangerous, threatening and unpredictable place. It would also be worthwhile to uncover the specific reason(s) behind the ideological asymmetry in perception of the economic world as dangerous; that is, whether it arises from sensitivity to physical or economic harms created by white-collar and corporate crimes. Finally, future studies are required to understand whether there are ideological differences in evaluations of other entities that make-up the economic world besides the stock market.

Secondly, throughout the studies, all the relevant independent, dependent and mediating variables were assessed with single items measures. The range of some of these items were also restricted to a few response options, which is bound to deflate the observed effect sizes. This might explain the small indirect effects. However, note that these effects, albeit small, still emerged with our suboptimal measures. The next step for future studies is to assess ideological differences (especially about beliefs about the dangers of the economic world) with well-validated and reliable measures to provide stronger effect sizes.

Further, the sensitivity analyses suggest that the results are not very robust. But note that none of the sensitivity parameters are *actually* zero. The sensitivity parameter is usually interpreted with respect to prior studies in the field (Imai & Yamamoto, 2013, p. 151). However, given the absence of similar prior studies, we argue that our results have a small degree of robustness to unmeasured confounds. Future studies can help us to compare and contrast the robustness of the current findings. Finally, the cross-sectional nature of the current study limits the extent to which causal inferences can be made about the current findings. Experimental manipulations or longitudinal studies are required to clearly establish whether ideological differences in perception of economic world as dangerous causally influence economic behaviours and policy preferences.

Nevertheless, the findings imply that liberals' greater financial threat-sensitivity may cause them to miss the valuable opportunities of investments and wealth accumulation, which may further widen the wealth gap across the ideological divide (Gelman, Shor, Bafumi, & Park, 2007). On the one hand, the fact that greater threat-sensitivity decreases liberals' stock ownership is an indication that they are more reluctant to participate in an unregulated economic world where unethical activities cause negative outcomes for individuals and the society. On the other hand, liberals' greater threat-sensitivity promotes efforts to support policies that mitigate the dangers of the economic world. We suggest that liberals' greater threat-sensitivity may, therefore, create a conflict of interest which they resolve by seeking the public interest to the detriment of their own personal economic fortunes in the stock market. We hope that the current study would provide the impetus for further studies into the political psychology of street crimes and white-collar or corporate crimes and their personal and policy implications. Such efforts would reveal further similarities and difference between conservatives and liberals with regards to their sensitivity and reactions to threatening information in the social and economic world.

CHAPTER FOUR

4.0 Sociocultural and economic political attitudes are differentially associated with self-reported fear of ancestral threats

4.1 Background

Fear is a subjective emotional state that is consciously experienced and elicited in response to environmental threats. However, there are psychological differences in fear-eliciting threats. Threats such as snakes, darkness, blood and heights are fear-relevant, which means that they are commonly associated with fears and phobias than are other threats. These threats are often referred to as evolutionary (phylogenetic or ancestral) fear-relevant threats because they are biologically or innately fear-relevant (Bracha, 2006; Marks & Nesse, 1994; Ohman & Mineka, 2001; Seligman, 1971). In contrast, threats such as guns are evolutionary recent (ontogenetic or modern) and their fears are acquired through social and cultural learning. Studies have shown that personality differences and demographic variables predict fear of ancestral threats (Ashton, Lee, Visser, & Pozzebon, 2008; Van Houtem et al., 2013). However, we know little about the relationship between political ideology and fear of ancestral threats. In the current study, we examine how multiple measures of political ideology (i.e., ideological self-identification, social and economic) are associated with a broad and qualitatively different range of ancestral threats.

A common narrative in political and social psychology over the past fifty years is that political conservatives are generally more fearful of threat than liberals, an observation that is referred to as the ideological asymmetry in threat perception (for reviews, see Jost et al., 2003b). More recent evidence suggests that conservatives' greater threat-sensitivity may be an evolutionary response to prevalent threats faced by early human ancestors living in precarious environments (Hibbing, Smith, et al., 2014a). However, emerging evidence
that this view may not be entirely complete: conservatives are no more fearful than liberals. Rather, the relationship between political ideology and fear depends on the nature of the fear-

eliciting stimulus (Jost et al., 2017), indicating that liberals may also be more fearful of some threats than conservatives. To date, the evidence showing ideological symmetries (or similarities) in fear relies heavily on modern threats (e.g., police brutality, terrorism) and the use of single-item ideology measures.

To obtain a more comprehensive insight into the nature of the relationship between ideology and threat perception, we examined how different ideological measures (i.e., single-item ideological self-identification vs. economic and social issue-based) are associated with self-reported fear of ancestral threats. We tested two competing hypotheses: the *ideological asymmetry in fear* hypothesis predicts that conservatives would report greater fear of a broad range of ancestral threats than liberals, regardless of how conservatism is measured. On the other hand, *ideological symmetry in fear* hypothesis predicts that both conservatives and liberals would equally report fear of ancestral threats depending on how ideology is measured.

4.1.1 Traditional perspectives on threat and ideology

Over the past two decades, two different but related models – the motivated social cognition and negativity bias hypothesis – have described the psychological differences between conservatives and liberals with respect to threat perception and threat sensitivity. Reviewing a large body of mostly self-report studies spanning over fifty years, the motivated social cognition model asserts that one of the basic differences between conservatives and liberals is conservatives' greater fear and sensitivity to threatening stimuli (Jost et al., 2003b; Jost et al., 2007). The motivated social cognition model, however, defines threat broadly but uses a narrow range of stimuli, mostly modern physical threats such as terrorism and gun control to assess individual differences (Crawford, 2017; Eadeh & Chang, 2020). Furthermore, the model supports a one-dimensional view of political ideology and does not specify whether and when social and economic ideology dimensions may be differentially associated with fear and sensitivity to threats. The motivated social cognition perspective, therefore, promotes an incomplete account of how qualitative differences in many threatening events and situations in the natural world relate to different operationalisations of political ideology (Brandt et al., 2020; Morgan & Wisneski, 2017).

On the other hand, the negativity bias hypothesis argues that ideological differences transcend self-reported differences in psychological reactions to threat (Hibbing, Smith, et al., 2014a). To assess the relation between ideology and threat-sensitivity, the negativity bias

hypothesis employs objective methods such as behavioural and neurophysiological measures of threat perception, which tap into nonconscious psychological processes which are not accessible to verbal self-reports. Furthermore, in addition to modern threats (e.g., guns, bombs, car accidents, etc.) the negativity bias hypothesis also uses evolutionary fear-relevant stimuli (e.g., spiders, snakes, blood, mutilations/injuries, etc.) to assess ideological differences. Based on these approaches, a growing number of studies have shown that conservatives exhibit greater skin conductance levels, attentional and memory biases, including enhanced neural responses to these threats than liberals (Ahn et al., 2014; Dodd et al., 2012; Mills et al., 2016; Pedersen et al., 2018; Smith et al., 2011). These findings are integrated into the negativity bias hypothesis and are cited as evidence that ideological asymmetries in threat-sensitivity partly reflect basic neural and psychophysiological reactions to threat (Hibbing, Smith, et al., 2014a; Jost & Amodio, 2011).

The assessment of ideological differences with evolutionary fear-relevant threats is not arbitrary. These class of threats can provide insights into how conservatives and liberals process threats which were prevalent in ancestral environments. Furthermore, evolutionary fear-relevant threats have some advantage over some modern threats in that the former category of threats are arguably, apolitical stimuli, and can therefore provide more accurate insights into general ideological differences (see also, Ruisch et al., 2021).

Evolutionary fear-relevant threats are accorded a privileged status in many cognitive models of threat processing. Existing evidence suggests that because these class of threats posed recurrent survival dangers to early human ancestors, they have a history of shaping human evolution in important ways (Isbell, 2006; Ohman & Mineka, 2001; see also Seligman, 1971). According to this view, due to recurrent encounters with dangerous situations and events in early ancestral environments, natural selection may have equipped humans with "biologically prepared" mechanisms and innate defence systems to automatically detect, respond and rapidly associate ancestral threats with greater fear than modern threats. This seems to explain why most common fears and phobias involve a small set of evolutionary fear-relevant threats (e.g., snakes, heights) than modern threats such as guns or electrical outlets. Over four decades of accumulated evidence demonstrates that humans display enhanced attentional biases and neurophysiological sensitivities to ancestral threats than non-threatening stimuli or modern threats (for reviews, see Coelho & Purkis, 2009; LoBue & Adolph, 2019; Ohman, 2005). Furthermore, these findings have consistently demonstrated that the amygdala is the key neural

substrate that has been shaped by evolutionary pressures to selectively and automatically process ancestral threats.

Drawing on the idea of biological preparedness, proponents of the negativity bias hypothesis interpret neurobiological differences between conservatives and liberals as evidence that conservativism may have evolved in response to the widespread distribution of threats in ancestral environments. That is, compared to liberals, natural selection pressures may have equipped conservatives with more reactive neurophysiological systems to facilitate rapid threat detection and processing. Evidence supporting this claim comes from studies showing that conservatives' amygdalae are larger and highly responsive to threats – both modern and evolutionary fear-relevant threats – than liberals' amygdalae (Ahn et al., 2014; Kanai et al., 2011; Schreiber et al., 2013). According to Hibbing, Smith and Alford (2014b) "[L]iberalism may thus be viewed as an evolutionary luxury afforded by negative stimuli becoming less prevalent and less deadly. If the environment shifted back to the threat-filled atmosphere of the Pleistocene, positive selection for conservative orientations would reappear and, with sufficient time, become as prevalent as it was then" (p. 214).

4.1.2 Current perspectives on ideology and threat

The negativity bias hypothesis has not only come under intense criticism (e.g., see commentaries to Hibbing, Smith, et al., 2014a), but more importantly, other studies have also failed to replicate some of its findings. For example, emerging evidence suggests that conservatives and liberals show similar behavioural and physiological reactions to modern and evolutionary fear-relevant threats (Bakker et al., 2020; Fiagbenu, Proch, & Kessler, 2019; Knoll, 2015; Osmundsen et al., in press). These studies suggest that the psychological processes underlying behavioural and physiological responses to threat might be similar for conservatives and liberals. However, we know little about the subjective emotional responses underlying conservatives' and liberals' responses to threats. This issue is important because negative or threatening stimuli evoke a variety of emotional responses (e.g., anger, fear, anxiety), which have been conflated by current research (Castano et al., 2011; P. C. Hogan, 2014; Lilienfeld & Latzman, 2014).

Our focus, therefore, is to examine the relationship between political ideology and self-reported fear of threatening stimuli. Although some studies have shown that conservatives and liberals equally exhibit physiological reaction to threatening stimuli, the existing evidence does

not directly imply that conservatives and liberals are equally fearful threatening stimuli. This is because the mechanisms that give rise to conscious subjective feelings of fear are separate from those that instigate behavioural and physiological responses to threat (LeDoux & Pine, 2016). Therefore, to assess the relationship between fear of threat and ideology, we need to assess subjective feelings of fear using direct methods such as verbal self-reports, "which remain[s] the gold standard in studies of consciousness" (LeDoux & Hofmann, 2018, p. 67). This approach has been used to show that conservatives and liberals are equally fearful of different kinds of modern threats (Jost et al., 2017).

4.1.3 Threat-specific perspective

To build on past research and move the field forward, we examine the relationship between political ideology and self-reported fear of a broad range of evolutionary fear-relevant threats. Our objective is consistent with recent calls for stimuli expansion in research on ideological differences (Elad-Strenger et al., 2020; Fiagbenu, Proch, & Kessler, 2020; Kessler et al., 2014) and also the general appeal for stimulus sampling in psychological research (Wells & Windschitl, 1999). These recommendations are reminiscent of the broader concept of representative sampling designs (Brunswik, 1955, 1956).

The central idea behind stimulus sampling is that the environmental conditions, situations or stimuli to which researchers want to generalize their findings must be specified, sufficiently sampled and represented in research designs to ensure that the intended generalization is supported. For instance, suppose x_1, x_2, $x_3 \ldots x_n$, represent a set of threatening stimuli belonging to the broader threat domain/category, X. Suppose a researcher finds that conservatives are more fearful of a randomly selected stimulus, say x_3, than liberals. Because the psychological qualities of the stimuli making up threat category X may differ substantially, it would be premature for the researcher to conclude that conservatives are more sensitive to threat X than liberals. This is because conclusions that are based on only a *single* threat stimulus (sampled from a single threat category) may render research findings precarious and deeply susceptible to misinterpretation and bias (e.g,. Fiagbenu et al., 2021b)

Consistent with the idea of stimulus sampling, a growing number of studies have used a broad range of threats or qualitatively different threats to show that conservatives and liberals are equally anxious/worried (Brandt et al., 2020), risk-sensitive (Choma et al., 2013), disgust-

sensitive (Elad-Strenger et al., 2020) and exhibit negativity biases in different threat contexts (Fiagbenu et al., 2019). We know of only one study that has explicitly shown that conservatives are *fearful* of terrorism, gun control, government corruption and illegal immigration whereas and liberals are fearful of pollution, climate change and overpopulation (Jost et al., 2017). But these findings are based on, arguably, modern threats and ideology was assessed with the single item liberal-conservative ideological self-identification scale, a measure that insufficiently captures multidimensional nature of ideological views (Feldman & Johnston, 2014). To extend this study, we examine how multiple ideology dimensions are related to a broad range of ancestral threats.

Our major objective is to examine conservatives' and liberals' self-reported fear of 10 ancestral threats belonging to four widely-established fear domains, namely, animal, natural environment, situational and blood-injection-injury threats, which are recognized by the Diagnostic and Statistical Manual V (DSM-V; American Psychiatric Association, 2013). Although past research reveals personality and demographic differences with respect to fear of ancestral threats (Ashton et al., 2008; Van Houtem et al., 2013; Wardenaar et al., 2017), we know little about how fear of these specific threats are associated with political ideology.

We are not only interested in investigating conservatives' and liberals' subjective fears of reptiles (snakes) and arthropods (spiders/insects), which are some of the most common threats investigated by the negativity bias hypothesis (e.g., Mills et al., 2016; Oxley et al., 2008). We expand animal threats to include rodents (mice) and carnivores (dogs). Early human ancestors may have faced potential lethal dangers from predators, venomous and pathogen-carrying animals and this explains why fear of these animals are still prevalent, to date (e.g., see Polak et al., 2019).

Furthermore, we examine how political ideology relates to fear of natural environment threats (heights, darkness, thunder/lightening) and situational threats (flying on an airplane, enclosed spaces). In early ancestral environments, darkness and confined spaces (e.g., holes, caves, etc.), may have diminished visibility and/or impeded physical mobility, which consequently, increased vulnerability to predators, enemy conspecifics or other lurking dangers. Also, falling from high places (e.g., cliffs, trees), or experiences of violent and extreme weather events may have caused fatal injuries or even death. From an evolutionary standpoint, avoidance of enclosed spaces or high places is adaptive, and innate cautiousness

around these stimuli serves survival functions (Bracha, 2006; Poulton & Menzies, 2002). Although flying on an airplane appears to be a contemporary threat, it is a commonly reported phobic-fear and is rooted in fear of heights and enclosed spaces (Mineka & Öhman, 2002; Oakes & Bor, 2010).

Finally, we examine whether conservatives and liberals differ in their fear of blood, needles and injury-related threats. These threats are classified under the broader category of blood-injury-injection threats (Olatunji et al., 2010; Wenzel & Holt, 2003) and have also been examined by the negativity bias hypothesis (e.g., Ahn et al., 2014; Oxley et al., 2008). Exposure to blood and injury-related threats triggers fainting responses, an evolutionary adaptation to excessive blood loss, which increases chances of survival (Diehl, 2005; Marks, 1988). It is aso believed that fainting evolved as a fitness enhancing strategy in response to middle Palaeolithic intra-group and inter-group warfare when exposure to sharp weapons was prevalent (Bracha, Bracha, Williams, Ralston, & Matsukawa, 2005). These evolutionary responses have been conserved across evolutionary times and may explain why fear of blood/needles/injection are common.

4.1.4 Ideology-specific perspective

Another major aim of the current study is to examine how qualitatively different ideology measures are associated with evolutionary fear-relevant threats. Most researchers typically rely on the unidimensional operationalization of ideology (ideological self-identification) as a default measure to assess the relationship between ideology and threat. Several cogent arguments and empirical evidence suggest that people's ideological views are sufficiently characterised along a single liberal-conservative ideological continuum (Hibbing, Smith, et al., 2014b; Jost et al., 2009; Judd et al., 1981). However, there is diversity in ideological views and these can be organized along, at least two dimensions; namely, social and economic ideology (Feldman & Johnston, 2014; Malka & Soto, 2015). The social dimension taps into the inclination to maintain long-established socio-cultural and moral traditions and to enforce in-group vs. out-group boundaries (e.g., anti-immigration), whereas the economic dimension taps into the tendency to support economic policies that perpetuate existing socioeconomic inequalities (e.g., anti-government intervention). Failure to account for these differences in any model of threat and ideology may produce bias conclusions regarding the threat-ideology link.

Our aim to examine diverse threat and ideology dimensions is also in line with Brunswik's (1955) representative sampling design. This perspective suggests that, it is not sufficient to just sample broad and varied range of threats to address ecological validity. It is equally important to address population validity in the assessment of ideological differences in threat perception. This means that the ideological (i.e., participant) populations to which researchers want to generalize their findings must be specified and sufficiently sampled to ensure that the intended generalization is supported. For example, suppose a researcher finds that conservatism (measured as conservative (ideological) self-identification) is positively associated with say, a broad range of threats, x_1, x_2, $x_3 \ldots x_{10,}$ belonging to the broader threat domain/category, X; it would be premature for the researcher to conclude that conservatives are generally more fearful than liberals. This is because conservatism was assessed with a *single* (non-issue-based) ideology measure. Consequently, the researcher should not on *a priori* grounds, without empirical demonstration, assume that economic or social (issue-based) conservatism would produce the same patterns of results with the same threats.

Acknowledging the diversity in ideology measures and assessing individual differences with both single and issue-based ideology measures provides a vital step towards understanding the threat-ideology link. At least, it would enable researchers to generalize their findings to the specific participants groups that are captured by the different ideology measures. In the current study, we concurrently examine how multiple ideology measures are associated with a broad range ancestral threats. This allows us to determine the extent to which presumed qualitative differences among ideology measures may potentially produce biased predictions about ideology and fear of threat.

There is, indeed, some sparse evidence that qualitative differences among ideology measures may produce different patterns of results depending on a researcher's choice of ideology measure. Although social and economic ideology dimensions are correlated, they are rooted in distinct psychological worldviews. Social conservatism (often operationalized as right wing authoritarianism, i.e., RWA) originates from the belief that world is a dangerous and threatening place whereas economic conservatism (often operationalized as social dominance orientation, i.e., SDO) is rooted in a tough-minded and competitive worldview (Duckitt, 2001; Duckitt et al., 2002). The distinct psychological antecedents of social and economic ideology imply that they may have different relationships with threat. That is, individuals who hold a cynical worldview should generally report being more threat-sensitive than individuals who

believe that the world is a relatively safe place. In contrast, perception of the world as a competitive place should generally be associated with less threat-sensitivity than belief that the world is a cooperative place.

Consistent with the view that qualitative differences in SDO and RWA would produce different associations with threat, Choma et al. (2017), showed that RWA is positively correlated with social, ethical, financial, health and recreational risk-based threats whereas SDO is generally, negatively correlated with these threats. In another study, Choma et al. (2014) assessed risk perception of 38 threats and found that ideological self-identification, RWA and SDO were each differentially associated with risk-based threats. But RWA was generally, positively associated with most of the threats whereas SDO was generally, negatively associated with most of the threats. Brandt et al., (2020) showed that ideological self-identification, social ideology and economic ideology were each differentially associated with negative emotion-based threats. Taken together, the above studies suggest that psychological processes associated with threat processing may be similar for conservatives and liberals such that conservatives and liberals would equally exhibit threat-sensitivity depending on how ideology is measured. This raises the possibility that multiple measures of ideology should have differential relationships with fear of a broad range of ancestral threats.

4.2 Study overview

Our specific research questions are: what patterns of associations would be revealed between the unidimensional ideology measure (i.e., ideological self-identification) and a broad range of ancestral threats? Would the multidimensional issue-based ideology measures (i.e., social and economic ideology) reveal a more nuanced association with a broad range of ancestral threats? To answer these questions, we analysed 9 independent US surveys to examine the relationship between the political ideology and ten threats belonging to four widely-established threat domains: 1. animal (snakes, spiders/insects, dogs and mice), 2. natural environment (heights, the dark and thunderstorms), 3. situational (enclosed spaces and flying on an airplane) 4. blood-injection-injury (blood/needle/injection). We test the following competing hypotheses:

Ideological asymmetry in fear: Political ideology, that is, ideological self-identification, social and economic ideology would each exhibit asymmetric relationships with

all the 10 ancestral threats such that conservatives (i.e., conservative self-identifiers, social and economic conservatives) would report greater fear of all the 10 threats whereas liberals (i.e., liberal self-identifiers, social and economic liberals) would report less fear of all the 10 threats. This prediction is based on the negativity bias hypothesis and the motivated social cognition model, which promote the idea that psychological processes underlying threat processing are more reactive in conservatives than in liberals and different dimensions of ideology are strongly interrelated and thus, largely interchangeable.

Ideological symmetry in fear: Political ideology (i.e., ideological self-identification, social and economic) would each exhibit differential (symmetric) relationships with all the 10 threats, such that conservatives and liberals would equally report greater fear of specific threats, depending on the ideology measure used to assess individual differences. This prediction recognises the qualitative differences in different ideology measures and also acknowledges that since psychological processes mediating threat processing maybe similar for conservatives and liberals, these processes should be activated by different kinds of threats.

4.3 Method

4.3.1 Participants

We obtained data from 8 independent nationally representative samples and 1 unrepresentative national sample from the US. Five samples were obtained from Chapman University Survey of American Fears which was an annual survey conducted from 2014-2018: (CUSAF Sample 1: N = 1573; CUSAF Sample 2: N = 1541; CUSAF Sample 3: N = 1511; CUSAF Sample 4: N = 1207, CUSAF Sample 5: N = 1190). All the datasets are available here: https://www.thearda.com/, and further details about the design and sampling methodology have been described elsewhere (Bader, Baker, Day, & Gordon, 2020). The rest of the samples include: The Roper Report's Business/Consumerism Poll conducted in 1977 (Roper; N = 2004), Gallup Polls conducted in 1998 (Sample 1: N = 1015) and 2001 (Sample 2: N = 1016). These surveys were obtained from The Roper Centre for Public Opinion Research (https://ropercenter.cornell.edu/). The final unrepresentative sample was the National Survey of American Life (NSAL: N = 6082), conducted from 2001-2003 obtained from: https://www.icpsr.umich.edu/web/ICPSR/studies/27121. Details about the design and

sampling methodology associated with the NSAL have been described elsewhere (Pennell et al., 2004).

4.3.2 Assessment of self-reported fears

The fears reported here were available in at least two of the surveys (see Tables 1 and 2). Altogether, participants indicated the extent to which they were afraid of 10 stimuli from 4 fear domains, namely, animals (*mice, dogs, snakes, spiders/insects),* natural environments (*heights, the dark, thunder/lightning*), situational (*enclosed spaces, flying on an airplane*) and blood-injection-injury (*blood/needles/injection*). Responses were scored on a 4-point scale (CUSAF; 1. *not at all afraid*, 4. *very afraid*), 3-point scale (Roper; 1. *not afraid at all*, 2. bother slightly, 3. *afraid of it*) and 2-point scale (Gallup and NSAL; 1. *not afraid*, 2. *afraid*).

4.3.3 Ideological self-identification

Participants indicated their political views on the single item liberal-conservatism self-identification scale. Responses were scored on a 7-point scale (CUSAF and NSAL; 1. *extremely liberal*, 7. *extremely conservative*); and a 5-point scale (Roper and Gallup: 1. *very liberal*, 4. *very conservative*). Higher scores on the scale represent greater conservative se-identification whereas lower scores indicate greater liberal self-identification.

4.3.4 Social ideology

CUSAF Sample. In the CUSAF Sample 1, participants indicated their attitudes towards, i). homosexuality (9 items, e.g., legalizing homosexual marriage undermines traditional marriage and the family. etc.), ii). punishment (6 items, e.g. make sentences more severe for all crimes, etc.) and iii). immigration (7 items, e.g. deportation is a good solution for immigration issues, etc.), on a 4-point scale (1 = *strongly disagree*, 4. *strongly agree*). In CUSAF Samples 3 through 5 participants responded to only the 7 immigration items. All items were averaged and scored such that higher scores indicate greater social conservatism whereas lower scores indicate greater social liberalism. All social ideology items are reported in the Supplementary Materials.

Gallup Sample. In the Gallup Sample 1 participants indicated whether they believed that sex before marriage is: (1. *not wrong*, 2. *wrong*). In Gallup Sample 2 participants indicated

what they believed explains the theory of human origins: (1. *evolution* 2. *creationism*). All items were averaged and scored such that higher scores indicate greater social conservatism whereas lower scores indicate greater social liberalism.

4.3.5 Economic ideology

Roper Sample. In the Roper survey, 6 items were used to assess the extent to which participants believed that there is too much government regulation of the following political issues, on a 3-point scale (1. *not enough*, 2. *about right* 3. *too much right*): i). *automobile safety*, ii). *banking activities*, iii). *safety of prescription drugs*, iv). *honesty and accuracy of claims that are made by advertisers*, v). *the prices of oil and gas*, and vi). *the manufacture and sale barbiturates*.

Gallup Sample. In Gallup Sample 1, three items assessed participants' views on whether government spending on social services should be (1. *increased*, 2. *kept at the present level* 3. *reduce/end altogether*). The items were: i). *improving medical/healthcare*, ii). *providing food programs*, iii). *improving education quality*. In the Gallup Sample 2, participants indicated their views on federal inheritance tax laws: (1. *leave inheritance tax laws unchanged*, 2. *eliminate inheritance taxes on only small businesses and family farms*, 3. *eliminate all inheritance taxes on all estates*). All single or multi-scale items were averaged and/or scored such that higher scores indicated greater economic conservatism whereas lower scores indicated greater economic liberalism.

4.4 Data analysis

4.4.1 Main analyses

Altogether, we obtained $k = 9$ samples. For each sample, we first derived a zero-order correlation matrix consisting of correlations among all 3 ideology measures, the 10 ancestral threats and 5 demographic covariates (i.e., age, sex, education, income and religious preference). This resulted in 9 independent correlation matrices. We then used a two-step meta-analytic path modelling (e.g., see, Cheung & Chan, 2005; Viswesvaran & Ones, 1995) to integrate the 9 correlation matrices. In the first step, the 9 correlation matrices were meta-analytically aggregated to form a pooled correlation matrix. We used fixed effects to aggregate

individual correlations. To adjust for the attenuation of individuals correlations, we corrected for sampling error by deriving the sample-size weighted correlations and also corrected for unreliability in the social and economic ideology multi-item measures, based on appropriate formulas and rationale described by previous research (Hunter & Schmidt, 2015; Wiernik & Dahlke, 2020). In the second step, the resultant pooled correlation matrix was then used to conduct regression analysis. In each model, we regressed each threat on all the three ideology measures with and without covariates. Following Viswesvaran and Ones (1995), the sample size of each regression model was the harmonic mean of the sample sizes across the relevant correlations considered. All 9 independent correlation matrices and the pooled correlation matrix are presented in the Supplementary Materials.

4.4.2 Exploratory analysis 1

We also explored the relative contribution or amount of variance explained by each ideology measure in predicting each threatening stimulus. Given inherent issues of multicollinearity among the three ideology measures, the relative contribution of each predictor to the model R^2 cannot be determined by the regression weights (Kraha, Turner, Nimon, Zientek, & Henson, 2012). We therefore supplemented regression analysis, with relative weight analysis (Tonidandel, LeBreton, & Johnson, 2009). This procedure partitions the model R^2 in each outcome variable among the predictor variables. The resulting output is a raw relative weight (*RW*) for each predictor, which represents its relative contribution to the outcome variable. The *RW* can also be rescaled by expressing it as a percentage of R^2 (i.e. $\%\,RW = RW/R^2 \times 100$). Predictors with larger *RW* (or *% RW*) are assumed to be the more "relatively important/relevant" predictors for the outcome variable.

4.4.3 Exploratory analysis 2

The main regression is based on the idea that ideological beliefs predict fear of ancestral threats. Given evidence supporting reciprocal relationships between ideology and threat (Brandt et al., 2020; Choma & Hodson, 2017), we also examined the extent to which fear of ancestral threats predicts ideological beliefs. We, thus, regressed each ideology measure on all the 10 threats. All analyses were carried out using *metafor* (Viechtbauer, 2010), *lavaan* (Rosseel, 2012) and *relaimpo* (Grömping, 2006) packages in R 3.6.2 (R Core Team, 2020).

4.5 Results

Sample-specific descriptive statistics and demographic characteristics across all the 9 samples are presented in Tables 3.1, 3.2, 3.3 and 3.4.

4.5.1 Zero-order correlation

Results of pooled zero-order correlation among all political ideology measures showed that conservative self-identification was associated with social conservatism (r = .55, p <. 001) and economic conservatism (r = .18, p <. 001). Social conservatism was associated economic conservatism (r = .08, p <. 001).

Sample-specific zero-order correlations are shown in Figures 3.1 and 3.2 whereas the pooled correlations across all samples are displayed in Figure 3.3. The results demonstrate that, across all samples, contrary to our prediction, conservative self-identification was not consistently positively associated with fear of ancestral threats. Rather, ideological self-identification was differentially associated with fear of ancestral threats, such that both conservative and liberal self-identifiers reported greater fear of different kinds threats. The patterns of effects are consistent with the pooled effect sizes in Figure 3.3, which show that conservatives and liberals identifiers did not significantly differ in their fear of mice, dogs, spiders/insects, heights, thunder/lightning, flying, enclosed spaces, blood/needles/injection. Rather, conservative self-identification was associated with greater fear of snakes than liberal self-identification, whereas liberal self-identification was associated with greater fear of the dark than conservative self-identification.

Furthermore, across all samples, social ideology largely exhibited asymmetrical relationships with fear of ancestral threats. Figure 3.3 shows that social conservatism was associated with greater fear of all the 10 threats whereas social liberalism was associated with less fear of all the 10 threats. Similarly, across all samples, economic ideology largely exhibited asymmetric relationships with fear of ancestral threats. Figure 3.3 shows that economic conservatism was associated with less fear of all the 10 threats whereas economic liberalism was associated with greater fear of all the 10 threats.

Table 3. 1 Descriptive statistics and reliability coefficients across CUSAF samples

	CUSAF Sample 1				CUSAF Sample 2			CUSAF Sample 3				CUSAF Sample 4				CUSAF Sample 5			
	N	α	M	SD	N	M	SD	N	α	M	SD	N	α	M	SD	N	α	M	SD
Political ideology																			
1. Conservative self-identification	1533		4.27	1.45	1511	4.24	1.52	1474		4.30	1.52	1207		4.08	1.62	1190		3.93	1.67
2. Social conservatism	1573	.91	2.46	.52				1511	.89	2.36	.67	1207	.90	2.12	.74	1190	.91	2.03	.77
Fear-based threats																			
3. Dogs					1502	1.55	.79	1488		1.47	0.74	1205		1.32	.58	1186		1.32	.58
4. Snakes					1504	2.09	1.02	1488		2.10	1.02	1205		1.89	.97	1185		1.90	.99
5. Spiders/insects					1505	1.90	.95	1488		1.89	.93	1206		1.85	.92	1183		1.85	.93
6. Heights	1532		1.94	.93	1498	1.97	1.01	1487		1.93	.97	1203		2.08	1.00	1186		2.11	1.02
. 7. The dark	1526		1.39	.67	1502	1.38	.68												
8. Thunder/lightning																			
9. Blood/Needles/Injection	1526		1.66	.86	1497	1.54	.76	1484		1.51	.74	1203		1.37	.60	1186		1.38	.61
10. Flying	1526		1.56	.84	1502	1.55	.82	1489		1.53	.82	1204		1.46	.79	1187		1.45	.76
11. Enclosed spaces	1522		1.7	.89	1498	1.72	.93	1491		1.67	.91	1204		1.76	.94	1184		1.76	.93
12. Age	1573		50.3	16.8	1541	50.1	17.4	1511		50.2	17.2	1189		47.4	16.9	1122		48.9	16.91

Table 3. 2 Demographic characteristics across CUSAF samples

	CUSAF Sample 1		CUSAF Sample 2		CUSAF Sample 3		CUSAF Sample 4		CUSAF Sample 5	
	N	%	N	%	N	**%**	N	%	N	%
Sex										
Male	785	49.9	748	48.5	738	48.8	547	45.3	687	57.7
Female	788	50.1	793	51.5	773	51.2	660	54.7	503	42.3
Religious preference										
Atheist	285	18.1	317	20.6	280	18.5	267	22.1	298	25
Religious	1280	81.4	1224	79.4	1231	81.5	895	74.2	821	69
Race/Ethnicity										
White	1147	72.9	1106	71.8	1109	73.4	940	77.9	861	72.4
African American/Black	150	9.5	155	10.1	152	10.1	84	7.0	83	7.0
Hispanic	159	10.1	169	11	155	10.3	95	7.9	132	11.1
Other race/ethnicity	117	7.4	111	7.2	95	6.3	73	6.0	100	8.4
Education										
Less than high school	148	9.4	119	7.7	154	10.2	11	0.9	31	2.6
High school graduate	446	28.4	451	29.3	463	30.6	37	3.1	180	15.1
Some college, no degree	454	28.9	434	28.2	439	29.1	611	50.6	303	25.5
College or higher	525	33.4	537	34.8	455	30.1	548	45.4	673	56.6
Income										
US$30,000 or less	333	21.2	326	21.2	338	22.4	231	19.1	308	25.9
US$30,000-$75,000	567	36.0	554	36.0	559	37.0	395	32.7	255	21.4
US$75,000 or more	673	42.8	661	42.9	614	40.6	510	42.3	513	43.1

Table 3. 3 Descriptive statistics and reliability coefficients across NSAL, Gallup and Roper samples

	NSAL Sample			Gallup Sample 1				Gallup Sample 2			Roper Sample			
	N	M	SD	N	α	M	SD	N	M	SD	N	α	M	SD
Political ideology														
1. Conservative self-identification	5259	3.94	1.47	988	-	3.21	.94	1016	3.20	.88	1879	-	3.22	1.02
2. Social conservatism	-	-	-	1015	.63	1.41	.49	1016	1.64	.48	-	.64		
3. Economic conservatism	-	-	-	1015	-	1.43	.47	1016	2.17	.80	2004	-	1.62	.40
Fear-based threats														
4. Mice	-	-	-	1013	-	1.25	.43	1014	1.20	.40	1984	-	1.54	.77
5. Dogs	-	-	-	1013	-	1.09	.29	1008	1.10	.30	1986	-	1.25	.53
6. Snakes	-	-	-	1012	-	1.55	.50	1012	1.51	.50	1967	-	2.17	.86
7. Spiders/insects	-	-	-	1012	-	1.89	.47	1014	1.26	.44	1990	-	1.49	.71
8. Heights	5887	1.30	.46	1014	-	1.33	.49	1011	1.37	.48	1983	-	1.67	.80
9. The dark	-	-	-	1015	-	1.07	.25	1014	1.05	.21	-	-	-	-
10. Thunder/Lightning	-	-	-	1012	-	1.16	.36	1015	1.11	.31	1989	-	1.41	.66
11. Blood/Needles/Injection	5889	1.27	.44	1010	-	1.20	.40	1015	1.19	.40	-	-	-	-
12. Flying	5852	1.26	.44	991	-	1.89	.39	1004	1.17	.38	1888	-	1.42	.80
13. Enclosed spaces	5890	1.19	.39	1011	-	1.34	.47	1010	1.34	.47	-	-	-	-
14. Age	6082	43.22	16.33	1006	-	45.38	16.53	1006	46.93	16.95	-	-	-	-

Table 3. 4 Demographic characteristics across NSAL, Gallup and Roper samples

	NSAL Sample		Gallup Sample 1		Gallup Sample 2		Roper Sample	
	N	%	N	%	N	%	N	%
Sex								
Male	3796	50.1	486	47.9	494	51.4	943	52.9
Female	2286	49.9	529	52.1	522	48.6	1061	47.1
Religious preference								
Atheist	660	11.0	96	9.5	85		135	6.7
Religious	5409	89.0	678	66.8	907		1856	92,6
Race/Ethnicity								
White	891	14.6	831	81.9	868	85.4	1745	87.1
African American/Black	5008	82.3	84	8.3	99	9.7	230	11.5
Hispanic	183	3.0						
Other race/ethnicity	-	-	88	8.7	41	4.0	20	1.0
Education								
0-11 years	1375	22.6	-	-	-	-	-	-
12 years	2136	35.1	-	-	-	-	-	-
13-15 years	1468	24.1	-	-	-	-	-	-
16 years or greater	1103	18.1	-	-	-	-	-	-
Less than high school	-	95	95	9.4	352	34.6	-	-
High school graduate	-	279	279	27.5	312	30.7	-	-
Some college, no degree	-	273	273	26.9	165	16.2	-	-
College or higher	-	363	363	35.8	182	17.9	-	-
Income								
US$0-2500	-	-	-	-	-	-	101	5.0
US$2500-$9000	-	-	-	-	-	-	447	22.3
US$9000-$15000	-	-	-	-	-	-	464	23.2
US$15000-$25000	-	-	-	-	-	-	499	24.9
US$25000 or more	-	-	-	-	-	-	232	11.6
US$30,000 or less	3186	52.4	337	33.2	538	53.0	-	-
US$30,000-$75,000	2232	36.7	416	41.0	200	19.7	-	-
US$75,000 or more	603	9.9	194	19.1	222	21.9	-	-

4.5.2 Regression and relative weight analyses

The pooled meta-analytic correlation matrix used to conduct the regression analyses are presented in the Supplementary Materials. Results of the main regression analysis in Table 3.3 (without covariates) and Figure 3.4 (with and without covariates) are largely consistent with the zero-order meta-analytic correlations. The results of the exploratory regression analysis (Figure 3.5) predicting ideological beliefs from ancestral threats are also largely consistent with the zero-order meta-analytic correlations. The findings show that fear of snakes and the dark significantly predicted support for general conservatism and liberalism, respectively, as measured by the single-item ideological self-identification scale. Moreover, fear of mice, snakes, the dark, thunder/lightning and blood/needles/injection significantly predicted support for (right-wing) social conservative attitudes and rejection of (left-wing) socially liberal attitudes. In contrast, fear of mice, thunder/lightning, and flying significantly predicted endorsement of (left-wing) economic liberal attitudes and opposition to (right-wing) economic conservative attitudes. Taken together, these findings demonstrate the reciprocal relationships between ideology dimensions and fear of ancestral threats.

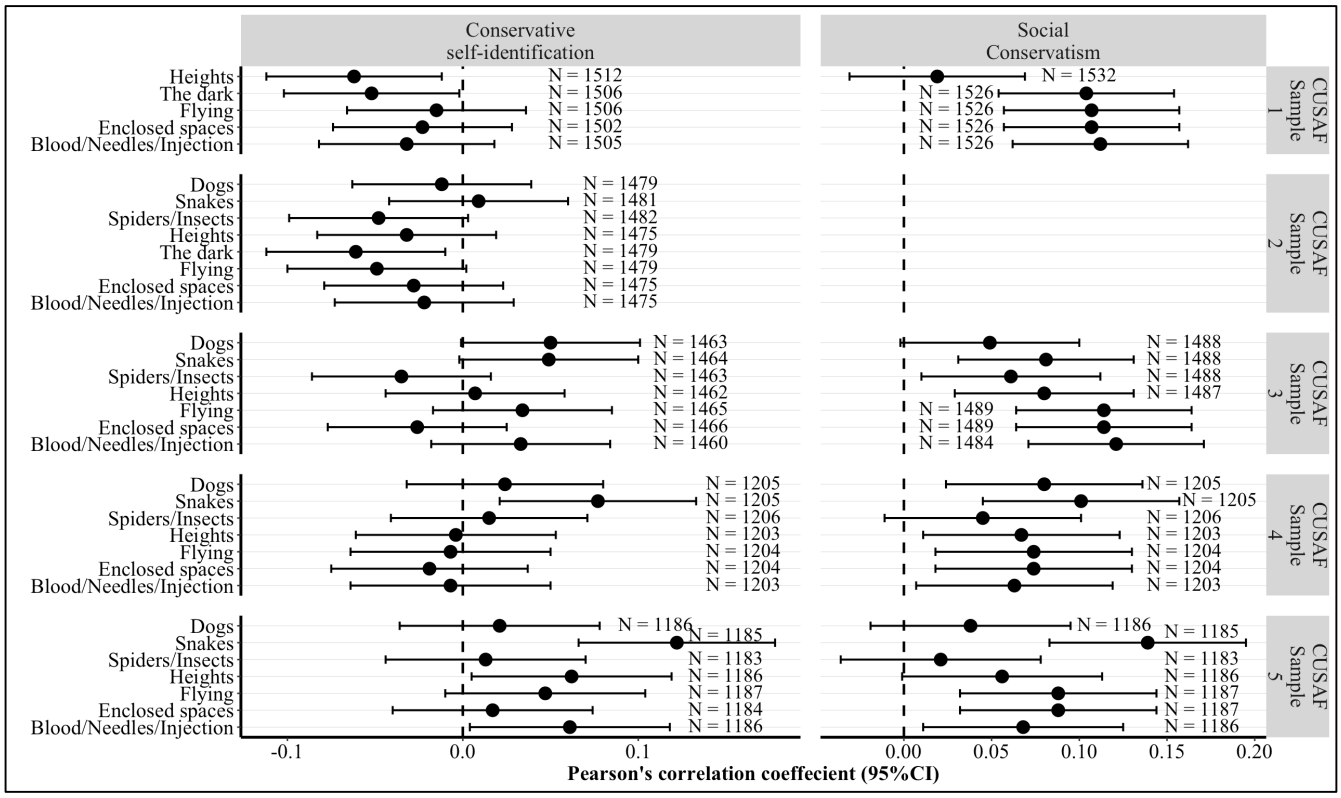

Figure 3. 1 Sample-specific correlations coefficients showing the relationship between political ideology dimensions and fear of ancestral threats, across all CUSAF samples

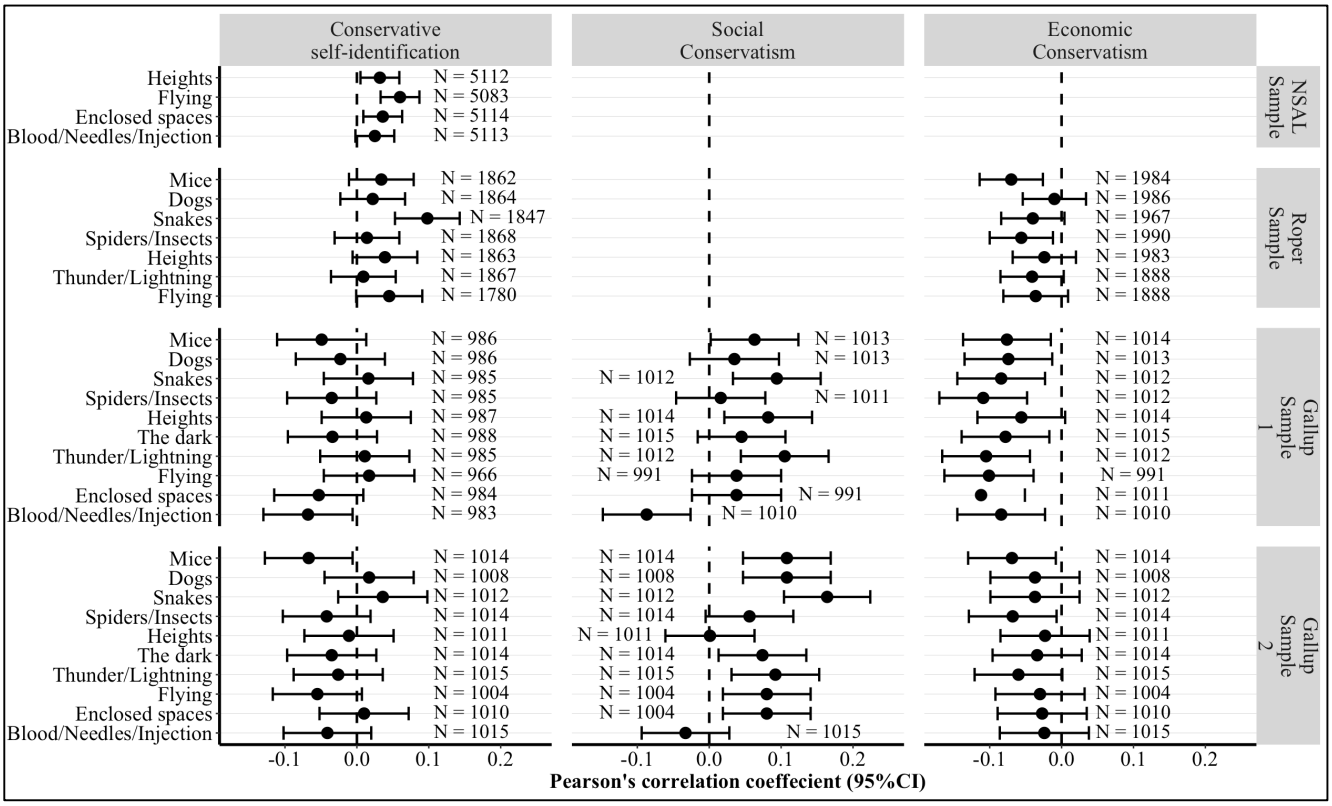

Figure 3. 2 Sample-specific correlations coefficients showing the relationship between political ideology dimensions and fear of ancestral threats, across NSAL Roper and Gallup

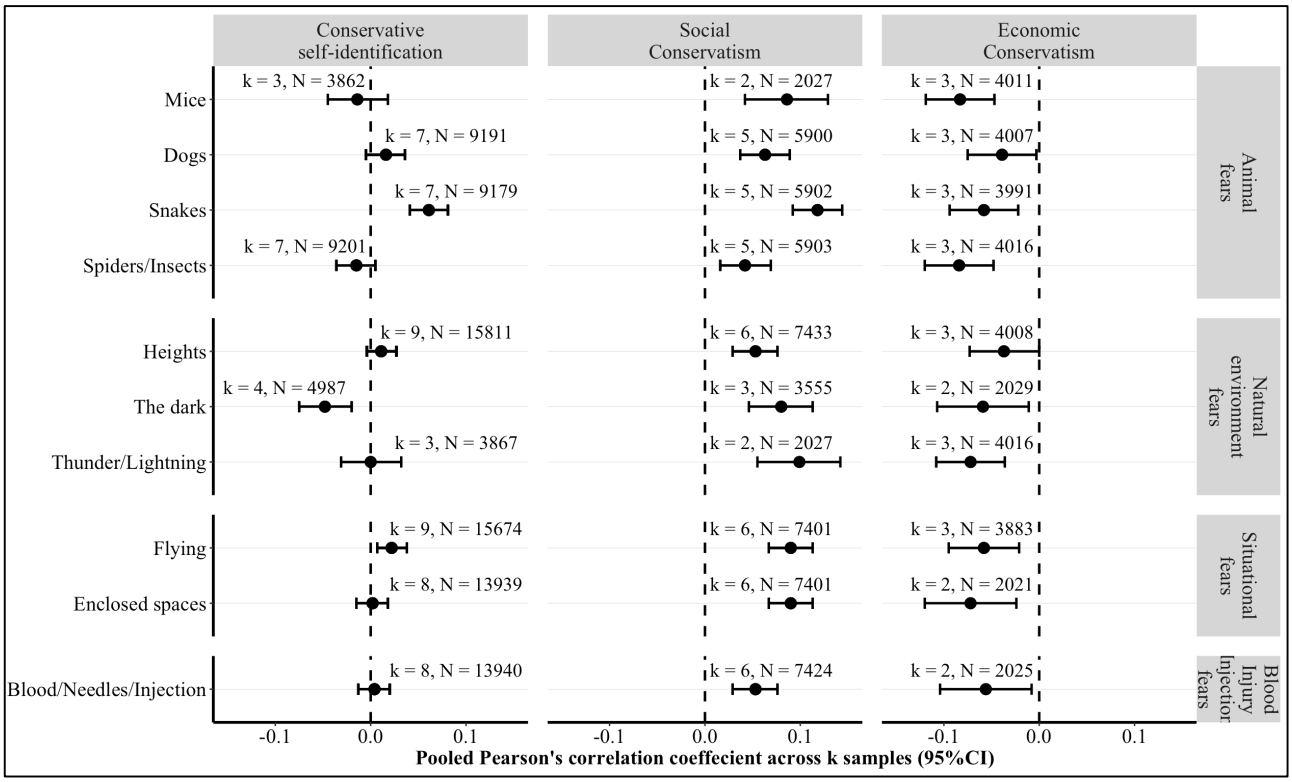

Figure 3. 3 Meta-analytic correlation coefficients showing the relationship between political ideology dimensions and fear of ancestral threats across five domains

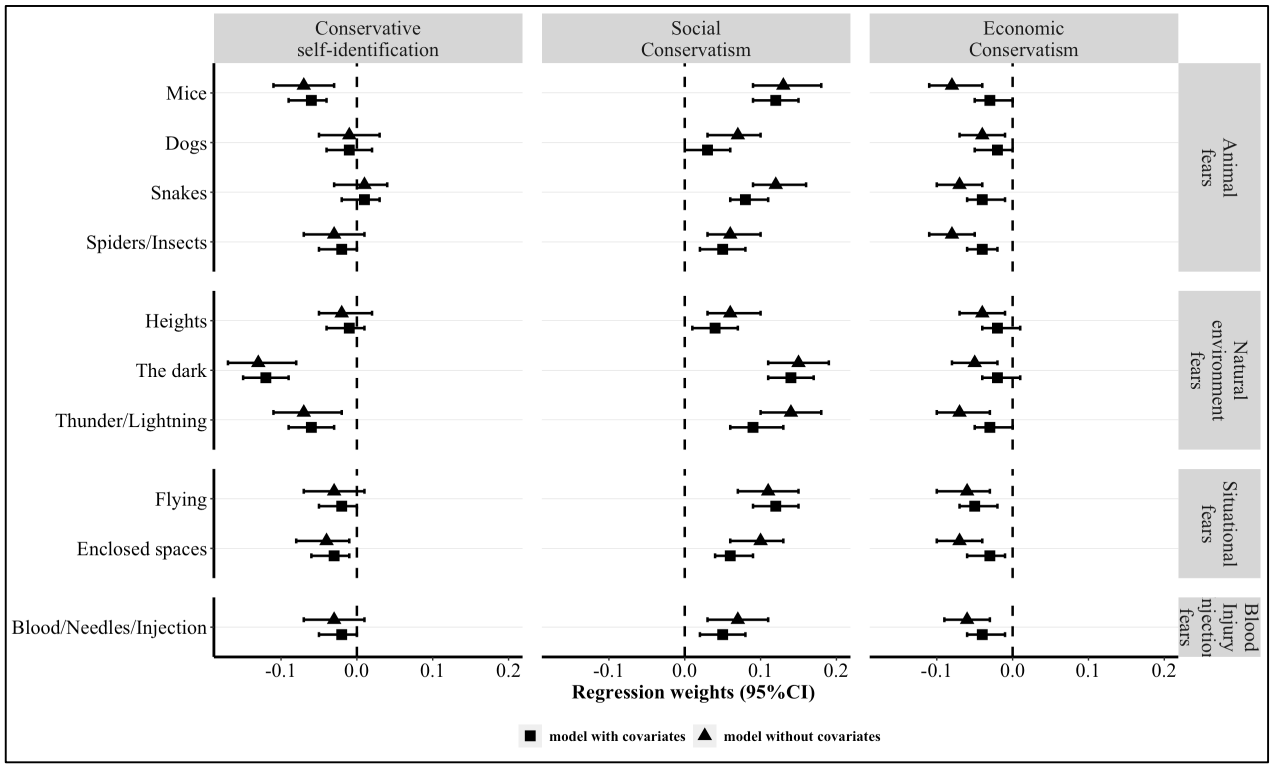

Figure 3. 4 Regression weights showing all three political ideology dimensions as predictors of each evolutionary fear-relevant threats

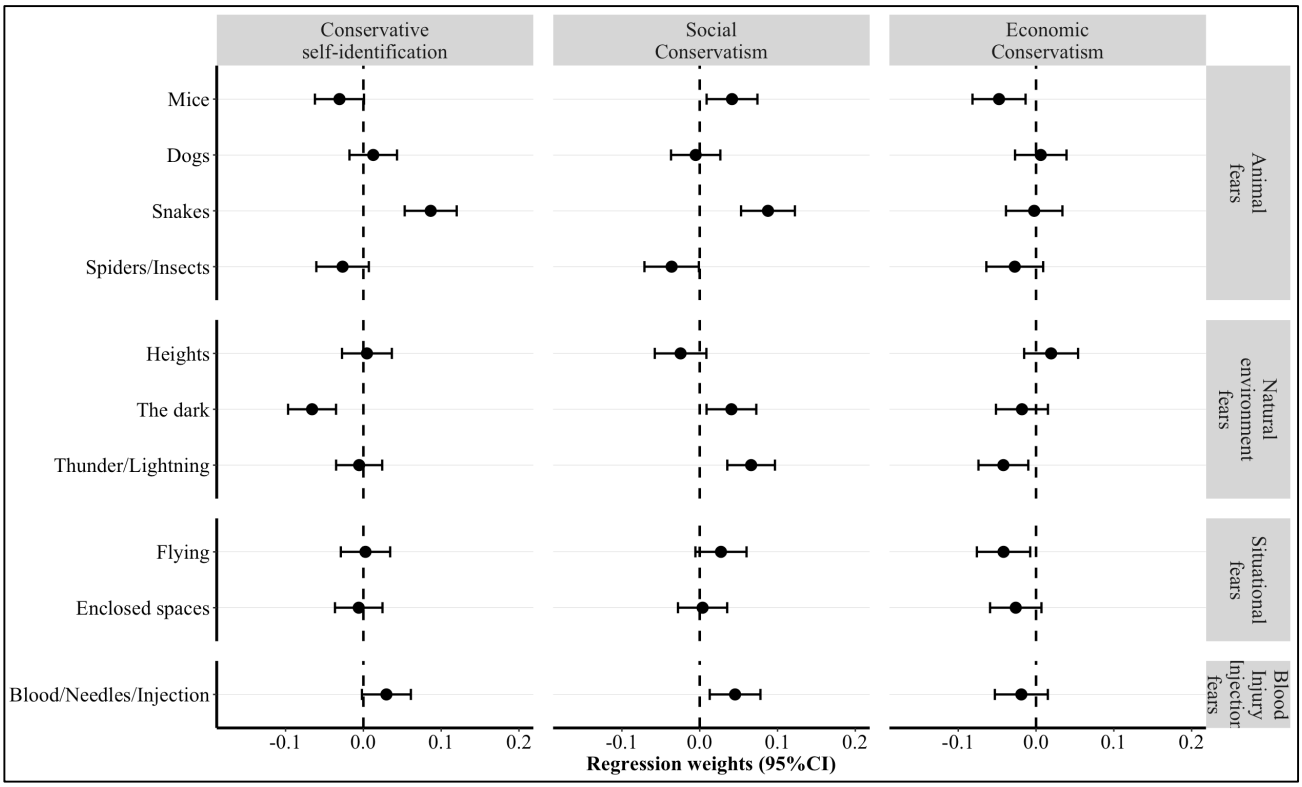

Figure 3. 5 Regression weights (without covariates) showing all the 10 evolutionary fear-relevant threats as predictors of each political ideology dimension

Table 3. 5 Comparisons of pooled correlation coefficients, regression weights (*B*) and relative importance weights (*RW*) showing the effects of different political ideology dimensions on fear of ancestral threats (without covariates)

	Political ideology	*r*	*p*	*B*	*p*	*RW*	*% RW*	R^2
Threats								
Animals								
Mice	Conservative self-identification	-.01	.618	-.07	.001	.002	11.05	.019
	Social conservatism	.09	<.001	.13	<.001	.011	55.40	
	Economic conservatism	-.08	<.001	-.08	<.001	.006	33.54	
Dogs	Conservative self-identification	.02	.130	-.01	.586	.000	6.42	.006
	Social conservatism	.06	<.001	.07	<.001	.004	62.08	
	Economic conservatism	-.04	.036	-.04	.005	.002	31.49	
Snakes	Conservative self-identification	.06	<.001	.01	.778	.002	11.42	.019
	Social conservatism	.12	<.001	.12	<.001	.013	65.71	
	Economic conservatism	-.06	.002	-.07	<.001	.004	22.86	
Spiders/Insects	Conservative self-identification	-.02	.144	-.03	.101	.001	8.46	.009
	Social conservatism	.04	.003	.06	.001	.002	39.59	
	Economic conservatism	-.08	<.001	-.08	<.001	.006	51.94	
Natural environments								
Heights	Conservative self-identification	.01	.161	-.02	.349	.000	5.51	.005
	Social conservatism	.05	<.001	.06	<.001	.003	57.61	
	Economic conservatism	-.04	.049	-.04	.006	.002	36.87	
The dark	Conservative self-identification	-.05	.001	-.12	<.001	.007	31.78	.021
	Social conservatism	.08	<.001	.15	<.001	.011	53.32	
	Economic conservatism	-.06	.016	-.05	.005	.003	14.89	
Thunder/lightning	Conservative self-identification	-.002	.984	-.06	.002	.002	9.62	.019
	Social conservatism	.10	<.001	.14	<.001	.012	63.96	
	Economic conservatism	-.07	<.001	-.07	<.001	.005	26.41	
Situational								
Flying	Conservative self-identification	.02	.005	-.03	.127	.001	6.02	.013
	Social conservatism	.09	<.001	.11	<.001	.008	64.43	
	Economic conservatism	-.06	.002	-.06	<.001	.004	29.54	
Enclosed spaces	Conservative self-identification	.002	.829	-.04	.022	.001	7.20	.012
	Social conservatism	.07	<.001	.10	<.001	.006	50.44	
	Economic conservatism	-.07	.003	-.07	<.001	.005	42.36	
Blood-Injury-Injection								
Blood/needles/injection	Conservative self-identification	.004	.667	-.03	.160	.000	5.92	.007
	Social conservatism	.05	<.001	.07	<.001	.003	42.62	
	Economic conservatism	-.06	.023	-.06	<.001	.004	51.46	

Table 3.3 shows results of the exploratory relative weight analyses which compares the unique predictive role of each ideology measure. Across all 10 threats, the percentages of variance (%*RW*) contributed by social and economic ideology in predicting each threat were relatively larger than the percentages of variance contributed by ideological self-identification in predicting each threat. This suggests that, generally, issue-based social and economic ideology dimensions are relatively more important predictors of ancestral threats than single-item, ideological self-identification measure. The only exception was only observed in fear of the dark, where comparatively, economic ideology contributed the least amount of variance.

4.6 Discussion

In the current study, we tested two competing hypotheses regarding the nature of the relationship between political ideology dimensions (ideological self-identification, social and economic ideology) and subjective fear of 10 evolutionary fear-relevant (ancestral) threats. The ideological asymmetry in fear hypothesis, which predicted that different measures of political conservatism would be *generally* positively associated with fear of evolutionary fear-relevant threats was not fully supported. This suggests that political conservatives are generally no more fearful than liberals as argued by the negativity bias hypothesis and motivated social cognition perspective of ideology (Hibbing, Smith, et al., 2014a; Jost et al., 2003b).

Rather, we found partial support for the ideological symmetry in fear hypothesis, which predicted that each of the different dimensions of political ideology would be differentially associated with ancestral threats. Only the ideological self-identification exhibited differential (or symmetric) associations with fear of ancestral threats. Although it is not clear why ideological self-identification exhibits symmetrical relationship with ancestral threats, our findings are consistent with previous studies showing that ideological self-identification is differentially associated with fear of modern threats (Jost et al., 2017), perception of risk-based threats (Choma et al., 2013) and sensitivity to worry-based threats (Brandt et al., 2020). These particular finding has two potential implications: (1). individuals whose ideological views are captured by the unidimensional ideology measure are equally fearful and (2). the relationship between the unidimensional ideology measure and fear of ancestral threats depends on the nature of the threat.

Our prediction that social and economic ideology would each exhibit differential relationships with the ancestral threats was not supported. Rather, social conservatives reported greater fear of ancestral threats than social liberals; whereas economic conservatives reported less fear of ancestral threats than economic liberals. These asymmetrical but diametrically opposite patterns of results may be explained by the fact that right-wing social conservative attitudes are rooted in a more fearful worldview than left-wing social liberal attitudes whereas right-wing economic conservative attitudes are rooted in a more competitive worldview than left-wing economic liberal attitudes (Duckitt et al., 2002) These asymmetrical patterns have also been observed in other studies showing that RWA is generally associated with greater self-reported risk perception, greater anxiety and greater fear of threatening stimuli whereas SDO is generally, associated with lower self-reported risk perception, lower anxiety and lower fear of threatening stimuli (Butler, 2013; Choma et al., 2013; Choma & Hodson, 2017; Shaffer & Duckitt, 2013). Taken together, these findings therefore imply that
social conservatives generally have a more fearful and threat-sensitive disposition than social liberals whereas economic conservatives generally have a less fearful and threat-sensitive disposition that economic liberals.

Although the negativity bias hypothesis and the motivated social cognition perspectives of ideology and threat (Hibbing, Smith, et al., 2014a; Jost & Amodio, 2011) suggest that conservatives' greater fear and threat-sensitivity may be biologically rooted, recent evidence suggests that this view may not be entirely complete: conservatives and liberals show similar behavioural and physiological reactions to modern and ancestral threats (Bakker et al., 2020; Fiagbenu et al., 2019; Knoll, 2015; Osmundsen et al., in press), suggesting a biological basis for liberals' threat-sensitivity. A large body of evidence supports the view that fear and sensitivity to ancestral threats may have evolved in response to natural selection pressures, suggesting that humans are biologically predisposed to respond to these class of stimuli (Bracha, 2006; Ohman & Mineka, 2001). By showing that conservatives and liberals equally exhibit fearful verbal-reports of ancestral threats, our study extends the growing body of research showing ideological similarities in threat perception. Taken together, we argue that psychological processes underlying behavioural and physiological and emotional responses to threatening stimuli might be similar for conservatives and liberals, depending on the nature of

the threat and ideology measure used to assess individual differences (e.g., Brandt et al., 2020; Elad-Strenger et al., 2020).

Does fear of ancestral threats predict support for political beliefs or does support for political beliefs predict fear of ancestral threats? Our findings provide evidence supporting both perspectives, consistent with previous studies (Brandt et al., 2020; Choma & Hodson, 2017). Brandt et. al (2020) have demonstrated that worries about modern threats such as terrorism and job loss predicts support for right-wing social attitudes and left-wing economic attitudes, respectively. Interestingly, our findings also suggest that fear of specific ancestral threats equally predicts support for both right-wing and left-wing social and economic attitudes. Taken, together, these findings are consistently, with emerging views that social and economic political beliefs equally serve as threat buffering systems when individuals are faced with threats (Eadeh & Chang, 2020; Malka & Soto, 2015).

The current research also illuminates recent discussions regarding the number and psychological content (or nature) of threatening stimuli used to assess ideological differences. Ruisch et al., (2020) have stressed that "[i]t is only through the use of ideologically neutral, … stimuli that we will gain an accurate understanding of the psychological underpinnings of political ideology"(Ruisch et al., 2021). According to this perspective, since basic cognitive differences underlies conservatives' greater threat-sensitivity, only the use of apolitical threats, rather than politically-laden threats would suffice to capture the supposed underlying ideological asymmetry in threat-sensitivity. Although Fiagbenu et al., (2020) support this view, they have argued that even in cases where apolitical are used to examine ideological differences, researchers should consider systematic sampling of these threats or should use a broad range of qualitatively different apolitical threats. Although we did not systematically sample the stimuli used in the present research, one strength of our study is that by assessing ideological differences with a broad range of apolitical threats the findings provide a more accurate insight into the ideology-threat link: conservatives and liberals are equally fearful depending on the nature of the threat and ideology measure used to assess individual differences.

The current findings highlight the importance of expanding the range of ideology and threatening stimuli used to assess individual differences. Brunswik (1956) notes that [o]ne of the most fundamental issues in the choice of variables is the *number of variables* allowed to enter the scope of a [study]" [emphasis his] (p. 7). He further argued that multiple "variable

design[s]. … make successful handling of problems of 'context possible' (p. 7)". Consistent with this view, we propose that a more comprehensive test of our ideological symmetry in fear hypothesis would require systematic sampling of a relatively large number of ancestral threats.

What findings should one anticipate when a broad range of ancestral threats are systematically sampled to examine ideological differences? We would expect that the patterns of results would be consistent with findings from Choma et al. (2013). In their study, participants rated their perceived risk of 38 threats. Conservative self-identification was positively correlated with 21 (55%) threats and negatively correlated with 16 (42%) threats. Moreover, RWA was positively correlated with 29 (76%) threats but negatively correlated with 9 (24%) threats. Finally, SDO was positively correlated with 2 (5%) and negatively correlated with 33 (87%) threats.

A careful observation of the findings from Choma et al. (2013) reveals interesting patterns. Ideological self-identification is differentially correlated with the threats in an approximate ratio of 1 to 1, showing a clear *quantitative* (*numerical) symmetry*, consistent with our pooled meta-analytic correlations. On the other hand, RWA and SDO exhibited *quantitative asymmetries:* individuals high in RWA were more sensitive to a broader range of threats than individuals low in RWA with a 3 to 1 ratio. In contrast, individuals high in SDO were less sensitive to a broader range of threats than individuals low in SDO with a 1 to 16 ratio. These findings are largely consistent with our finding showing the differential but diametrically opposite associations between economic and social ideologies and ancestral fear-based threats. Based on these results, we propose that the existence of quantitative ideological (a)symmetries in threat processing, which would emerge when different ideology measures are used to assess a broad range (ancestral) threats.

The quantitative (a)symmetry in the ideology-threat link implies that it is not entirely correct to suggest that social conservatives are *more* threat-sensitive than social liberals; this statement should be qualified with respect to the quantity of threats including the ideology measures used to assess ideological differences. Consistent with this view, the present findings support the notion that social conservatives (i.e., individuals who endorse right-wing social views) seem to be general more sensitive to a *broad* range of threats than social liberals (i.e., individuals who endorse left-wing social views). This implies that, there is a higher chance that any randomly selected threatening stimulus would elicit greater anxiety, fear,

disgust and riskiness in social conservatives than in social liberals. Similarly, economic conservatives (i.e., individuals who endorse right-wing economic views) seem to be generally less sensitive to a *broad* range of threats than economic liberals (i.e., individuals who endorse left-wing economic views). This implies that there is a higher chance that any randomly selected threatening stimulus would elicit lower anxiety, fear, disgust and riskiness in economic conservatives than in economic liberals. Taken together, assessment of individual differences with a broad range of threats provides a more nuanced insight into the psychological differences between conservatives and liberals.

Our exploratory findings also reveal that social and economic ideology appear to be the most important predictors of fear of ancestral threats because they contributed relative larger proportions of variance in predicting each threat compared to the ideological self-identification measure. This finding is consistent with one previous line of research: casual inspection of the results from Choma et al. (2013) shows that, the patterns of correlations among SDO and the risk-based threats and RWA and the risk-based threats were relatively larger than the correlations among ideological self-identification and the risk-based threats. Feldman & Johnston (2014) have aruged that social and economic dimensions of ideology are sufficient to capture individuals' ideological views, implying that the single-item ideological identification measure may be a redundant measure. By extension, we argue that the social and economic ideology dimensions may be sufficient to assess individual differences in threat processing because they seem to reveal more nuances and provide much more insight in how conservatives and liberals respond threats than the single-item, non-issue-based measure.

To reiterate, it is not clear why conservatives and liberals are equally fearful of different kinds of ancestral threats. Future studies should examine why certain *qualities* of threats tend to differentially cluster around social and economic dimensions of ideology. Understanding qualitative asymmetries in threat would move the field forward. Secondly, we have only used a few ancestral threats from four domains. However, our study provides a framework for further investigations into how specific ancestral threats domains are related to ideology. For example, investigations into ideological similarities and differences in fear of specific animals or natural environment threats and their underlying mechanisms would move the field forward. Furthermore, since blood and animal threats trigger both fear and disgust (de Jong & Merckelbach, 1998; Polak et al., 2019; Radlova et al., 2020), we propose that future studies should examine ideological differences and similarities in fear and disgust of blood and

animal threats. Moreover, since conservatives' fears have genetic origins (Hatemi, McDermott, Eaves, Kendler, & Neale, 2013), we hope that future studies would also look into the genetic bases of liberals' fears. Again, we cannot infer from our cross-sectional study why conservatives and liberals are equally fearful of ancestral threats. However, we hope that the current findings would encourage further systematic investigations of the politics of ancestral threat processing and how it compares and contrasts with modern threats.

Current models linking conservatism with greater fear in general and fear of ancestral threats, in particular, are not entirely complete, because these models were founded on biased selection of threatening stimuli and political ideology measures. The current findings suggest that different dimensions of conservatism and liberalism are equally associated with evolutionary fear-relevant threats, suggesting biological bases of conservatives' and liberals' fears. The current evidence supports the idea that the relationship between political ideology and fear of apolitical, ancestral threats is a function of the nature and quantity of the threat and ideology measures used to assess individual differences. Biased participant and stimuli selection may lead to biased conclusions about individual differences. Thus, the concurrent use of at least, multidimensional measures of political ideology and a broad range of qualitatively different threats provides a more nuanced understanding regarding the politics of threat perception.

CHAPTER FIVE

5.0 General discussion

5.1 Summary

Political conservatives are thought to be more sensitive to threats, perceive the world as a more dangerous place and form more negative attitudes than liberals (Altemeyer, 1981; Duckitt & Sibley, 2009; Hibbing, Smith, et al., 2014a; Jost et al., 2003b; Shook & Fazio, 2009). These findings are usually taken as evidence that the psychological processes underlying sensitivity to threats and dangers are more heightened in conservatives than in liberals. The findings also suggest that the motivation to manage threats and reduce uncertainties are much more expressed by conservatives than liberals. Although some emerging evidence suggests that conservatives and liberals are equally threat-sensitive (Brandt et al., 2020; Elad-Strenger et al., 2020; Malka et al., 2014b; Proch et al., 2019), broader questions remain as to whether conservatives and liberals differ in their sensitivities to context-specific social, economic and natural threats. Moreover, questions about whether similar psychological processes underlie ideological differences in threat sensitivity and under what conditions liberals, compared to conservatives, express greater motivation to manage threats are yet to be resolved.

The present dissertation provided three lines of research to expand the existing research on psychological differences and similarities between conservatives and liberals with respect to their sensitivities to threats and how they cope with them. The findings, taken together, suggest that conservatives are no more threat sensitive nor are they much more motivated to manage threats than liberals. Rather the relationship among political ideology, threat sensitivity and management depends on the nature of the threatening stimulus and the ideology measure used to assess individual differences.

Prior behavioural research demonstrated that in a novel food foraging context, conservatives are less exploratory and consequently form more negative attitudes than liberals (Shook & Fazio, 2009). This is taken as evidence that conservatives are generally more cautious and sensitive to negative information than liberals. The findings also suggest that exploration––which is presumed to be the psychological process underlying attitude formation (Fazio et al.,

2015)—is less exhibited by conservatives than liberals. To date, there is no equivalent behavioural study to demonstrate in which situations liberals also exhibit more cautious behaviours and thus form more negative attitudes than conservatives. Therefore, the *first line of research* presented in Chapter 2 sought to answer the question: *is the relationship between political ideology and attitude formation via exploration dependent on the psychological context in which attitudes are formed?* To answer this question, two competing hypotheses were tested. The domain-specific hypothesis proposed that conservatives would exhibit less exploratory behaviours and thus form more negative attitudes than liberals, irrespective of the context in which attitudes formation occurs. The domain-specific hypothesis proposed that conservatives and liberals would both exhibit exploratory behaviours and thus form more negative attitudes depending on the context in which attitude formation occurs.

To test the competing hypotheses, participants from a small midsized university in Germany were randomly assigned to play a simulated food foraging game (called BeanFest) which involved a potential for physical harm and a stock market game (called StockFest), which involved a potential for financial harm. The results revealed that in the BeanFest game conservative participants exhibited a less exploratory (more cautious) strategy and consequently, formed more negative attitudes towards the beans than liberals; whereas liberals adopted a more exploratory (less cautious) strategy and consequently formed more positive attitudes towards the beans than conservatives. On the other hand, the reverse behaviour was observed in the StockFest context. Here, compared to liberals, conservatives adopted a more exploratory strategy and formed more positive attitudes towards the stocks than liberals; whereas liberals adopted and a more cautious strategy and formed more negative attitudes towards the stocks than conservatives. These findings support the domain-specific hypothesis: the relationship between political ideology and attitude formation via exploration depends on the nature of the attitude stimulus and psychological context in which attitudes are formed. In other words, exploration – the psychological process underlying attitude formation – is similar for conservative and liberals, but this process may be triggered by different types of stimuli. The findings also suggest that conservatives and liberals exhibit negativity biases in different psychological contexts.

The findings from Chapter 2 suggest that liberals are more cautious in financial contexts and consequently form more negative attitudes towards stocks than conservatives. These findings, in many ways, are consistent with previous studies showing that liberals are

usually less likely to participate in hypothetical and real-world stock markets than conservatives (Choma et al., 2014; Kaustia & Torstila, 2011; Moore et al., 2010). However, these studies tell us little about how conservatives and liberals perceive the stock market in particular, and how they cope with economic threats and dangers in general. The *second line of research* in Chapter 3 therefore, addressed the following questions: 1). *do conservatives and liberals actually differ in their perception of the stock market as a dangerous and risky place to invest money*? 2). *do conservatives and liberals actually differ in stock market participation?* 3). *does perception of the stock market as a dangerous and risky place explain liberals' stock market aversion*? and 4). *does perception of the stock market as a dangerous and risky place explain why liberals support tighter regulation of the stock market than conservatives*? and 5). *does perception of the stock market as a dangerous and risky explain why liberals oppose proposals to invest Social Security benefits in the stock market than conservatives*?

The findings in Chapter 3, based on data from five nationally representative datasets from the United States revealed that perception of the stock market as a dangerous and risky place to invest money mediated the relationship between political ideology and 1). stock market participation 2). regulation of the stock market 3). opposition to investment of Social Security in the stock market. That is, the more liberals perceive the stock market as a relatively more dangerous and riskier place to invest money, the less likely they are to invest in the stock market; whereas the more conservatives perceive the stock market as a relatively safe, secure and stable place to invest money, the more likely they are to invest in the stock market. Further, the more liberals perceive the stock market as a relatively dangerous and threatening place to invest money, they more likely they are to support tighter regulation of the stock market and oppose investment of workers' Social Security benefits in the stock market. In contrast, conservatives perceive the stock market as a relatively safe, secure and stable place which explains why they are less likely to support tighter regulation of the stock market and also why they are more likely to support the investment of Social Security benefits in the stock market.

While Chapters 2 and 3 established that conservatives and liberals are equally sensitive to different kinds of threats, the studies examined only a few perceived threatening stimuli (i.e., beans, stocks and the stock market). One may argue that relative to liberals, conservatives' greater interest in money and business-related themes (Kemmelmeier et al., 2005; Sheldon & Nichols, 2009), may explain their greater participation to the stock market and their positive attitudes towards stocks. Also, stocks and the stock market may be perceived as politicized

stimuli, which may explain the observed ideological asymmetries. Comparatively, there is perhaps little reason to believe that evolutionary fear-relevant threats (e.g., snakes and spiders, height, the dark) are politicized stimuli. In fact, existing evidence suggests that humans may have evolved neural and physiological systems that aid rapid detection and response to these classes of threats, which explains why many people develop clinical phobic-fears of evolutionary fear-relevant stimuli (Bracha, 2006; Marks & Nesse, 1994). Specifically, the negativity bias hypothesis suggests that especially conservatives, rather than liberals, exhibit greater attentional and memory biases including neural and physiological sensitivities to evolutionary fear-relevant stimuli than liberals (e.g., snakes, spiders, blood Ahn et al., 2014; Dodd et al., 2011; Mills et al., 2016; Oxley et al., 2008; Smith et al., 2011). But to date, no study has examined ideological differences and similarities in fear responses to a broad range of evolutionary fear-relevant threats.

The *third line of research* presented in Chapter 4 was therefore, designed to address two novel research questions: 1). *do conservatives and liberals actually differ in their self-reported fear of evolutionary fear-relevant threats*? 2). *does the relationship between political ideology and fear of evolutionary fear-relevant stimuli depend on the nature of the ideology measure used to assess individual differences*? The latter question is important because previous studies suggest that right-wing social attitudes and beliefs are more associated with fear and needs for security and certainty than left-wing social attitudes, whereas left-wing economic attitudes are much more rooted in fear and needs for security and certainty than right-wing economic attitudes (Brandt et al., 2020; Butler, 2013; Malka, Lelkes, & Holzer, 2017; Malka & Soto, 2015; Malka et al., 2014b). Thus, it was expected that social conservatives would report being more fearful of evolutionary fear-relevant stimuli than social liberals, whereas economic conservatives would report being less fearful of the stimuli than economic liberals.

The study presented in Chapter 4 was based on data from nine nationally representative US respondents surveyed between 1977 and 2018, who indicated their fear-responses to 10 evolutionary fear-relevant threats sampled from four well-established phobia domains. 1). *animal* (snakes, spiders/insects, dogs and mice), 2. *natural environment*

(heights, the dark and thunderstorms), 3. *situational* (enclosed spaces and flying on an airplane) 4. *blood-injection-injury* (blood/needle/injection). The meta-analytic findings from the

independent surveys confirmed the expected prediction: social conservatives reported being more fearful of the stimuli than social liberals whereas economic conservatives reported being less fearful of the stimuli than economic liberals. This differential relationship was observed despite the fact the observed correlation between social and economic conservatism. The findings therefore suggest that the evolved psychological processes that mediate sensitivity to non-politicized, evolutionary fear-relevant stimuli may be similar for conservatives and liberals, but these processes depend on the nature of the ideology measure used to assess individual differences.

5.2 Synthesis

The research findings summarized above are largely based on recommendations from representative designs proposed by Brunswik (1947). Social and political psychologists have argued that Brunswik's theoretical framework could help provide better insights into how individual differences are moderated by different environmental contexts (Kessler et al., 2014; Wells & Windschitl, 1999). Brunswik argued that to ensure that research findings are representative and valid across different human populations and environments, different participants groups as well as different ecological contexts/stimuli/situations must be randomly sampled. For instance, to achieve population validity, participants should be randomly sampled to ensure that research findings can be generalized to the population of participants intended by the researcher. Similarly, to ensure ecological validity, experimental stimuli should be randomly sampled to ensure that research findings can be generalized to the ecological contexts or stimulus groups intended by the researcher. Inadvertent biases and misinterpretations can creep into research conclusions when sampling is not adequately conducted across both participant and stimulus dimensions. In fact, research findings and

conclusions based on poor sampling provides little understanding into how individuals interact with their environment.

Some of the biases and incomplete conclusions inherent in previous research on political ideology and threat sensitivity can be attributed to inadequate sampling. For instance, prior research revealed that conservatives are generally more sensitive to negative and threatening information than liberals (Altemeyer, 1998; Duckitt et al., 2002; Hibbing, Smith, et al., 2014a; Jost et al., 2003b; van Leeuwen & Park, 2009). However, most of these studies used

physically threatening stimuli (e.g., street crimes, terrorism) to assess individual differences (Crawford, 2017; Eadeh & Chang, 2020). Thus, what prior studies actually demonstrated is not that conservatives are *generally* more threat sensitive than liberals, but rather that conservatives are perhaps *specifically* more sensitive to physically threatening information than liberals. In order words, the conclusion that conservatives are generally more threat-sensitive is not incorrect but rather incomplete because of the unrepresentative stimuli examined in the prior studies. By mostly focussing on only physical threats and ignoring non-physical threats, previous studies had indeed introduced a great deal of bias in the research on ideology and threat sensitivity.

The present findings are largely grounded in the representative sampling approach to understanding individual differences and thus provide novel insights that could help to address and clarify conclusions from past studies. For example, the findings in Chapter 2 demonstrate the value of stimulus sampling and how it provides better understanding into the psychological differences between conservatives and liberals. Participants in the BeanFest condition were presented with an experimental situation where eating bad beans could potentially cause ill-health and consequent death. Conservatives may have interpreted this situation as physically threatening, which may explain why they deployed a more cautious strategy and hence formed more negative attitudes towards the beans than liberals. The thought of exposing themselves to a potentially physical harm situation may have triggered less exploration in conservatives than liberals. Since liberals were more exploratory in the BeanFest, one can also assume that they were less sensitive to the potentially physically harmful situation presented in the BeanFest game. These assumptions, however, need to be empirically examined in future research. Finally, one may argue that the BeanFest game confirms previous findings that conservatives tend to be more sensitive to physical threatening information and situations than liberals (e.g., Crawford, 2017; Eadeh & Chang, 2020).

Surprisingly, conservatives deployed a rather exploratory strategy in the StockFest whereas liberals were more cautious. The reversal in exploratory behaviour was observed even though the StockFest game simulated a *negative* and *threatening* situation involving the potential loss of money or bankruptcy upon sampling bad stocks. If conservatives are indeed generally more threat-sensitive and negatively biased than liberals as proposed by previous research, then one would expect that they would be more cautious in the StockFest game as

well. However, conservatives' greater exploratory behaviour may reflect their greater interest in money and business-related themes (Kemmelmeier et al., 2005; Sheldon & Nichols, 2009).

The StockFest findings imply that conservatives may be much more willing to explore situations where there is a potential for obtaining financial rewards, even when there is equally a chance for losing money. This may suggest that conservatives are less sensitive to financially harmful situations than liberals. On the other hand, liberals' lesser exploration in the StockFest may reflect their greater disinterest in situations where there is potential for obtaining financial rewards. Overall, the findings provide empirical evidence to support the notion that assessing individual differences with qualitatively different threatening stimuli could help identify the similarities between conservatives and liberals across different situations. The behaviours that conservatives and liberals adopted in the physical and financially threatening situations simulated in the BeanFest and StockFest games, respectively, demonstrate that conservatives are no more threat sensitive or negatively biased than liberals, as argued by previous research (Hibbing, Smith, et al., 2014a); rather ideological differences in negativity biases emerge depending on the ecological context in which attitudes are formed.

The stimulus sampling approach provides further opportunities to compare and contrast the behavioural strategies that liberals and conservatives deploy when navigating physically and financially threatening situations in the real-world. Since conservatives perceive the social world of street-crime and terrorism as a more dangerous and threatening place than liberals (Crawford, 2017; Jost et al., 2003b; Zimring & Hawkins, 1978), it is perhaps reasonable for conservatives to avoid social situations which involve high risks of physical victimization. Consistent with this view, it has been shown that conservatives exhibit more cautious social behaviours such as avoiding travelling and crowds, whereas liberals are more open and willing to explore these situations (Reinhart, 2017; Sloan et al., 2020). Such cautious social behaviours may help conservatives to reduce their perceived susceptibility to physical victimization and also help them to cope with what they perceive to be a risky and dangerous social world.

In contrast, when it comes to economic behaviours, it is liberals, rather than conservatives, who exhibit more cautious behaviours. For example, as shown in Chapter 3, compared to conservatives, liberals perceive the stock market as a dangerous and risky place to invest money. This is probably because, compared to conservatives, liberals are much more concerned about the widespread corporate crimes and financial misconducts in the economic world that disrupt the stability of the stock market, resulting in personal investment loses and

lower stock market participation (Eadeh & Chang, 2020; Giannetti & Wang, 2016; Kroska et al., 2019; Sane, 2019; Shover & Grabosky, 2010; Unnerver et al., 2008). Consequently, it is perhaps reasonable for liberals to avoid economic situations which involve high risks of economic victimization. Liberals' cautious behaviours and their avoidance of the stock market may help them cope with what they perceive to be a risky and dangerous economic world.

Conservatives and liberals do not only adapt their personal behaviours in response to perceived threats and dangers, they also adopt public policies which they believe are suitable for managing and reducing perceived social and economic threats and uncertainties. For example, it has been demonstrated that conservatives' greater perception of the social world as a dangerous and threatening place and their greater fear and concerns about terrorism and street crimes (Altemeyer, 1981; Duckitt, 2001; van Leeuwen & Park, 2009), explains why they oppose immigration and also why they support tougher punitive measures than liberals (Haner et al., 2020; Haner et al., 2019; McCann, 2008). From conservatives' perspective, adopting these policies serve as a deterrent to perceived "dangerous social elements" who physically harm innocent people and wreak havoc on society.

On the other hand, as demonstrated in Chapter 3, liberals' greater perception of the stock market as a dangerous and threatening place explains their greater support for protective economic policies such as tighter regulation of the stock market and financial institutions and their greater opposition to privatization of the Social Security programme. From liberal's perspective, tighter regulatory policies can help to avert perceived "dangerous economic activities" such as corporate scandals and white-collar crimes, which are known to precipitate stock market crashes and economic recessions, resulting in investments loses, unemployment, homelessness and increase in social inequality (Grabka, 2015; Pfeffer et al., 2013; Rheinhart & Rogoff, 2009; Shover & Grabosky, 2010). Moreover, opposition to policy initiatives that seek to invest part of workers' Social Security benefits into the stock market could help prevent the elderly, pensioners and vulnerable populations from losing their investments in what liberals believe to be dangerous and risky stock market.

Overall, the empirical evidence and arguments presented in Chapters 2 and 3 reveal that conservatives and liberals are equally sensitive to different kinds of threatening and dangerous situations. Prior research argues that potentially dangerous and threatening situations create discomfort, insecurity and uncertainty, which in turn facilitate behaviours that aim to reduce the impact of these negative cognitive and emotional states (Clark & Isen, 1982; Janoff-

Bulman & Frieze, 1983; Kagan, 1972). Consistent with this view, the present dissertation shows that conservatives and liberals equally alter their behaviours and adopt public policies which they believe are well-suited to help them cope with different kinds of threats and dangers. To the extent that these behaviours and policies serve the palliative function of buffering against any perceived threats and dangers, the present findings suggest that needs to achieve psychological certainty and security are equally associated with conservative and liberal belief systems as foreshadowed by previous research (Brandt et al., 2020; Elad-Strenger et al., 2020; Malka & Soto, 2015; Malka et al., 2014b; Proch et al., 2019).

Furthermore, the current findings suggest that the "internal" psychological processes underlying sensitivity to threats and dangers are similar for conservatives, but these processes are tuned to detect and respond to different kinds of threats. If this view is correct, then it appears that from a political point of view what is perceived as a "threat" or a "danger" may be indeed subjective. That is to say, what conservatives perceive as threatening may be perceived by liberals as harmless whereas what liberals perceive as threatening may be perceived by conservatives as harmless. For example, consider the issue of crime discussed in Chapter 3. Although one may consider criminal offences to be objectively and morally wrong, it appears that viewing crime through an ideological lens creates biases about how crime should be defined and what activities constitute criminal offenses. The fact that conservatives are more sensitive to street crimes than liberals whereas liberals are more sensitive to white-collar crimes than conservatives indicates that crime is a politicized stimulus (Zimring & Hawkins, 1978, 1993).

One advantage of assessing ideological differences with politicized stimuli such as crime is that it enables researchers to understand conservatives' and liberals' justification for perceiving the different types of crime as threatening or less threatening. Insights from the psychology of basic human values (Schwartz, 1992) provides some understanding into ideological asymmetries in concerns about street crimes and white-collar crimes. Human values are abstract ideals that play an important role in understanding the psychological motives underlying people's attitudes, opinions and behaviours. Conservatives prioritize security (i.e., living in a safe, stable and harmonious society and avoiding anything that endangers one's safety) and conformity values (i.e., people should follow the rules at all times and should restrain their impulses and actions so as not harm others or violate social expectations and norms) more than liberals. In contrast, liberals prioritize the values of benevolence (i.e.,

preserving and enhancing social welfare) and universalism (i.e., understanding, tolerating and treating people justly and protecting the weak and vulnerable in society) more than conservatives (Caprara, Schwartz, Capanna, Vecchione, & Barbaranelli, 2006; Schwartz et al., 2013). Viewing the world through these values provides conservatives and liberals with cogent arguments to rationalize their different attitudes and opinions about different types of crimes.

Conservatives endorse the values of self-discipline and conformity (see also Clarkson, Chambers, Hirt, Otto, & Leone, 2015) and thus tend to attribute the causes of street crimes (e.g., muggings, burglary, rape, murder) to individual character failures such as lower self-control (e.g., poverty; Caroll, Perkowitz, Lurigio, & Weaver, 1987; Pickett & Baker, 2014). This view presupposes that crime is determined by internal dispositional factors and that criminals deliberately fail to inhibit their impulses to harm others. Accordingly, criminals should be held accountable for making the world a dangerous place for others. From conservatives' point of view, stiffer punishment and longer prison sentences in response to street crimes can potentially restore social order and make the world a safer place indeed.

Liberals, in contrast, attribute the causes of street crime to situational factors such as lower income and poverty, which they believe are beyond people's immediate control. According to this view, people engage in crime because society has failed to provide them with better alternative activities such as employment. To reduce the incidence of crime, individuals should be given lenient punishments and rehabilitated so that they become productive members of society. Conservatives' and liberals' different concerns and solutions for resolving street crimes stems from their different attributions about the causes of crime. Conservatives' greater adherence to conformity and security values leads them to perhaps overestimate the dangers of street crime, which explains why they favour more authoritarian solutions to addressing these types of crimes; whereas liberals' endorsement of benevolence and universalism values compels them to favour more humanitarian and welfare-enhancing solutions to addressing street crime.

Why then are conservatives less concerned about white-collar and corporate crimes than liberals? Ideological differences in attitudes towards white-collar and corporate crimes can be appreciated by considering the differences in conservatives' and liberals' adherence to self-enhancement values of power (i.e., the desire to have control over people and resources) and achievement (desire for personal success and competence). Self-enhancement values are associated with preference for competition and the free-market economy (Kasser, Cohn,

Kanner, & Ryan, 2007); but are also the drivers of a wide array of unethical behaviours (Pulfrey & Butera, 2013) in the economic world (i.e., corporate institution and financial markets). People who adhere to self-enhancement values tend to focus on contributions of the rich and powerful people to society while refusing to question the legitimacy of the processes through which they attain their resources. Moreover, adherence to self-enhancement values may lead people to believe that the powerful and wealthy people are infallible because of the perception that they acquired their resources through sheer hard work and discipline. Even if there is evidence that they obtained some of their wealth and power through dubious and unethical means, such accusations are often overlooked or portrayed as sheer envy or unjust criticisms of the rich and powerful elite, by the poor and despondent masses.

Adherence to self-enhancement values also ensures that corporate scandals and misconducts and the offenses of the powerful and the elite are rationalized as being part and parcel of the operations of free-market capitalism: after all, "one cannot make omelettes without breaking a few eggs". In other words, since capitalism and neoliberal values provide the opportunity to achieve wealth and power, it may be justifiable to sometimes violate a few rules as long as it can potentially benefit society in the long run. Conservatives, compared to liberals, are stronger adherents of self-enhancement values, believe in free-market capitalism and endorse the cut-throat competitiveness that is characteristic of the neoliberal economic system (Azevedo et al., 2019; Duckitt & Sibley, 2009). This asymmetry might explain why conservatives turn a blind eye on the crimes of the powerful and underestimate the seriousness and pervasiveness of white-collar and corporate crimes (Kroska et al., 2019; Michel et al., 2014; Rebovich et al., 2000; Zimring & Hawkins, 1978).

Although unbridled pursuit of self-interest and unregulated competition and risk seeking activities in the economic world potentially yields benefits for individuals and society, such activities are also the harbingers and causes of financial crises, which end up causing more harms to innocent investors. Self-transcendent values – which are much more endorsed by liberals than conservatives – seek to provide justice, equality and protection for the weak and vulnerable in society. Liberals believe that an unregulated free-market economic system is dangerous because it creates opportunities for people to violate rules and engage in all manner of illegal activities (e.g., fraud, Ponzi schemes, bribery, price fixing, embezzlements, etc.), to benefit themselves at the expense of others. Consequently, to prevent white-collar and corporate crimes and to safeguard the welfare of investors and the society at large, laws must be enacted

to regulate the activities of the economic world; and the rich and powerful should also be held accountable for their crimes and misdemeanours (Kroska et al., 2019; Unnerver et al., 2008).

Thus far, the present dissertation argues that assessing individual differences with politicized stimuli such as crime provides some sort of "processing fluency" for conservatives and liberals to easily justify and rationalize why they perceive street-crimes and white-collar crimes as threatening or less threatening. One may therefore conclude that the differences between conservatives and liberals with respect to sensitivity to criminal threats are a product of "motivational" differences in threat-perception and has nothing to do with basic cognitive differences. In order words, people endorse conservative belief systems because of its ability to protect them from potential physical victimization by street crimes whereas people endorse liberal belief systems because of its ability to protect them from the potential economic victimization. In fact, conservatives' tougher anti-crime policies and other social control measures tend to provide some level of social safety to citizens, whereas liberals' emphasis on tight regulatory economic reforms tends ensure the welfare of investors from corporate crimes. These pieces of evidence suggest that people hold on to conservative and liberal belief systems to satisfy their existential motives of feeling safe and secure.

Assessing individual differences with politicized stimuli such as crime also enables conservatives and liberals to reflect on their pre-existing attitudes and values which helps them to come up with the reasons for their fears, concerns and sensitivity to different types of crimes. However, such politicized stimuli do not provide insights into the basic cognitive processes underlying why conservatives and liberals come to learn that some stimuli are more threatening than others or how they form negative attitudes towards novel stimuli. The findings from Chapter 2, addressed this issue by illustrating the interaction between cognitive and motivational processes underlying political ideology and attitude formation towards novel and non-politicized stimuli.

The BeanFest and StockFest games have some advantages over self-reported studies on threat-sensitivity. First, the beans and stocks were novel in that participants had no exposure to them prior to playing the games. Secondly, there is no reason to believe that beans or stocks are by nature political stimuli. Moreover, both games engaged attentional, learning and memory processes and enabled participants to respond to the stimuli "in real-time" with little or no reflection on their pre-existing attitudes. From this perspective, it can be argued that the findings from the Chapter 2 represent "pure" cognitive differences between conservatives and liberals.

In other words, conservatives and liberals can equally, attend to, learn, form and recall attitudes towards different kinds of stimuli in their environments, suggesting that the cognitive (or mental) processes involved in attitude formation in conservatives and liberals are triggered by the psychological features of the stimuli.

However, it is clear that there are also motivational reasons underlying differences in conservatives' and liberals' cautious behaviours. For example, the motivation to avoid death upon eating bad beans may explain why conservatives exhibited a more cautious behaviour in the BeanFest whereas the motivation to avoid bankruptcy upon sampling bad stocks may explain why liberals exhibited a more cautious behaviour in the StockFest. This indicates that participants were not *only* reacting to the novel beans and stocks, but they were also reacting to the threatening contexts in which the stimuli where being sampled. Future studies should strip both games of any mention of death and losing money in order to clarify how conservatives and liberals form attitudes when engaging with only the beans and stocks. It would also be interesting to examine how conservatives and liberals form attitudes toward other stimuli besides beans and stocks.

The findings from Chapter 2 demonstrate that ideological asymmetries in threat sensitivity clearly emerge when individual differences are assessed with non-politicized stimuli such as beans and stocks in behavioural games. However, since the study did not unpack the different dimensions of ideology, it is unclear how these findings generalize to social and economic ideology dimensions. The question arises whether social (vs. economic) conservatives and liberals differ in their sensitivities to non-politicized threats. To address this question and to build on the ideas and findings from Chapter 2, Chapter 4 assessed how social and economic ideology dimensions are related with a broad range of non-politicized stimuli known as evolutionary fear-relevant threats (e.g., snakes, spiders, heights).

One advantage of evolutionary fear-relevant threats is that they cannot be readily attributed to any ideological group. That is to say, there is no reason to expect that conservatives would be more afraid of snakes than liberals nor is there any justification to expect that liberals would be more fearful of the dark than conservatives. In fact, threats such as fear of heights, snakes, and the dark are believed to be innate fears that evolved in humans across evolutionary time-scales (Mineka & Öhman, 2002; Ohman & Mineka, 2001). Consequently, it would be expected that conservatives and liberals would be equally fearful of evolutionary fear-relevant stimuli.

Despite the prediction that conservatives and liberals should equally exhibit fear of evolutionary fear-relevant threats, empirical evidence from the negativity bias hypothesis, demonstrates that conservatives generally exhibit stronger sensitivities towards these threats than liberals (Hibbing, Smith, et al., 2014a, 2014b; Mills et al., 2016). However, these studies mostly focussed on the social rather than economic conservatism. Previous evidence suggests that social conservative attitudes (e.g., anti-abortion and anti-immigration) are associated with higher needs for certainty and security that social liberal attitudes (e.g., pro-abortion and anti-immigration) whereas economic conservative attitudes (e.g., anti-regulation, lower taxation) are less associated with needs for certainty and security than economic liberal attitudes (e.g., pro-regulation and higher taxes; Malka, Lelkes, & Holzer, 2017; Malka & Soto, 2015; Malka et al., 2014b). Consequently, it was expected that the relationship between political ideology and fear of evolutionary fear-relevant threats should depend on the type of ideology measure used to assess individual differences. Consistent with this prediction, the findings revealed that social conservatism (right-wing social attitudes) is more associated with fear of evolutionary fear-relevant threats than social liberalism (left-wing social attitudes); whereas economic conservatism (right-wing economic attitudes) is less associated with fear of evolutionary fear-relevant threats than economic liberalism (left-wing economic attitudes). The findings, therefore, suggest that conservatives and liberals are equally fearful even when individual differences are assessed with non-politicized and naturally occurring threats. Moreover, the study contributes to the emerging body of literature showing that different types of threats and dangers are associated with different dimensions of conservative and liberal belief systems (Brandt et al., 2020; Crawford, 2017; Malka, Lelkes, & Holzer, 2017).

5.3 Implications

One implication of the current findings is that the psychological processes and neural structures (i.e., neurocognitive architecture) involved in perception of threats and dangers, and responding to negative stimuli and events in the social, natural and economic world might be similar for conservatives and liberals; but these processes and structures are activated or triggered by different threatening stimuli or events. These findings therefore depart from the dominant narratives that argue that greater threat sensitivity is associated with political conservatism than liberalism. The findings also show the value of stimulus sampling in understanding ideological differences and similarities, implying that researchers should

endeavour to implement these research approaches to achieve a more comprehensive insight into the psychology of conservativism and liberalism (Kessler et al., 2014; Wells & Windschitl, 1999).

Moreover, the findings imply that ideological asymmetries in sensitivity to social and economic threats have consequences for conservatives' and liberals' social and economic behaviours. The present findings suggest that conservatives tend to avoid food foraging situations than liberals; whereas liberals avoid stocks and the stock market than conservatives (see also Han et al., 2019; Kaustia & Torstila, 2011; Moore et al., 2010; Shook & Fazio, 2009). It is also well-known that conservatives avoid social situations and activities such as travelling and crowded places because of their greater fear of crime and terrorism than liberals (Reinhart, 2017; Sloan et al., 2020). This means that conservatives, by avoiding these social situations, are actually choosing to forgo the possibility of making new friends, travelling to new places, sampling new foods and experiencing new situations. Similarly, by avoiding the stock market, liberals may be missing out on the potential of improving their economic situations in the stock market. Exploration is a well-known strategy and psychological process through which negative attitudes can be reduced (Fazio et al., 2015). Consequently, if conservatives and liberals fail to explore novel social and economic situations, then their negative perceptions and beliefs about the dangers and threats of the social, economic and natural world would indeed persist. Future studies should, therefore, focus on designing interventions to encourage exploration in conservatives and liberals to help them reduce their negative attitudes and beliefs.

Finally, it appears that conservative and liberal ideologies are important for organising society and resolving different social and economic problems. Conservatives' greater concerns about street crimes and terrorism may enable governments to create policies that would protect the "social world" from these harmful threats. In so doing, people would go about their social activities without fear of physical victimization. In contrast, liberals' greater concerns about corporate and white-collar crimes may enable governments to design policies that would protect the "economic world" from these dangers. In doing so, people would go about their economic activities without fear of economic victimization. Conservative and liberal belief systems could therefore be seen as important for the improving civil society. Finally, looking at the world through conservative and liberal ideological lenses could enable individuals to recognize their similarities and differences with regards to perceiving fears and dangers in the natural world. Recognizing and acknowledging differences and similarities promote perspective taking and

empathy across the ideological divide, which may be a first step towards reducing ideological gridlock and political polarization. Consequently, individuals across the ideological divide can come together to resolve pressing social and economic problems.

5.4 Limitations and future directions

There are several notable limitations of the present findings that could be addressed by future research. For instance, Chapter 2 was based on student samples thus making it unclear the extent to which the findings generalize to large nationally representative samples. Further, the study did not include any covariates such as income and education, which are known to influence stock market participation. However, the exclusion was necessary to keep the study as closely as possible to the original study by Shook and Fazio (2009), in order to replicate and extend it. Future studies should clarify the extent to which context-specificity in attitude formation via exploration in the BeanFest and StockFest games depend on demographic variables. Similarly, just like the original study, there were no systematic attempts to examine whether the findings differ depending on the economic and social ideology dimensions. This is a gap that should be addressed by future studies because it could reveal whether attitude formation via exploration is context-specific as well as ideology-dependent. Moreover, the findings were based on only two stimuli contexts – beans and stocks. Future studies should investigate how these findings generalize beyond health/food and financial contexts (see Fiagbenu et al., 2021b).

The current dissertation only scratches the surface of research work on ideological differences in perception of the economic world as a dangerous and risky place. Particularly, Chapter 3 focusses on ideological differences in perception of danger in the stock market. However, the economic world, broadly defined, does not only include financial markets but also corporate institutions and people who work therein, such as business leaders, CEOs, hedge fund managers, etc. These economic agents are usually accused of financial embezzlements and misconducts. Future research should focus on understanding whether conservatives and liberals differ in their perception of not only economic institutions but also the human agents who work in the corporate world and financial markets. A valuable extension is for future studies to focus on designing more reliable and valid psychometric measures to assess individual differences in beliefs about the dangers and threats of the economic world. This

measures can be juxtaposed with existing scales that assess individual differences in beliefs about physical threats and dangers of the social world (Duckitt et al., 2002, p. 92)

Further, in Chapter 3 only a few samples of fear stimuli from each of the four-evolutionary fear-relevant threat domains were examined. Future studies could broaden the range of threats to clarify the extent to which ideological differences and similarities vary within and across broader threat domains. Further work is also required to compare effects sizes for the relationship among ideology and fear of modern and ancestral threats. Knowledge about the effect sizes can provide insights into how and whether sensitivity to modern and ancestral threats differ across the ideological divide. Finally, another important area for further research would be to examine ideological differences in behavioural responses to evolutionary fear-relevant threats to complement the emotional self-reported fear responses examined in the current studies.

Finally, the three lines of research described in the current dissertation do not provide insight into the direction of causality between threat sensitivity and political beliefs. For examples, the findings in Chapter 2 show that conservatives form more negative attitudes towards beans than liberals whereas liberals form more negative attitudes towards stocks than conservatives. However, it is also equally possible that individuals who hold negative attitudes towards beans tend to identify as conservatives than liberals whereas individuals who hold more negative attitudes towards stocks tend to identify as liberals than conservatives. One approach to establish the direction of causality is to experimentally induce negative attitudes towards beans or stocks and observe whether this will enhance support for conservative or liberal beliefs. Similarly, in Chapter 3, it is unclear why liberals perceive the stock market as a threatening and riskier place than liberals, although we assumed that these differences could stem from ideological differences in sensitivity to the perceived dangers in the economic world. One way to test this assumption is to test whether experimental exposure to conservatives and liberals do, for example, corporate crimes and observe if it influences their perception of the stock market as threatening as well as their political beliefs (e.g., Eadeh & Chang, 2020). Additionally, although Chapter 4 showed that conservatives and liberals are equally fearful of naturally occurring ancestral threats, it is equally possible that people who are fearful of these threats tend to adopt conservative of liberal beliefs. One way to establish causality is to induce fear of natural threats (e.g., spiders, darkness) and examine whether it will cause people to support conservative or liberal beliefs.

5.5 Conclusion

Is the world a dangerous, threatening and unpredictable place or is it a safe, secure predictable place to live in? The answer, according to the present dissertation, is not a straightforward "yes" or "no", but depends on whom one asks and the specific aspect of the world to which one is referring. Not everybody is pessimistic (or optimistic) about the world around them and not everyone believes that human nature is inherently bad (or good). Perceiving the world through a conservative ideological lens leads one to believe that street crimes committed by bad and immoral people make the social world a dangerous place to live in. This view makes people very cautious, less trusting in their personal and social relationships. Perceiving the social world as a dangerous place also motivates people to support government policies that promote social control measures to establish order and social stability. In contrast, perceiving the world through a liberal ideological lens leads one to think that corporate crimes committed by bad and immoral capitalists and rich and powerful elites make making the economic world a dangerous place to live in. This view makes people very cautious in their relationships with the economic world and decreases their trust in businesses, financial markets and economic agents. Consequently, perception of the economic world as a dangerous place causes people to support government initiatives that regulate economic activities to promote economic order and stability.

Furthermore, different dimensions of conservative and liberal ideologies are associated with perception of the natural world as fearful and threatening. Perceiving the world through a social conservative ideological lens makes people more fearful of naturally occurring and non-politicized threats such as snakes, heights and the dark, whereas perceiving the natural world through a social liberal ideological lens makes people less fearful of these natural threats. In contrast, perceiving the natural world through an economic conservative ideological lens make people less fearful of naturally occurring and non-politicized threats whereas perceiving the world through economic liberal ideological lens makes people less fearful of these natural threats. Taken together, the findings and arguments making up this dissertation suggest that conservatives and liberals equally possess the basic cognitive and motivational processes to detect, process and cope with threats and dangers in the social, economic and natural worlds.

From the cradle to the grave, we are motivated to believe that the world we see around us is objective and real indeed. However, like Plato's "Allegory of the Cave" from his book

The Republic, what we see around us is actually a reflection of our own subjective interpretations which we project onto the "ideal world". The conservative person in his cave perceives and interprets the shadows on the wall of the cave as the true and ideal state of the world. The same applies to the liberal person in his cave. It is only when they leave their respective caves that they realize that the shadows that they saw are not a reflection of true reality, but are rather subjectively shared experiences which have long been mutually reinforced by similar and interdependent others and have thus come to be commonly held as "objective truths". The findings presented in this dissertation suggest that our interpretations of the world need to be *contextualized* to reflect our subjective experiences and not always *generalized* as though everyone – especially people with different worldviews – shares our perceived realities. Hopefully, the current findings dissertation would enable the reader to recognise that the stark differences in our ideological worldviews arise from our individual biases and errors in reasoning, which emerge as a consequence of our collective assessment of situations and events in the world; our high need to agree with similar others, and our motivation to maintain a sense of shared reality with people with whom we inhabit our different ideological bubbles. Research designs that take into account the fact that our mental faculties and decision-making processes are influenced by different environmental contexts could provide deeper insights into our psychological differences and similarities. Finally, acknowledging that our perception of the social, economic and natural worlds is not rooted in reality but shaped by different ideological worldviews could enable us come to terms with our flawed human nature and embrace our common humanity.

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APPENDIX

BeanFest instructions

Humans spend a lot of time deciding which foods are worth eating and which foods are not. Eating good food is necessary for **good health** and **long-life**. In contrast, eating bad food may result in **malnutrition, illness** or even **death.** It is therefore necessary to eat good food and avoid bad food. This is a game we call **BEANFEST**, which involves eating beans. Good beans are **positive** and are helpful because they increase your **health points**. Bad beans are negative and are harmful because they decrease your **health points**. The goal of the game is to carefully learn which beans are good to **eat** and which beans are bad to **avoid**. To learn which beans are good or bad, it is important to know that they vary in ***two*** ways: from circular to oval to oblong and from one, to few to many speckles as shown in Figure 1. On each trial, you will be presented with a bean as shown in Figure 2 and must decide within 5 seconds whether or not to choose to eat it by using the corresponding keys on the keyboard. If you decide to choose the bean, you will gain 10 health points if it is a good bean, or you will lose 10 health points if it is a bad bean. If you decide not to choose it, it will have no effect on your total health points. Feedback about your decision and the effect of the bean and your points would be displayed as shown in Figures 3, 4 & 5. Use the feedback to guide your decision to choose or avoid the bean on future trials. The health meter displays your current health points as a green and red bar. You can win or lose health points ranging from 0 to 100. You will start the game with 50 health points. Reaching health 100 points represents winning the game which means **Survival**. Reaching 0 health points represents losing the game which means **Death**.

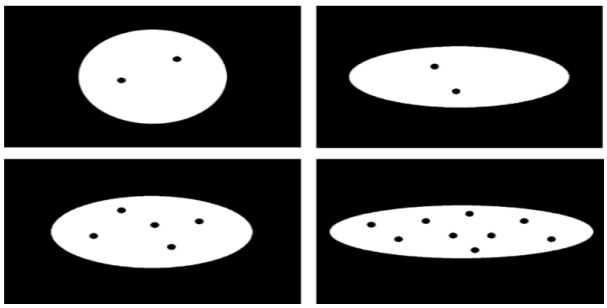

Figure 1. Example of bean types that you will see

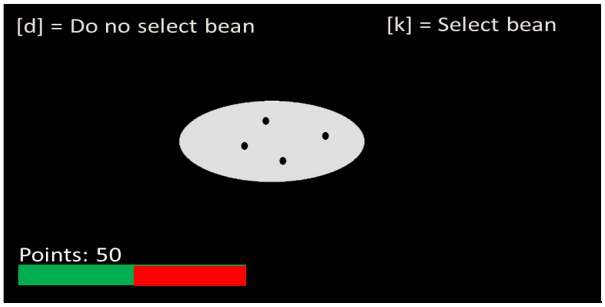

Figure 2. A bean as shown before making a choice

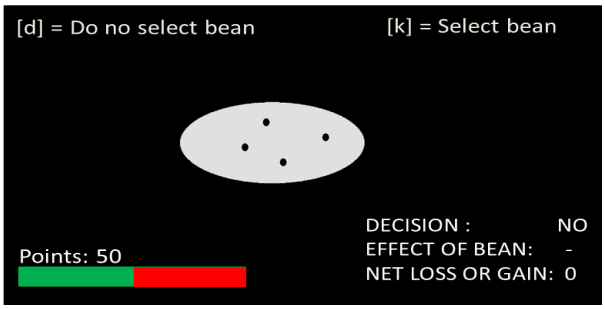

Figure 3. Feedback after not selecting a bean

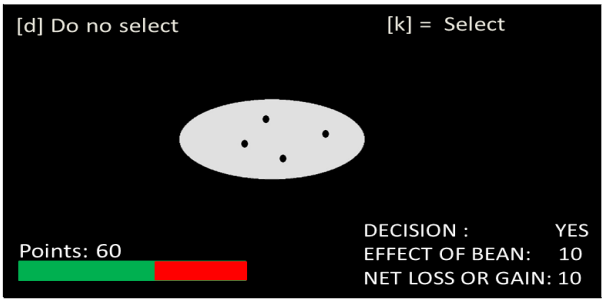

Figure 4. Feedback after choosing a good bean

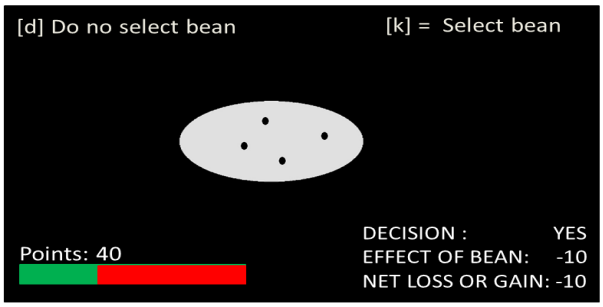

Figure 5. Feedback after choosing a bad bean

Try to get as many wins as possible and avoid dying! After each win or loss you will restart the game with 50 points. The game phase is divided into three sessions. At the end of each session, you may decide to take a short rest or continue.

After the game is over, you will be shown each bean again without a health meter as shown in Figure. 6. We want you to judge which beans you believe to be helpful or harmful by using the respective keys on the keyboard. No feedback will be displayed. If you are unsure, you may guess. Each bean would be presented for 5 seconds, so try to respond as accurately and as quickly as possible.

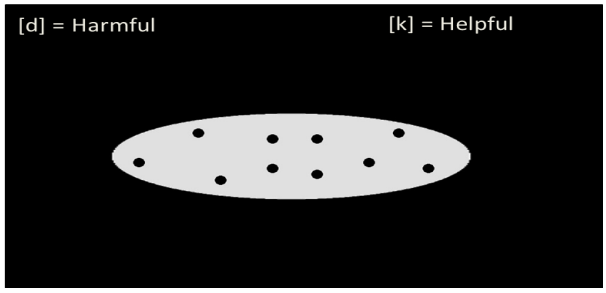

Figure 6. A bean as shown on the test phase.

StockFest instructions

Investors spend a lot of time deciding which stocks are worth buying and which stocks are not. Buying good stocks increases investment profits, which increases **wealth** and **financial security**. In contrast, buying bad stocks may result in **losing lots of money** or **even bankruptcy.** It is therefore necessary to buy good stocks and avoid bad stocks. This is a game we call **STOCKFEST,** which involve choosing stocks. Good stocks have a positive value and are helpful because they increase your **profit points**. Bad stocks have a negative value and are harmful because they decrease your **profit points**. The game has two phases, i.e., a learning phase and a test phase. The goal of the learning phase is to carefully learn which stocks are good to buy and which stocks are bad to avoid. To learn which stocks are good or bad, it is important to know that they vary in ***two*** ways: from circular to oval to oblong and from one, to few to many speckles as shown in Figure 1. On each trial, you will be presented with a stock as shown in Figure 2 and you must decide within 5 seconds whether or not to choose to buy it by using the corresponding keys on the keyboard. If you decide to choose the stock, you will gain 10 profit points if it is a good stock, or you will lose 10 profit points if it is a bad stock. If you decide not to choose it, it will have no effect on your total profit points. Feedback about your decision and the effect of the stock and your points would be displayed as shown in Figures 3, 4 & 5. Use the feedback to guide your decision to choose or avoid the stock on future trials. The profit meter displays your current profit points as a green and red bar. You can win or lose points ranging from 0 to 100. You will start the game with 50 points. Reaching 100 points represents winning the game which means you are currently accumulating **wealth**. Reaching 0 points represents losing the game which means **bankruptcy**.

Try to get as many wins as possible and avoid bankruptcy! After each win or loss you will restart the game with 50 points. The study phase is divided into three sessions. At the end of each session, you may decide to take a short rest or continue.

After the game is over, you will be shown each stock again without a profit meter as shown in Figure. 6. We want you to judge which stocks you believe to be helpful or harmful

by using the respective keys on the keyboard. No feedback will be displayed. If you are unsure, you may guess. Each stock would be presented for 5 seconds, so try to respond as accurately and as quickly as possible.

Try to get as many wins as possible and avoid bankruptcy! After each win or loss you will restart the game with 50 points. The study phase is divided into three sessions. At the end of each session, you may decide to take a short rest or continue.

After the game is over, you will be shown each stock again without a profit meter as shown in Figure. 6. We want you to judge which stocks you believe to be helpful or harmful by using the respective keys on the keyboard. No feedback will be displayed. If you are unsure, you may guess. Each stock would be presented for 5 seconds, so try to respond as accurately and as quickly as possible.

Declaration of Ethical Conduct

I, Michael Edem Fiagbenu, doctoral researcher at the Friedrich Schiller University Jena, hereby declare that I am familiar with the applicable regulations of the Faculty of Social and Behavioural Sciences. I wrote this dissertation independently without unauthorized help. I have not taken any text sections from a third party or my own examination papers without citing them. I have also indicated all the aids, personal communications and sources I have used. Furthermore, I have not received help from any commercial dissertation agent, nor have third parties received direct or indirect pecuniary benefits from me for work related to the content of the submitted dissertation. I declare that I have not submitted this dissertation or even parts of it for a state or other academic examination or as a dissertation at another university.

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Date, Michael Edem Fiagbenu